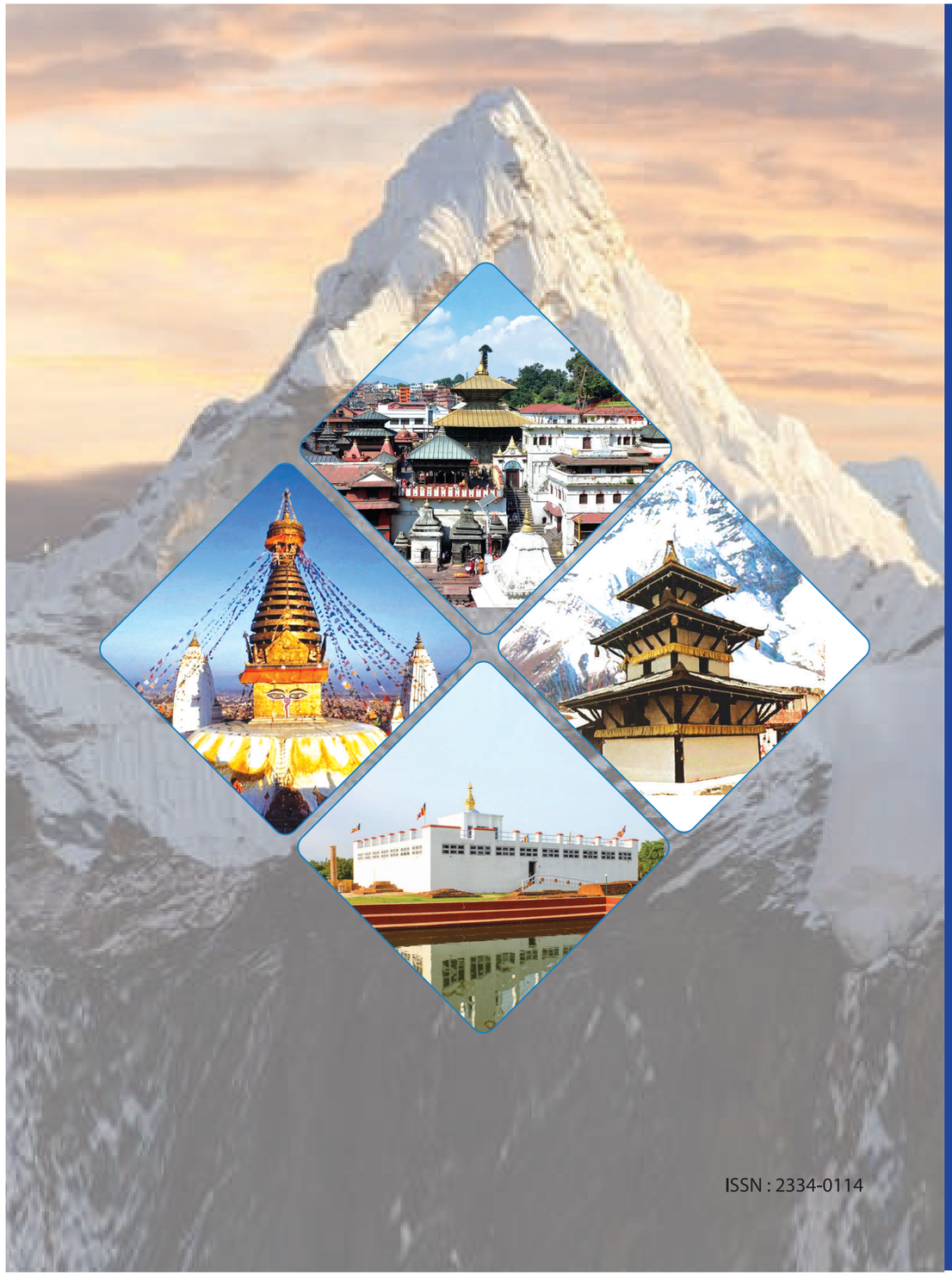


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30th International Conference on IT Applications and Management

THEME: ENTREPRENEURSHIP AND SPIRITUALITY IN THE AGE OF DIGITAL INNOVATION

12-16 February, 2025 Nepal

Organized By: ...for a complete human being Texas International College

(IITAMS) International ITAM Society

KDSs Korea Data Strategy Society

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30th International Conference on IT Applications and Management

THEME: ENTREPRENEURSHIP AND SPIRITUALITY IN THE AGE OF DIGITAL INNOVATION

Organized by

Texas International College, Kathmandu, Lumbini Buddhist University, Lumbini, Nepal

Supported by

Korea Data Strategy Society, Korea Internet e-Commerce Association, University Grants Commission-Nepal, Tribhuvan University of Nepal

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Letter from the Chairman of International ITAM Society on ITAM-30 Nepal

Dear respected guests, colleagues, esteemed speakers, and scholars

I heartily welcome you all to the 30th International Conference on IT Applications and Management in Kathmandu, Nepal's historic and vibrant city. Surrounded by the serene Himalayas, this city is the perfect backdrop for our theme: Spirituality and Entrepreneurship in the Age of Digital Innovation.

We live in an age where technology reshapes industries and redefines our values, purpose, and connections. In an era defined by rapid technological advancements, where artificial intelligence, big data, and digital ecosystems shape the future, it is imperative to ask: where are we going, and where should we go from here today? How can we align innovation with a sense of purpose and spiritual fulfillment? Our theme of ITAM-30, "Spirituality and Entrepreneurship in the Age of Digital Innovation," could not be more relevant in this sense.

Spirituality speaks to the essence of human connection, ethical leadership, and the pursuit of meaning beyond material success. Entrepreneurship, in turn, thrives on creativity, resilience, and the courage to challenge the status quo. Spirituality offers a lens to examine the deeper purpose of technology and entrepreneurship. It inspires us to explore how we can merge the ancient wisdom of mindfulness, compassion, and resilience with the ingenuity of modern entrepreneurship and IT applications. When combined with the transformative power of digital innovation, these forces hold the potential to address some of the world's most pressing challenges, from creating sustainable businesses to fostering inclusive growth and well-being. It reminds us to balance ambition with ethics, innovation with empathy, and development with sustainability. This balance is vital as we stand at the digital disruption and societal transformation crossroads.

We have experts and professionals from diverse fields, each bringing unique perspectives to this dialogue. Throughout this conference, we will engage in thought-provoking discussions. We will examine how spirituality can inspire responsible entrepreneurship, how technology can amplify human potential, and how the synergy of these elements can drive meaningful innovation. I encourage you to exchange ideas freely, question assumptions, and build bridges across disciplines and cultures. Let this be a platform for meaningful dialogues, transformative ideas, and lifelong connections. Remember that our ultimate goal is to use technology and entrepreneurship to uplift humanity and inspire future generations.

I take this opportunity to express my deepest gratitude to the organizing committee, sponsors, and volunteers who have worked tirelessly to make this conference a success. To our keynote speakers, session chairs, panelists, and participants—thank you for your dedication to advancing knowledge and shaping a better future. I wish you all a fruitful and inspiring conference ahead! Let's embrace this opportunity to learn, connect, and inspire one another.

Thank you.

Namjae Cho

Namjae Cho

Chairman, International ITAM Society

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30th International Conference on IT Applications and Management

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February 12 ~ 16, 2025

Pre-Conference Symposium: Future of Asia (February 12, 2025 Wednesday)

Venue: Malla Hotel, Kathmandu

Program

Time	Symposium "Future of Asia"
16:00~18:00	Opening statement to begin Symposium Sateesh Kumar Ojha **16:00 Assemble at the seminar room of Malla Hotel, Kathmandu** **16:16.20 Honoring Dignitaries for the Welcome/wishes** - Dev Raj Adhikari(Chair UGC, Nepal) - Namjae Cho (Chairman, International ITAM Society, Korea) - Keshar Jung Baral(V.C, Tribhuvan U., Nepal) - Subarna Lal Bajracharya(V.C, Lumbini B. U., Nepal) - Bhesh Raj Pokharel (Chair, Texas International College/Tribhuvan University) **16.20-16.25 - Welcome speech - Shyam Sundar Shrestha** **16.25-16.35 - Highlights on Organizer - Sarala Karki** **16:35~17:40 Keynote Speaker: Prof. Kanes Rajah (CEPD London, UK)** **Theme: Spirituality and Entrepreneurship in the Age of Digital Innovation** **17:40~18:30 onwards Freestyle Discussion with Panel and Participants** Wrap-up and steps forward - Govinda P. Acharya
18:00~20:00	**Dinner and Interaction**

Conference ITAM-30 Inauguration: Plenary Session

(February 13, THURSDAY) Venue: Texas International College, Kathmandu

Time	ITAM-30 Conference
08:30~09:00	**Registration**
	Inauguration Plenary Session **H/C** Sarala Karki (Texas International College, Nepal) **National Anthem**
09:00~10:40	**Opening Statements and Announcements** - Sateesh Kumar Ojha (Chair of Organizing Committee, Lincoln U. College, Malaysia) **Honoring Dignitaries [with garlands]** - Dev Raj Adhikari (Chair UGC, Nepal) - Namjae Cho (Chairman, International ITAM Society, Korea) - Keshar Jung Baral(V.C, Tribhuvan U., Nepal) - Subarna Lal Bajracharya(V.C, Lumbini B. U., Nepal) - Bhesh Raj Pokharel (Chair, Texas International College/Tribhuvan University) **16.2 Lightening Lamp and Wishes from Dignitaries** - Dev Raj Adhikari (Chair UGC, Nepal) - Namjae Cho (Chairman, International ITAM Society, Korea) - Keshar Jung Baral(V.C, Tribhuvan U., Nepal) - Subarna Lal Bajracharya(V.C, Lumbini B. U., Nepal) **Handing Session to** Namjae Cho (Chairman, International ITAM Society, Korea) **Greeting** - Seok-Chan Jeong (President, KIECA, Dongeui U., Korea) - Jeong Hoon Lee (President of KDSS, Hansung U., Korea) **Keynote Speech** **Speaker 1:** Santosh Rangnekar (IIT Roorkee, India) **Theme: Spirituality and Entrepreneurship in the past, present, and future.** **Gratitude and voter of thanks - Bhesh Raj Pokharel**
10:40~11:00	**Coffee Break**

Time	Track A	Track B	Track C
Session 1 11:00 ~12:30	**Session A1 Spirituality and Entrepreneurship** Chair: A.C Joshi, (Doon U., India)	**Session B1 Human Resource in Workplaces** Chair: Hee Sun Kim (U. of Hawaii Hilo, USA)	**Session C1 Work and Life with Intelligent Technology** Chair: Thanachart Ritbumroong (NIDA, Thailand)
	A1.Examining the Moderating Role of Spirituality in Entrepreneurial Intentions and Activities Bernard Lee (St.Francis U., Hong Kong), Namjae Cho (Hanyang U., Korea), Oliver Hon Ming Yau (Hong Kong Metropolitan U., China) **A1.2 Purpose-Driven Innovation: Spiritual Entrepreneurship in the Digital Sphere** A.C Joshi, Rajeev Kumar (Doon U. Dehradun, India) **A1.3 Exploring the importance of spirituality in public enterprises of Nepal** Sarmila Neupane (Singhania U., India) Purushottam Subedi (GD Goenaka U., India) **A1.4 Beyond Thank You: The Science of Gratitude in the Workplace: Systematic Literature Review & Bibliometric Analysis** Sakshi Tiwari, Santosh Rangnekar (IIT Roorkee, India) **A1.5 The Mediating Role of Ethical Awareness in the Relationship Between Profit Orientation and Ethical Decision-Making in Competitive Work Environments** Nimesh Prasad Adhikary (Lincoln U. Col., Malaysia) **A1.6 A Study on the Impact of Regional Entrepreneurship Ecosystem Factors on Firm Performance: Focused on Companies Supported by the University-Centered Entrepreneurship Program** Myeong Kwan Lee, Sang Hyeok Park, Jeong Sun Park (Gyeongsang Nat'l U., Korea)	**B1.1 Connective flow, people, and expectations in the workplace** Hee Sun Kim (U. of Hawaii at Hilo, USA) Elena Obushenkova (U. of Auckland, New Zealand) **B1.2 The Role of Relational Transparency in Fostering Positive Meaning in the Workplace: A Pathway to Sustainable Organizations** Rishabh Tripathi, Santosh Rangnekar (IIT Roorkee, India) **B1.3 Examining the Moderating Role of Organizational Commitment in the Relationship Between Occupational Safety Programs and Employee Performance** Subash Ghimire, Anjay K. Mishra, Amiya Bhaumik (Lincoln U. Col., Malaysia) **B1.4 Employee Personality and Organizational Performance in Nepalese Insurance Companies** Anil Kaspal (Universal Modern College, Nepal) **B1.5 Building Human Resource Capacity: Establishing HR Departments and HRIS in Kathmandu Schools** Sateesh K. Ojha, Shyam Sundar Shrestha (Lincoln U., Malaysia) **B1.6 Human Resource Intervention and Employee Absenteeism: A Moderation Study of Biometric Attendance** Ava Shrestha (Lincoln U. College) Xitiz Basnet (Infrastructure U. Kuala Lumpur, Malaysia) **B1.7 Moderating effect of Job Conditions in the relationship between Supervisor Support and Emotional Engagement** Sushma Tamang (Lincoln U. Col., Malaysia) **B1.8 Bridging the Gap: A Systematic Literature Review on Performance Appraisal Interviews Using the PRISMA Framework** Sarala Karki, Sateesh K. Ojha (Texas Int'l College Kathmandu, Nepal)	**C1.1 Social and Psychological Identities of the Multiverse Life** Bhes Bahadur Khadka (Singhania U., India) **C1.2 The Impact of Service Robot Usefulness and Enjoyment on Service Robot Satisfaction and Service Satisfaction** Sang-Lee Cho, Jin-Hyun Bae, Seok-Chan Jeong (Dongeui U., Korea) **C1.3 Deriving Knowledge Graph from Crowdsourced Civic Input: A Bangkok Love-Hate Story** Thanachart Ritbumroong, Songwut Ahmornahnukul, Phaninthorn Swanyawatthaga (NIDA, Thailand) **C1.4 Facility AI Platform Service and Organizational Performance based on SERVPERF Model** Byongkoo Lee, Taesoo Moon (Dongguk U., Korea) **C1.5 Will Graphic Designers Become Obsolete? Examining Individuals' Intentions to Self- Design Using Generative Artificial Intelligence Tools and the Role of Self-Efficacy** Yann-Jy Yang (Nat'l Central U. Taiwan) and Chih-Chien Wang (Nat'l Taipei U. Taiwan) **C1.6 The Role of AI in Protecting Digital Identity in Cybersecurity** Suman Thapaliya (Texas Int'l College Kathmandu, Nepal) **C1.7 What Drives AI Acceptance? Analyzing Nepalese Management Scholars' Intentions** Padam Bahadur Lama, Arjun Kumar Niroula, Sateesh K. Ojha, (Tribhuvan U., Nepal)

12:30~14:00	**Lunch Break**		
Session 2 14:00~15:30	**Session A2**: **Learning and Career Development** Chair: Chi Chien Wang (National Taipei U., Taiwan)	**Session B2 Entrepreneurship and Business Development** Chair: Pragya Singh (IIIT Allahabad, India)	**Session C2**: **ICT Adoption And Application** Chair: Taesoo Moon (Dongguk U., Korea)
	A2.1 From Career-centric Concern to Sense of Learning: A Regression-based Study in Indian Organizations Prashant Mishra, Santosh Rangnekar (IIT Roorkee, India) **A2.2 The Essential Competencies for Indonesian Giggers to Survive** Yanki Hartijasti (U. of Indonesia, Indonesia) **A2.3 Transformative Impacts of HR Analytics on Talent Management: Insights, Strategies, and Future Trends** Avash Koirala, Sateesh Kumar Ojha (Lincoln U. Col., Malaysia) **A2.4 Unveiling the Future of Employee Performance: A Bibliometric Insight and Systematic Literature Review** Mahima Mishra, Santosh Rangnekar (IIT Roorkee, India) **A2.5 Life Satisfaction Research Across Three Decades: Trends and Patterns via Bibliometric Analysis Using VOS Viewer and R** Aditi Badoni, Santosh Rangnekar (IIT, Roorkee, India) **A2.6 Impact of Technology: Challenges and Opportunities for Women Entrepreneurs in Nepal** Sonam Rajgarhia (Lincoln University College, Malaysia) **A2.7 Enhancing Creativity in Higher Education Through Big Data Analytics and Design Thinking Methodologies** Giseob Yu, Namjae Cho (Hanyang U., Korea)	**B2.1 Entrepreneurial Learning and Bowen's Differentiation of Self: A Cross-Cultural Analysis Between Italy and South Korea** Cinzia Dessì, Jessica Lampis, Annalisa Succa (U. Cagliari, Italy) **B2.2 The Interplay of Absorptive Capacity, Organisational Learning, and External Knowledge in SMTEs Innovation: A Systematic Review** Andrea Vincis, Cinzia Dessì (U. of Cagliari, Italy) **B2.3 Developing Startup Business Models Using ChatGPT: Prompt Writing Strategies and Affordance Design Focused on Task Types** Seung Hee Oh, Sang Hyeok Park, Jeong Sun Park (Gyeongsang Nat'l U., Korea) **B2.4 Exploring the Diversification Potential of Bitcoin Forks in Cryptocurrency Portfolios** Anik Kumar Mallick, Supriya Kumari, Pragya Singh (IIIT Allahabad, India) **B2.5 Exploring the Role of Instagram Micro-Influencers in Shaping Consumer Purchase Intention for Restaurants in Nepal** Narayan Prasad Aryal, Gobind K. Singh (Tribhuvan U., Nepal) **B2.6 Eroding Trust in Banks and Financial Institutions: Causes, Consequences, and the Impact of Declining Interest Rates on Fixed Deposits and Savings** Rajan Singh Bhandari, Sateesh Kumar Ojha (Lincoln U. Col., Malaysia) **B2.7 An Overview of the Difficulties in Introducing New Whisky to the Nepali Market** Yeak N. Sharma (Tribhuvan U., Nepal) **B2.8 Effect of Merger and Acquisition on Financial Performance of Commercial banks in Nepal** Dharma Raj Dhakal	**C2.1 Factors Influencing Continuous Use Intention of E-book Authoring Tools** Dae-Yul Jeong, Seok Hwan Kim (Gyeongsang Nat'l U., Korea) **C2.2 Enhancing Road Safety Through AI-Powered Helmet Detection and Connected Vehicle Systems** Harsh Bamniya, Rahul Dev Garg, Santosh Rangnekar (IIT Roorkee, India) **C2.3 Leveraging Technology to Enhance Banking Business Productivity in the Data-Driven Era** Jugal Kishor Kushwaha, Abhijit Ghosh (Lincoln U. Col. Nepal), Anjay Kumar Mishra(Kathmandu col. of Management, Nepal) **C2.4 Perceived Value of Facilities AI Platform Service and Organizational Performance by Feedback: An Empirical Study Based on the IS Success Model** Byongkoo Lee, Taesoo Moon (Dongguk U., Korea) **C2.5 Exploring the Influence of Socio-Demographic Factors on the Type Preference of Electric Vehicles** Shaurya Mall (UPES, India) Ramesh Anbanadam (IIT Roorkee, India) **C2.6 Impact of digitalization on small and medium enterprises: Challenges and opportunities** Sambed Timilsina (Texas College of Management and IT, Nepal) **C2.7 Prioritized ICT Adoption to Bridge the Technology Gap for Socioeconomic Improvement in Asian LDC s** Deepak Thapa **C2.8 Application of Deep Learning Algorithms and Genetic Programming for Forecasting Stock Prices in Nepal: A Comparative Study** Mukesh Ghimire (Texas College of Management & IT Kathmandu, Nepal)

15:30~16:00	**Coffee Break**		
	Session A3: **Culture, Tourism and Hospitality** Chair: Yanki Hartijasti (U. of Indonesia)	**Session B3 Energy, Environment and Technology** Chair*:* Sang Hyeok Park (Gyeongsang Nat'l U., Korea)	**Session C3**: **Educational and Social Service Issues** Chair*:* Govinda Acharya (Lincoln U. College)
Session 3 16:00 ~17:30	**A3.1 Exploring the Industry and Academia Gap in Nepalese Hospitality Industry** Dinesh Basnet (Tribhuvan U., Nepal) Roopesh Shrestha (Soaltee Hotel, Nepal) **A3.2 Gautama Buddha: The First Traveler-Exploring his Journey as the Foundation of Transformative Travel and its Impact on the Development of Modern Tourism** Shree Prasad Bhattarai (Lumbini Buddhist U., Nepal) **A3.3 Adoption of Sustainable Practices by Homestay Operators and its Influence on Satisfaction with Moderation of Experience** Sujan Lamichhane (Alpine Club of Himalaya, Nepal) **A3.4 Future of Eco-Tourism: Integrating AI and Blockchain for Transparent and Sustainable Practices** Dinesh Basnet, Sateesh Kumar Ojha, Suman Bhattarai (Lincoln U., Malaysia) **A3.5 Recent strategies and use of information technologies for the Development of Tourism Industry: a case study of Pokhara valley** Shukra Raj Adhikari (Lincoln U. College, Malaysia) **A3.6 Mountain Tourism in Nepal: A Surefire Formula for Prosperity** Surya Bahadur Ghimire, Malathi Basnet (Lincoln U., Malaysia) **A3.7Customer's Satisfaction with The Nonstar Hotels in Far-Western Nepal** Puspa Raj Padal (Lincoln U. Col., Malaysia)	**B3.1 Developing Generative AI-driven ESG Report Generation System** Min-Yuh Day, Ting-Chi Wang, Yu-Jyun Zheng, Jun-Yu Wu, Bor-Jen Chen (Nat'l Taipei U., Taiwan) **B3.2 A Study on Management Procedures for Efficient Implementation of Technology Demonstration Projects: Focusing on the Climate and Environmental Sector** Jinkwan Jung, Haeun Kim (The Seoul Institute, Korea) **B3.3 Performance Evaluation of Guheshwori Wastewater Treatment Plant (GWWTP), Kathmandu, Nepal** Ashish Ghimire, Sateesh Kumar Ojha (Lincoln U. Collage, Malaysia) **B3.5 Electric Vehicle in India: A Review of Challenges and Opportunities** Shaurya Mall, Shreya Mall, Akansha Rawat (UPES, India) **B3.6 Application of Wastewater for Reclamation of Desert: A Life Cycle Cost Analysis (LCCA)** Rajan Raj Pandey (Lincoln U. College, Malaysia) **B3.7 Smart Cities in a Sustainable and Intelligent Era: Exploring the Links to UN Goals, Society 5.0, and Industry 5.0** Milan Pantha, Sateesh Kumar Ojha (Lincoln U. Col., Malaysia)	**C3.1 Effect of Trade Unionism on Government School Teachers' Performance in Kathmandu** Ganesh Datta Pant, Sateesh Kumar Ojha (Lincoln U. College, Malaysia) Janga Bahadur Hamal, Basu Dev Lamichhane (Tribhuvan U., Nepal) **C3.2 Child Care Home Trends in Nepal** Janak Kumar Poudel (Lincoln U. Col., Malaysia) **C3.3 Harnessing Artificial Intelligence to Raise Education Levels in Nepal: A SWOT Analysis as Part of Nepal's Technology Strategic Planning** Ali Ameen, Pradeep Bastola, Chanda Neupane, Nazmus Sakib (World U. of Bangladesh, Bangladesh) **C3.4 Conflicts in Education: A Perspective to Internalize Education** Ramhari Silwal (Himalayan college, Nepal) **C3.5 Factors Contributing to the Outflow of Skilled Professionals from the Education Sector in Nepal** Sunita Dabadi (Lumbini Academy College, Nepal) **C3.6 Exploring the Determinants of Undergraduate and Graduate Satisfaction with College Management** Sagar Thapa (Texas College of Management & IT, Nepal) **C3.7 Factor Influencing Student's Educational Performance in Higher Educational Institutes in Kathmandu: A Structural Equation Modeling Assessment** Bachchu Ram Sapkota **C3.8 Policy Provision and Teacher Motivation in Tribhuvan University** Raju Raut

Conference ITAM-30 Valedictory: Plenary Session

(February 13, THURSDAY) Venue: Texas International College, Kathmandu

17:30~18:00	**Valedictory Session** - Namjae Cho (Chairman, International ITAM Society) - Dae-Yul Jeong (Dean, Business School, Gyeongsang National U., Jinju, Korea)
18:30~	**Conference Banquet**

Workshop and Cultural Activities (February 14-16, 2025)

Time	Program
February 14 FRIDAY 09:00~18:00	Move from Kathmandu to Chitwan by Chartered bus **Chitwan National Ecological Park**
February 15 SATURDAY 09:00~18:00	Move from Chitwan to Lumbini by Chartered bus **Cultural visits and Workshop on Spirituality at Lumbini**
February 16 SUNDAY 09:00~18:00	**Workshop on Spirituality and Cultural visits** **Venue: Lumbini Buddhist University** Move from Lumbini to Kathmandu by Chartered bus

(IITAMS)

International ITAM Society

Korea Data Strategy Society

Lumbini-ITAM Symposium 2025 - Detailed Itinerary

Moderator: Dr. Manik Ratna Shakya
Date: 15th and 16th February 2025
Location: Lumbini Buddhist University, Lumbini, Nepal

Day 1 – 15th February 2025

Time	Activity	Details
14:00	**Welcome and Check-in of ITAM Delegates**	Delegates from various universities and organizations arrive at Lumbini. The check-in process will be facilitated by Lumbini Buddhist University (LBU) staff at the hotel.
16:00 – 17:00	**Informal Meeting with Deans and LBU Authorities**	A casual meet-and-greet session will be held at Lumbini Buddhist University with the Deans, University authorities, and senior faculty members to discuss the symposium's objectives and foster collaboration.
17:00 – 19:30	**Visit Major Lumbini Sites**	Delegates will visit major Buddhist landmarks, including the Maya Devi Temple (Birthplace of Buddha), the Ashoka Pillar, and the Lumbini Garden. This visit will provide delegates with an opportunity to experience the sacred and historical significance of the site.
19:30 – 21:00	**Courtesy Dinner by LBU at Buddha Maya Garden**	A formal dinner will be hosted at the Buddha Maya Garden, where delegates will have an opportunity to interact with fellow participants, exchange ideas, and enjoy traditional Nepali cuisine in a peaceful setting.
21:00	**Return to Hokee Hotel**	After the dinner, delegates will be transported back to their respective hotels for the night.

Day 2 – 16th February 2025

Time	Activity	Details
05:30	**Wake-up Call and Meet at Hotel Lobby**	Delegates gather in the hotel lobby. Breakfast will be served prior to the morning activities.
06:00 – 06:30	**Walk to Mayadevi Premises for Meditation**	A peaceful walk will be organized to the Mayadevi Temple, the birthplace of Buddha. Delegates will engage in a 30-minute meditation session, connecting with the spiritual heritage of Lumbini.
07:30 – 09:00	**Breakfast at Hotel**	Breakfast will be provided at the hotel before the academic sessions begin.
09:30 – 10:00	**Arrival at Lumbini Buddhist University (LBU)**	Delegates will arrive at LBU campus where they will be received by the symposium organizing committee and directed to the venue of the event.
10:00 – 10:15	**Meet and Greet Session**	Official opening of the symposium with brief introductions. The moderator, Dr. Manik Ratna Shakya, will welcome all delegates and speakers.
10:15 – 10:30	**Session Briefing by Prof. Dr. Sateesh Kumar Ojha**	Prof. Dr. Sateesh Kumar Ojha will provide an overview of the symposium, explain the schedule for the day, and introduce the themes and topics to be covered in the academic sessions.
10:30 – 10:40	**Paper Presentation by Dr. Shree Prasad Bhattarai**	Dr. Bhattarai will present a paper on topics related to Buddhism and Lumbini's global significance in Buddhist studies.
10:45 – 12:30	**Keynote Presentation: "Significance of Lumbini" by Prof. Basanta Bidari**	Prof. Basanta Bidari, Senior Archaeologist and Department Head of Archaeology, will discuss Lumbini's archaeological importance, the historical relevance of Buddha's birthplace, and how it influences the understanding of Buddhist heritage.
12:30 – 13:15	**Lunch Break**	Delegates will enjoy a lunch break, which will provide an opportunity for networking and informal discussions among delegates, faculty, and speakers.
13:15 – 15:15	**Presentations by Guest Speakers**	A series of presentations by esteemed guest speakers, providing diverse perspectives on various aspects of Buddhist studies and modern society:

	Mr. Ajay Awasthi – "Significance of Spirituality and Technology in Modern Society"	Mr. Awasthi, a spiritual leader from India, will explore the intersection of spirituality and technology, discussing how modern society can benefit from a balance between spiritual values and technological advancements.
	Dr. Chandra Kala Ghimire, **"Head, Central Department of Buddhist Studies, Tribhuvan University"**	Dr. Ghimire a scholar of Buddhism keen in discussing about how health both physical and mental can accelerate the human well being under Buddhism philosophy.
	Dr. Nima Sherpa – "Significance of Mayana Studies in Modern Society"	Dr. Sherpa will present the importance of Mayana studies in modern times, emphasizing the relevance of this Buddhist tradition in shaping contemporary societies.
	Bhikksu Shree Vajira, "Significance of Theravada Buddhist Studies in Modern Society"	Bhikksu Vajira will discuss the significance of Theravada Buddhism in contemporary society, explaining its teachings and practices in modern-day contexts.
	Acharaya Dayanidhi Gautam, "Significance of Sanskrit Literature in Buddhist Studies"	Acharya Gautam will present on the importance of Sanskrit literature in Buddhist studies, discussing how ancient texts are still valuable for understanding and interpreting modern Buddhist practices.
	Mr. Bikram Pandey Kaaji, "Promotion and Marketing of Lumbini Connecting Technologies"	Mr. Pandey Kaji, Goodwill Ambassador of Lumbini-Kapilvastu, will speak about the promotion and marketing strategies for Lumbini, emphasizing the role of technology in connecting Lumbini to the global audience. He will also discuss how modern technologies can help preserve and promote Buddhist heritage.
15:15 – 16:00	**Special Remarks by Chairman of ITAM LBU-ITAM Symposium 2025**	The Chairman of ITAM will offer closing remarks on the importance of the symposium, stressing the value of international collaboration in Buddhist studies and future projects.
15:30 – 16:00	**Tea Break**	Light refreshments will be served. This break provides an opportunity for delegates to discuss the day's sessions and engage in informal conversations.
16:00 – 16:30	**LBU-ITAM Special Talk in Senate Hall**	A special talk organized by LBU-ITAM will focus on future collaboration opportunities and initiatives in Buddhist studies, particularly related to Lumbini's global significance.
16:30 – 17:00	**Farewell to Delegates**	The symposium will conclude with a formal farewell to all delegates, thanking them for their participation. Delegates will receive certificates of participation, and formal group photos will be taken.
17:00	**End of Program and Departure**	The program concludes, and delegates will be free to depart or engage in additional sightseeing or networking activities if time permits.

Examining the Moderating Role of Spirituality in Entrepreneurial Intentions and Activities

Bernard LEE
Associate Professor, School of Business and Hospitality Management, Saint Francis University
Prof. Namjae CHO, School of Business, Hanyang University
Prof. Oliver Hon Ming YAU, Honorary Professor, Lee Shau Kee School of Business and Administration, Hong Kong Metropolitan University
**Presenter and coordinator*

Abstract

This study delves into spirituality's role in entrepreneurial activities within the Greater Bay Area (GBA). The objective is to uncover how spiritual beliefs and practices affect entrepreneurial intentions and behaviours. Data were amassed from 200 university students and alumni via structured surveys, meticulously designed to capture diverse dimensions of entrepreneurship and participants' spiritual practices. Employing SmartPLS, a sophisticated tool for structural equation modelling, data analysis was carried out, enabling a detailed exploration of the relationships between spirituality and entrepreneurship. This quantitative approach allows for a comprehensive examination of how these elements interact to influence entrepreneurial dynamics. The findings are anticipated to contribute significantly to the entrepreneurship literature by spotlighting the significance of spirituality in shaping both the motivational and ethical aspects of entrepreneurial behaviour.

Keywords: *Spirituality, Entrepreneurship, SmartPLS, Structural Equation Modeling, Entrepreneurial behaviour*

1. Introduction

Ajzen's Theory of Planned Behavior (1991) posits that specific psychological drivers are instrumental in motivating individuals to initiate entrepreneurial ventures. This theoretical framework has been particularly applicable in the context of the Greater Bay Area (GBA), a region characterized by its robust economic landscape and substantial development potential. According to Patchell (2023), these attributes have attracted a significant influx of both prominent corporations and smaller enterprises seeking expansion opportunities within this dynamic market.

Moreover, the Hong Kong government has played a pivotal role in catalyzing this entrepreneurial spirit among youth by implementing a variety of subsidies and incentives aimed at fostering business engagement in the GBA (Cheng, 2021). This governmental support has manifested in substantial business growth, as evidenced by the latest data from the Companies Registry of the HKSAR government, which reports a record increase in local company registrations. By the end of 2024, the number of companies listed reached over 1.46 million, an increase of 29,736 from the previous year (Xinhua, 2025).

The importance of entrepreneurship in stimulating economic growth and driving innovation in multiple industries is well-documented (Ordeñana et al., 2024). The entrepreneurial landscape today, characterized by swift changes, diverse consumer bases, and high market potential, offers fertile ground for emerging entrepreneurs (Katjiteo, 2024). This report explores how the Extended Theory of Planned Behavior (TPB), enriched with cultural and personal factors like spirituality, can be applied to better understand and enhance entrepreneurial intent and behavior among university students in the Greater Bay Area (GBA).

The traditional TPB model, which outlines that individual actions are guided by attitudes, norms, and control perceptions, often misses the nuanced effect of personal beliefs like spirituality—integral in shaping values and behaviors. This study delves into how these elements intersect to influence entrepreneurship within the vibrant yet culturally distinct GBA.

For businesses and educational bodies, this research offers strategic insights on incorporating spiritual dimensions into entrepreneurial education and practice, thus aligning personal beliefs with professional endeavors. By doing so, organizations can foster a more comprehensive development of entrepreneurial qualities among youths.

The paper proceeds with a detailed examination of the theoretical framework of TPB and spirituality, followed by a methodological overview, analysis of findings from qualitative and quantitative data, and practical recommendations for integrating spirituality into entrepreneurial strategies, particularly in culturally diverse regions like the GBA.

2. Theoretical Framework

Extended Theory of Planned Behavior (TPB) and Entrepreneurship

The Extended Theory of Planned Behavior (TPB) serves as a psychological framework for understanding how

various factors influence individual behavior. Initially developed by Icek Ajzen in 1991, the TPB posits that behavior is primarily driven by behavioral intention, which is shaped by three core constructs: attitude toward the behavior, subjective norms, and perceived behavioural control (Ajzen, 1991). Over time, the TPB has been widely applied in entrepreneurship research to understand the psychological and social mechanisms underpinning entrepreneurial intentions and actions (Krueger, Reilly, & Carsrud, 2000).

Attitude Toward the Behavior

Attitude Toward the Behavior refers to an individual's positive or negative evaluation of engaging in a specific activity. In the context of entrepreneurship, especially within the cosmetics industry, this involves assessing the desirability of starting a business. Prospective entrepreneurs may perceive benefits such as creative expression, financial rewards, and the opportunity to establish a unique brand identity. Positive evaluations in these areas have been shown to boost entrepreneurial intentions (Lortie & Castogiovanni, 2015). Conversely, concerns about challenges like intense competition, market saturation, and industry volatility can lead to negative attitudes, potentially deterring entrepreneurial endeavors.

Subjective Norms

Subjective Norms encompass the perceived social pressures to perform or refrain from engaging in a behavior. This highlights the significant influence of family, peers, and broader societal expectations on entrepreneurial intentions. In collectivist cultures such as Hong Kong, societal norms play a crucial role in shaping individual decisions. Hong Kong societal values often emphasize group harmony and risk aversion, which can discourage entrepreneurial pursuits. However, family support or social networks that promote entrepreneurship can positively influence intentions (Wong & Ip, 2024; Shinnar, Giacomin, & Janssen, 2012).

Perceived Behavioral Control

Perceived Behavioral Control pertains to the extent to which individuals believe they are capable of executing a behaviour, incorporating elements such as self-efficacy, resource availability, and perceived opportunities. In the context of cosmetics entrepreneurship, factors like access to financial resources, industry knowledge, and relevant skills significantly impact perceived behavioral control. Individuals who perceive themselves as equipped with the necessary resources and abilities are more likely to develop and act upon entrepreneurial intentions (Elias, 2024).

Extensions of the TPB

Recognizing inherent limitations in the original Theory of Planned Behavior (TPB), recent scholarly efforts have sought to refine and expand this framework to better reflect the intricacies of entrepreneurial activity. Biggs et al. (2024) have enriched the TPB by incorporating emotional and contextual factors such as passion, resilience, and cultural norms, thus improving its capacity to predict entrepreneurial behavior effectively. Concurrently, Duong (2024) has explored how personal beliefs, spirituality, and ethical considerations act as pivotal determinants of entrepreneurial intentions within varying cultural milieus. Furthermore, Sorakraikitikul et al. (2024) underscore the critical role of fostering positive attitudes towards entrepreneurship through enhanced educational programs, robust social support networks, and agile government policies, particularly focusing on stimulating economic growth in Thailand. These adaptations not only augment the TPB but also underscore the complex, dynamic nature of entrepreneurial intentions influenced by both individual desires and broader situational factors. This presentation will delve into these extensions, demonstrating their significance in providing a more nuanced understanding of entrepreneurship across diverse settings.

Spirituality and Entrepreneurship

Spirituality, a multifaceted construct, profoundly shapes personal belief systems, influencing values, behaviors, and decision-making processes within both individual and organizational contexts (Bindlish, Nandram, & Joshi, 2024). Research by Singh & Awasthy (2024) underscores the significant role that spiritual practices play in fostering entrepreneurial inclinations towards social, ethical, and environmental concerns. In organizational settings, such practices enhance employee relations, market engagement, and adherence to ethical standards. Furthermore, spirituality's core elements—seeking meaning, connection, and purpose—play a pivotal role in driving the motivations and actions of entrepreneurs, suggesting that spiritual capability is not only beneficial but strategic for the sustainable development of social enterprises (Vedula & Agrawal, 2024). This paper explores how spirituality serves as a cornerstone for ethical entrepreneurship and organizational success.

Spirituality as an Entrepreneurial Motivator

In the realm of entrepreneurship, spirituality emerges as a significant motivator, particularly when entrepreneurs integrate their spiritual beliefs into their business operations (Raza et al., 2025). Entrepreneurs who are deeply rooted in their spiritual values often seek to ensure that their business practices are congruent with these beliefs, fostering a strong sense of intrinsic motivation. A recent empirical study by Raza et al. (2025) has substantiated this connection, with the development and validation of the Islamic Entrepreneurial Scale. This scale, which assesses entrepreneurship from both business and spiritual perspectives—namely trustworthiness, honesty,

truthfulness, Taqwa, good intention, and adherence to religious obligations—has been shown to positively influence the performance of SMEs. These findings underscore the profound impact that spirituality can have on business efficacy, highlighting the dual advantages of ethical orientation and enhanced business outcomes.

Spirituality and Resilience

Recent studies, including those by Daniilidou & Xanthopoulou (2024), have demonstrated that spirituality significantly contributes to resilience and coping mechanisms, which are crucial in high-pressure environments. This paper reviews 692 publications from 1998 to 2023 using a bibliometric analysis to systematically explore the expansion of teacher resilience literature. The unpredictable nature of entrepreneurship demands emotional resilience, which spiritual beliefs can provide, aiding entrepreneurs in overcoming obstacles and sustaining motivation. Furthermore, Rosales and Silveyra (2024) highlight the importance of spiritual well-being in enhancing entrepreneurial performance through life balance, stress management, and improved interpersonal relations. This study also introduces the concept of humane entrepreneurial orientation, a behaviour theory that integrates spiritual well-being with entrepreneurial performance, proposing that spiritual values within entrepreneurial ecosystems are key to navigating challenges and achieving long-term success.

The Influence of Spirituality in a Secularizing World

In the contemporary landscape, marked by an increasing shift towards secularism and a corresponding decline in trust and engagement with religious institutions (Beehner, 2024), there has been a notable surge in interest in spirituality. This shift not only reflects a broader societal trend but also mirrors changes in workplace dynamics, where employees increasingly seek means of spiritual expression. Beehner (2024) notes that as secularism grows, so does disenchantment with traditional religious bodies, prompting individuals to explore spirituality as an alternative avenue for fulfilling their existential queries and expressing their core values. This paper explores the implications of this shift for organizational behaviour, particularly focusing on how spirituality influences employee attitudes towards career, health, and interpersonal relationships. Additionally, it discusses how spirituality equips entrepreneurs with a growth mindset, crucial for navigating the challenges of innovation and adaptability in the business realm. This perspective on failure and success reshapes their approach to entrepreneurship, fostering resilience and continuous learning.

Spirituality and Organizational Culture

The research by Daryono et al. (2025) underscores the significant impact of professional culture on product and service quality, adaptability to market changes, and overall organizational success. This study provides a comprehensive analysis of how business culture intertwined with engagement strategies can elevate employee satisfaction and productivity, offering a strategic blueprint for organizational advancement. Concurrently, Rosales & Silveyra (2024) explore the transformative role of spirituality in entrepreneurial settings, proposing the 'holistic entrepreneurial inventory'. Their findings suggest that spirituality-infused leadership fosters a workplace conducive to collaboration, ethical behavior, and supportive interactions, which in turn boosts employee engagement and organizational performance. Together, these studies provide a nuanced understanding of how integrating spiritual values into business practices can substantially benefit corporate culture and operational success.

Spirituality and the Theory of Planned Behavior

Spirituality often remains an overlooked aspect in the business world, yet it holds significant potential in shaping entrepreneurial outcomes. According to a recent study by Usman, Baig, and Fatima (2024), spirituality plays a crucial moderating role in the Theory of Planned Behavior—a model that predicts deliberate action. Their research highlights how spirituality influences entrepreneurial behaviors by altering perceptions of support within social environments. Entrepreneurs with a strong spiritual foundation tend to view their surrounding norms more positively, which can significantly boost their confidence and drive towards entrepreneurial activities. This insight offers a valuable perspective for business leaders and entrepreneurs, emphasizing the importance of nurturing spiritual values to enhance both personal well-being and professional success.

Academic Interest in the Spirituality - Entrepreneurship Nexus

The nexus between spirituality and entrepreneurship is garnering more spotlight in the academic realm, with several studies underscoring the pivotal role spiritual beliefs play in shaping entrepreneurial pursuits (Vedula & Agrawal, 2024; Usman, Baig & Fatima, 2024; Rosales & Silveyra, 2024). Entrepreneurs who embrace a sense of higher purpose in their lives are not only more motivated but also more likely to embark on new business ventures, as highlighted by Kuvshinikov & Kuvshinikov (2024). This deep-rooted motivation, stemming from personal spiritual beliefs, is linked to an entrepreneur's resilience in facing business challenges, according to research by Adlmaier-Herbst & Maisch (2024) and further elaborated by Ogbumgbada & Nwachukwu (2024). These findings suggest that spirituality isn't just a personal comfort; it's a powerful catalyst for entrepreneurial success, enhancing resilience and the ability to navigate the unpredictable waters of business.

Inner Peace and Entrepreneurial Performance

In the challenging world of entrepreneurship, maintaining inner peace isn't just a personal benefit; it's a strategic necessity. Recent studies, including those by Koburtay & Alqhaiwi (2024), have shown the profound impact of spiritual practices on emotional regulation, leading to sharper decision-making and enhanced business performance. Particularly for entrepreneurs working in conflict-ridden areas, these practices are shown to improve aspects of psychological well-being such as self-acceptance and having a definitive purpose in life, though they may struggle with environmental mastery and personal relationships.

Moreover, the research highlights the positive influence of religiosity, specifically within an Islamic framework, on the psychological well-being of entrepreneurs, while also identifying the societal barriers they face. Moşteanu (2024) adds to this discourse by linking inner tranquillity with reduced stress levels and increased productivity, critical elements for sustaining business operations. He advocates for a cycle of continuous monitoring and dynamic adaptation in risk management to tackle evolving challenges head-on.

For businesses looking to thrive in uncertain times, adopting an integrated approach to strengthen foundational resilience, risk management, and continuity practices is indispensable. This blog calls on business leaders to reassess and enhance their organizational strategies to navigate future uncertainties effectively.

Spirituality and Innovation

Recent research by Goli & Babu (2024) underscores the significant role of spirituality-focused workshops in enhancing innovation and creativity among engineering students. The study highlights how such initiatives not only promote personal growth but also encourage students to develop unconventional problem-solving skills, essential for the dynamic field of engineering. This article explores the crucial need to embed a culture of innovation, entrepreneurial spirit, and a startup mindset within engineering education frameworks to prepare students for the complexities of future technological challenges. It further discusses the integration of entrepreneurial concepts into engineering curricula as a means to boost inventiveness, interdisciplinary collaboration, and industry readiness, while also considering the challenges of implementing such transformative educational strategies. Additionally, findings by Games et al. (2025) emphasize the importance of spiritual capital in fostering resilience among entrepreneurs, enabling them to convert challenges into opportunities for innovation and business differentiation. This body of work collectively advocates for a paradigm shift in engineering education to equip students as pioneering problem solvers and agents of societal progress.

Spiritual Foundations of Entrepreneurial Action

In the world of entrepreneurship, where risk and uncertainty are the norms, spirituality might just be the anchor that ambitious individuals need. According to a revealing study by Bassil (2024), spirituality provides not just a sense of stability but also a deeper sense of life's meaning that empowers entrepreneurs to navigate turbulent waters more effectively. This dual role of spirituality helps individuals recognize opportunities and patterns unnoticed by others, thus fostering a unique entrepreneurial mindset.

Interestingly, Bassil's research delves into the nuanced role of religious beliefs in shaping entrepreneurial decisions. While maintaining a strong internal locus of control, individuals with pronounced religious beliefs tend to shy away from self-employment, unless they place high importance on God in their daily decisions, which positively correlates with their likelihood of pursuing self-employment. This insight is particularly relevant in the MENA region, where religion plays a significant role in daily life and work, offering policymakers data-driven strategies to boost entrepreneurship and economic development in these areas.

Inclusive Identity and Entrepreneurial Motivation

Marques (2024) presents a comprehensive analysis of how various spiritual traditions—Buddhist psychology, Daoist philosophy, and Hindu beliefs—inform and enhance contemporary management practices. This study explores foundational Buddhist concepts such as the Four Noble Truths and the Noble Eightfold Path, which advocate for ethical and non-harmful managerial behaviors, and the recognition of life's impermanence. Similarly, Daoist teachings emphasize the importance of oneness, equality, and achieving self-alignment through tranquility, while Hindu philosophy promotes an ethical framework based on unity and the interconnectedness of all beings. Marques argues that these spiritual traditions offer valuable insights against hyperindividualism, fostering a management ethos that respects the interconnected nature of human identities and promotes a collective sense of purpose. This perspective not only enriches individual identities but also aligns them towards shared goals, enhancing cooperation and driving proactive, positive actions in inclusive business settings.

Stress Management and Spirituality

Recent studies by Islam et al. (2024) and Zaidman (2024) explore the integration of spiritual leadership and self-spirituality within business settings, particularly focusing on their effects on stress management for entrepreneurs and business leaders. Islam et al. introduce a strategic innovation-focused framework for small and medium-sized enterprises (SMEs) that leverages spiritual leadership principles derived from Islamic teachings. This

framework aims to enhance organizational success by scientifically deploying and evaluating spiritual leadership practices, potentially revolutionizing how businesses address leadership and stress management. Zaidman's research complements this by documenting significant reductions in stress and improvements in coping capacity and communication within workplaces that adopt self-spirituality practices, including mindfulness. Although the transformative power of self-spirituality in organizations appears limited, specific practices like mindfulness are identified as potent tools for fostering internal stability and relaxation through physiological changes like theta wave production and increased dopamine levels. Collectively, these studies underscore the profound impact of spirituality-based practices in enhancing psychological resilience and operational efficiency in challenging business environments.

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Purpose-Driven Innovation: Spiritual Entrepreneurship in the Digital Sphere

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Abstract

In an era defined by rapid technological advancement and global connectivity, the role of entrepreneurship is evolving beyond profit generation and encompasses broader values of purpose, ethics, and spirituality. Purpose-driven innovation integrates the principles of spiritual entrepreneurship with the boundless potential of the digital sphere, creating a paradigm where business ventures serve as vehicles for personal growth, community upliftment, and societal transformation. The paper explores the symbiotic relationship between spirituality and entrepreneurship, emphasizing how spiritual practices such as mindfulness, self-awareness, and ethical decision-making can foster resilience, creativity, and innovation in digital business contexts. It examines the motivations and methodologies of entrepreneurs who align their ventures with higher values such as sustainability, social equity, and personal fulfillment while leveraging digital tools and platforms to scale their impact. The core theme of the paper is the concept of "digital dharma," which means that the digital age provides unprecedented opportunities to democratize access to spiritual and ethical business practices. From online wellness platforms to mission-driven startups, technology enables the global dissemination of values-driven entrepreneurship models. At the same time, the digital sphere poses challenges, including the risks of disconnection, superficiality, and ethical dilemmas in data privacy and artificial intelligence. The paper explores the shifting paradigms in entrepreneurship, where profit maximization is no longer the sole priority. Delving deep into the societal trends emphasizing mindfulness, sustainability, and ethical business practices is the core theme of the paper. The paper also provides an overview of spiritual entrepreneurship and defines it as a model that integrates values, ethics, and higher purpose into business ventures and discusses how digital innovation enhances or complicates this integration.

Keywords: *Purpose- driven innovation, Spiritual Entrepreneurship, Digital transformation, Sustainability, Social Impact, Technological Advancement.*

1. Introduction

Overview of Purpose-Driven Innovation

Recent research explores the intersection of spirituality, entrepreneurship, and digital innovation. Spiritual entrepreneurship is driven by deep values, a clear sense of purpose, and applied ethics in service (Raco et al., 2019). It goes beyond profit-making to focus on bettering others and meeting customer needs. Spiritual capital significantly influences business innovation and performance, particularly in developing economies (Neubert et al., 2017). Purpose-driven innovation refers to the strategic development of products, services, and business models that prioritize meaningful goals beyond financial profitability. It aligns an organization's innovation efforts with a clearly defined purpose, often addressing social, environmental, or ethical challenges. The theoretical Foundations of purpose driven innovation are:

- Spiritual Entrepreneurship: Defining spiritual entrepreneurship as a framework that aligns personal growth, service to others, and economic activities.
- Digital Innovation: Outline how digital platforms and tools, including artificial intelligence, blockchain, and social media, provide opportunities to scale spiritual and ethical ventures.
- Purpose-Driven Innovation: Introduces the concept of purpose-driven innovation, where innovation serves as a means to fulfill a higher societal or environmental purpose.
- Discuss synergy between spirituality and technology in fostering meaningful entrepreneurial models.

The drivers of Purpose-Driven Innovation are that the modern consumers increasingly demand transparency, ethical practices, and meaningful contributions from businesses. Digital tools enable rapid innovation while providing platforms for addressing global challenges. Issues like climate change, inequality, and health crises drive organizations to innovate with purpose. Employees, particularly younger generations, seek meaningful work aligned with their values. A clear sense of purpose resonates with customers, building trust and long-term relationships. Organizations with a strong purpose appeal to value-driven employees. Balancing financial and societal goals ensures resilience and adaptability in changing markets. Addressing real-world problems contributes to global progress and social equity. Some of the challenges are balancing profitability

with purpose, overcoming resistance to change within traditional business structures and ensuring authenticity to avoid accusations of "purpose-washing." Purpose-driven innovation is not just a business strategy; it is a transformative approach to creating solutions that align with the values and aspirations of a changing world. It redefines the role of innovation as a force for good, fostering a more inclusive and sustainable future.

Defining Spiritual Entrepreneurship and the Role of the Digital Sphere

Spiritual entrepreneurship is a paradigm of business that integrates spiritual principles and practices into entrepreneurial ventures, aligning profit motives with a deeper purpose of serving humanity and contributing to global well-being. Unlike traditional entrepreneurship, which focuses predominantly on financial gains, spiritual entrepreneurship emphasizes the following:

1. **Purpose-Driven Approach**: Ventures are guided by a higher purpose that seeks to create value beyond economic profits, often addressing societal or environmental issues.
2. **Inner Awareness and Growth**: Entrepreneurs prioritize personal and collective growth, fostering mindfulness, compassion, and ethical decision-making.
3. **Holistic Impact**: The focus extends to the well-being of all stakeholders, including employees, customers, communities, and the environment.
4. **Integration of Values**: Core spiritual values such as integrity, empathy, gratitude, and sustainability are embedded into the business model and operations. Spiritual entrepreneurship creates a balance between material success and inner fulfillment, redefining the purpose of business as a transformative force for good.

The Role of the Digital Sphere

The **digital sphere** has become a powerful enabler of spiritual entrepreneurship, amplifying its reach and impact in several ways:

1. **Global Connectivity:**
    - Digital platforms bridge geographical boundaries, enabling entrepreneurs to connect with like-minded individuals and communities worldwide.
    - Online networks facilitate collaboration and the sharing of spiritual and ethical business practices.
2. **Scalability of Purpose:**
    - Digital tools allow for scalable models, whether through e-commerce, digital products, or virtual services, ensuring that the entrepreneurial purpose reaches a global audience.
3. **Accessibility and Inclusion:**
    - Technology democratizes access to knowledge, funding, and markets, empowering underrepresented groups to participate in entrepreneurial ecosystems.
    - Virtual tools ensure inclusivity by removing barriers like location or cost, making spiritual ventures accessible to diverse audiences.
4. **Content Creation and Education:**
    - Entrepreneurs can leverage digital platforms to share spiritual teachings, mindfulness practices, and value-based business frameworks through blogs, videos, and social media.
    - Online courses and webinars help disseminate knowledge and attract followers aligned with the venture's mission.
5. **Sustainability and Efficiency:**
    - Digital innovations like remote work, virtual meetings, and AI-driven tools promote sustainable operations while reducing carbon footprints.
6. **Data-Driven Insights:**
    - Analytics and digital tools provide valuable insights into customer behavior, enabling entrepreneurs to align their offerings with their audience's values and needs.

Challenges in the Digital Sphere:

- **Authenticity**: Maintaining genuine connections in a highly digitalized environment.
- **Information Overload**: Standing out in a crowded online space while maintaining clarity of purpose.
- **Ethical Technology Use**: Navigating concerns like privacy, misinformation, and algorithmic bias.

By leveraging the digital sphere, spiritual entrepreneurs can amplify their impact, foster a global sense of community, and make purpose-driven innovation an accessible reality for a wider audience. This paper also discusses practical frameworks for cultivating purpose-driven innovation, such as integrating spiritual principles

into business planning, fostering mindful leadership in tech-based enterprises, and utilizing digital platforms to amplify impact. Case studies of successful spiritual entrepreneurs are analyzed to highlight best practices and lessons learned. By aligning purpose, spirituality, and digital innovation, this approach advocates for a holistic model of entrepreneurship that harmonizes material success with inner fulfillment and societal benefit. Ultimately, purpose-driven innovation serves as a blueprint for shaping a more conscious and sustainable digital future. Women's spiritual entrepreneurship offers a new approach to capitalism, emphasizing traditionally feminine ideals and spiritual practices (Kieffer, 2020). In the digital era, the myth of innovation and fantasy of entrepreneurship serve as coping mechanisms for workplace disruptions (Chua, 2018).

2. Theoretical Framework

A theoretical framework Entrepreneurship, Innovation with Purpose, and The Influence of Digital Transformation would ideally include the following elements:

Core Components:

1. **Spirituality and Entrepreneurship**
   - **Core Values**: Integrity, Empathy, Mindfulness.
   - **Focus**: Aligning business goals with spiritual principles and fostering holistic well-being.
2. **Innovation with Purpose**
   - **Key Elements**: Sustainability, Societal Impact, Ethical Practices.
   - **Focus**: Developing innovations that create value beyond profit, addressing global challenges.
3. **The Influence of Digital Transformation**:
   - **Key Drivers**: Global Connectivity, Scalability, Digital Tools.
   - **Focus**: Leveraging technology to amplify purpose-driven initiatives and enhance accessibility.

Key Characteristics:

Purpose-driven innovation is grounded in an overarching mission or vision that reflects the organization's values and commitment to societal well-being. It emphasizes long-term sustainability, ensuring that innovations contribute positively to the planet and society rather than focusing solely on short-term gains. It also engages a wide range of stakeholders, considering their needs and perspectives in the innovation process, which leads to more inclusive and equitable solutions. Ethical considerations guide the process, ensuring that the outcomes of innovation align with moral and cultural principles.

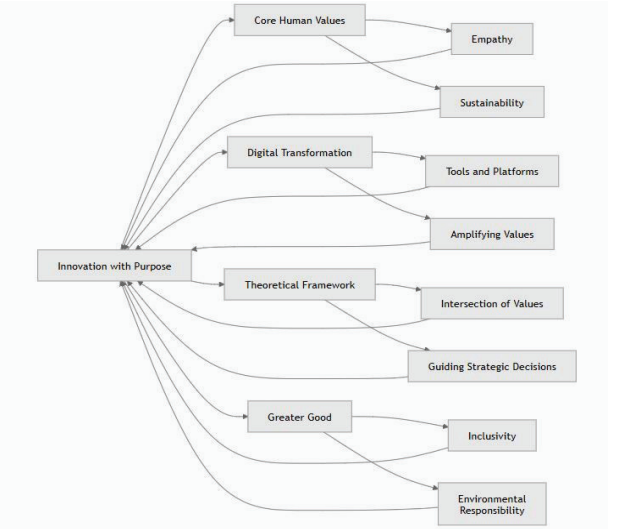


Figure 1. Theoritical Framework

Purpose-Driven Innovation: Key Dimensions

Purpose-driven innovation revolves around aligning business goals with spiritual values, embedding ethical and sustainable practices, and redefining success metrics beyond profit. By integrating core principles such as integrity, compassion, and mindfulness, organizations ensure their objectives resonate with a higher purpose that benefits all stakeholders. Ethical and sustainable practices are central, focusing on minimizing environmental impact, fostering fairness in supply chains, and designing human-centric solutions that prioritize well-being and inclusivity. Success is measured not solely by financial gains but through holistic metrics like societal impact, stakeholder value, and contributions to environmental sustainability. This multidimensional approach fosters long-term resilience, trust, and meaningful impact in an increasingly values-driven global marketplace. In conclusion, purpose-driven innovation offers a transformative approach to business by integrating spiritual values, ethical and sustainable practices, and a redefined understanding of success. By aligning goals with principles such as integrity, mindfulness, and compassion, organizations can create meaningful connections with stakeholders and foster holistic well-being. Prioritizing sustainability and ethics ensures that innovations contribute positively to society and the environment, while success metrics beyond profit—such as societal impact and stakeholder value—provide a more comprehensive measure of progress. This approach not only drives long-term growth but also positions businesses as catalysts for positive change in a values-driven world.

Impact Analysis

Purpose-driven ventures, grounded in spiritual entrepreneurship, are reshaping the global business

landscape by addressing societal challenges, driving socioeconomic development, and fostering long-term benefits for stakeholders. Their impact extends across key areas, including socioeconomic contributions, tackling global challenges, and creating enduring value for diverse stakeholders. Purpose-driven businesses contribute significantly to socioeconomic progress by creating jobs, empowering communities, and promoting inclusive economic growth. These ventures often operate in underserved or marginalized regions, offering innovative solutions tailored to local needs. By integrating spiritual values into their operations, they prioritize fair trade practices, equitable wealth distribution, and the upliftment of vulnerable populations. For instance, businesses promoting renewable energy or fair labor practices stimulate local economies while fostering sustainability. This dual focus on economic development and ethical integrity strengthens community resilience and fosters trust among stakeholders. Entrepreneurs exhibit varying levels of spiritual orientation, ranging from "Strictly Business" to "Soul Seekers" (Kauanui et al., 2008). Spiritual entrepreneurs actively integrate their values into organizational culture and relationships with employees, customers, and suppliers (King-Kauanui et al., 2010). This integration of spirituality and entrepreneurship aligns with Christian work ethics and mission (Hatta & Lie, 2022).

Spiritual entrepreneurship plays a pivotal role in addressing pressing global challenges such as climate change and social inequality. Entrepreneurs committed to higher purposes leverage innovation to mitigate environmental impacts, promote social equity, and support sustainable development goals. For example, ventures centered on clean energy reduce reliance on fossil fuels, while socially inclusive models empower women, minorities, and other underrepresented groups. By emphasizing compassion and mindfulness, spiritual entrepreneurs inspire transformative change, building ecosystems that promote harmony between people and the planet. Their initiatives align with a vision of global interconnectedness, ensuring that innovation serves humanity's collective well-being. The long-term impact of purpose-driven ventures extends beyond immediate gains, delivering sustained value to all stakeholders. Employees benefit from meaningful work environments that prioritize well-being, growth, and purpose. Customers engage with ethical brands that align with their values, fostering loyalty and advocacy. Communities thrive as businesses address critical issues like education, healthcare, and environmental preservation. Moreover, investors increasingly recognize the financial viability and social impact of purpose-driven ventures, resulting in robust support for such initiatives. This enduring value creation solidifies trust, enhances reputations, and builds a legacy of positive change. In essence, purpose-driven innovation, fueled by spiritual entrepreneurship, has a profound and far-reaching impact. By addressing socioeconomic disparities, confronting global challenges, and creating enduring stakeholder value, these ventures pave the way for a more equitable, sustainable, and compassionate world. Their holistic approach redefines the role of business as a force for good, fostering progress that benefits humanity and the planet alike.

The Role of Technology in Spiritual Entrepreneurship

The role of technology in spiritual entrepreneurship is transforming how individuals and organizations merge spirituality with innovative business practices to create meaningful impacts. Leveraging digital tools has become a cornerstone for impactful innovation, enabling spiritual entrepreneurs to develop apps, online courses, and platforms that offer meditation, wellness, and mindfulness resources to global audiences. Social media plays a pivotal role in building vibrant communities by fostering authentic connections, sharing inspirational content, and facilitating interactive engagements that amplify the reach of spiritual messages. Platforms like Instagram, YouTube, and TikTok have allowed spiritual leaders to break geographical barriers, creating inclusive spaces for dialogue and growth. Meanwhile, emerging technologies like artificial intelligence and virtual reality present exciting opportunities for immersive spiritual experiences, such as virtual retreats or AI-driven personal coaching. However, these advancements also come with ethical implications, including concerns about data privacy, commercialization of spiritual practices, and maintaining authenticity in a digital-first world. Balancing innovation with ethical responsibility is key to ensuring that technology empowers rather than dilutes the essence of spirituality in this rapidly evolving landscape.

Emerging Technologies and their Ethical Implications

Bottom of Form

Emerging technologies, such as artificial intelligence (AI), augmented reality (AR), blockchain, and virtual reality (VR), are reshaping the fabric of society with unprecedented potential to solve complex problems and enhance human capabilities. However, their rapid advancement brings significant ethical implications that needs careful consideration. AI, for instance, raises concerns about bias in algorithms, the potential for job losses, and the erosion of privacy through data misuse. Similarly, biotechnology innovations like gene editing and synthetic biology challenge ethical boundaries surrounding human enhancement and the sanctity of natural processes. Blockchain, while promising transparency and decentralization, can inadvertently facilitate illicit activities due to its anonymity. Virtual reality, with its capacity to immerse users in alternate worlds, poses risks of addiction, escapism, and the blurring of reality. Across

these domains, issues of equitable access, accountability, and long-term societal impact emerge as critical concerns. Addressing these implications requires a proactive, multidisciplinary approach involving technologists, ethicists, policymakers, and communities to ensure that innovation aligns with human values, prioritizes the common good, and mitigates harm in a world increasingly shaped by technology.

3. Future Directions

The future of spiritual and digital innovation is poised to embrace trends that emphasize personalization, accessibility, and community-driven approaches. Advances in artificial intelligence and machine learning will power tailored spiritual experiences, such as AI-driven meditation guides, virtual reality retreats, and personalized wellness programs. Blockchain could enable secure, transparent systems for charitable giving and decentralized spiritual communities. As these innovations grow, policy implications will play a pivotal role in ensuring ethical practices, equitable access, and protection of sensitive data. Governments and organizations must establish support mechanisms, such as funding for socially impactful tech startups, regulatory frameworks for digital wellness platforms, and programs to educate users about emerging spiritual technologies. Bridging the gap between profit and purpose will remain a central challenge, calling for business models that integrate sustainable revenue generation with a commitment to ethical and impactful practices. Influencer marketing has emerged as a powerful strategy within the digital marketing landscape, leveraging the reach and engagement of social media influencers to promote brands, spirituality and products (Kumar *et al.,* 2024). By prioritizing authenticity, inclusivity, and ethical responsibility, the convergence of spirituality and digital innovation holds immense potential to foster holistic growth and global well-being.

4.Conclusion

The intersection of spiritual entrepreneurship and the digital sphere is ushering in a transformative era, where purpose-driven innovation is not just a possibility but a necessity. In a world influenced by technological advancements, the integration of spirituality and digital tools presents a unique opportunity to address both individual and collective needs. This integration empowers entrepreneurs to transcend traditional business paradigms by focusing on values such as compassion, authenticity, and community while using cutting-edge technologies for greater impact. At the core is the recognition that digital tools can amplify the reach and accessibility of spiritual practices. Platforms like social media, apps, and online courses have democratized access to mindfulness, meditation, and wellness resources, breaking down barriers of geography, cost, and time. Entrepreneurs in this space are no longer confined to physical locations or face-to-face interactions; they can now engage with a global audience, creating a more inclusive and interconnected spiritual ecosystem. This ability to scale impact is a hallmark of purpose-driven innovation, as it enables entrepreneurs to serve diverse communities while staying true to their core mission of fostering well-being and personal growth. However, this integration has its own challenges. Emerging technologies such as artificial intelligence (AI), blockchain, and virtual reality (VR) bring both opportunities and ethical dilemmas. AI can offer personalized spiritual guidance and insights, but it also raises concerns about algorithmic biases and the potential commodification of spirituality. Blockchain technology can promote transparency and fairness, particularly in charitable endeavors, but its use must align with the values of trust and integrity inherent in spiritual pursuits. Similarly, AR/VR can create immersive environments for spiritual exploration, yet it risks fostering escapism or diminishing the authenticity of human connection. Addressing these challenges requires spiritual entrepreneurs to adopt a mindful approach to technology—embracing its potential while upholding ethical principles and prioritizing the well-being of their audiences.

Policy and support mechanisms are essential in navigating these complexities. Governments, private organizations, and industry leaders must collaborate to establish regulatory frameworks that protect users while fostering innovation. These frameworks should address critical issues such as data privacy, algorithmic accountability, and equitable access to digital spiritual resources. Additionally, funding initiatives, mentorship programs, and educational opportunities can empower spiritual entrepreneurs to navigate the digital sphere with confidence and competence. Such support systems are vital for ensuring that purpose-driven innovation thrives in an environment that values ethical responsibility and social impact. A crucial aspect of purpose-driven innovation is the balance between profit and purpose. The digital age has made it possible for entrepreneurs to monetize their offerings in diverse ways, from subscription models to crowdfunding. However, spiritual entrepreneurship must tread carefully to ensure that the pursuit of profit does not overshadow its mission of service and authenticity. Transparent business practices, fair pricing models, and a commitment to reinvesting profits into community development or charitable initiatives can help maintain this balance. By prioritizing purpose over profit, spiritual entrepreneurs can build trust and loyalty, fostering long-term relationships with their audiences and creating a positive ripple effect in society. The future of spiritual entrepreneurship in the digital sphere lies in its ability to adapt and innovate while staying grounded in core values. This requires a continuous commitment to learning, collaboration, and reflection. Entrepreneurs must remain

open to feedback, engage with diverse perspectives, and embrace emerging trends without compromising their mission. By fostering partnerships with technologists, policymakers, and other stakeholders, they can co-create solutions that address pressing global challenges while promoting spiritual growth and well-being.

To conclude, purpose-driven innovation in spiritual entrepreneurship shows a powerful paradigm shift that has the potential to reshape how we approach business, technology, and spirituality. By leveraging digital tools, addressing ethical implications, and balancing profit with purpose, spiritual entrepreneurs can create transformative experiences that uplift individuals and communities alike. As we move forward, the success of this movement will depend on its ability to harmonize technological advancement with human values, ensuring that the digital sphere becomes a space for authentic connection, growth, and meaningful impact. Through intentionality, creativity, and collaboration, spiritual entrepreneurship in the digital age can inspire a more compassionate, inclusive, and purpose-driven world.

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Exploring the importance of spirituality in public enterprises of Nepal

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Abstract

Spirituality, an essential aspect of human life encompasses beliefs, values, and sense of purpose essential to personal as well as professional lives. The main objective of the study is to explore the importance of spirituality in PEs towards fulfilling their objectives creating a work life balance among the employees. Study is based on policy documents, literatures, information obtained from or observation of working culture of the employees of PEs. Very less study is found in this matter. This paper assesses the benefits of PEs and offers recommendations for future projects to policy makers, researchers to put an effort to prevent PEs from going out of business and to ensure their continuity

Keywords: *Public enterprises, spirituality in work place, work life balance, creativity, digital age*

Introduction

Spirituality plays a vital role in human life, shaping our beliefs, values, and sense of purpose. It extends beyond our personal lives and is also important in our professional lives. Increasingly, individuals are striving to align their personal beliefs and values with their work. Embracing spirituality in the workplace can enhance job satisfaction, engagement, and productivity, while also fostering better relationships with colleagues and clients. *According to Petchsawang and Duchon (2009), workplace spirituality or spirituality at work is defined as "having compassion towards others, experiencing a mindful inner consciousness in the pursuit of meaningful work and that enables transcendence."* Spirituality at work is not about religion, or getting people converted to a specific belief system (Cavanagh, 1999), but an "internal substance", "a value, belief, attitude, or emotion", "that affects people's behaviour" (Moore & Casper (2006:109–110). According to Furman, Benson, Canda, and Grimwood (2005), spirituality can be understood as a mindset or perspective that involves seeking meaning, purpose, and morally enriching connections with oneself, others, the world, and a higher reality. From the foregoing definitions, it could be observed that workplace spirituality reflects employee experiences such as a sense of meaning, purpose, community, and transcendence at workplace, revealing the meaning and purpose in life, sense of interconnectedness and belonging, and personal joy and fulfilment (Giacalone & Jurkiewicz, 2010; Pawar, 2009; Petchsawanga & Duchon, 2012)

Objectives of the study

The main objective of this study is to explore the importance of spirituality in the PEs of Nepal. For this the study is trying to answer the following questions:

1. What are the objectives of establishing public enterprises in Nepal?
2. Why public enterprises are important in the context of Nepal?
3. How is the performance of PEs in Nepal?
4. What are the reasons behind poor functioning of the PEs?
5. How spirituality in human resource of PEs helps to overcome the problem?
6. How can the spirituality practiced in this digital age?,

Study method

Different literatures and policy documents are reviewed and analyzed in order to explore the importance of spirituality in public enterprises of Nepal. With the help of keywords, literatures are searched from different search engines like research gate, Google scholars and also from the references and bibliography of the literatures.

Significance of the Study

This study examines the historical and present performance of Nepal's Public Enterprises (PEs) in addition to projecting the future of these companies. It is a priceless tool for academics and students studying public enterprises (PEs) and their privatization in Nepal. This paper

assesses the benefits of PEs and offers recommendations for future projects to be carried out by the policy makers, researchers to put an effort to prevent PEs from going out of business and to ensure their continuity

Limitations

The primary reasons for this study's limitations include only the review of secondary data, limited literatures, and the dearth of contemporary studies on the subject matter. Additionally, the findings of the study are not much reliable due to lack of direct engagement of entity's operational and managerial level employees. As a result, it is more challenging to fully verify the impact of spirituality in performance of PEs and possibility of using digital platform to enhance spirituality within organization.

Discussion

The creation of public enterprises serves a number of political, social, and economic goals in any economy. Since the 1930s (B.S. 1990s), Nepal has had Public Enterprises (PEs) with a number of primary goals. These include offering affordable, necessary goods and services for daily living, making sure that everyone has easy access to them, generating jobs, establishing the framework for the construction of physical infrastructure, encouraging an independent and self-sufficient economy, helping to promote exports and import substitution, fostering an environment that is favorable to the expansion of the private sector, and, ultimately, establishing an egalitarian state that upholds social justice. The strategy for starting and running public enterprises in Nepal has changed over time due to the importance that these businesses play in providing basic consumer products and services, building infrastructure, and delivering public services. When manufacturing and the supply chain are disrupted by crises, disasters, or other calamities, the establishment of PEs has shown to be particularly important. (Public Enterprises' Annual Performance Review, 2024)

In developing countries like Nepal, the key objectives for establishing public enterprises include:

a) Achieving economic development in a balanced and organized manner by providing essential infrastructure.

b) Distributing consumption goods at reasonable prices while improving their quality.

c) Establishing large, non-profit oriented organizations that are beyond the capacity of the private sector.

d) Contributing to national revenue generation.

e) Earning foreign exchange.

f) Creating employment opportunities.

g) Achieving the economic, political, and social objectives of the nation by mobilizing available capital and labor resources.

h) Correcting the unfavorable balance of payments through import substitution and export promotion.

In the past, state firms have prioritized output over meeting customer needs because of scarcity problems. Public businesses today, however, need to be more competitive in the market and sensitive to consumer needs. Overstaffing is one of the main issues public organizations confront since it can result in enterprise sickness and organizational inefficiencies. This is frequently brought on by unclear goals and a lack of dedication to effectiveness and productivity. According to Gant (1979), the government's choice to actively and directly interfere in the economy in order to accomplish the objectives specified in its development plan is the main cause of the public business sector's formation in a nation. The following are some examples of specific government-assigned goals for public businesses that fall under the economic, social, and political justifications for public ownership and are intended to accomplish macro-level objectives:

(a) Making money for the government by paying taxes, interest on loans, dividends, and other sources.

(b) Preserving limited foreign currency or increasing the foreign exchange base through the export of commodities and services that generate foreign exchange or the replacement of imported goods

(c) Lessening the economy's dependence on imports and a limited number of domestic activities.

(d) Encouraging a fair allocation of income and wealth, avoiding the concentration of financial resources in the hands of a select few.

(e) Creating and offering infrastructure services that boost private sector expansion and quicken the pace of national economic growth.

(f) Ensuring equitable industrial distribution across different geographic locations to reduce regional imbalances and ensure balanced development across diverse economic sectors.

(g) Providing welfare benefits like as housing, healthcare, transportation, and social services, as well as lowering unemployment and creating work possibilities for residents, all while serving as a model for private entrepreneurs in labor-management relations and promoting social stability.

(h) Protecting consumer interests by giving low-income groups access to necessary goods and services at reasonable costs.

(i) Promoting research and development to strengthen self-reliance and support indigenous technologies.

(j) Encouraging increased public involvement in the ownership and administration of profitable businesses.

(k) Serving as a regulatory body to guarantee adherence to the law within its purview

Conclusion

Integrating digital spirituality into public enterprises can be a transformative approach that nurtures individuals and strengthens communities. By fostering a shared sense of purpose, promoting well-being, and engaging employees and the public in meaningful ways, public enterprises can enhance their impact and create a more compassionate and effective service model. Balancing technology with spiritual principles can lead to both organization success and improved community welfare.

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Beyond Thank You: The Science of Gratitude in the Workplace: Systematic Literature Review & Bibliometric Analysis

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Abstract

Gratitude, a positive emotion arising from recognition and appreciation of benefits received has been increasingly highlighted in past years. Its potential to enhance individual and organizational well-being has led to growing interest in exploring the impact of gratitude in workplace settings. This systematic literature review, coupled with a bibliometric analysis using Biblioshiny and the Scopus database from the 21st century. Out of 452 articles, 79 articles of ABDC-listed journals were selected, aims to provide a comprehensive overview of the existing research on gratitude at work.

The review systematically identified, appraised, and synthesized empirical studies that investigate the relationship between gratitude and various workplace outcomes, including job satisfaction, trust, employee well-being, and job performance. By rigorous methodological approaches, this review identified key themes, theoretical frameworks, and empirical findings.

Furthermore, a bibliometric analysis was conducted to visualize the intellectual structure of the field, identified influential authors, journals, and uncover emerging trends and research gaps. The outcomes of this systematic literature review contributed to a deeper understanding of the mechanisms through which gratitude operates at the workplace. It provides practical implications for organizations seeking to foster positive work environments. This framework highlighted the potential benefits of cultivating gratitude at workplace. This research aims to inspire future researchers to a deeper understanding of the relationships between gratitude and various other organizational dimensions.

Keywords: *Gratitude at the workplace, Job satisfaction, Trust, Systematic literature review, Job Performance, Bibliometric Review*

Introduction

Gratitude, being a positive emotion, refers to a generalized tendency to recognize and respond with grateful emotion to the roles of other people's behavior in the positive experience and outcomes that one obtains (McCullough *et al.*, 2001). In other ways, this can also be defined as a feeling of appreciation in response to an experience that is beneficial to, but not attributable to, the self (Badri *et al.*, 2022a)it details the mediating effect of workplace friendship in explaining the linkages between gratitude and AWB at work. Design/methodology/approach: This study used a sample of 272 millennial workers in this study. A survey invitation was sent out to all of the respondents through email. A 20-item job-related AWB (Van Katwyk et al., 2000. In today's dynamic and demanding work environment, positive emotions like gratitude are a buffer between employee exhaustion and a negative work environment. Errors are inevitable, but an organization focusing on an error management culture will reduce employee anxiety and generate feelings of gratitude (Y. Chen *et al.*, 2021)this study explores the influence of error management climate on entrepreneurial self-efficacy and innovation behavior under the boundary condition of Zhongyong thinking. Two hundred ninety samples of Chinese entrepreneurs are empirically analyzed in this study, and results show that: (1. In workplace settings, gratitude can be observed in two ways: one is state gratitude, i.e., benefit-oriented or arises after receiving any benefit or positive experience, and the other is trait gratitude, which is a generalized tendency to be grateful. Gratitude has pervaded across all levels and all disciplines. Tu *et al.*, (2023)the present study proposes a mediated moderation model in which tourists' trait gratitude and positive resident–tourist contact jointly influence TCB. In driving TCB, the interactive effect of trait gratitude and positive contact is mediated by perceived insider status. Data were collected from 497 Mount Wuyi tourists and analyzed using structural equation modeling. The results reveal that trait gratitude positively influences TCB, and this relationship is moderated by positive contact. Furthermore, positive contact moderates the association between trait gratitude and perceived insider status. Additionally, perceived insider status, which is positively related to TCB, significantly mediates the moderating effects of positive contact on the link between tourists' trait gratitude and TCB.","author":[{"dropping-parti

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Although many studies have been done on gratitude in the service and marketing sector, health, and educational institutions, there is a dearth of studies on gratitude in organizational behavior. Many scholars have done literature reviews on gratitude. However, the present study provides a deeper understanding of fostering gratitude in the workplace for employee well-being and focuses on leader gratitude to promote positive outcomes in an organization. Also, combining this literature review with bibliometric analysis provides insights into the production of articles per year on gratitude and the proportion of gratitude research according to the subject area.

Rationale for the Study

Although Gratitude is a crucial positive emotion in the workplace, there is still limited literature review available on solely exploring gratitude at the individual level. Previous studies have shed light on the antecedents and outcomes of gratitude and methods of measuring it at various levels, i.e., Leader's gratitude, trait gratitude, state gratitude, and workplace gratitude. While the positive impact of Gratitude on individual well-being is well-documented, research on the specific role of gratitude in the workplace remains limited. This knowledge gap necessitates a thorough investigation into the relationship between gratitude practices, such as expressing appreciation, acknowledging contributions, and fostering a culture of thankfulness, and key workplace outcomes, including employee engagement, job satisfaction, organizational commitment, and overall performance. Combining literature review with bibliometric analysis, this study provides a new horizon for future researchers. The focus of this research work lies on answering the following questions:

1. How does gratitude relate to employee job satisfaction, work engagement, and overall well-being?
2. What are the impacts of leader gratitude on employee performance?
3. What are various theories critically reviewed in the literature on workplace gratitude?
4. What is the publication trend of Gratitude research in the workplace?
5. What are the ongoing research themes on Gratitude in the workplace?

Methodology

The present study will be analyzed using a systematic literature review (SLR) and bibliometric analysis in the domain of Gratitude in the workplace. (Bennet & Bennet, 2004) define how existing studies can be evaluated and interpreted rigorously using all possible keywords. A potential research gap can be identified using the SLR technique, which further facilitates exploring the missing domains.)(Keränen et al., 2012)and identify research issues that hamper current B2B branding research. Design/methodology/approach: The study employs a systematic review, and identifies 73 relevant journal publications from the years 1973-2010 that were subsequently evaluated for further analysis. Findings: This study identifies five possible issues hampering

current B2B branding research: the lack of systematic theory development, the transference of consumer concepts, the dominance of quantitative research, the lack of longitudinal research, and the focus on single industries. Research limitations/implications: This study considers only published journal articles, excluding books and conference proceedings. By highlighting the research issues, this paper aims to direct research efforts to areas where they will have the most impact, and thus aid more rapid advancement of B2B branding as a discipline. Originality/value: This study provides the first systematic review to identify and evaluate the current B2B branding literature. The review identifies the key literature related to B2B branding, provides an overview of past research and identifies emerging research issues to be addressed in future research. © Emerald Group Publishing Limited.","author":[{"dropping-particle":"","family":"Keränen","given":"Joona","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Piirainen","given":"Kalle A.","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Salminen","given":"Risto T.","non-dropping-particle":"","parse-names":false,"suffix":""}],"container-title":"Journal of Product and Brand Management","id":"ITEM-1","issue":"6","issued":{"date-parts":[["2012"]]},"page":"404-417","title":"Systematic review on B2B branding: Research issues and avenues for future research","type":"article-journal","volume":"21"},"uris":["http://www.mendeley.com/documents/?uuid=e0cc7d36-0e17-425e-804d-b7242dae3094"]}],"mendeley":{"formattedCitation":"(Keränen et al., 2012**.** Systematic Literature review involves three steps: Planning for the review, using the existing literature to conduct the review, and finally, reporting the review (Tranfield et al., 2003)traditional 'narrative' reviews frequently lack thoroughness, and in many cases are not undertaken as genuine pieces of investigatory science. Consequently they can lack a means for making sense of what the collection of studies is saying. These reviews can be biased by the researcher and often lack rigour. Furthermore, the use of reviews of the available evidence to provide insights and guidance for intervention into operational needs of practitioners and policymakers has largely been of secondary importance. For practitioners, making sense of a mass of often-contradictory evidence has become progressively harder. The quality of evidence underpinning decision-making and action has been questioned, for inadequate or incomplete evidence seriously impedes policy formulation and implementation. In exploring ways in which evidence-informed management reviews might be achieved, the authors evaluate the process of systematic review used in the medical sciences. Over the last fifteen years, medical science has attempted to improve the review process by synthesizing research in a systematic, transparent, and reproducible manner with the twin aims of enhancing the knowledge base and informing policymaking and practice. This paper evaluates the extent to which the process of systematic review can be applied to the management field in order to produce a reliable knowledge stock and enhanced practice by developing context-sensitive research. The paper highlights the challenges in developing an appropriate methodology.","author":[{"dropping-particle":"","family":"Tranfield","given":"David","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Denyer","given":"David","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Smart","given":"Palminder","non-dropping-particle":"","parse-names":false,"suffix":""}],"container-title":"British Journal of Management","id":"ITEM-1","issue":"3","issued":{"date-parts":[["2003"]]},"page":"207-222","title":"Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review","type":"article-journal","volume":"14"},"uris":["http://www.mendeley.com/documents/?uuid=b3436ca2-7f0f-4160-9653-94b8b3ba1fa8"]}],"mendeley":{"formattedCitation":"(Tranfield et al., 2003.

Planning and Conducting the Review

Data Collection

Data was retrieved from the Scopus Database in 11th December 2024. The Scopus covered a wide range of literature and provided valuable sources for researchers. In the present study, for the systematic literature review and bibliometric analysis, articles that are published in the 21st century were selected to gain a broader overview of existing literature and future implications. Keywords used to explore the existing literature are "Gratitude" OR "workplace gratitude" OR "gratitude in organization" OR "gratitude theories" OR "gratitude antecedents" OR "gratitude consequences" OR "Employee gratitude" OR "gratitude as mediating role" OR "gratitude as moderating role" The total number of articles found without applying any screening criteria is 9680, indicating highly matured work of gratitude in the research arena.

Data Analysis:

Identification:

In the present work, both systematic literature reviews coupled with bibliometric analyses were carried out with Biblioshiny software of R Studio and Microsoft Office 365. A total number of 9680 articles were found after a primary search in the field of title, abstract, and keywords with the help of the following search string:

String: TITLE-ABS-KEY (“Gratitude” OR “workplace gratitude” OR “gratitude in organization” OR “gratitude theories” OR “gratitude antecedents” OR “gratitude consequences” OR “Employee gratitude” OR “gratitude as mediating role” OR “gratitude as moderating role”)

Articles screening and selection framework is shown in Fig. 1 as a PRISMA framework.

Screening Criteria:

After identifying 9860 articles on Gratitude at the workplace, screening criteria were applied to limit the resources for effective analysis. Available filters applied in the screening process are Range, Subject Area (i.e., Health Science, Psychology, Education, etc.), Document type (Book, conference papers, etc.), criteria related to Language selection, and stage of publication. Fig. 2 shows the diversification in the workplace gratitude research field.

In the present research work, articles from the 21st century (2000-2024) were extracted from the Scopus database. The search for the subject area was limited to Business management and accounting, and articles in English published in the journals were selected.

String: TITLE-ABS-KEY (“Gratitude” OR “workplace gratitude” OR “gratitude in organization” OR “gratitude theories” OR “gratitude antecedents” OR “gratitude consequences” OR “Employee gratitude” OR “gratitude as mediating role” OR “gratitude as moderating role”) AND (LIMIT-TO (SUBJAREA , “BUSI”)) AND (LIMIT-TO (DOCTYPE , “ar”)) AND (LIMIT-TO (LANGUAGE , “English”)) AND (LIMIT-TO (SRCTYPE , “j”)) AND (LIMIT-TO (PUBSTAGE , “final”)) AND (LIMIT-TO (OA , “all”))

A total number of 452 articles were retrieved after applying the above screening criteria.

Selection of the articles for Inclusion:

Due to the significant increase in scientific output and its availability in bibliographic databases has highlighted the utility of ‘bibliometrics’ in providing a quantitative measure of scientific activities through the statistical analysis of scientific literature. 452 articles were included in the bibliometric analysis, as bibliometric analysis is a the technique used to analyze the existing literature to predict future scope, for which we required a larger volume of existing literature. As already mentioned, in this research work systematic literature review is coupled with bibliometric analysis, due to which a further screening of 452 articles was conducted, and 79 articles published by ABDC-listed journals were selected to make the review more comprehensive.

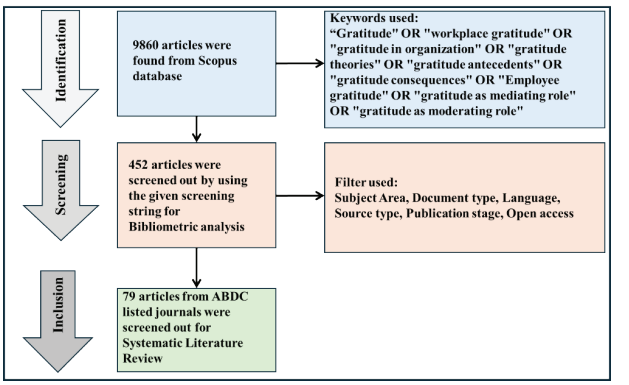


Figure 1 PRISMA framework

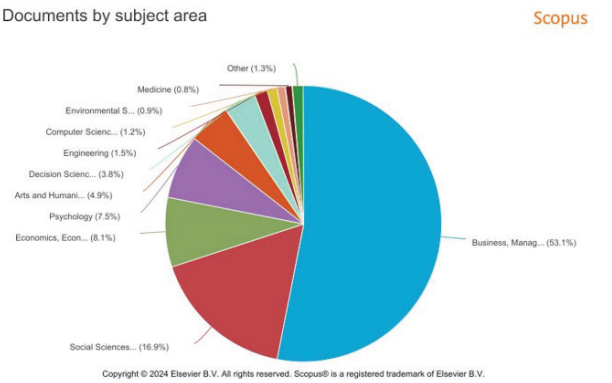


Figure 2 Documents by Subject area

Reporting the Review

In this review phase, the final 79 articles listed in the ABDC journal were analyzed based on the objectives formulated. All the articles are summarised in the subsequent table, and the findings of SLR are elaborated on in the next step.

Results

Objective 1: Impact of Gratitude on Employees

In this objective, we critically examine the magnificent role of gratitude in work scenarios, i.e., how gratitude leads to job satisfaction and other positive outcomes and plays the role of mediator, leading to positive resources and moderators in enhancing the variability of positive output.

Table 1 Some Prominent literature on employee gratitude

SN	Authors	Objectives	Method	Conclusion	Industry
1	(B. Liu et al., 2023)	Discussed the relationship between employee gratitude, employee voice behavior, and employee caring practices.	SEM	Employee caring practices enhance employee gratitude,which leads to employee voice behavior.	Hospitality
2	(Bhargava et al., 2024)	Studied the relationship between employee engagement, gratitude, and subjective well-being.	SEM	Fostering gratitude practices in the workplace can significantly improve employee well-being.	Information Technology
3	(Saini & Yadav, 2024)	Define the relation between trait gratitude, life satisfaction, and materialism in future managers.	PLS-SEM	Gratitude significantly enhances the life satisfaction of future managers	Business Management and Education
4	(Sarkar et al., 2024)	Studied the role of gratitude and psychological capital in countering workplace toxicity	SEM and Regression analysis	Gratitude and PsyCap are powerful tools for reducing workplace toxicity	Service and manufacturing industry.
5	(Badri et al., 2022b)it details the mediating effect of workplace friendship in explaining the linkages between gratitude and AWB at work. Design/methodology/approach: This study used a sample of 272 millennial workers in this study. A survey invitation was sent out to all of the respondents through email. A 20-item job-related AWB (Van Katwyk et al., 2000	Examined the relationship between gratitude, workplace friendship, and affective well-being.	SEM	Gratitude and workplace friendship significantly enhance affective well-being among millennial employees in the corporate services industry.	Corporate service industry
6	(Harrison et al., 2021)but not active job search. Research limitations/implications: This study extends research on job search by highlighting the applicability of trait gratitude to the job search process. Practical implications: Career counsellors should consider trait gratitude as relevant for program development to address the self-regulation of personal resources during job search. Originality/value: This study is the first step towards connecting trait gratitude to the job search literature. The study identifies trait gratitude as a distal personal resource important for self-regulation of a proximal personal resource (i.e. perceived employability	Studied the relationship between trait gratitude and job search behavior	SEM	Trait gratitude enhances perceived employability which leads to preparatory job search behavior.	Student Job seeker from business program

The literature review on the impact of gratitude at work on employees highlights the significant role of gratitude in various organizational contexts, emphasizing its impact on employee behavior, well-being, and workplace culture. The studies reviewed span multiple industries, including hospitality, information technology, business management, and service sectors, demonstrating the universal relevance of gratitude in enhancing organizational outcomes.

Liu *et al.* (2023) explored the relationship between employee gratitude, voice behavior, and caring practices in the hospitality industry. Their findings suggest that employee caring practices foster gratitude, encouraging employees to voice their opinions and concerns. This study underscores the importance of nurturing a supportive work environment to enhance employee engagement and communication. By fostering a culture of care, organizations can create a more open and communicative workplace where employees feel valued and heard. Bhargava *et al.* (2024) investigated the link between employee engagement, gratitude, and subjective well-being in the information technology sector. They found that fostering gratitude practices significantly improves employee well-being, highlighting the role of gratitude in creating a positive workplace atmosphere that benefits both employees and organizations. This research suggests that gratitude can be a key factor in reducing burnout and increasing job satisfaction, particularly in high-stress industries like IT.

Saini and Yadav (2024) focused on the relationship between trait gratitude, life satisfaction, and materialism among future business management and education managers. Their research indicates that gratitude significantly enhances life satisfaction, suggesting that cultivating gratitude can lead to more fulfilled and less materialistic future leaders. This finding is particularly relevant in today's fast-paced, consumer-driven world, where materialism can often overshadow personal well-being and ethical leadership. Sarkar *et al.* (2024) examined the role of gratitude and psychological capital (PsyCap) in mitigating workplace toxicity in the service and manufacturing industries. Their findings reveal that gratitude and PsyCap are effective tools for reducing workplace toxicity, emphasizing the need for organizations to invest in psychological resources to combat negative work environments. This study highlights the importance of fostering resilience and positive psychological states among employees to create healthier workplaces.

Dutta *et al.* (2023) studied the relationship between mindfulness practices, gratitude, and intolerance of uncertainty across various industries. They concluded that gratitude and mindfulness practices help mitigate intolerance of uncertainty by improving emotional, psychological, and social well-being, suggesting that these practices can enhance resilience in uncertain times. This research is particularly relevant in the context of global uncertainties, such as economic instability and pandemics, where employees may face heightened stress and anxiety. Cardon and Wong (2024) explored how gratitude expression impacts happiness in the service and manufacturing sectors. They found that meaningful, personalized, and frequent expressions of gratitude enhance employees' sense of value and engagement, contributing to a thriving workplace culture. This study underscores the importance of authentic and consistent gratitude practices in fostering a positive organizational climate.

Ni *et al.* (2022) highlighted the importance of gratitude expression during crises, particularly in the frozen food and cold chain supply industry. Their research showed that receiving gratitude expressions from coworkers during the COVID-19 crisis positively affected employees' self-efficacy and task performance, underscoring the value of gratitude in crisis management. This finding suggests that gratitude can be a powerful tool for maintaining morale and productivity during challenging times. Guzzo *et al.* (2022) studied the relationship between corporate social responsibility (CSR), gratitude, compassion, and well-being in the hospitality industry. They found that employees' perceptions of CSR positively influence well-being and organizational citizenship behavior through gratitude and compassion, indicating that CSR initiatives can enhance employee well-being indirectly. This research highlights the interconnectedness of organizational ethics, employee emotions, and workplace behavior.

Badri *et al.* (2022) examined the relationship between gratitude, workplace friendship, and affective well-being in the corporate service industry. Their findings suggest that gratitude and workplace friendships significantly enhance affective well-being among millennial employees, highlighting the importance of social connections at work. This study emphasizes the role of interpersonal relationships in fostering a positive work environment, particularly for younger employees who value social interactions. Harrison *et al.* (2021) investigated the relationship between trait gratitude and job search behavior among students from general business programs. They found that trait gratitude enhances perceived employability, leading to more proactive job search behavior, suggesting that gratitude can positively influence career development. This research indicates that gratitude can be a valuable asset for students and young professionals navigating the job market.

Gratitude is a powerful, multifaceted tool that enhances employee well-being, engagement, and organizational culture across various industries. By fostering gratitude practices, organizations can create supportive environments, improve crisis management, and promote positive workplace behaviors, ultimately leading to

better employee and organizational outcomes. The reviewed studies emphasize the importance of integrating gratitude into organizational practices, from leadership development and CSR initiatives to daily interactions and crisis response strategies. In a world where workplace stress and uncertainty are prevalent, gratitude offers a simple yet profound way to enhance resilience, foster positive relationships, and build thriving organizational cultures. Organizations prioritizing gratitude will likely see improved employee satisfaction and performance and stronger, more cohesive teams that are better equipped to navigate challenges and achieve long-term success.

Objective 2: Impact of Leader Gratitude on Employees

Table 2 Prominent literature on leader gratitude

S.No.	Author	Objectives	Method	Conclusion	Industry
1	(Jiang & Qu, 2023)	Studied the relationship between leader-member exchange and gratitude towards the leader	SEM	Leader favorable feedback reduces employee withdrawal behavior through increased gratitude.	Retail Industry
2	(S. Chen et al., 2023)	To study the relationship between leader gratitude expression and follower proactive behavior.	SEM	Followers' proactive behaviors Leader gratitude expressions increased by enhancing their role breadth, self-efficacy, and perceived social worth	Advertising and Marketing
3	(Jiang & Qu, 2023)	To study the relationship between inclusive leadership and employee proactive behavior	SEM	Inclusive leadership can drive proactive behavior among employees by fostering workplace gratitude.	IT, Manufacturing, Tourism and Hospitality
4	(Ritzenhöfer et al., 2019) this research examines the consequences of leaders' expressions of gratitude and pride for their followers. In two experimental vignette studies (N = 261; N = 168	To study leaders' expression of gratitude and pride and followers' satisfaction, turnover intentions	Regression analysis	Leaders' expressions of gratitude reduce perceptions of selfishness, enhancing follower satisfaction and OCB while lowering turnover intentions, whereas pride expressions increase perceived selfishness, negatively impacting these outcomes.	Service and Manufacturing
5	(Ritzenhöfer et al., 2017)	To study leaders' expression of pride and gratitude and followers' perception of leader trustworthiness	Multiple regression	Leaders' expressions of pride and gratitude differentially influence followers' perception of the leader's trustworthiness and trust.	Advertising Agency
6	(van Dierendonck & Patterson, 2015)	To study the relationship between servant leadership and followers' well-being and organizational outcomes.	Theoretical and Conceptual	compassionate love is a cornerstone of servant leadership, fostering virtuous attitudes (humility, gratitude, forgiveness, altruism) that enhance follower well-being and organizational outcomes.	Service and Marketing

The literature review on leader gratitude reveals the relationship between leadership behaviors, gratitude, and various organizational outcomes across different industries. These studies collectively highlight the significant impact of leadership styles and expressions of gratitude on employee behavior, satisfaction, and overall organizational performance.

Jiang & Qu (2023) investigated the relationship between leader-member exchange (LMX) and gratitude towards the leader in the retail industry. Using Structural Equation Modeling (SEM), they found that favorable feedback from leaders reduces employee withdrawal behavior by increasing gratitude. This study underscores the importance of positive leader-employee interactions in fostering a grateful and engaged workforce. By providing constructive and appreciative feedback, leaders can mitigate negative behaviors and enhance employee commitment. Chen *et al.* (2023) focused on the relationship between leader gratitude expression and follower proactive behavior in the advertising and marketing industry. Their SEM analysis revealed that leaders' expressions of gratitude enhance followers' proactive behaviors by boosting their role breadth, self-efficacy, and perceived social worth. This research highlights the role of gratitude in empowering employees to take initiative and contribute more effectively to organizational goals. Leaders who express gratitude can create a more dynamic and proactive work environment.

Jiang & Qu (2023) also examined the impact of inclusive leadership on employee proactive behavior across various industries, including IT, manufacturing, tourism, and hospitality. Their findings indicate that inclusive leadership drives proactive behavior by fostering workplace gratitude. This suggests that leaders who promote inclusivity and appreciation can significantly enhance employee engagement and initiative. Inclusive leadership practices and gratitude can lead to a more motivated and productive workforce. Ritzenhöfer *et al.* (2019) studied the effects of leaders' expressions of gratitude and pride on follower satisfaction, turnover intentions, and organizational citizenship behavior (OCB) in the service and manufacturing sectors. Their regression analysis showed that expressions of gratitude reduce perceptions of leader selfishness, thereby enhancing follower satisfaction and OCB while lowering turnover intentions. In contrast, expressions of pride increase perceived selfishness, negatively impacting these outcomes. This study emphasizes the importance of humility and gratitude in leadership, as opposed to pride, which can adversely affect employee morale and retention.

Ritzenhöfer *et al.* (2017) further explored how leaders' expressions of pride and gratitude influence followers' perceptions of leader trustworthiness in an advertising agency setting. Their multiple regression analysis revealed that gratitude expressions positively affect followers' trust in their leaders, while pride expressions have the opposite effect. This research highlights the critical role of emotional expressions in building and maintaining trust within teams. Leaders who express gratitude are more likely to be perceived as trustworthy and reliable, fostering a positive and cohesive work environment. Van Dierendonck & Patterson (2015) conducted a theoretical and conceptual study on the relationship between servant leadership and followers' well-being and organizational outcomes in the service and marketing industries. They identified compassionate love as a cornerstone of servant leadership, which fosters virtuous attitudes such as humility, gratitude, forgiveness, and altruism. These attitudes enhance follower well-being and organizational outcomes, suggesting that servant leadership practices rooted in compassion and gratitude can lead to more satisfied and productive employees.

The studies reviewed collectively demonstrate the profound impact of leadership behaviors and expressions of gratitude on employee behavior, satisfaction, and organizational outcomes. Leaders who express gratitude and practice inclusive, servant leadership styles can foster a more engaged, proactive, and satisfied workforce. Gratitude, in particular, emerges as a powerful tool for enhancing employee well-being, reducing turnover intentions, and building trust within teams.

In contrast, expressions of pride and selfishness can negatively affect employee morale and trust. Therefore, leaders should prioritize humility and gratitude in their employee interactions to create a positive and supportive work environment. Doing so can enhance organizational performance and foster a culture of appreciation and mutual respect. Integrating gratitude into leadership practices can lead to more resilient and cohesive teams that are better equipped to navigate challenges and achieve long-term success. Organizations prioritizing gratitude and compassionate leadership will likely see improved employee satisfaction, reduced turnover, and enhanced overall performance.

Objective 3: Prominent Theories

In the context of Workplace Gratitude, various theories provide a robust framework for understanding the role of gratitude in shaping workplace dynamics, employee behavior, and organizational outcomes. Table 3 shows the various theories used in organizational behavior regarding workplace gratitude. Social Exchange Theory (Blau, 1964) explains how gratitude fosters reciprocal relationships between employees and organizations, enhancing engagement and organizational citizenship behavior. When employees feel appreciated, they are more likely to reciprocate with increased loyalty and effort, creating a positive cycle of mutual support, Liu et

al., (2023) investigated social exchange theory to theorize how employee caring practices leads to employee gratitude. Broaden and Build Theory (Fredrickson, 2001) highlights how gratitude, as a positive emotion, broadens employees' thought-action repertoires and builds psychological resources, such as resilience and creativity, which are essential for navigating workplace challenges. Leading to the Broaden and Build theory Bhargava et al. (2024) demonstrated the impact of employee gratitude on subjective well-being

Emphasis of Affect event theory lies on how workplace events, such as expressions of gratitude, trigger emotional reactions that influence job satisfaction and performance (Weiss & Cropanzano, 1996), Jiang & Qu(2023) emphasized affect event theory and demonstrated how leader favorable feedback lowers employee withdrawal behavior. Gratitude is a positive affective event, reducing stress and enhancing emotional well-being. Self-Determination Theory (Deci & Ryan, 1980) posits that gratitude fulfills employees' psychological needs for autonomy, competence, and relatedness, enhancing intrinsic motivation and engagement. When employees feel valued, they are more likely to be intrinsically motivated, leading to higher levels of performance and job satisfaction Xia et al., (2024)we investigated the relationship between inclusive leadership (measured at Time 1 applied Self Determination Theory to explain how inclusive leadership leads to employee proactive behavior.

Conservation of Resource Theory (Hobfoll *et al.*, 1990) positions gratitude as a psychological resource that helps employees manage job demands and cope with stress. By fostering a culture of gratitude, organizations can help employees conserve and build their emotional and psychological resources, leading to greater resilience and well-being. A negative work environment lowers employee psychological resources. Positive emotions like gratitude can minimize this negative effect (Mahipalan & Garg, 2024)insurance, IT, automobile and oil and gas companies. The collected data is explored for reliability, validity, multicollinearity and common method variance estimates. Also, the relationship between workplace toxicity and PsyCap and the moderating effect of gratitude are examined using structural equation modelling. Findings: The findings report a negative association between toxicity and PsyCap. Also, the study concludes a significant moderating effect of gratitude. The study recommends the institutionalisation of a gratitude-based organisation to reduce the impact of workplace bullying and uncivil behaviour. Originality/ value: The study is based on primary data and one of the few studies that explore psychological capital as a dependent variable, which is influenced by toxic behaviours at work.",”author”:[{“dropping-particle”:””, ”family”:”Mahipalan”,”given”:”Manju”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Garg”,”given”:”Naval”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””}],” container-title”:”International Journal of Organizational Analysis”,”id”:”ITEM-1”,”issue”:”3”,”issued”:{“date-parts”:[[“2024”]]},”page”:”476-503”,”title”:”Does workplace toxicity undermine psychological capital (PsyCap.Demerouti & Bakker, (2023)suggests that gratitude is a valuable resource that balances job demands, reducing burnout and enhancing employee performance, utilizing these tenets of job demand resource theory Garg et al., (2023) explained that positive emotions minimize the negative impact and lead to enhanced psychological resources like psychological capital. Moral Affect Theory of Gratitude McCullough et al., (2001) emphasizes gratitude as a moral emotion that reinforces ethical behavior and social bonds in the workplace. Leaders who express gratitude model virtuous behavior, fostering a culture of appreciation and mutual respect. Ren et al., (2023) explain how moral emotions like gratitude influence individuals to take more charge. Eisenberger et al., (1986) explained that gratitude enhances employees' perceptions of organizational support, increasing commitment, loyalty, and performance. Employees who feel appreciated perceive the organization as supportive, leading to more substantial organizational commitment. Leading to organizational support theory Hameed & Khwaja, (2023)employees can perceive that their organisation enacts HRM practices from two benevolent intentions (a the human resource management (HRM) framework places HRM practices as the custodian of employee well-being in an organization.

Trait Activation Theory (Tett & Burnett, 2003) explores how situational cues, such as gratitude expressions, activate positive traits like empathy and prosocial behavior, enhancing teamwork and collaboration Tu et al., (2023)the present study proposes a mediated moderation model in which tourists' trait gratitude and positive resident–tourist contact jointly influence TCB. In driving TCB, the interactive effect of trait gratitude and positive contact is mediated by perceived insider status. Data were collected from 497 Mount Wuyi tourists and analyzed using structural equation modeling. The results reveal that trait gratitude positively influences TCB, and this relationship is moderated by positive contact. Furthermore, positive contact moderates the association between trait gratitude and perceived insider status. Additionally, perceived insider status, which is positively related to TCB, significantly mediates the moderating effects of positive contact on the link between tourists' trait gratitude and TCB.”,”author”:[{“dropping-particle”:””,”family”:”Tu”,”given”:”H.”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Zhang”,”given”:”Z.”,”non-dropping-particle”:””,”parse-names”:false,”suffix”:””},{“dropping-particle”:””,”family”:”Jiang”,”giv

en":"Z.","non-dropping-particle":"","parse-names":false,"suffix":""}],"container-title":"Journal of Travel Research","id":"ITEM-1","issue":"8","issued":{"date-parts":[["2023"]]},"page":"1832-1847","title":"When and How Tourists Engage in Citizenship Behavior: The Interactive Effect of Trait Gratitude and Positive Resident–Tourist Contact","type":"article-journal","volume":"62"},"uris":["http://www.mendeley.com/documents/?uuid=f2e5894b-b5ee-39ef-b122-1533e1f5273e"]}],"mendeley":{"formattedCitation":"(Tu et al., 2023 examined individuals sensitized with the trait gratitude reflex more citizenship behavior. Gratitude can also amplify positive emotions and outcomes, as suggested by the Amplification Theory of Gratitude (Watkins, 2014), creating a virtuous cycle of positive behaviors in the workplace. Additionally, the Find Remind and Bind Theory of Gratitude Algoe, (2012) highlights how gratitude strengthens social bonds, fostering a sense of community and collaboration among employees. Garg et al., (2021) with the find remind and bind theory, Broden build theory examined the relation between gratitude and leadership among university teachers.

In summary, these theories underscore gratitude's multifaceted role in organizational behavior. Gratitude enhances employee well-being, engagement, and performance by fostering positive emotions, building psychological resources, and strengthening social bonds. By integrating gratitude into organizational practices, leaders can create a supportive and resilient workplace culture, ultimately leading to improved organizational outcomes and long-term success.

Table 3 Prominent theories in Gratitude at workplace

Theory	Author	No. of Studies
Social exchange theory	Blau (1964)	**10**
Broaden and build theory.	Fredrickson (2004)	**11**
Social Role Theory	AH Eagly (1987)	**1**
Affective event theory	Weiss and Cropanzano (1996)	**4**
Moral affect theory of gratitude	McCullough (2001)	**2**
Self-determination theory	Deci and Ryan (2000)	**5**
Attribution theory	Weiner (1985)	**4**
Conservation of resource theory	SE. Hobfoll (1989)	**1**
Motivation theory	Maslow (1943), Herzberg (1966)	**1**
Wellbeing theory	Seligman (2011)	**1**
Appraisal theory	Lazarus and Folkman (1984)	**1**
Job demand resource theory	Demerouti, Bakker, and Schaufeli (2001)	**4**
Amplification Theory of Gratitude	Watkins (2014)	**1**
Perceived organizational support theory	Eisenberger, Hutchison, and Sowa (1986)	**1**
Trait activation theory	Tett and Burnett (2003)	**4**
Mindfulness to Meaning Theory	Garland, Gaylord, and Fredrickson (2015)	**1**
Find Remind and Bind theory of gratitude	Algoe (2012)	**1**
Pro-social behavior theory	Batson (1987), Penner et al. (2005)	**1**

Bibliometric analysis:

Objective 4: Publication trend in workplace gratitude literature

The utmost purpose of conducting a bibliometric analysis on workplace Gratitude is to provide a broader picture of research work, the publication trend of articles and the country with the top ranking in this research field with the help of scientific techniques. Fig. 3 illustrates the distribution of Scopus-indexed articles from 2002 to 2026. Initially, an upward surge can be observed in the trend from the year 2002 to 2009, although the trend represents slow growth in

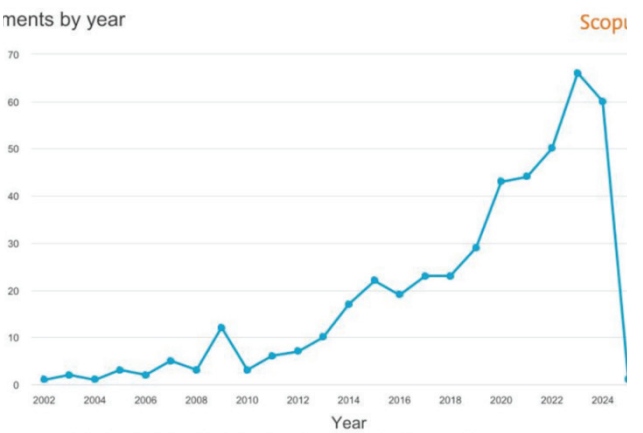


Figure 3 The year-wise trend in publication

Fig. 3 illustrates the distribution of Scopus-indexed articles from 2002 to 2026. Initially, an upward surge can be observed in the trend from year 2002 to 2009, although the trend represents slow growth in the output. This may be due to the limited number of articles indexed with Scopus. Moving ahead, a drastic increase

in trend can be observed from 2011 onwards. This may be because of an increase in global research productivity and the indexing of documents increased annually. From 2019 to 2023, a sharp rise was observed, especially after the COVID-19 pandemic; this shows that researchers continuously started working with this positive emotion in the workplace. The steep decline from 2024 to 2025 may be due to delays in indexing or publication processes. Overall, the graph shows the upward trend in scientific publishing, which paves the way for future researchers to explore this research arena further Fig. 4 displays the distribution of documents indexed in Scopus by country or territory, comparing the output for up to 15 regions. The x-axis represents the number of documents, while the y-axis lists the countries or territories. The United States has the highest document count, reflecting its dominant position in global research output and strong academic and research institutions. Following the U.S., China holds the second position, showcasing its recent rapid growth and investment in scientific research.

India ranks third, demonstrating its significant contributions to global research, especially in emerging fields. Australia and the United Kingdom follow closely, consistently emphasizing research and innovation. Taiwan, Canada, South Korea, Germany, and Indonesia also feature prominently, reflecting their active participation in scientific research and publication. The distribution highlights the varying levels of research activity across countries, with developed nations like the U.S., U.K., and Germany maintaining strong outputs while emerging economies such as China, India, and Indonesia increasingly contribute to the global knowledge base. This trend underscores the globalization of research and the growing influence of non-Western nations in academic publishing. Overall, the figure emphasizes the diverse geographic landscape of scientific research.

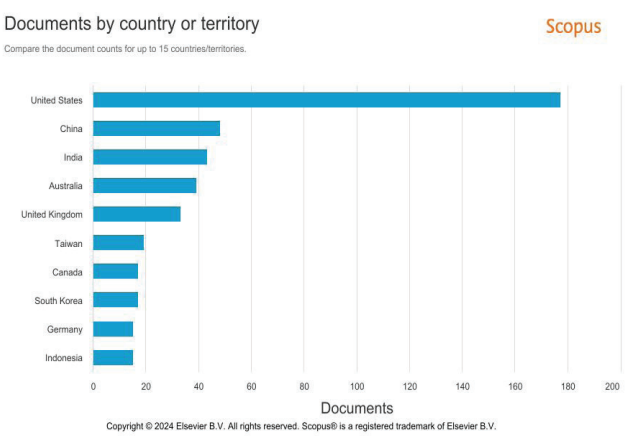


Figure 4 Country-wise ranking in Gratitude literature

Objective 5: Key themes in Gratitude at workplace

Fig. 4 presents a thematic map that categorizes various themes based on their relevance and centrality in a specific context, likely related to academic or industry research. The map is divided into three main sections: Niche Themes, Emerging or Declining Themes, and Basic Themes.

Niche Themes include academic research, environmental values, and the hospitality industry, which are specialized and may have a focused audience. These themes are complemented by topics like social media, prosocial behavior, and online social networking, indicating a strong interest in digital interactions and their impact on society. Marketing, retailing, and internet-related topics also fall under this category, suggesting their importance in contemporary research. Emerging or Declining Themes are not explicitly listed, but their presence implies that the map is dynamic, reflecting the evolving nature of research interests over time. Basic Themes, which are foundational and widely recognized, are also not detailed but are crucial for understanding the broader context of the research landscape.

The map uses a relevance degree (centrality) metric to indicate the importance of each theme within the overall framework. This helps identify which themes are central to current discussions and which are more peripheral. Including specific topics like decision-making, sustainable development, and heritage tourism highlights the interdisciplinary nature of the research, bridging fields such as psychology, operations research, and behavioral studies. Overall, the thematic map provides a structured overview of key research areas, helping to identify trends and focus areas for future studies.

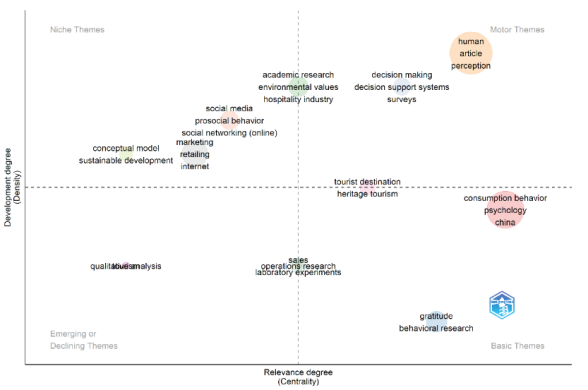


Figure 5 Key Themes in Gratitude at Workplace

Influential authors and Journals

Table 4 shows the most relevant authors in a Gratitude at Workplace research field and the number of documents associated with each author, likely indicating their contribution or influence. Garg N is the most prominent author with 15 documents, suggesting a significant

impact or extensive research output. Other authors, such as Bock De, Septanto F, Bagozzi Rp, Folse Jag, Graph S, Kolyesnikova N, Mangus Sm, and ROMAN S, each have 10 documents indicating substantial contributions as well. Dodd Th has the fewest documents, with 5, suggesting a relatively smaller presence in this context.

Table 4 Influential Authors in Gratitude at Workplace

Author Name	Number of Documents
Garg N	15
Bock DE	10
Septanto F	10
Bagozzi RP	10
Folse Jag	10
Graph S	10
Kolyesnikova N	10
Mangus SM	10
Roman S	10
Dodd TH	5

Table 5 presents a list of academic journals and the number of documents associated with each, likely indicating their relevance or contribution to a specific field of study, such as business, marketing, or hospitality. The "Journal of Business Research" stands out with the most documents (20), suggesting it is a highly relevant source. Other significant journals include the "European Journal of Marketing" and the "Journal of Retailing and Consumer Services," each with 15 documents. Journals like the "Journal of Business Ethics," "Journal of Services Marketing," "International Journal of Hospitality Management," and "Journal of the Academy of Marketing Science" each have 10 documents, indicating moderate relevance. The "Humanities and Social Sciences Communications," "International Journal of Contemporary Hospitality," and "Journal of Marketing" have the fewest documents (5 each), suggesting they are less prominent in this context. This data is helpful for researchers and academics to identify key sources in their field.

Table 5 Influential Journals in Gratitude at Workplace

Journal Name	Number of Documents
JOURNAL OF BUSINESS RESEARCH	20
EUROPEAN JOURNAL OF MARKETING	15
JOURNAL OF RETAILING AND CONSUMER SERVICES	15
JOURNAL OF BUSINESS ETHICS	10
JOURNAL OF SERVICES MARKETING	10
INTERNATIONAL JOURNAL OF HOSPITALITY MANAGEMENT	10
JOURNAL OF THE ACADEMY OF MARKETING SCIENCE	10
HUMANITIES AND SOCIAL SCIENCES COMMUNICATIONS	5
INTERNATIONAL JOURNAL OF CONTEMPORARY HOSPITALITY	5
JOURNAL OF MARKETING	5

Discussion

As highlighted in the reviewed literature, the discussion on the impact of gratitude in the workplace underscores its multifaceted role in enhancing employee well-being, organizational culture, and leadership effectiveness. Gratitude, as a positive emotional state, has been shown to significantly influence various organizational outcomes across different industries, including hospitality, information technology, business management, and service sectors. The studies collectively emphasize that gratitude acts as a mediator and moderator, fostering positive resources and enhancing the variability of positive outcomes in the workplace. Based on the reviewed literature, this discussion will delve into the key findings, implications, and future directions.

Impact of Gratitude on Employees

The literature reveals that gratitude enhances employee well-being, job satisfaction, and engagement. It has been found that employee caring practices in the hospitality industry foster gratitude, encouraging employees to voice their opinions and concerns. This suggests that a supportive work environment, where employees feel valued and heard, can significantly enhance communication and engagement. Similarly, it has been highlighted that fostering gratitude practices in the information technology sector improves employee well-being, reducing burnout and increasing job satisfaction. This is particularly relevant in high-stress industries where employee well-being is often compromised.

Moreover, gratitude has been linked to life satisfaction and reduced materialism among future managers. It has been demonstrated that trait gratitude significantly enhances life satisfaction, suggesting that cultivating gratitude can lead to more fulfilled and less materialistic leaders. This finding is crucial in today's consumer-driven world, where materialism can overshadow personal well-being and ethical leadership. Additionally, it has been found that gratitude and psychological capital (PsyCap) are effective tools for reducing workplace toxicity in the service and manufacturing industries. This underscores the importance of investing in psychological resources to

combat negative work environments and foster employee resilience.

The role of gratitude in mitigating intolerance of uncertainty has also been explored, with findings indicating that gratitude and mindfulness practices improve emotional, psychological, and social well-being. This is particularly relevant in times of global uncertainty, such as economic instability and pandemics, where employees may face heightened stress and anxiety. Furthermore, it has been emphasized that meaningful and frequent expressions of gratitude enhance employees' sense of value and engagement, contributing to a thriving workplace culture. This highlights the importance of authentic and consistent gratitude practices in fostering a positive organizational climate.

Impact of Leader Gratitude on Employees

The literature on leader gratitude reveals that leadership behaviors and expressions of gratitude significantly impact employee behavior, satisfaction, and organizational performance. It has been found that favorable feedback from leaders reduces employee withdrawal behavior by increasing gratitude, underscoring the importance of positive leader-employee interactions. Similarly, it has been demonstrated that leaders' expressions of gratitude enhance followers' proactive behaviors by boosting their role breadth, self-efficacy, and perceived social worth. This suggests that leaders who express gratitude can create a more dynamic and proactive work environment.

Inclusive leadership, combined with gratitude, has also been shown to drive proactive behavior among employees. It has been found that inclusive leadership fosters workplace gratitude, enhancing employee engagement and initiative. This is particularly relevant in diverse industries such as IT, manufacturing, tourism, and hospitality, where inclusivity and appreciation can lead to a more motivated and productive workforce. It has been further highlighted that leaders' expressions of gratitude reduce perceptions of selfishness, enhancing follower satisfaction and organizational citizenship behavior (OCB) while lowering turnover intentions. In contrast, expressions of pride increase perceived selfishness, negatively impacting these outcomes. This emphasizes the importance of humility and gratitude in leadership, as opposed to pride, which can have detrimental effects on employee morale and retention.

Moreover, it has been found that gratitude expressions positively affect followers' trust in their leaders, while pride expressions have the opposite effect. This highlights the critical role of emotional expressions in building and maintaining trust within teams. Leaders who express gratitude are more likely to be perceived as trustworthy and reliable, fostering a positive and cohesive work environment. Compassionate love has also been identified as a cornerstone of servant leadership, which fosters virtuous attitudes such as humility, gratitude, forgiveness, and altruism. These attitudes enhance follower well-being and organizational outcomes, suggesting that servant leadership practices rooted in compassion and gratitude can lead to more satisfied and productive employees.

Prominent Theories and Future Directions

The reviewed literature is grounded in several prominent theories, including social exchange theory, broaden and build theory, and self-determination theory. These theories provide a robust framework for understanding the mechanisms through which gratitude influences workplace outcomes. For instance, social exchange theory explains how gratitude fosters reciprocal relationships between employees and organizations, increasing engagement and well-being. Similarly, the broaden and build theory highlights how gratitude expands employees' thought-action repertoires, leading to positive emotions and enhanced resilience.

The bibliometric analysis reveals a growing interest in workplace gratitude research, particularly after the COVID-19 pandemic. The United States leads in research output, followed by China and India, reflecting the globalization of research and the increasing contributions of emerging economies. The thematic map identifies key themes such as academic research, environmental values, and digital interactions, indicating the interdisciplinary nature of gratitude research. Future studies should explore the long-term effects of gratitude interventions, the role of cultural differences in gratitude expression, and the integration of gratitude into leadership development programs.

Conclusion

In conclusion, gratitude is a powerful tool that enhances employee well-being, engagement, and organizational culture across various industries. Organizations can create supportive environments by fostering gratitude practices, improving crisis management, and promoting positive workplace behaviors. Leaders who express gratitude and practice inclusive, servant leadership styles can foster a more engaged, proactive, and satisfied workforce. Integrating gratitude into organizational practices, from leadership development to daily interactions, can lead to more resilient and cohesive teams that are better equipped to navigate challenges and achieve long-term success. Organizations prioritizing gratitude will likely see improved employee satisfaction, reduced turnover, and enhanced overall performance.

Limitations

Although the present study on systematic review coupled with bibliometric analysis provides both a comprehensive literature review and scientific production of articles, it

still has some limitations. The data was extracted from a single source, the Scopus database, which resulted in the loss of prominent research works linked to other databases. Future researchers could follow mixed approaches while selecting a database (i.e., more than one database). A more robust model could be presented by combining Workplace Gratitude with other variables.

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The Mediating Role of Ethical Awareness in the Relationship Between Profit Orientation and Ethical Decision-Making in Competitive Work Environments

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Abstract

Organizations often prioritize profit to maintain growth and competitiveness; however, this focus can create ethical dilemmas that challenge employees' moral principles. Ethical awareness, defined as the ability to recognize and evaluate the ethical implications of decisions, is posited to mitigate the negative effects of profit-driven pressures on ethical behavior. This study examines the mediating role of ethical awareness in the relationship between profit orientation and ethical decision-making in competitive work environments. Using data from employees across various industries, analyzed through structural equation modeling (SEM), the findings reveal that profit orientation significantly impacts ethical decision-making, with ethical awareness serving as a partial mediator. Furthermore, the results highlight the critical importance of fostering ethical awareness and creating supportive ethical climates within organizations to balance financial objectives and ethical standards. These insights offer valuable implications for organizational leaders seeking to integrate ethical considerations into decision-making processes while maintaining competitive profitability.

Keywords: *Profit Orientation, Ethical Awareness, Ethical Decision-Making, Organizational Ethics, Mediation Analysis*

Introduction

In today's intensely competitive business environment, organizations are under constant pressure to achieve and sustain profitability as a key determinant of success. Profit orientation, characterized by the prioritization of financial targets and revenue growth, is essential for organizational expansion and survival (Friedman, 1962; Jensen, 2002). However, when profitability becomes the dominant focus, it often creates ethical challenges for employees who must navigate conflicting priorities. These challenges are particularly pronounced in high-pressure, competitive work environments, where decisions may involve compromising ethical standards to meet financial objectives (Dubinsky & Ingram, 1984).

Ethical decision-making, the process of evaluating and acting based on moral principles, is vital for preserving organizational integrity, societal trust, and long-term sustainability (Rest, 1986; Haidt, 2001). Yet, employees frequently face dilemmas where profit-driven objectives appear at odds with ethical considerations. This tension underscores the need for mechanisms that enable individuals to balance profitability with moral responsibility. Ethical awareness, defined as the ability to recognize and evaluate the ethical implications of decisions, emerges as a critical factor in addressing this dynamic. Individuals with heightened ethical awareness are better equipped to identify ethical dilemmas, understand their broader implications, and make decisions that align with both organizational and societal values (Akaah & Riordan, 1989).

The ethical climate within organizations plays a crucial role in shaping how employees perceive and respond to ethical challenges. Victor and Cullen (1987) emphasize that an ethical climate—comprised of norms, values, and rules— provides a framework that guides behavior, fostering accountability and moral responsibility. A strong ethical climate, coupled with an organizational culture that values integrity, can mitigate the ethical tensions posed by profit- driven pressures. In contrast, weak ethical climates may exacerbate the likelihood of ethical fading, where moral considerations are overshadowed by financial priorities (Tenbrunsel & Smith-Crowe, 2008).

Moreover, the pressures of business competitiveness can amplify these challenges, further highlighting the need for robust ethical frameworks. High levels of market competition often push organizations to prioritize short- term financial outcomes, sometimes at the expense of ethical standards (Dubinsky & Ingram, 1984). However, ethical awareness and a supportive ethical climate can act as buffers, empowering employees to make decisions that uphold ethical values while navigating profit-oriented objectives.

This study explores the dynamic relationship between profit orientation and ethical decision-making, with a specific focus on the mediating role of ethical awareness. It investigates how ethical awareness helps employees reconcile the competing demands of profitability and ethical

behavior, and how organizational culture and ethical climate influence this relationship. By examining these interactions, the research seeks to offer insights into how

organizations can balance financial performance with ethical integrity, fostering sustainable success in competitive work environments.

This exploration contributes to the broader discourse on ethical management, emphasizing the importance of cultivating ethical awareness and supportive organizational environments. By integrating concepts of profit orientation, ethical awareness, ethical decision-making, and ethical climate, the study aims to provide practical strategies for organizations to achieve profitability without compromising their moral obligations.

Literature Review and Hypotheses Development

Profit orientation has long been recognized as a central driver of organizational success, emphasizing the pursuit of financial targets and profitability as key objectives (Friedman, 1962; Jensen, 2002). This orientation often manifests in operational goals, decision-making processes, and employee responsibilities, where achieving financial outcomes becomes the primary focus. While such an approach can foster growth and competitiveness, it may also create ethical tensions by pressuring individuals to prioritize profit over other considerations. Research by Tenbrunsel and Smith-Crowe (2008) highlights how a strong focus on profit can lead to "ethical fading," where employees unintentionally disregard ethical dimensions in their work. This suggests that an excessive emphasis on profitability can influence organizational priorities and individual decision-making, reinforcing the need to explore how profit orientation shapes day-to-day activities and workplace dynamics.

In environments where profit orientation dominates, ethical awareness becomes a critical mediating factor that enables individuals to recognize and address the ethical implications of their decisions (Sternberg, 2011; Freire, 1970). Ethical awareness involves not only identifying ethical dilemmas but also understanding their broader consequences on stakeholders and society. Rest's Four-Component Model (1986) establishes ethical awareness as the first step in ethical decision-making, emphasizing that individuals cannot engage in moral judgment or action without first recognizing the ethical aspects of a situation. This foundational role of ethical awareness is further supported by Jones' Issue-Contingent Model (1991), which explains how factors such as the magnitude of consequences and social consensus enhance ethical awareness in high-stakes scenarios.

Organizations play a crucial role in fostering ethical awareness through training programs, resource availability, and a culture that encourages open discussion of ethical issues. Freire (1970) emphasizes the dynamic nature of ethical awareness, which evolves through reflection, education, and interaction. When employees are equipped to identify and evaluate ethical concerns, they are better positioned to balance profit-driven pressures with moral considerations. This is particularly relevant in competitive work environments, where the prioritization of financial goals may otherwise overshadow the recognition of ethical implications.

Ethical decision-making builds upon ethical awareness and involves evaluating actions based on moral principles, ensuring accountability, fairness, and societal trust (Rest, 1986; Haidt, 2001). Rest's Four-Component Model underscores the interconnectedness of awareness, judgment, intention, and behavior, asserting that ethical decision-making relies on the foundation of moral recognition. Jones (1991) adds that the characteristics of ethical issues—such as their perceived severity—affect how individuals approach ethical decisions. However, Haidt's Social Intuitionist Model (2001) challenges purely rational frameworks by highlighting the role of emotion and intuition. These intuitive judgments, influenced by workplace culture and individual predispositions, often shape ethical decisions in subtle but impactful ways.

Practical challenges arise in ethical decision-making when organizational pressures for profit compromise moral standards. Bandura's Theory of Moral Disengagement (1999) explains how individuals rationalize unethical behavior through mechanisms like moral justification or displacement of responsibility. For instance, employees may justify prioritizing profit over ethics by perceiving such actions as necessary for achieving organizational targets. This further underscores the mediating role of ethical awareness in mitigating disengagement, ensuring that decision-making processes are informed by moral values rather than dominated by financial goals.

The interplay between these constructs reveals a dynamic relationship. Profit orientation, while necessary for organizational success, can create ethical conflicts if left unchecked. Ethical awareness acts as a mediator, helping individuals and organizations navigate the tension between financial objectives and moral principles. Without awareness, employees may succumb to profit-driven pressures, leading to decisions that compromise ethical standards. Conversely, when ethical awareness is nurtured, it empowers individuals to recognize and address ethical dilemmas, facilitating decision-making that aligns with both financial and moral priorities.

Thus, the following hypotheses are proposed:

H1: Profit orientation significantly impacts ethical decision- making.

H2: Ethical awareness mediates the relationship between profit orientation and ethical decision-making.Methodology

Research Design

A quantitative approach was employed to explore the relationships between profit orientation, ethical awareness, and ethical decision-making. The study involved a sample of 160 prospective participants from C-Suite to Assistant level staff across various industries, ensuring a diverse representation of organizational perspectives in competitive work environments. The main objective was to investigate the mediating role of ethical awareness in the relationship between profit orientation and ethical decision-making. A structured survey was used to collect data on these three core variables: Profit Orientation (Independent Variable), Ethical Awareness (Mediator), and Ethical Decision- Making (Dependent Variable). Structural Equation Modeling (SEM) was utilized to analyze the direct and indirect relationships between these variables and to test the proposed hypotheses.

Data Collection

Data were gathered using a 15-question survey, with responses measured on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The survey was designed to assess the three key variables, as outlined below. Each variable was measured through a set of targeted questions designed to capture the essence of the respective dimensions.

Profit Orientation refers to the extent to which financial targets and profitability are prioritized in organizational decisions. It focuses on how profit considerations influence daily work tasks and decisions at different levels.

Ethical Awareness examines the participants' ability to recognize ethical dilemmas in their work environment and assess whether their actions align with ethical standards.

Ethical Decision-Making assesses the participants' adherence to moral principles when making decisions within the organization. It focuses on whether individuals prioritize ethics over profitability and how often they consider the long-term consequences of their actions.

Variable	Questions
Profit Orientation	How often does your organization prioritize financial targets in work-related decisions?
	Do you feel pressured to prioritize profit over other factors in your role?
	How frequently do you see organizational decisions align with ethical values?

A total of 143 responses were considered for analysis after removing incomplete responses.

Data Analysis

The data were analyzed using SPSS 23 and AMOS 23 following the guidelines of Anderson and Gerbing's (1988) two-step model. This approach involved the measurement model, which was used to conduct confirmatory factor analysis and assess reliability and validity among items and constructs, and the structural model, which was employed to evaluate model fit and test hypotheses.

To measure model fit, several indicators were used, including chi-square (χ^2), chi-square to degrees of freedom ratio (χ^2/df), Tucker–Lewis Index (TLI), Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Squared Residual (SRMR). An exploratory factor analysis (EFA) was also performed using principal component analysis with varimax rotation. A minimum factor loading criterion of 0.70 was established, and the communalities of the scale were calculated to ensure acceptable levels of variance explanation. The results showed that all communalities exceeded 0.50.

Bartlett's Test of Sphericity was conducted to evaluate the significance of the correlation matrix, yielding statistically significant results (χ^2 (66) = 760.196, $p < 0.000$). This indicated that the correlation matrix was suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.868, exceeding the threshold of 0.80, further confirming the appropriateness of the data for factor analysis.

The exploratory factor analysis (EFA) identified three factors that explained a cumulative variance of 67.26%. The rotated component matrix revealed that items loaded strongly on their respective constructs: profit orientation (PO), ethical awareness (EA), and ethical decision-making (ED). Standardized factor loadings for the retained items ranged from 0.713 to 0.821, all exceeding the recommended threshold of 0.50 (Hair Jr. et al., 2014). Additionally, communalities for all items were above the minimum acceptable value of 0.50, with values ranging from 0.542 to 0.770.

Table 1-KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.868
Bartlett's Test of Sphericity	Approx. Chi-Square	760.196
	df	66
	Sig.	.000

Table 2-Rotated Component Matrix

PO3 from the Profit Orientation construct, item EA3 from the Ethical Awareness construct, and items ED4 and ED5 from the Ethical Decision-Making construct were excluded from the analysis.

Internal reliability was assessed using Cronbach's alpha values for each construct, which ranged from 0.851 to 0.864, exceeding the threshold of 0.7. Composite reliability (CR) values ranged from 0.827 to 0.855, falling within the acceptable range of 0.70 to 0.90 (Sideridis et al., 2018). This confirms high reliability for all constructs.

Convergent validity was assessed using Average Variance Extracted (AVE), which indicates the amount of variance captured by a construct compared to the variance due to measurement error. The AVE values ranged from 0.545 to 0.663, with all constructs meeting the threshold of 0.50 (Bagozzi & Yi, 1988). This establishes convergent validity across constructs.

Discriminant validity was evaluated using the Fornell-Larcker criterion. The square root of the AVE for each construct was greater than its correlations with other constructs, confirming that all constructs are distinct and measure unique aspects of the model (Fornell & Larcker, 1981).

Table 3-Reliability and Validity Assessment

Constructs	**CR**	**AVE**	**Sq. Root of AVE**	**PO**	**EA**	**ED**
Profit Orientation (PO)	0.83	0.55	0.738	1	0.47	0.56
Ethical Awareness (EA)	0.84	0.56	0.747	0.47	1	0.66
Ethical Decision Making (ED)	0.86	0.66	0.815	0.56	0.66	1

Measurement and Structural Modelling

Confirmatory Factor Analysis (CFA) was conducted using AMOS to evaluate the measurement models for Profit Orientation (PO), Ethical Awareness (EA), and Ethical Decision-Making (ED). Items with low factor loadings were removed to improve the model fit. Specifically, item

The model fit indices were assessed to evaluate the overall goodness of fit. The results indicated an excellent fit, as shown by the following indices: CMIN/DF = 1.114 (threshold: between 1 and 3, excellent), CFI = 0.993 (threshold: >0.95, excellent), SRMR = 0.045 (threshold:

<0.08, excellent), RMSEA = 0.028 (threshold: <0.06, excellent), and PClose = 0.791 (threshold: >0.05, excellent). These results demonstrate that the measurement model met the required thresholds for reliability and validity, confirming the appropriateness of the constructs for further analysis (P.M. Bentler, 1990; Bentler & Hu, 1998; Hair Jr. et al., 2014).

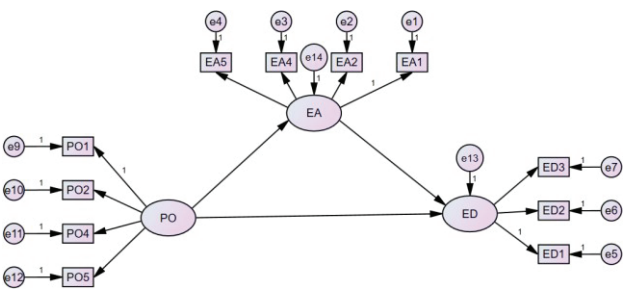


Table 4-Goodness of Fit Model

Criteria	**Value**
p-value	0
$\chi^2/df \leq 5.00$	1.528
GFI ≥ 0.80	0.828
AGFI ≥ 0.80	0.8

CFI ≥ 0.90	0.92
TLI ≥ 0.90	0.912

Table 6-Mediation Analysis

Criteria	Value
RMSEA ≤ 0.05 - 0.08	0.048
SRMR ≤ 0.08	0.057

The relationship between Profit Orientation (PO) and Ethical Decision-Making (ED) was found to be positive and significant, with an estimate of 0.293, a critical ratio (CR) of 3.176, and a p-value of 0.001, which is less than the 0.05 threshold. This result supports the hypothesis, indicating that Profit Orientation significantly influences Ethical Decision-Making. The R^2 value of 0.507 indicates that Profit Orientation explains 50.7% of the variance in Ethical Decision-Making.

Table 5-Hypothesis Testing

Hypothesis	Estimate	SE	CR	p-value	R^2	Decision
Profit orientation significantly impacts ethical decision-making.	0.293	0.092	3.176	0.001	0.507	Accepted

Thus, H1 is accepted, confirming that Profit Orientation significantly impacts Ethical Decision-Making.

Mediation Analysis

The study assessed the mediating role of ethical awareness (EA) in the relationship between profit orientation (PO) and ethical decision-making (ED). The results revealed that the indirect effect of profit orientation on ethical decision- making through ethical awareness was positive and significant (b = 0.222, lower bound = 0.089, upper bound = 0.397, p = 0.002), supporting the proposed mediation and H2. Furthermore, given the direct effect from profit orientation (PO) to ethical decision-making (ED) was significant, it shows that ethical awareness partially mediated the relationship between profit orientation and ethical decision-making. A summary of the mediation analysis is presented in Table 6.

Path	Indirect Effect	Lower Bound	Upper Bound	Significance	Decision
PO → EA → ED	0.222	0.089	0.397	p = 0.002	Partial Mediation

Conclusion

Ethical awareness plays a crucial role in mediating the relationship between profit orientation and ethical decision-making. In a competitive business environment, profit pressures can sometimes lead employees to prioritize financial gains over ethics, potentially resulting in unethical behavior. Ethical awareness counteracts this by enabling employees to recognize ethical dilemmas, evaluate their consequences, and balance financial goals with moral principles. Fostering ethical awareness helps ensure that business objectives align with societal values, promoting long-term success.

Organizations that actively cultivate ethical awareness are better equipped to prevent ethical fading, where short-term goals overshadow long-term ethical considerations. Employees with strong ethical awareness are more likely to make decisions that uphold both personal and organizational integrity. This approach leads to more sustainable practices wherein profitability and ethics work in tandem.

While this study highlights the importance of ethical awareness, further research should examine additional factors that influence ethical decision-making, such as leadership, corporate governance, and reward systems. Emotional intelligence and workplace relationships may also play significant roles.

Future research should also explore how ethical decision-making varies across industries and organizational contexts, as challenges and ethical dilemmas can differ based on sector-specific pressures, company size, and cultural influences. Understanding these differences will allow organizations to tailor ethical awareness programs to better address unique challenges in various environments.

Additionally, developing more effective tools to measure ethical awareness is crucial. Real-time assessments can help organizations implement timely interventions and improve their ethical training programs. Future research could also investigate the impact of interventions like mindfulness

training or ethical simulations in enhancing ethical awareness.

In conclusion, embedding ethical awareness into organizational culture ensures that business decisions remain both profitable and ethically sound. Ongoing research will deepen the understanding of ethical decision- making and help businesses navigate ethical challenges in a competitive world, fostering long-term trust and integrity.

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A Study on the Impact of Regional Entrepreneurship Ecosystem Factors on Firm Performance: Focused on Companies Supported by the University-Centered Entrepreneurship Program

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Abstract

This study empirically analyzed the impact of entrepreneurship ecosystem factors, including regional policy, entrepreneurial culture, infrastructure (incubation facilities), investment attraction environment, networks, market exploration, growth, and local attachment, on the firm performance of 75 startups supported by the University-Centered Entrepreneurship Program.

The factor analysis results indicated that the eight factors (policy, culture, infrastructure, investment attraction environment, network, market exploration, growth, and local attachment) demonstrated high reliability and validity, distinctly categorized. Correlation analysis revealed significant positive (+) correlations between firm performance and factors such as networks, market exploration, growth, and local attachment.

In the multiple regression analysis, infrastructure (β=0.481), networks (β=0.298), growth (β=0.349), and local attachment (β=0.247) were found to have significant positive (+) effects on firm performance. However, entrepreneurial culture unexpectedly exhibited a significant negative (-) coefficient (β=-0.351). Meanwhile, regional policy, investment attraction environment, and market exploration were not statistically significant in this model.

These findings suggest that incubation infrastructure, networks, growth strategies, and local attachment directly contribute to short-term improvements in firm performance. On the other hand, entrepreneurial culture and regional policies may exert indirect effects through mediating variables. Therefore, future research should expand the sample and apply structural equation modeling (SEM) to investigate more sophisticated causal relationships.

This study holds academic and practical significance by emphasizing the importance of "practical support systems," "growth strategies," and "community integration" in designing and managing regional entrepreneurship ecosystem policies and programs.

Keywords: *Entrepreneurship Ecosystem, Firm Performance, University-Centered Entrepreneurship Program, Startup Support, Regional Innovation, Infrastructure and Network, Local Attachment, Entrepreneurial Culture, Scale-up Strategy, Policy Impact on Startups*

1. Introduction

As startups are emerging as a key driver of national and regional economic growth worldwide, there is an active movement to create innovation ecosystems through collaboration between governments and the private sector (Acs & Audretsch, 1990; Autio, 2015; Audretsch & Thurik, 2001). In a context where growth strategies based on traditional industrial structures are reaching their limits, entrepreneurship is regarded as an effective means of simultaneously generating economic and social value in various aspects such as job creation, technological innovation, and new industry development (Shane & Venkataraman, 2000; Drucker, 1985).

Korea has also pursued multifaceted policies to revitalize the entrepreneurial ecosystem in line with this global trend. Recently, attention has been increasing toward fostering entrepreneurship at the regional level to address the problem of over-concentration in the capital region (Audretsch & Peña-Legazkue, 2012). In particular, the University-Centered Entrepreneurship Program, promoted through collaboration between the government and universities, aims to identify and nurture startups

tailored to regional characteristics, contributing to long-term goals such as regional economic development and job creation (Ministry of SMEs and Startups, 2023).

However, there is a relative lack of empirical verification regarding whether such support policies and programs actually enhance firm performance and what mechanisms underlie their effectiveness. The survival and growth of startups result from the interaction of multidimensional factors such as policy, culture, infrastructure, networks, and financial accessibility (Isenberg, 2011; Mason & Brown, 2014). Therefore, simple support for specific factors may have limited policy effects, and it has been argued that multiple elements need to work synergistically (Neck et al., 2004; Feld, 2012).

Based on this awareness of the problem, this study systematically analyzes the impact of entrepreneurship ecosystem factors—regional policy, entrepreneurial culture, incubation facilities, investment attraction environment, networks, market exploration, growth, and local attachment—on the firm performance of 75 startups participating in the University-Centered Entrepreneurship Program. By doing so, this research seeks to identify which ecosystem factors significantly enhance startup performance and provide strategic and policy implications for regional entrepreneurship promotion.

This study has three specific research objectives. First, it aims to verify the consistency between theoretical and empirical classifications. It examines whether the major factors of the entrepreneurship ecosystem suggested by prior studies (Isenberg, 2011; Spigel, 2017) are meaningfully categorized in empirical analyses, such as factor analysis.

Second, it seeks to explore the correlations and regression relationships between entrepreneurship ecosystem factors and firm performance. The study investigates the linear associations between each factor (e.g., policy, culture, infrastructure, networks) and firm performance, as well as the significant influences identified through multiple regression analysis.

Third, based on the analysis results, the study aims to derive specific recommendations for designing regional entrepreneurship ecosystem policies and fostering collaboration between universities and the private sector. It particularly discusses which factors should be prioritized to ensure the efficient operation of the University-Centered Entrepreneurship Program.

2. Theoretical Background

2.1 Concept and Components of the Entrepreneurial Ecosystem

The entrepreneurial ecosystem refers to the multidimensional interaction of environmental factors surrounding the creation, growth, exit, and re-entry of startups (Isenberg, 2011). This concept expands upon traditional studies of industrial clusters or regional innovation systems, emphasizing the combination of entrepreneurship and innovation to create regional economic dynamism and sustainable employment.

2.1.1 Regional Policy

Regional policy refers to the various systems and administrative support measures established by central or local governments and public institutions to assist startups and SMEs. Examples include simplifying startup licensing procedures, providing tax benefits, granting subsidies, easing regulatory requirements, and promoting technology commercialization (Isenberg, 2011).

Previous studies suggest that policy serves as a fundamental infrastructure, enabling startups to initiate and operate businesses more smoothly (Mason & Brown, 2014). For instance, inadequate administrative support or regulatory flexibility at the regional level can complicate the establishment and operation of startups, potentially reducing startup rates and survival rates. However, Neck et al. (2004) emphasized that policy is most effective when combined with other factors such as networks, infrastructure, and investment environments, functioning as part of an integrated system.

2.1.2 Entrepreneurial Culture

Entrepreneurial culture refers to the social and psychological dimensions that respect entrepreneurship and foster an environment of innovation and tolerance for failure (Isenberg, 2011; Spigel, 2017). It encompasses perceptions of entrepreneurs, societal acceptance of failure, and encouragement of new initiatives.

According to the GEM (Global Entrepreneurship Monitor) report, societal perceptions of entrepreneurship and innovation, such as respect for successful entrepreneurs and reduced stigma toward failure, significantly influence individual decisions to start businesses and early-stage entrepreneurial activity (TEA). Spigel (2017) viewed entrepreneurial ecosystems not as mere "aggregations of physical resources" but as relational and cultural structures where unique regional narratives critically influence entrepreneurship. For instance, Silicon Valley's legacy of entrepreneurial stories and its acceptance of second chances provide potential entrepreneurs with a psychological safety net, encouraging innovation.

Nonetheless, Mason & Brown (2014) argued that culture alone cannot elevate firm performance. Practical infrastructure such as incubators and networks must operate alongside cultural factors to maximize effectiveness.

2.1.3 Incubation Infrastructure

Incubation infrastructure refers to the physical and organizational support systems available to startups, such as incubators, accelerators, co-working spaces, startup support agencies, and specialized consulting services (e.g., legal, accounting, and intellectual property services) (Isenberg, 2011).

Such infrastructure provides critical resources for startups during their early stages when capital and manpower are often limited, thereby increasing the likelihood of survival and growth (Spigel, 2017). For example, affordable or nearly free spaces and facilities can significantly reduce the burden on startups struggling with limited budgets (Mason & Brown, 2014). Additionally, incubators and accelerators offer layered services like mentoring, technical advice, and investment connections, helping startups gain business expertise and industry networks (Lumpkin & Dess, 1996).

In South Korea, the University-Centered Entrepreneurship Program has linked regional incubators with university infrastructure, enabling startups to access R&D advice and collaborative research more efficiently (Gyeongnam Shinmun, 2024).

2.1.4 Investment Environment

The investment environment includes various funding sources such as angel investment, venture capital (VC), government funds, and crowdfunding, along with the accessibility of these resources. For startups to take risks and sustain innovation, adequate capital infusion is essential (Isenberg, 2011).

Venture capitalists and angel investors, who pursue high-risk, high-return investments, often provide not only funding but also networks and mentoring, accelerating startups' growth trajectories (Mason & Brown, 2014). Stam (2015) highlighted that an active venture investment ecosystem within a region allows innovative firms to undertake large-scale R&D investments or pursue global marketing initiatives. Conversely, the lack of investment opportunities forces entrepreneurs to operate conservatively, limiting creativity and scale-up potential. Neck et al. (2004) suggested that policy support (e.g., tax incentives) and the formation of investor communities (e.g., angel networks and investment conferences) are prerequisites for developing a robust financial ecosystem.

2.1.5 Networks

Networks refer to the structures in which stakeholders such as startups, large corporations, investors, research institutes, support organizations, and public institutions collaborate, exchange resources, and share knowledge and capabilities.

Spigel (2017) defined entrepreneurial ecosystems as "relational organizations," emphasizing that networks are the core mechanism driving ecosystem functionality. Information exchange among startups, open innovation with large corporations, investor connections, and cooperation with government entities are all facilitated through networks. Mason & Brown (2014) also found that regions with active collaboration among diverse players are more likely to produce high-growth firms. Events like networking meetings, joint projects, and mentoring programs help startups solve technical, market, and financial challenges quickly while building trust-based partnerships (Isenberg, 2011).

2.1.6 Market Exploration

Market exploration involves recognizing and pursuing new markets and business opportunities. This includes expanding into global markets, utilizing new technologies, and identifying niche markets.

Isenberg (2011) emphasized "Markets" as a crucial element of entrepreneurial ecosystems, noting that startups must access not only domestic markets but also international ones to enhance scalability. Examples include leveraging online distribution and digital platforms to actively explore new markets, leading to increased market share. Mason & Brown (2014) found that firms with strong export and internationalization capabilities at the regional level have a higher likelihood of achieving high growth, underscoring market exploration as a precursor to scale-up success.

2.1.7 Growth

Growth refers to the extent to which firms seek scale-up strategies or explore international market entry, along with their management, investment, and marketing plans (Wiklund, 1999).

Wiklund (1999) demonstrated that SMEs adopting aggressive growth strategies are more likely to transition into high-growth firms with rapid increases in revenue and employment. This involves bold investments in resources such as capital, talent, and technology, which require well-established incubation infrastructure, networks, and investment environments for execution (Mason & Brown, 2014). Lumpkin & Dess (1996) argued that firms with high entrepreneurial orientation are more likely to pursue market innovation and take calculated risks, leading to steeper growth trajectories.

2.1.8 Local Attachment

Local attachment refers to the sense of belonging, community consciousness, and willingness to contribute to regional development that entrepreneurs and startups have for their operating area (Kibler, 2013).

Kibler (2013) asserted that entrepreneurs with strong local attachment are more likely to utilize local resources (e.g., talent, customers, public support) and establish stable local networks, improving their survival rates and positively impacting the regional economy. Spigel (2017) also noted that entrepreneurs closely integrated with regional culture and communities actively participate in networking, information exchange, and mentoring activities, strengthening the entrepreneurial ecosystem. Examples include voluntary collaborations at local festivals and participation in regional economic activation projects.

2.2 Determinants of Firm Performance in Prior. Research

Firm performance is one of the most frequently studied topics in management and entrepreneurship. Traditionally, it has been measured using financial indicators such as revenue, net profit, market share, return on investment (ROI), and return on assets (ROA) (Venkatraman & Ramanujam, 1986). However, with startups often lacking sufficient financial data or facing significant uncertainty in their early stages, the use of non-financial indicators (e.g., customer satisfaction, brand recognition, market awareness) and subjective evaluations by entrepreneurs has become increasingly common (Lumpkin & Dess, 1996; Wiklund & Shepherd, 2005).

Covin & Slevin (1991) argued that SMEs with high entrepreneurial orientation can enhance both financial and non-financial performance through innovation, risk-taking, and creativity. Lumpkin & Dess (1996) emphasized that financial performance alone is insufficient to explain a startup's competitive advantage or long-term growth potential. Instead, factors such as innovation, market responsiveness, organizational flexibility, and customer satisfaction must also be considered.

In the context of entrepreneurial ecosystems, firm performance extends beyond individual profitability to include regional economic revitalization, job creation, and enhanced innovation capacity (Audretsch & Thurik, 2001; Acs & Audretsch, 1990). Identifying the determinants of startup performance is thus critical for informing policy and practical decision-making.

2.3 Research Model and Hypothesis Development

2.3.1 Research Model

This study establishes an analytical framework, as illustrated in <Figure 1>, to examine how entrepreneurial ecosystem factors (policy, culture, incubation infrastructure, investment attraction environment, networks, market exploration, growth, and local attachment) influence firm performance.

2.3.2 Research Hypotheses

Based on the research model in <Figure 1>, the following hypotheses are proposed:

H1: The higher the perceived effectiveness of regional policy, the higher the firm performance.

H2: The more favorable the entrepreneurial culture, the higher the firm performance.

H3: The greater the adequacy and accessibility of incubation infrastructure, the higher the firm performance.

H4: The better the investment attraction environment, the higher the firm performance.

H5: Firms that effectively utilize networks will exhibit higher firm performance.

H6: Firms with stronger market exploration capabilities will exhibit higher firm performance.

H7: Firms with growth-oriented strategies will exhibit higher firm performance.

H8: Firms with stronger local attachment will exhibit higher firm performance.

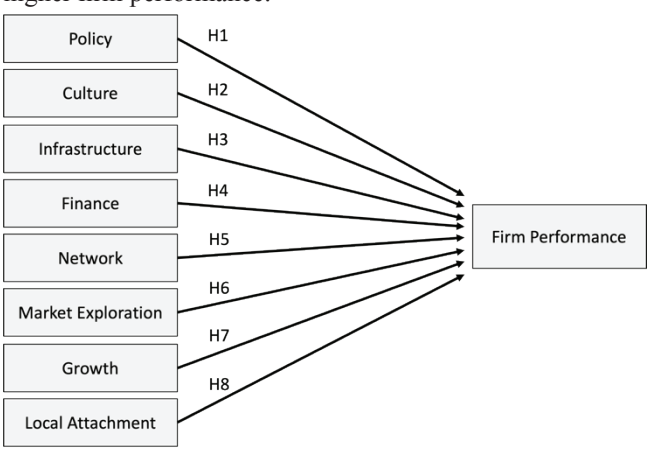


Figure 1 – **Research Model**

3. Research Methodology

3.1 Research Subjects and Sampling Design

The sample for this study consists of 75 startups selected for the University-Centered Entrepreneurship Program during 2023–2024. These companies span various industries and have received policy support (e.g., incubation facilities, investment, mentoring), making them a suitable group for evaluating entrepreneurial ecosystem factors.

The study was conducted over a three-week period from November 11 to November 30, 2024. Online surveys were administered to 75 startup representatives (or key executives) after explaining the research objectives.

The survey included questions related to entrepreneurial ecosystem factors and firm performance, using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

To analyze the impact of entrepreneurial ecosystem factors on firm performance, this study employed factor analysis, correlation analysis, and regression analysis. Factor analysis used principal component analysis (PCA) with Varimax rotation to assess the structural fit of the independent variables, while Cronbach's alpha and factor loadings were examined for reliability and validity. Correlation analysis identified the direction and significance of relationships between the factors and firm performance. Lastly, regression analysis was performed to evaluate the effects of entrepreneurial ecosystem factors on firm performance, with VIF used to check for multicollinearity.

3.2 Operational Definitions of Variables and Measurement Tools

Table 1 - Operational Definitions Variables

Factor	Operational Definition	References
Policy	Institutional environment, including local government and public institution priorities for startup support, regulatory easing, and administrative efficiency.	Isenberg (2011), Mason & Brown (2014), Neck et al. (2004)
Culture	Social attitudes that respect entrepreneurship, tolerate failure, and encourage innovation and risk-taking.	Isenberg (2011), Spigel (2017)
Infrastructure	Physical and organizational support systems, such as incubators, accelerators, and startup support agencies.	Isenberg (2011), Spigel (2017), Mason & Brown (2014)
Finance	Availability and accessibility of funding opportunities, such as angel investors, venture capital (VC), government funds, and investment support programs.	Isenberg (2011), Mason & Brown (2014), Neck et al. (2004)
Network	The level of collaboration and information exchange among stakeholders, including startups, corporations, universities, research institutions, investors, and public organizations.	Spigel (2017), Mason & Brown (2014), Feld (2012)
Market Exploration	The capability and willingness to identify and develop new markets or business opportunities, including global market entry and niche market identification.	Isenberg (2011), Mason & Brown (2014)
Growth	The degree to which firms seek expansion strategies (scale-up) or explore international market opportunities through innovation, investment, and marketing.	Wiklund (1999), Mason & Brown (2014)
Local Attachment	Sense of belonging, community identity, and willingness to contribute to regional development.	Kibler (2013), Spigel (2017), Neck et al. (2004)
Firm Performance	Comprehensive results reflecting the level of goal achievement, including financial and non-financial outcomes.	Lumpkin & Dess (1996)

Policy: Policy was measured using eight items that assess local government and public institution roles, such as regulatory easing, administrative efficiency, and startup support prioritization. The measurement was based on elements outlined by Isenberg (2011) and Neck et al. (2004).

Culture: Culture was evaluated with seven items, focusing on social perceptions, respect for entrepreneurs, tolerance for failure, and an innovative mindset. These cultural dimensions are also highlighted as core variables in the Global Entrepreneurship Monitor (GEM) report.

Infrastructure: Infrastructure was assessed using four items related to physical support facilities such as incubators, startup parks, accelerators, and access to professional services (e.g., legal, accounting). The framework was designed based on the "Supports" category discussed in Spigel (2017).

Finance: The financial environment was measured using four items covering access to funding opportunities, including angel investors, venture capital, and government funds. This construct incorporates elements of "finance and investment" proposed by Mason & Brown (2014).

Network: Network factors were assessed using four items evaluating collaboration and information sharing with other companies, institutions, public organizations, universities, and research institutions. The framework reflects the "relational organization" perspective of Spigel (2017).

Market Exploration: Market exploration was measured using two items focusing on identifying and preparing to

enter new markets or business opportunities. The construct aligns with the "Perceived Opportunities" dimension in the GEM report.

Growth: Growth was evaluated with two items emphasizing expansion strategies, international market entry, and future-oriented growth intentions. This measure incorporates the scale-up indicators proposed by Wiklund (1999).

Local Attachment: Local attachment was measured using four items addressing the sense of belonging, identity, and willingness to contribute to regional development. The framework is based on Kibler's (2013) perspective on regional entrepreneurial intention.

Firm Performance: Due to the challenges of obtaining financial indicators for early-stage startups, firm performance was measured primarily through subjective evaluations (manager perceptions) and non-financial indicators. The four items included revenue growth, customer satisfaction, competitiveness, and goal achievement, assessed using a 5-point Likert scale (Lumpkin & Dess, 1996).

4. Analysis Results

4.1 Descriptive Statistics

This study conducted a survey of 75 startups participating in the University-Centered Entrepreneurship Program. The key demographic characteristics of the respondents and their distribution across entrepreneurial stages are presented in <Table 2>.

Regarding gender, male respondents accounted for the majority, with 58 individuals (77.3%), while female respondents totaled 17 (22.7%). This reflects the general trend of a higher male participation rate in entrepreneurial activities compared to females.

In terms of age, the largest group was in their 40s, with 26 respondents (34.7%), followed by those aged 50 and older (22 respondents, 29.3%), and those in their 30s (21 respondents, 28.0%). Respondents in their 20s were fewer, numbering only 6 (8.0%). This suggests that entrepreneurial activities are primarily active among middle-aged individuals with career experience.

Regarding educational background, respondents with a bachelor's degree comprised the largest group at 30 (40.0%), followed by those with a master's degree (25 respondents, 33.3%) and doctoral degree holders (13 respondents, 17.3%). Respondents with a high school diploma accounted for only 7 (9.3%), reflecting the high proportion of highly educated individuals in the entrepreneurial ecosystem. Notably, more than 90% of the respondents held a college degree or higher.

When categorized by entrepreneurial stage, the largest group consisted of startups in the early stage (3 years or less), accounting for 36 respondents (48.0%). This was followed by growth-stage startups (4 to 7 years), with 24 respondents (32.0%), and pre-startup entrepreneurs, numbering 15 (20.0%). This distribution indicates that the sample primarily comprises early-stage and growth-stage entrepreneurs, highlighting the importance of support for these stages of entrepreneurship.

The total of 75 respondents represents a diverse range of ages, educational backgrounds, and entrepreneurial stages. The dominance of highly educated individuals and early-stage entrepreneurs in the sample suggests that the study effectively reflects a group actively engaged in the entrepreneurial ecosystem. These demographic characteristics provide valuable baseline data for designing entrepreneurship support policies and programs.

Table 2 - Distribution by Demographic Characteristics

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	58	77.3
	Female	17	22.7
Age	20s	6	8.0
	30s	21	28.0
	40s	26	34.7
	50s and above	22	29.3
Education	High school diploma	7	9.3
	Bachelor's degree	30	40.0
	Master's degree	25	33.3
	Doctoral degree	13	17.3
Entrepreneurial Stage	Pre-startup	15	20.0
	Early-stage startup (≤3 years)	36	48.0
	Growth-stage startup (4-7 years)	24	32.0
Total		75	100.0

4.2 Factor Analysis and Reliability Analysis

Principal component analysis with Varimax rotation revealed that eight factors (policy, culture, infrastructure, investment environment, network, market exploration, growth, and local attachment) were extracted as per their theoretical classifications, with most factor loadings exceeding 0.5. The Cronbach's alpha values for each factor were as follows: policy (α = .909), culture (α = .886), infrastructure (α = .886), investment environment (α = .851), network (α = .845), market exploration (α = .755), growth (α = .729), and local attachment (α = .863). These results indicate that the entrepreneurial ecosystem components proposed in prior studies (e.g., Isenberg, 2011; Mason & Brown, 2014) were validated in the context of domestic empirical data.

The Cronbach's alpha for all factors ranged from .70 to .90, demonstrating sufficient internal consistency for all measurement tools (Nunnally & Bernstein, 1994).

Table 3 - Variable Composition and Reliability Analysis

Factor	Number of Items	Cronbach's α	Description
Policy	8	.909	Institutional support such as regulatory easing, administrative efficiency, and prioritization of startup support.
Culture	7	.886	Social attitudes toward entrepreneurship, including respect for entrepreneurs, tolerance for failure, and encouragement of innovation and challenges.
Infrastructure	4	.886	Physical and organizational resources, such as incubators, accelerators, and startup support services.
Investment Environment	4	.851	Availability and accessibility of funding opportunities, including angel investors, venture capital, and government funds.
Network	4	.845	Collaboration and information exchange among startups, corporations, universities, and other stakeholders.
Market Exploration	2	.755	The ability and willingness to identify and develop new markets and business opportunities.
Growth	2	.729	Future-oriented strategies for scaling up or entering international markets.
Local Attachment	4	.863	Sense of belonging, community identity, and willingness to contribute to regional development.

4.3 Correlation Analysis Results

The correlation analysis between firm performance and entrepreneurial ecosystem factors revealed significant positive correlations for Network ($r = .255^*$, $p < .05$), Market Exploration ($r = .315^{**}$, $p < .01$), Growth ($r = .390^{**}$, $p < .01$), and Local Attachment ($r = .282^*$, $p < .05$). Although Infrastructure showed a p-value of .060, which did not meet the .05 threshold, its correlation coefficient ($r = .218$) indicated a positive direction. On the other hand, Entrepreneurial Culture, Regional Policy, and Investment Environment did not show statistically significant correlations with firm performance.

Table 4 - Correlation Analysis Results

Variable	Regional Policy	Culture	Infrastructure	Investment Environment	Network	Market Exploration	Growth	Local Attachment	Firm Performance
Regional Policy	1	0.534	0.500	0.391	0.342	-0.061	-0.001	0.152	0.025
Culture	0.534	1	0.531	0.334	0.339	0.032	-0.033	-0.015	-0.110
Infrastructure	0.500	0.531	1	0.138	0.198	0.003	-0.113	-0.103	0.218
Investment Environment	0.391	0.334	0.138	1	0.575	0.059	0.175	0.044	0.014
Network	0.342	0.339	0.198	0.575	1	0.178	0.112	0.158	0.255*
Market Exploration	-0.061	0.032	0.003	0.059	0.178	1	0.391	0.099	0.315**
Growth	-0.001	-0.033	-0.113	0.175	0.112	0.391	1	0.124	0.390**
Local Attachment	0.152	-0.015	-0.103	0.044	0.158	0.099	0.124	1	0.282*
Firm Performance	0.025	-0.110	0.218	0.014	0.255*	0.315**	0.390**	0.282*	1

4.4 Regression Analysis Results

The results of the multiple regression analysis, which set firm performance as the dependent variable and included eight factors as independent variables, are presented in <Table 5>.

First, **Infrastructure** emerged as the most significant positive predictor of firm performance ($\beta = .481$, $p < .001$). This indicates that the more abundant resources such as incubators, support facilities, and professional services are, the higher the firm's performance. This finding aligns with prior research highlighting the critical role of infrastructure in promoting early stability and growth for startups.

Growth (expansion strategies) also demonstrated a significant positive impact ($\beta = .349$, $p < .01$), suggesting that companies actively pursuing scale-up strategies or exploring international market opportunities are more likely to achieve higher performance. This underscores the importance of strategic planning and execution in driving firm success.

Network showed a positive effect ($\beta = .298$, $p < .05$), indicating that firms that establish collaborative relationships and share knowledge and resources with various partners are better positioned to gain a competitive edge in terms of profitability and market performance. The use of networks serves as a crucial foundation for resource exchange and cooperation within the entrepreneurial ecosystem.

Additionally, **Local Attachment** also had a significant positive impact on firm performance ($\beta = .247$, $p < .05$). This finding suggests that firms with a strong commitment to contributing to their local communities tend to achieve better outcomes. It is presumed that these firms benefit from synergies through local marketing efforts or collaboration with community networks (Kibler, 2013).

In contrast, **Entrepreneurial Culture** exhibited a significant negative effect ($\beta = -.351$, $p < .01$). While it was not significant in the correlation analysis, its negative coefficient in the regression analysis indicates that cultural factors alone may not guarantee improved performance. This result may reflect a scenario where cultural emphasis conflicts with tangible support factors (e.g., infrastructure, networks) in terms of relative explanatory power. In other words, even in regions with a strong entrepreneurial culture, a lack of practical support can hinder performance.

Finally, **Regional Policy**, **Investment Environment**, and **Market Exploration** were found to be statistically insignificant ($p > .05$). This suggests that the direct influence of these factors on firm performance is relatively weaker compared to others or that the characteristics of the study sample made it challenging to identify clear relationships.

Table 5 - Regression Analysis Results

Variable	Unstandardized Coefficients (B)	Standard Error	Standardized Coefficients (β)	t-value	p-value
Regional Policy	-0.102	0.121	-0.103	-0.844	0.402
Entrepreneurial Culture	-0.352	0.119	-0.351	-2.958	0.004**
Infrastructure	0.411	0.099	0.481	4.135	0.000***
Investment Environment	-0.133	0.110	-0.144	-1.215	0.229
Network	0.277	0.108	0.298	2.554	0.013*
Market Exploration	0.111	0.100	0.113	1.112	0.270
Growth	0.332	0.097	0.349	3.431	0.001**
Local Attachment	0.238	0.093	0.247	2.569	0.012*
Constant	0.365	0.636		0.574	0.568

Table 6 - Hypothesis Testing Results

Hypothesis	Result
H1: Regional Policy has a positive effect on firm performance.	Rejected
H2: Entrepreneurial Culture has a positive effect on firm performance.	Rejected
H3: Infrastructure positively affects firm performance.	Accepted
H4: Investment Environment positively affects firm performance.	Rejected
H5: Network positively affects firm performance.	Accepted
H6: Market Exploration positively affects firm performance.	Rejected
H7: Growth positively affects firm performance.	Accepted
H8: Local Attachment positively affects firm performance.	Accepted

5. Interpretation of Results and Discussion

5.1 Key Findings and Implications

This study confirmed that the adequate provision of infrastructure, such as startup incubators and accelerators, positively impacts startup performance. Infrastructure elements, including office space, equipment, mentoring, and specialized services such as legal and accounting support, are essential resources within an entrepreneurial ecosystem and prerequisites for success. Additionally, the findings reaffirm that networks operate through social capital in entrepreneurial ecosystems, enhancing firm performance by facilitating collaboration and resource sharing among various partners.

Firms with strong growth (scale-up) intentions demonstrated higher performance in terms of revenue and customer satisfaction, underscoring the critical role of growth strategies in boosting market outcomes. Expansion strategies, such as international market entry, aggressive marketing, and new product development, serve as key drivers of success.

Another significant factor was the firms' engagement with their local communities, which positively influenced performance. Startups with strong local attachment and a commitment to contributing to the community appeared to gain more resources and support through partnerships with local governments, residents, and businesses. This highlights the potential of community relationships to foster sustainable growth and regional economic revitalization.

Conversely, entrepreneurial culture alone was found insufficient to guarantee firm performance. High social recognition of entrepreneurship may not translate into tangible results if practical resources like infrastructure or networks are lacking. This finding suggests that entrepreneurial ecosystems require balanced development across multiple dimensions to maximize their effectiveness.

Although regional policy, investment environment, and market exploration were not statistically significant in this study, they may contribute to firm performance through indirect pathways or mediating effects. For instance, policies may strengthen infrastructure, which in turn boosts performance. Future research employing structural equation modeling (SEM) could explore these indirect mechanisms more rigorously.

In conclusion, this study empirically examined the impact of entrepreneurial ecosystem factors on firm performance. The findings underscore the importance of infrastructure, networks, growth strategies, and community engagement as core elements for the successful operation of entrepreneurial ecosystems. These results not only align with existing research but also clarify how diverse ecosystem factors contribute to firm performance.

6. Conclusion

6.1 Summary and Contributions

This study analyzed the impact of entrepreneurial ecosystem factors—policy, culture, infrastructure, investment, networks, market exploration, growth, and local attachment—on firm performance, focusing on 75 regional startups supported by the startup-focused university program. The factor analysis revealed that the eight factors were clearly distinguishable both theoretically and statistically. Multiple regression analysis showed that infrastructure, networks, growth strategies, and local attachment had significant positive effects on firm performance, while entrepreneurial culture had a negative coefficient when controlling for other variables. Policy, investment environment, and market exploration were not statistically significant in this model.

These findings indicate that regional startups achieve better performance not merely through "atmosphere" or "policy" but by effectively leveraging practical resources (e.g., infrastructure), cooperative networks, clear growth directions, and community ties. Furthermore, the study revealed that entrepreneurial culture alone cannot ensure performance improvement without simultaneous development of other infrastructural and resource factors.

6.2 Policy and Practical Recommendations

Based on the results, this study provides the following recommendations for enhancing entrepreneurial ecosystems:

1. **Strengthening Infrastructure:** Expanding physical and institutional infrastructure is the most urgent task. Without adequate facilities like startup incubators and accelerators, startups face barriers such as funding shortages, challenges in technology development, and workspace limitations during the early stages. Comprehensive infrastructure, including business support programs, prototyping spaces, and specialized consulting (e.g., legal, accounting, intellectual property), should be reinforced to provide startups with stable growth foundations.
2. **Regularizing Networking Events:** Creating regular opportunities for interaction among local businesses, research institutes, investors, and public institutions can help startups identify collaboration opportunities and resolve managerial or technical issues quickly. Regular networking events strengthen the interconnectedness of the entrepreneurial ecosystem and foster an environment conducive to sharing innovative ideas and resources.
3. **Supporting Growth Strategies:** Tailored support for companies with clear expansion strategies,

such as international market entry or new market development, is crucial. This could include participation in overseas exhibitions, global partnership programs, and capacity-building education for internationalization. Such measures would help scale-up-oriented firms achieve competitiveness and rapid growth in global markets.

4. **Enhancing Community Engagement:** Firms with strong local attachment are more likely to contribute to the regional economy in the long run. Strategies such as local brand marketing, participation in regional festivals and events, and collaboration on public projects should be encouraged to deepen firms' ties with the community. These efforts not only foster stable business operations but also contribute to regional economic revitalization.

5. **Improving Policy and Cultural Effectiveness:** Policies should not remain at the level of announcements or promotions but should deliver tangible outcomes at the entrepreneurial frontlines. Simplifying documentation processes, relaxing regulations, and increasing the number of support personnel directly deployed to startup operations are necessary steps. Entrepreneurial culture must go beyond slogans to establish institutional and social safety nets that tolerate failure and encourage second chances. Such actionable policies and cultural initiatives can provide entrepreneurs with both practical assistance and psychological assurance.

Together, these recommendations aim to elevate the overall quality of entrepreneurial ecosystems, laying a foundation for regional and national economic growth.

6.3 Limitations and Directions for Future Research

While this study provides valuable insights into the relationship between entrepreneurial ecosystem factors and firm performance, several limitations highlight the need for further research:

1. **Sample Size and Generalizability:** This study focused on 75 startups participating in a specific program within a specific region, which limits the generalizability of its findings. Expanding the research to include other regions and programs (e.g., initiatives led by the Ministry of SMEs and Startups or local governments) could validate the general characteristics of entrepreneurial ecosystems and enhance the external validity of the results.

2. **Lack of Longitudinal Analysis:** As a cross-sectional study, this research could not measure the long-term effects of ecosystem factors or their cumulative impacts on firm performance over time. Longitudinal studies are necessary to understand how these factors interact and influence performance across different stages of entrepreneurship, such as the startup, growth, and maturity phases. Such studies would provide valuable insights into the sustainability and long-term effectiveness of entrepreneurial support policies.

3. **Mediating and Moderating Effects:** This study did not analyze mediating or moderating effects. While entrepreneurial culture and policy were not directly significant, they may influence performance indirectly through factors like infrastructure or networks. For example, policies may enhance infrastructure, which then drives performance. Future research employing structural equation modeling (SEM) or mediation and moderation regression analyses could explore these mechanisms in greater depth.

In conclusion, while this study provides a foundational understanding of the relationship between entrepreneurial ecosystems and firm performance, broader samples, longitudinal observations, and advanced analytical methods could further enrich the field. These efforts would significantly contribute to the design of effective policies and ecosystem strategies.

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From Career-Centric Concern to Sense of Learning: A Regression-Based Study in Indian Organizations

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Abstract

Navigating the crossroads of career ambition and workplace learning reveals a pivotal connection that shapes both individual growth and organizational knowledge. It thus becomes imperative to study the relationship between Career Concern and Sense of Learning. Building on Self-Determination Theory (SDT) this study investigates this relationship, using data collected from the employees (N=162) from the Indian organizations. Data were collected using a survey questionnaire and analysed to assess how career concerns impact sense of learning within the organizational context. Employing linear regression analysis, the findings reveal that career concern significantly predicts sense of, highlighting the critical role of career related concerns in enhancing employees' learning experiences at work. The results demonstrate that increased individual's concern for their career trajectory, fosters a stronger sense of learning in the workplace. This study contributes to understanding workplace dynamics in the Indian context, emphasizing the importance of concern for career trajectory for professional growth and organizational learning. Additionally, this research forwards the SDT by linking career concerns with sense of learning; it bridges the gap between motivation theories and organizational learning, emphasizing intrinsic drivers like career aspirations in fostering workplace learning. Future research should consider exploring additional predictors and employing diverse sampling methods to generalize these findings across industries and cultural contexts.

Keywords: *career adaptability, concern, sense of learning, work passion, linear regression, self-determination theory*

Introduction

Over the past decade, a significant workplace transformation has taken place, driven by numerous factors, primarily, rapid technological advancements, societal changes and pandemic impact (Mercer, 2024). This includes, but is not limited to the human-machine collaborations, flexible work models and adaptation of data driven insights (Mercer, 2024). Today, employees' vocational concerns are centred around the need for personalized, equitable and autonomous learning opportunities which allocate adequate budget, time and resources; additionally, concerns about the clear career advancement paths and adaptability to technological changes are also paramount (Great Place To Work, 2024). The approach of development and learning has also evolved significantly wherein more emphasis is laid on individual growth journeys and development of tailored programs such that the needs of unique skills, ambitions and goals are met (Great Place To Work, 2024). Growth opportunities in the 21st century include career coaching, access to various learning platforms and resources such as certifications, webinars, crash courses and hackathons (Great Place To Work, 2024).

Indian organizations today are largely influenced by the rapid integration of artificial intelligence (AI) and automation (Wheebox, 2024). These shifts are not only reshaping the job roles but also necessitates a fresh focus on continuous learning, reskilling and upskilling (Wheebox, 2024), emphasizing the need for adaptability, technological proficiency and commitment to employee well-being.

The Future of Jobs Report 2023, by the World Economic Forum emphasizes that 23% of jobs are prospectively heading towards significant changes by 2027 due to shifting economic priorities and technological advancements (World Economic Forum, 2023). Along the same lines the International Labour Organization highlights the rising influence of gig economy and remote work trends in altering the employment landscape (*World Employment and Social Outlook*, 2022). These critical developments require employees and employers alike to adapt to this new paradigm shift in productivity, collaboration and skill acquisition.

In the context of Indian workplace, these changes are particularly accentuated by the national demographic dividend and diverse economic sectors. Reports from the Ministry of Skill Development and Entrepreneurship and NITI Aayog emphasize the need for reskilling and upskilling initiatives to address the skill gaps with particular focus on technology-intensive domains (Ministry of Skill Development and Entrepreneurship, 2023). The government has started initiatives like Digital

India and Skill India Mission to prepare the workforce for emerging opportunities. However, challenges like the digital divide, non-uniform access to education and large informal economy complicate and decelerate the implementation of these initiatives. The advent of hybrid work set-ups and flexible employment options are pushing Indian organizations to rethink their traditional management practices.

With the workplace evolution, concerns surrounding career stability, job satisfaction and career growth have taken a spotlight in the employee experience. Employees today are increasingly prioritizing alignment with organizational values and personal fulfilment over traditional metrics of career success. This shift is accentuated around the focal point on mental health, work-life balance and ethical work environments. Industries such as IT, e-commerce and healthcare are experiencing high turnover rates as the employees seek roles that offer long-term security and learning opportunities. Furthermore, marginalized groups and women face unique challenges in manoeuvring these changes given the systemic barriers and accessibility to leadership roles.

The workplace changes are met with fostering of a sense of lifelong learning and adaptability among employees. The World Economic Forum report underscores that upskilling, with digital literacy, emotional intelligence and critical thinking, is no more an option, rather imperative (World Economic Forum, 2023). Learning initiatives are critical not only for career growth but also to instil psychological resilience amidst uncertainties.

Efforts to embed a culture of lifelong learning are often reflected in Indian government and private sector collaborations. Programs such as *Pradhan Mantri Kausal Vikas Yojna* lays a pathway for acquisition of in-demand skills (*Pradhan Mantri Kaushal Vikas Yojana 2.0 (PMKVY 2.0) 2016-20 | Ministry of Skill Development and Entrepreneurship | Goverment Of India*, n.d.) while corporate programs focus on fostering innovation and creativity. However, employees often struggle to balance skill development with work responsibilities, creating a need for supportive environment and policies.

Research Objectives

Within Indian organizations, the relationship between career concerns and sense of learning remains underexplored. Existing studies, despite their suggestion that organizational learning, facilitated by strategic human resource management practices, correlates positively with organizational performance (Khandekar & Sharma, 2006), the specific impact of individual career concerns on personal learnings is not well documented. Moreover, while research has examined the career management practices in Indian organizations (Budhwar & Baruch, 2003), the direct link between employees' career related anxieties and their learning activities requires further investigations. With these established facts, the present research aims to

1. Study the impact of career concerns on sense of learning.

2. Compare the differences in sense of learning among freshers and experience employees and public and private sector employees.

Addressing this gap is crucial for development of targeted interventions that align with career development initiatives with organizational learning cultures, consequently enhancing employees' adaptability and growth and reducing career concerns.

Theoretical Framework

The present research, rooted in the Career Construction Theory (Savickas, 2005) and Self-Determination Theory (Ryan & Deci, 2000), offering a theoretical foundation to examine the relationship between career concerns and the sense of learning. Career Construction Theory stresses on individual's proactive role in shaping their career pathway through adaptability and self-directed development, specifically in dynamic workplace environments. Meanwhile, Self Determination Theory emphasizes the importance of intrinsic motivation and autonomy in nurturing growth and engagement, aligning well with the authors' focus on autonomous and personalized learning opportunities. This study, building on these frameworks, logically explores how career concerns, which are an integral aspect of career adaptability, catalyses learning behaviour by navigating individuals to acquire new skills and adapting to changing professional demands. This theoretical integration not only situates career concerns in a broader framework of development and motivation, but also explains the psychological underpinnings of a learning as a response to career uncertainties. By exploring these horizons, the research contributes to an intricate understanding of how career related anxieties push individuals to towards lifelong learning and adaptability, specifically in evolving workplace contexed in Indian settings.

Sense of Learning

The modern workplace is progressively acknowledged as a crucial place for professional development, organizational innovation and lifelong learning. Sense of learning as a dimension, the behavioural aspect of work passion, is characterized by a continuous learning mindset and the effort to improve one's work (Johri et al., 2016). The learning in workplace contexts is affected by a range of factors from managerial practices, organizational culture to role of technology and individual readiness. Learning at workplace manifests itself in formal, informal and hybrid modes. Whereas structured training

programs primarily compose formal learning, providing opportunities for acquisition of new skills, informal learning often involves on-the-job problem-solving, peer interactions and proactive self-directed initiatives (Kyndt et al., 2016). The duality of physical and digital workspace, emphasised as "phygital environments" by Karhapää et al., (2024)interviews and participant diaries. Findings – The digital work environment consisted of a complex network of technologies and people connected to them. The ethnographic accounts revealed both expansive and restrictive features of the digital environment. Digital technology extended learning opportunities by providing flexible possibilities for interaction, collaboration and access to a wealth of information. On the contrary, digitally mediated presence could restrict learning if the attendance and learning remained superficial. The complexity and constant change in digital workplace environments presented challenges that could potentially restrict learning. Information overload, constant interruptions and changes were burdens that required employees' skills to manage these challenges.1758-7859","issue":"9","journalAbbreviation":"JWL","language":"en","license":"https://www.emerald.com/insight/site-policies","page":"19-36","source":"DOI.org (Crossref explains the role of digital tools in fostering knowledge sharing and collaborations, albeit not without challenges such as information overload. Along the same lines, (Van Der Baan et al., 2024)organizations are investing in continuous skills development of their employees and therefore implement personal development plans (PDPs self-directed learning, which mediates the relationship between perceived autonomy support and engagement in both formal-informal leaning activities, is enhanced by autonomy supportive environments.

Digital technology also encourages new forms of learning as explored by Aroonsri & Crocco (2024) where gig workers used social media platforms to share tacit knowledge, support one another as virtual communities, demonstrating the potential of technology to overcome the conventional barriers on learning. Deshmukh & Mehta (2024) found a negligible effect of social influence on online learning continuance, but also identified performance expectancy, effort expectancy and management support to be the critical factors for the same.

The social fabric of workplace significantly affects the outcomes of learning. Staff cohesion, fostered by shared vision, trust and managerial support reduced knowledge hiding and enhanced learning (Birhanu & Gugssa, 2024). Relational spaces encouraging reflections and collaboration are critical in hybrid or virtual settings (Lokhtina & Faller, 2024). Additionally, trust forms an essential element in structured learning relationships such as coaching and mentoring. Weinberg & Hausfeld (2024) found that client readiness for coaching and the trust in coach significantly impacts work effectiveness and personal learning. This relationship between trust and improved performance is also mediated by personal learning.

A learning-oriented workplace is moulded by cultural, structural and interpersonal factors. By providing encouragement and resources for employee development, perceived organizational support fosters a sense of learning. Organizations with robust support systems aid engagement in learning activities (Garavan et al., 2002; Khurram, 2009)intermittent and discontinuous learning to increasingly informal, experiential, asynchronous and real-time situated learning. Highlights three contemporary themes in both the workplace learning and HRD literatures, namely: knowledge, expertise, competence and capability; organisational learning; and employability and career resource development and workplace learning: Emerging theoretical perspectives and organisational practices","This study aims at exploring the relationship of university teachers' perception of organizational support with its antecedents and consequences. This study uses Social Exchange Theory (Blau, 1964. Constructive managerial practices like coaching and mentoring further promote learning by creating opportunities for reflective practices and skill acquisition (Jin & McDonald, 2016). Additionally, the cultural orientation of an organization is also a significant driver of learning. Job characteristics such as enrichment and task variety are enablers of informal learning and reflective practices and are crucial across sectors but undergo different implementation (Hetzner & Heid, 2015).

Both organisations and individuals gain profound benefits from learning at the workplace. Improved organizational performance, enhanced job satisfaction and better career development are common outcomes (Baruch & Bozionelos, 2011; Boardman et al., 2010) definitions (e.g., Arnold, 1997; Arthur, Hall & Lawrence, 1989; Greenhaus, Callanan & Godshalk, 2000; Kram, 1985. Informal learning environments drive innovation, problem solving skills and adaptability, which are essential elements for competitive industries (Kyndt et al., 2016). Private firms emphasize profitability and market competitiveness, whereas public organizations, while constrained by resources and bureaucracy, align learning initiatives with societal goals, whereas (Camilleri, 2007) role states, job characteristics, employee□leader relations, and employee perception of the organisation. Results were obtained through: structural equation modelling for the examination of multiple relationships between PSM and its dimensions, and the antecedents; and ANOVA for testing the individual hypotheses.\n\nFindings\nThis study provides some evidence to show that the PSM of public employees is mainly the result of the organisational environment surrounding them. The motivational context variables particularly those related to the organisational setting are the most dominant predictors of the PSM

Career Concern

Concerns related to career are crucial aspects of professional development and career development. Career concerns are usually connected to career adaptability, which includes four dimensions of confidence, curiosity, control and concern (Maggiori et al., 2017)in varied settings, the aim of this article was to develop a brief 12-item version, the Career Adapt-Abilities Scale–Short Form (CAAS-SF. The "concern" dimension of career adaptability, as defined by Mark Savickas, refers to an individual's capacity to look ahead and prepare for future career tasks and challenges. Savickas explains it as the extent to which a person is aware of the importance of career planning and feels optimistic about their vocational future (Savickas, 2005). They reflect a proactive method towards manoeuvring professional changes. Career adaptability in organizational context has been studied avidly. It has been emphasized by Chouhan (2022) to be linked negatively to turnover intention and positively impacting career satisfaction.

Career concerns include apprehensions and motivations regarding the career trajectory and progressions. They are shaped by various factors including personality traits such as self-efficacy and proactive behaviours that enhance career adaptability (Guo et al., 2014a). Yousefi et al. (2011) reported that career related concerns along with social support and learning goal orientations are significant predictors of adaptability. Along the same lines, career adaptability was reported as a mediator between social support and career concerns; additionally having a learning orientation was associated with fewer career concerns (Creed et al., 2009). Work experience further effects the career concerns. Early-career individuals face an acute career concerns due to their restricted experience (Kooij et al., 2017). Organizational factors such as career opportunities and perceived employability, further drive career concerns, with job insecurity acting as a significant moderator (Kraimer et al., 2011; Ngo et al., 2017)we found that participation in training classes, leader–member exchange, and career mentoring were each positively related to employees' perceptions of organizational support for development. We also found support for the moderator hypotheses. Specifically, development support positively related to job performance, but only when perceived career opportunity within the organization was high. Further, development support was associated with reduced voluntary turnover when perceived career opportunity was high, but it was associated with increased turnover when perceived career opportunity was low. Our study demonstrates that social exchange and career motivation theory work together to explain when and how employees' perceptions of organizational support for development relate to turnover and job performance. (PsycInfo Database Record (c. They also promote adaptability and career success by enhancing proactive work behaviour (Spurk et al., 2019). These suggest the complexity of career concerns in driving both organizational stability and individual outcomes. The multifaceted role highlights the importance of addressing career concerns to foster organizational and individual outcomes.

Career Concern and Sense of Learning

A central response that emerges with career concerns is learning. In organizational contexts, a learning culture fosters skill enhancement directional with career goals, acknowledging the connection between professional growth and adaptability (Fugate et al., 2004). Zacher (2014) pointed how individuals with high adaptability, to mitigate career uncertainty, engage in lifelong learning.

For developers intrinsic motivation shows a suggestive links between career goals and technical and collaborative skill acquisition (Subramanyam & Xia, 2008). Managerial decision making, similarly, is influenced by career concerns, promoting learning and strategic effort allocation (Loss & Renucci, 2021)managers use projects and effort to influence the labor market beliefs regarding their ability. We show that managers consider how projects affect the extent to which posterior beliefs can differ from initial beliefs, the precision of posterior beliefs, and equilibrium implementation effort costs. The following results obtain. Although projects differ only in terms of the information they reveal, equilibrium implementation effort costs can reverse project choices. More informative projects can induce lower effort despite the learning effect identified by Holmströmm's paper (1999.

Construction and career adaptability theories emphasize addressing career concerns through strategic interventions, such as training and counselling, to reduce career related concerns (Guo et al., 2014b). Since career concerns drive individuals to engage in skill enhancement, lifelong learning, and strategic growth efforts to mitigate career uncertainties and achieve career goals. We hypothesize the relationship shown in the picture:

H1: Concerns would be positively related to sense of learning.

Hypothesized Model: Showing the hypothesized relationship between Concern and Sense of Learning.



H2: There would be a significant difference in the sense of learning levels of public and private sector employees.

H3: There would be a significant difference in the sense of learning levels of freshers and experienced employees

Rationale for the study

The modern workplace, driven by societal changes, technological advancements and pandemic's impact, is undergoing profound transformations. These transformations have raised career concerns, such as skill development and adaptability as crucial factors in influencing employee personal growth and learning. However, this relationship between career concerns and sense of learning stays underexplored, specifically in Indian context. This quantitative study aims to address this gap by how career concerns shape sense of learning among employees and comparing these effects across different organizational sectors and different career stages.

Originality Value

This research provides a novel perspective by linking career concerns directly with the sense of learning, an understudied connection in existing literature. It uniquely focuses on the Indian context exploring sectoral and career-stage differences in sense of learning.

Importance of the Research

Exploring the proposed interplay between career concerns and sense of learning is vital for building an adaptive workforce that is resilient to the dynamic nature of today's work environment. The findings of this study will aid in developing targeted interventions like career counselling and personalized training programs based on individual's needs to foster employee growth and well-being. By addressing career concerns, organizations can improve performance, enhance learning cultures and support learning through lifespan, offering both practical and academic contributions to the field.

Method

Sampling and procedure

Data was collected from the full-time employees of various services and manufacturing related public and private organizations from various parts of India. Respondents were selected based on having a minimum of one year of work experience. These respondents were working at junior, middle and senior level of various organizations. It has been suggested that gathering data from diverse sources aids the generalizability (Agarwal & Gupta, 2018; Tomarken & Serlin, 1986)the purpose of this paper is to develop and test a moderated-mediation model examining the relationships between motivating job characteristics, work engagement, conscientiousness and managers' turnover intentions.\n \n \n Design/ methodology/approach\n Data were collected using a survey questionnaire from 1,302 managers working in eight Indian private sector organizations. Structural equation modeling and hierarchical regression analysis were used to test the hypothesized relationships between the study variables.\n \n \n Findings\n The study found evidence of the mediating role of work engagement for the relationship between motivating job characteristics and managers' turnover intentions. Conscientiousness moderated the relationship between work engagement and turnover intention. The total and indirect effects of motivating job characteristics on turnover intention were moderated by conscientiousness.\n \n \n Research limitations/implications\n The study was cross-sectional, so inferences about causality are limited.\n \n \n Practical implications\n The findings of this study reaffirm the crucial role of job characteristics in influencing work engagement and turnover intention. By examining work engagement as a mediator for the job characteristics-turnover intention relationship, this study explores the process through which job characteristics are associated with turnover intention. The findings of the moderating influence of contentiousness on the relationship of direct and indirect effects of job characteristics suggests that individual personality can influence social exchanges as well as managerial attitudes and behaviors in multiple ways.\n \n \n Originality/value\n The study provides an insight into the underlying process through which job characteristics are related to managers' turnover intentions. To the best of the authors' knowledge, such a study is the first of its kind.","container-title":"Personnel Review","DOI":"10.1108/PR-09-2016-0229","ISSN":"0048-3486","issue":"2","journal Abbreviation":"PR","language":"en","license":"https://www.emerald.com/insight/site-policies","page":"353-377","source":"DOI.org (Crossref. The survey was designed on Google Form in English and was circulated to the respondents through electronic channels including emails, LinkedIn and WhatsApp. The circulated instrument communicated the researchers' objectives, assurance of using the data for academic purposes and maintaining anonymity of the respondents.

A response rate of 21.6% was observed wherein 162 responses were received out of the total distributed 750 questionnaires. The Google Form was designed in a way that it required respondents to necessarily respond to each item, making it insusceptible to missing responses or incomplete submissions. The questionnaire also collected demographic information of the respondent under the heads of their age, sex, marital status, educational background, nature of organization, status of organization, and job position level. The collected information and their respective share is tabulated in Table 1.

Table 1

Demographic profile of the respondents

Demographic Features	Sample (n=162)	% (Percentage)
Sex		
Female	52	32.10
Male	110	67.90
Age		
21-35 years	116	71.60
36-50 years	36	22.22
51-65 years	10	6.17
65 and above	0	0
Education		
Diploma	16	9.88
Graduate	82	50.62
Postgraduate	56	34.57
Ph.D.	8	4.94
Experience		
Up to 5 years	94	58.02
5-10 years	14	8.64
More than 10 years	54	33.33
Organization Status		
Public	65	40.12
Private	97	59.88
Nature of Organization		
Manufacturing	51	31.48
Service	111	68.52
Job Position		
Junior level	68	41.98
Middle level	88	54.32
Senior level	6	3.70

Research Approach

A descriptive cross-sectional method was adopted for this paper with a covariance-based non-random sampling approach. Furthermore, the data were gathered using a self-reported survey questionnaire. It is fitting to use collect precise and sensitive data for a cross-sectional research using a self-referential scale (Babbie, 2020). (Verma et al., 2020) favoured the use of convenience sampling to be suitable for an unknown population that is scattered around the nation. It was, thus, foreseen that convenience sampling would effectively outweigh the random sampling procedure for the present study.

Measures

For the two variables of the present study, Concern and Sense of Learning, reliable and valid measurements used in past studies were employed. The adopted operationalizations and instruments were used with a seven-point "Likert scale".

Concern

The conceptualization and measurement of the independent variable concern was done by a 3-item subscale from Career Adapt-Abilities Scale-Short Form developed by Maggiori et al., (2017)in varied settings, the aim of this article was to develop a brief 12-item version, the Career Adapt-Abilities Scale–Short Form (CAAS-SF. The Cronbach's reliability coefficient for this scale was 0.822. An indicative item of the scale is "Thinking about what my future will be like." The items were responded in reference to the instruction "Please rate how strongly you have developed each of the following abilities using the scale," on a 7-point Likert scale where 1 meant "Not at all strong" and 7 implied "extremely strong" with 4 as the middle point reflecting "moderately strong."

Sense of learning

The conceptualization and measurement of the dependent variable sense of learning was done by a 4-item subscale developed by Johri et al., (2016). The Cronbach's reliability coefficient for this scale was 0.756. An indicative item of the scale is "I would still do this work, even if I received less pay." The items were on a 7-point Likert scale where 1 meant "Very strongly disagree" and 7 implied "Very strongly agree" with 4 as the middle point reflecting "Neutral." One of the four items was dropped due to low factor loading.

Analytical Approach

The collected data were analyzed using IBM SPSS (27th version) and IBM AMOS (27th version). Confirmatory factor analysis (CFA) was done to assess the measurement model. Fit indices such as goodness of fit index (GFI), normed fit index (NFI), adjusted goodness of fit (AGFI)and comparative fit index (CFI) were taken into consideration for the assessment of model fit quality. An RMSEA, root mean square error of approximation, value under 0.05 implies a very good fit while values between 0.06 and 0.08 indicate an acceptable error of approximation (Hooper et al., 2008)guidelines are presented on their use. The paper also provides reporting strategies of these indices and concludes with a discussion on the future of fit indices.","container-title":"Electronic Journal of Business Research Methods","ISSN":"1477-7029","issue":"1","language":"en","license":"Copyright (c. Further, the construct's convergent and discriminant validity were assessed. Independent sample t-test and simple linear regression analysis were done to assess the hypotheses.

Results

Assessment of measurement model

The means, standard deviations and correlations are depicted in Table II and the standardized factor loadings, reliability of the constructs and validity is shown in Table III. The CFA of the variables showed a good model fit with (χ^2= 14.696, degrees of freedom (df)=8, χ^2/df =1.837, p= 14.696, NFI = 0.955, CFI = 0.978, TLI = 0.960, RMSEA = 0.072). An RMSEA value in the interval 0.06-0.08 indicates an acceptable fit (Hooper et al., 2008; Steiger, 2007)guidelines are presented on their use. The paper also provides reporting strategies of these indices and concludes with a discussion on the future of fit indices.","container-title":"Electronic Journal of Business Research Methods","ISSN":"1477-7029","issue":"1","la nguage":"en","license":"Copyright (c. Additionally, the standardized estimates of the items ranged from 0.725 to 0.840 for concern and from 0.579 to 0.823 for sense of learning. For a significant convergent validity of the used instruments, a high composite reliability and substantial loadings are the indicators (Cable & DeRue, 2002). According to (Fornell & Larcker, 1981)in addition to the known problems related to sample size and power, is that it may indicate an increasing correspondence between the hypothesized model and the observed data as both the measurement properties and the relationship between constructs decline. Further, and contrary to common assertion, the risk of making a Type II error can be substantial even when the sample size is large. Moreover, the present testing methods are unable to assess a model's explanatory power. To overcome these problems, the authors develop and apply a testing system based on measures of shared variance within the structural model, measurement model, and overall model.","container-title":"Journal of Marketing Research","1547-7193","is sue":"1","journalAbbreviation":"Journal of Marketing Research","language":"en","license":"https://journals.sagepub.com/page/policies/text-and-data-mining-license","page":"39-50","source":"DOI.org (Crossrefthe average variance extracted (AVE) for a construct should exceed the shared variance it has with other constructs, where shared variance is defined as the squared correlation between the constructs. The authors' calculations portray the discriminant validity for both the constructs, concern and, sense of learning.

Table 2

Means, Standard Deviations and Correlation

Variables (n=162)	Mean	SD	1. Concern	2. Sense of learning
1. Concern	5.11	1.194		
2. Sense of learning	4.41	1.366	0.357**	

Source: Authors' calculations.

Table 3

The overall reliability, discriminant validity of the constructs and the standardized loadings of the indicators.

Constructs	Indicators	AVE	MSV	(α)/CR	Factor loadings	t-values ***
Concern		0.609	0.092	0.822/0.823		
	CON1				0.725	8.527
	CON2				0.840	8.948
	CON3				0.772	
Sense of learning		0.526	0.092	0.756/0.765		
	SoL1				0.752	
	SoL2				0.823	6.927
	SoL4				0.579	6.351

Note. AVE, average variance extracted; CR, composite reliability; MSV, maximum shared variance; α = Alpha Coefficients; ***p<0.001

Source: Authors' calculations.

Regression analysis of the proposed relationship

A simple linear regression was conducted to examine whether Concern significantly predicts Sense of Learning. The regression model was statistically significant, $F(1, 160) = 23.36$, $p < .001$, and accounted for approximately 12.7% of the variance in sense of learning ($R^2 = .127$, Adjusted $R^2 = .122$).

The unstandardized regression coefficient (B) for Concern was 0.436 (SE = 0.090), indicating that for each one-unit increase in Concern, Sense of Learning increases by 0.436 units. The standardized coefficient (β) was 0.357, which is a medium effect size. The relationship was statistically significant, $t(160) = 4.83$, $p < .001$. Thus, the hypothesis H1 was supporting. Table 4 shows the figures obtained by the analysis.

Table 4

Linear Regression Analysis Predicting Sense of Learning from Concern

Predictor	B	SE B	β	t	p	95% CI (Lower, Upper)
Constant	0.000	0.082	-	0.00	1.000	[-0.162, 0.162]
Concern	0.436	0.090	0.357	4.833	***	[0.258, 0.614]

Note. B = unstandardized regression coefficient; SE B = standard error of B; β = standardized regression coefficient. ***p < .001

Source: Authors' calculations.

Independent Sample t-test (organization status and sense of learning)

The data gathered on the organization status (public/private) was employed to test the hypothesis H2. An independent-samples t-test was conducted, refer table 5 to compare the sense of learning for public and private organization employees. There were significant differences (t (156.463) = 2.674, p = 0.008) in the scores. The mean score for employees from public organizations (M = 0.266, SD = 0.924) was higher than the employees of private organizations (M = -0.178, SD = 1.190). The magnitude of the differences in the means (mean difference =0.4456, 95% CI: 0.116 to 0.774) was significant. Hence, H2 was supported.

Independent Sample t-test (work experience and sense of learning)

To test the hypothesis H3, the data gathered on the work experience level of the respondents was divided into freshers and experienced employees into less than five years work experience and more than five years work experience respectively. An independent-samples t-test was conducted to compare the sense of learning for freshers and experienced employees. As shown by table 6, there were significant differences (t (157.16) = -2.369, p = 0.019) in the scores. The mean score for freshers (M = -0.1683, SD = 1.1774) was lower than experienced (M = 0.2327, SD = 0.9718). The magnitude of the differences in the means (mean difference =0.4009, 95% CI: -0.7352 to -0.0667) was significant. Hence, H3 was supported.

Table 5

Differences in Sense of Learning between Public and Private sector employees

				Levene's Test for Equality of Variances		t-test for Equality of means						
		Mean	SD	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
											Lower	Upper
Sense of Learning	Public	0.2668	0.92464	2.674	156.463	0.008	0.44562	0.16664	0.11646	2.674	156.463	0.008
	Private	-0.1788	1.19071									

Table 6

Differences in Sense of Learning between Freshers and Experienced employees

				Levene's Test for Equality of Variances		t-test for Equality of means						
		Mean	SD	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
											Lower	Upper
Sense of Learning	Freshers	-.1683	1.17741	4.000	0.047	-2.369	157.164	0.019	-0.40097	0.16923	-0.73522	-2.369
	Experienced	0.2327	0.97187									

Discussion

The researchers gain an insight into the understanding of career concern's influence over the sense of learning among employees with important distinctions based on career stage and organizational type. The authors find three critical insights: career concerns positively predict the sense of learning, public sector and experienced employees report a higher sense of learning compared to private sector employees and freshers respectively.

Career Concerns positively predict the Sense of Learning

One of the primary findings of the present study is that the sense of learning is significantly predicted by the career related concerns among employees, supporting the notion that concerns regarding career progression can catalyse skill acquisition and personal growth. This findings establish an alignment with Koen & van Bezouw (2021)making it more important than ever to manage this insecurity. While previous research suggests that proactive coping is a promising way to alleviate job insecurity, we suggest that, paradoxically, it may be particularly difficult to act proactively when feeling emotionally distressed about the future of one's job. Drawing on the principle of resource scarcity and the Conservation of Resources theory, we propose that affective job insecurity ignites a scarcity mindset that inhibits workers' future focus and cognitive functioning, thereby undermining proactive career behavior. Additionally, we examine whether income adequacy can compensate for these negative consequences of job insecurity. Results of a three-wave survey study among 108 self-employed professionals during the COVID-19 pandemic showed that initial affective job insecurity was negatively related to cognitive functioning but unrelated to future focus. Yet, the latter relationship was moderated by income adequacy: affective job insecurity was positively related to future focus when participants reported high income adequacy. In turn, future focus was positively related to proactive career behavior, which was subsequently related to lower cognitive job insecurity. Thus, while replicating the finding that workers can proactively manage their cognitive job insecurity, we also showed that initial affective job insecurity may obstruct people's cognitive functioning. We discuss how our results signal a Matthew effect, in which job insecure people with sufficient means are able to look ahead and proactively build resources to change their career, while job insecure people with insufficient means may fall behind.: Frontiers","source":"Frontiers","title":"Acting Proactively to Manage Job Insecurity: How Worrying About the Future of One's Job May Obstruct Future-Focused Thinking and , who emphasized the positive relationship between future focus and proactive work behaviour. Additionally, this finding can be viewed and understood through the lens of motivational theories such as Career Construction Theory (Savickas, 2005) and Self-determination Theory (Ryan & Deci, 2000), which posit that career concerns, when navigated effectively, can enhance intrinsic motivation and adaptive behaviour. Employees experiencing career-related anxieties are likely to mitigate these uncertainties and enhance their employability, by engaging in learning activities, training and skill acquisition. Related variable like proactive personality has association with positive career adaptability (Mansell & Turner, 2023), which in turn reduces career anxieties (Jia et al., 2020). This is specifically relevant in the Indian workplace context, where rapid socio-economic and technological changes necessitate continuous learning and adaptability.

Moreover this relationship between career concerns and sense of learning aligns with the increasing emphasis on lifelong learning in modern organizational settings where employees who perceive gaps in their skills or in career trajectories often view learning as a strategic response to address these gaps and increase employability (Stephany, 2021)a network of skills from the job profiles of 14,790 online freelancers is constructed. Based on this skill network, relationships between 3,480 different skills are revealed and marginal effects of learning a new skill can be calculated via workers' wages. The results indicate that learning in-demand skills, such as popular programming languages, is beneficial in general, and that diverse skill sets tend to be profitable, too. However, the economic benefit of a new skill is individual, as it complements the existing skill bundle of each worker. As technological and social transformation is reshuffling jobs' task profiles at a fast pace, the findings of this study help to clarify skill sets required for designing individual re-skilling pathways. This can help to increase employability and reduce labour market shortages.. The finding is amplified by the proliferation of government-led initiatives such as Skill Indian and Digital India, which promote upskilling as a means to remain competitive in globalized economy (Akther, 2023)particularly those living in rural areas. This initiative has been instrumental in empowering young people in rural India to pursue entrepreneurial endeavors by providing them with the education and training they need to launch successful firms. The Skill India Program provides numerous pathways to gaining marketable expertise in fields as diverse as agriculture, manufacturing, and the service sector. These courses equip participants with the real-world skills and experience crucial to the success of any business initiative. To add to that, the Skill India Program offers budding business owners both financial aid and mentorship services. In addition to low-interest loans, the program offers mentorship and training in areas including business strategy, product promotion, and financial management. The Skill India Program has had a profound effect on business growth in rural areas. It has contributed to the emergence of a new crop of self-reliant, technically proficient, and creative business leaders.",the cultural emphasis on learning and education in India (Nayak & Padhi, n.d.) likely reinforces that learning is essential to navigate uncertainty and can be expanded to include the workplace domain.

Psychological resilience presents itself as another explanation for this finding. Employees with career-related anxieties may develop a higher awareness of need for personal growth, driving themselves to invest in skill development as a coping mechanism (Haenggli & Hirschi, 2020). In Indian workplace where job security

and career progression are highly valued, manifestation of resilience as a proactive approach to learning explains the present finding.

Sectoral differences in Sense of Learning

The finding that there is a sectoral difference in the sense of learning where public sector employees report a higher sense of learning that their private sector counterparts can be attributed to several factors related to organizational structures, cultural orientation and resource allocation. Employee development is often prioritized in Indian public sector organizations in India, as a part of their long-term societal objectives (Camilleri, 2007)role states, job characteristics, employee□leader relations, and employee perception of the organisation. Results were obtained through: structural equation modelling for the examination of multiple relationships between PSM and its dimensions, and the antecedents; and ANOVA for testing the individual hypotheses.\n\nFindings\nThis study provides some evidence to show that the PSM of public employees is mainly the result of the organisational environment surrounding them. The motivational context variables particularly those related to the organisational setting are the most dominant predictors of the PSM dimensions.\n\nResearch limitations/implications\nThe empirical results presented in this study should be viewed as preliminary that necessitate further extensive empirical research.\n\nPractical implications\nThe findings suggest that public sector management has the task of creating a proper and appropriate climate for its employees. Furthermore, PSM has generated particular interest because it is perceived or assumed to have a positive impact on the job behaviour of individuals in particular, job satisfaction and fulfilment, and their respective level of performance. It is therefore important that public sector organisations find ways of encouraging PSM amongst its employees.\n\nOriginality/value\nThis paper contributes to the literature regarding PSM by examining the relationship between dominant antecedents and the dimensions of PSM, and presents the findings as a model to show the dynamics in these relationships."which contrasts with the profit-driven focus of private organizations. This difference in organizational priorities may lead to more consistent access to structured learning opportunities among public sector employees resulting in a higher reported sense of learning. Our findings reflect the structural advantage and career stability inherent in certain segment of the Indian workforce where public sector employees report a higher sense of learning.

Moreover, the stability associated with public sector jobs creates a conducive environment for personal growth. Public sector employees are less likely to experience this job insecurity (Chawdhary et al., 2024) , allowing them to focus on skill acquisition without the immediate pressure of performance metrics, unlike their private sector counterparts. This stability is particularly prominent in Indian context where public sector jobs are considered prestigious and secure, attracting individuals with long term career development plans.

The public organizations emphasize on societal goals, which may in-turn enhance employee's sense of purpose and motivation (Satyawadi & Ghosh, 2012) to engage in learning activities. They are deeply woven with the socio-economic fabric of the country aligning their learning initiatives with national development goals, instilling within the employees a sense of pride and motivation. On the contrary, private sector employees may experience greater pressure to meet short term performance targets, limiting their engagement in learning initiatives. Moreover, implementation of large-scale training programs and mentorship initiatives in public sector organizations are often enabled by government funding and policies.

Differences in Sense of Learning among differently experienced employees

The final major finding that there is a higher reported sense of learning among experienced employees than freshers, emphasizes the role of career stage in shaping learning behaviours. Experienced employees usually have a clearer understanding of their career paths and organizational expectations that enables them to engage in learning activities aligning them with their professional goals (Wang et al., 2012). This finding is consistent with Career Construction Theory, that emphasizes that individuals with greater career adaptability are more likely to pursue learning opportunities with the intent of enhancing their long-term career prospects.

In the context of Indian workplace, the evolving demands of mid-career and late career professionals contextualizes these results. Experienced employees are often in need to adapt to technologies and leadership roles, necessitating continuous learning. Their accumulated expertise and knowledge over time also prepares them to take the position of mentors and contributors to organizational learning, further enhancing their sense of learning. They may actively perform and participate in skill development programs, leadership training and knowledge sharing initiatives, reinforcing their engagement in learning.

Conversely, freshers may experience higher career anxieties given the limited experience (Kooij et al., 2017) and exposure, which could affect their confidence and willingness to engage in learning activities. Though the onboarding and entry level training programs are crucial for skill acquisition, freshers may struggle to balance these initiatives with the challenges of navigating a new organizational environment. In the Indian context, familial and social expectations place a significant pressure on young professionals and this transition becomes particularly daunting for them.

The disparity in access to organizational resources also plays a role in senior employees typically having greater access to training programs, professional networks, and developmental opportunities than the freshers, consequently reporting a higher sense of learning. Additionally, their ability to apply the learned skills in practical leadership contexts may aid them in having a sense of fulfilment and motivation to continue learning. Freshers on the other hand, may require more structured support and mentorship to develop their confidence and learning behaviours.

Indian workplaces often have a cultural orientation that accentuates this difference by emphasizing hierarchical structures and respect for experience, leading to higher investments in development of senior employees while freshers remain in the process of acclimatizing to organizational expectations.

Experienced employees often a have higher income. A study by Koen & van Bezouw (2021)making it more important than ever to manage this insecurity. While previous research suggests that proactive coping is a promising way to alleviate job insecurity, we suggest that, paradoxically, it may be particularly difficult to act proactively when feeling emotionally distressed about the future of one's job. Drawing on the principle of resource scarcity and the Conservation of Resources theory, we propose that affective job insecurity ignites a scarcity mindset that inhibits workers' future focus and cognitive functioning, thereby undermining proactive career behavior. Additionally, we examine whether income adequacy can compensate for these negative consequences of job insecurity. Results of a three-wave survey study among 108 self-employed professionals during the COVID-19 pandemic showed that initial affective job insecurity was negatively related to cognitive functioning but unrelated to future focus. Yet, the latter relationship was moderated by income adequacy: affective job insecurity was positively related to future focus when participants reported high income adequacy. In turn, future focus was positively related to proactive career behavior, which was subsequently related to lower cognitive job insecurity. Thus, while replicating the finding that workers can proactively manage their cognitive job insecurity, we also showed that initial affective job insecurity may obstruct people's cognitive functioning. We discuss how our results signal a Matthew effect, in which job insecure people with sufficient means are able to look ahead and proactively build resources to change their career, while job insecure people with insufficient means may fall behind.suggests that income adequacy moderates the relationship between job insecurity and future focus; furthermore, individuals with adequate income are better able to maintain future focus and engage in proactive career behaviours. The income disparity between the freshers and experienced employees thus suggests that financially more secure employees such as the experienced ones would engage in proactive career behaviours such as learning, training and skill development.

Theoretical Implications

By linking career concerns and sense of learning, an understudied relationship, the study contributes to existing literature by establishing a direct link between them particularly in Indian workplace context. Drawing from the Self-Determination Theory (Ryan & Deci, 2000) and Career Construction Theory (Savickas, 2005), the findings of this study reinforce the proposition that adaptability and intrinsic motivation play a crucial role in fostering learning as a response to career uncertainties. By empirically validating the relationship between career concerns and sense of learning, this research extends the theoretical understanding of how individuals manoeuvre career-related anxieties through skill acquisition and personal growth through proactive behaviours.

The study's focus on sectoral and career stage differences offers a fresh perspective on the heterogeneity of learning experiences at the workplace, underscoring the interplay of external organizational factors (e.g., public versus private sector) and individual career trajectories (e.g., freshers versus experienced employees) in moulding the learning behaviour, thus contribution to career adaptability and organizational learning theories. The cultural applicability of existing theoretical frameworks in rapidly transforming organizations is aided by integration of contextual factors specific to India.

Practical Implications

The present research finds its significant implications for organizations in policy and practice. Organizations should view employee anxieties about their career progression as an intervention opportunity rather than challenges in the light of our findings that career concern positively predicts the sense of learning. Addressing these concerns through targeted programs like career counselling, training initiatives and mentoring can help organizations foster a culture of learning through lifespan, consequently enhancing employee engagement, adaptability and retention. The study highlights the need for tailored learning interventions to different employee segments such as more structured onboarding programs, mentorship and skill building workshops to inculcate a sense of learning at early career stages while utilizing the experience of experienced employees in knowledge transfer and contributions to organizational learnings.

Additionally, the observed differences between private and public sector employees in terms of sense of learning calls for sector-specific interventions wherein public organizations could continue leveraging their existing learning frameworks and private organizations could invest in policies that enhance job stability and align

career development opportunities with organizational objectives. Collaborations among private and public sector organizations could further strengthen the knowledge sharing and promote a sense of learning by dwelling into other sector's operational mechanisms.

Further, to bridge the digital divide and to enhance accessibility, particularly among the resource-constrained settings and geographically dispersed employees, organizations must integrate technology-enabled learning platforms. Organizations could also benefit from proactively creating a psychologically safe environment and managing work-life balance to address concerns, consequently having an impact on the sense of learning among the employees.

Limitations of the Study and Future Directions

Despite the given insights of the study, it remains subject to various limitations that future research that future research should address. The cross-sectional design of the research limits its ability to establish causal relationships between career concerns and sense of learning, which could be aided by studies in the future tracking how changes in career concerns influence the learning behaviour over time. Furthermore, the reliance of study on self-reported data introduces the risk of social desirability bias. Objective measures or multi-source feedback could aid in data accuracy enhancement in future works. Since the study is contextualized to Indian workplace, the findings of the same might not be directly generalizable to other economic or cultural settings, which calls for future research that address the cultural heterogeneity and explore the cross-cultural dynamics with the involved variables to present a more globally generalizable model.

Future research exploring potential mediators and moderators may broaden the understanding of the underlying mechanisms through which career concern predicts sense of learning in the organizations.

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The Essential Competencies for Indonesian Giggers to Survive

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Abstract

Economic pressures have resulted to enormous layoffs, forcing workers to turn to gig work as a safety net. However, it is still questionable whether the government would establish true partnership and protect giggers, therefore Indonesian giggers should be realistic about the circumstances. Consequently, the aim of this study is to focus on the essential competencies giggers must develop to overcome tough challenges and thrive in the competitive gig economy. Based on the analysis, giggers must acquire both technical and soft skills to survive in the competitive gig economy. The two most critical technical skills are digital literacy and basic financial management, while important soft skills are time management and adaptability and resilience. By investing in skill development and staying informed about employment laws and protections, giggers can navigate the complexities of the gig economy more effectively and increase their chances of success.

Keywords: *Gig Economy, Indonesian Giggers, Online Motorcycle Taxi Drivers*

Introduction

In 2024, economic pressures led to massive layoffs across industries. In response to rising prices and inflation, 63% of workers are turning to gig work as safety net, which is consistent with Bloomberg research [9].

However, the legal status of online motorcycle taxi drivers has not been sufficiently addressed by the Indonesian government since the partnership model was implemented in 2019 [11]. This has resulted in arbitrary actions by application companies without government sanctions, causing gig workers or giggers in Indonesia to feel unfair laws.

Currently, around 60% of Indonesia's workforce, or more than 83 million freelancers from low and middle income groups, works in the informal sector and gig work [7] and they continue to seek more equal regulations. However, it is still questionable whether the government would establish true partnership and protect giggers [18].

Given these circumstances, giggers in Indonesia must be more realistic about the circumstances and uncertainty surrounding the government's response. Consequently, the aim of this study is to focus on the essential competencies giggers must develop to overcome tough challenges and thrive in the competitive gig economy.

Literature Review

The Growth of Giggers

The gig economy, a phenomenon that emerged during the 2008-09 financial crisis and the pandemic, has transformed the global workforce into a network of gig workers or giggers, with new companies constantly entering the app world to capitalize on this trend, driven by increased digitization and internet penetration [5; 17]. According to the World Bank, there are approximately 435 million giggers worldwide [9].

Before we go any further, it is necessary to define giggers. Giggers are individuals who take on short-term or project-based jobs, often for multiple clients, rather than being employed by single company [19]. They can choose when, where, and for whom they work, either autonomously or through platforms.

Giggers are categorized into platform and non-platform-based workers. Platform workers work on online software apps or digital platforms, while non-platform-based workers work in conventional sectors and are part-time or full-time, often holding another regular job, such as delivery or ride-sharing drivers [2].

Despite the fact that they lack the security, perks, and benefits of full-time employees and often have to provide their own health insurance and retirement plans, giggers enjoy greater flexibility and independence, allowing them to pursue other jobs or side hustles based on their schedules and interests [19]. They can work from any location, such as ridesharing services like Uber and Lyft or food delivery apps GoFood.

Giggers are comparatively young, work fewer hours, prefer flexible schedules, and have low to mid-level education. Income from gig work is not their primary source of income, and they often hold another regular job [2]. They value transparent, timely, and assured payments, and are not too concerned with non-wage benefits.

According to the research, low- and lower-middle-income countries account for 18% of this traffic, led by India, Ukraine, the Philippines, Indonesia, Pakistan, and Nigeria [9]. These countries account for 40% of gig work platform users. The World Bank identified 545 gig work platforms in at least 63 countries around the world [9].

Advantages and Disadvantages Being Giggers

There are several advantages and disadvantages being giggers. The advantages are (a) independence to work from their own spaces (home, car); (b) flexibility to choose working hours and have autonomy to decide when and how to complete them; (c) accessibility to broader job opportunities and quick income for those with minimum skills and experiences (<34 years, minimum diploma degree); (d) opportunity to earn extra income [13]; (e) change in work approach where Gen Y and Z have different perspective on careers and prioritize finding work that matches passions and interests [10].

Nevertheless, being giggers have several disadvantages. First, tight competition between drivers and applications as they must wait up to 1-2 hours to get one order [6; 13]. Second, a lack of benefits like traditional employees, such as health insurance, retirement plans, paid leave [13].

Third, financial instability due to a lack of safety nets [13]. Fourth, high operational costs because earnings are only around USD6 per day due to low kilometer rates which must cover fuel cost, food, vehicle maintenance, internet data packages, plus household expenses [6].

Fifth, long working hours from dawn to midnight, resulting in loss of valuable family time and dealing with physical and mental health issues [6; 13]. Sixth, isolation which lead to feelings of isolation for some individuals and have a bad impact on both productivity and mental health [13].

The last one is open to exploitation and abuse which include (a) lack of unionization, privacy and competition issues [3] and (b) legal gaps in partnership cooperation between multinational and local companies [16] regarding tariff policies, commission, work conditions, management of platform algorithm, as well as discrimination, unequal pay and male-centric algorithmic labor control because no negotiation or mutual agreement (unfair and unequal partnership).

Giggers, despite contributing significantly to economic growth and improving customer service [4], encounter numerous problems and drawbacks than benefits, raising the question of whether technological innovation has improved giggers' quality of life or resulted in human exploitation.

Competencies of Giggers in the Digital Era

To survive in today's increasingly competitive gig economy, giggers must acquire both technical and non-technical skills [14]. This is consistent with the findings of another study, which found that the most prevalent skill gaps among new giggers were industry-specific knowledge (42.86%) and non-technical skills (28.57%) [1].

With regard to the success of giggers in India, the top skills required for giggers were identified [8]. The first one is digital literacy which is crucial for giggers since it allows them to effectively use platforms such as navigation apps, order management, and digital payment systems.

The second skill is time management that is essential for peak hours, as it can boost earnings, while the third one is utilizing expense-tracking apps helps manage vehicle maintenance and fuel costs, maximizing net earnings [8].

The fourth skill is clear communication, which is required for delivery and logistics roles, while the fifth skill is adaptability, which is required in the dynamic gig economy [8].

Furthermore, 20-year research has identified essential skills that are crucial for successful giggers [14]. The first skill is quick initiation to quickly claim opportunities without waiting for someone else to take control. The second skill is be adaptable and consider flexible alternatives such as flexible working hours and alternative ways of doing things because the gig economy is unpredictable.

The third skill is that giggers prefer to work without supervision on clearly defined tasks, work independently, accept full responsibility for their work, and are responsible for ensuring they have sufficient monthly income.

In the gig economy, a balance between goal orientation (focused on a mission and goals) and problem orientation (interested in problem prediction, prevention, or resolution) is typically required as the fourth skill.

Appreciate gradual change and enjoy agile environment or extreme pioneering is the fifth skill, while assertiveness that involve prioritizing rules and standards is the sixth skill.

The seventh skill is low in consistency. The fast-paced and short-term nature of the gig economy requires quick completion of tasks and moving on to the next [14]. The eighth skill is the willingness to learn, as giggers may need to switch between different apps (food delivery and ridesharing) in a single day.

The ninth skill is people skills, including emotional intelligence, communication, listening, and empathy, which are crucial for effective customer interactions in various communication methods like phone calls, chatting, meal deliveries, and Zoom meetings [14].

The tenth skill is time management skill that can help giggers to meet deadlines without sacrificing work quality or causing excessive stress [14].

These 10 non-technical skills combined with the technical skills offered by LalaMove [20], an on-demand delivery platform, will be very powerful and important for giggers to succeed.

The technical skills are (1) setting fixed pickup schedule based on sleep patterns and other activities, such as picking up and dropping off schoolchildren; (2) prioritizing the most important tasks; for example, when an order comes in, prioritize completing it first to get a good rating; (3) setting daily target by planning what to do today or tomorrow, and setting a target to complete orders to get maximum income; (4) taking orders at a "easy to find" location by choosing a strategic location to wait for orders to save time and fuel; (5) setting a break time to avoid fatigue, perform better, and maintain a work-life balance; (6) utilizing navigation technology or maps to save time and fuel, discover fastest route, avoid traffic jams; and (7) avoid multitasking to maintain optimal productivity, as the human brain tends to be burdened with information and commands at once.

The Essential Competencies for Indonesian Giggers to Survive

The gig economy in Indonesia, hailed by the government as the future of the industry, faces challenges from app companies due to lack of thorough regulations [18]. Regulations only apply to motorcycle taxis, and app providers view drivers as laborers [16], focusing on profit. They overlook real problems like high consumer complaints, no measurable minimum service standard, and shifting exploitation strategies to "partnerships" on service-based platforms and "popularity while making money" on social media [12; 15].

Facing these complex circumstances, giggers in Indonesia need to acquire both technical and soft skills to succeed. The two most important technical skills are digital literacy and basic financial management.

Digital literacy involves using gig platforms for navigation, order management, and payment, while basic financial management involves utilizing expense-tracking app for vehicle maintenance, fuel costs, budgeting, saving, and income management.

The most crucial soft skills needed for Indonesian giggers are time management and adaptability and resilience. Time management is essential for meeting deadlines, balancing multiple gigs efficiently without sacrificing work quality, prioritizing tasks, and allocating time accordingly to maximize productivity.

Adaptability and resilience are crucial due to regulatory challenges and changing market demands. This skill involves quickly adjusting to changing market demands, client expectations, and managing stress. Giggers should be flexible in their skills and services, developing coping strategies to cope with the uncertainties to maintain mental health.

In summary, giggers need to possess both technical and soft skills to maintain a high-quality work-life balance and maximize their earnings to thrive in the gig economy.

Conclusion

The gig economy in Indonesia presents unique challenges, including regulatory gaps and intense competition. To thrive, giggers must develop technical skills like digital literacy and basic financial management, as well as soft skills like time management and adaptability and resilience.

Therefore, giggers should invest in skills development by regularly updating their skillset, and stay informed about labor laws and protections that may affect gig work in Indonesia. By honing these competencies, giggers can navigate the complexities of the gig economy more effectively and increase their chances of success.

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Transformative Impacts of HR Analytics on Talent Management: Insights, Strategies and Future Trends

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Abstract

Purpose

The aim of this paper is to explore and summarize the possible implications of HR Analytics on Talent Management by cultivating a data-driven culture from organization perspective. This paper discusses on the concept of Talent Management and HR Analytics and their integrated implications. This study is based on the inclusion of research articles, journal papers, books, and websites dealing with the concept of Talent Management, HR Analytics, and data-driven culture in organizations.

There has been increased area of attention in the area of HR Analytics, Talent Management and Organization performance. HR Analytics has raised the value of Talent as an effective performance measuring instruments on how does it serve the organization to gain competitive advantage. Overall, it helps leaders and decision-makers to reach to a decision on business and people related to recruitment, retention, employee trainings, rewards, recognition, career planning, organizational efficiency and effectiveness among others. It is significant to understand that to assess the performance of talents and the organization as a whole, metrics should be used as KPIs and analytics where possible.

Practical implications

This paper is expected to support talent managers and decision-makers in an Organisation where applying HR Analytics is crucial for effective decision-making. Further, this paper has supported the base to further explore HR analytics on managerial as well as academic perspectives.

Originality/Value

This paper is based mostly on the study of existing literatures, models found in the existing literature and a bit of experience in HR domain of the author himself.

Keywords: *HR Analytics, People Analytics, Human Capital, Talent Management, Data-driven Culture, Strategic thinking and decision making*

Introduction

The concept of Talent management has begun from ages as found evident in various studies, books and literatures. The concept, practice and implication of Talent Management is still radiant. Post pandemic and the modern world being digitized, technological development has been constantly and rapidly accelerating everywhere and in every discipline all around being a significant part of human's personal and professional life. This paradigm shift is restructuring organizations and thinking pattern of leaders and managers from continuing traditional business to integrating technology in one of the most crucial resources for thriving business – Human Resources. This is where the new era of HR Analytics has dawned.

HR analytics could be understood as a credible source to provide statistically valid data and evidence that can be used in the process of creating new strategies during the implementation of HR practices, strategies and other measures. (Mohammed, 2019)

Big data are now becoming highly relevant in HR domain to provide clear direction to the future of the organization under completely modern circumstances. Over recent years, the adoption of technology has moved from static human resource management practices into more dynamic, real-time solutions, dashboard based analytical reports. These are being used in the areas of applicant tracking system, recruitment, performance management, learning and development and employee well-being among others.

HR Analytics consists of a number of processes enabled by technology, that use descriptive , visuals and statistical methods to interpret people data and HR practice (Marler & Boudreau, 2017)however only 14 articles were in quality peer-reviewed journals. Our review of these articles addresses the following 5 questions: (1

Research Objectives

The key objectives of this paper are to:

1. Discuss how HR Analytics is impacting and transforming talent management.

2. Explore the strategies employed by few organizations to implement HR Analytics and its impact.
3. Explore future trends in HR Analytics and their potential effects on talent management.

Methodology

This paper discusses on the concept of Talent Management and HR Analytics and their integrated implications. To comprehensively understand the impact of HR Analytics on talent management, a systematic literature review was conducted. This study is based on the inclusion of research articles utilizing academic databases such as Google Scholar, JSTOR, and research gate to gather relevant literature with major literatures published between 2015 and 2024. Related case studies, books, websites and articles were also explored while dealing with the concept of Talent Management, HR Analytics and data driven culture in organizations. Peer-reviewed articles, books, and conference papers were also studied that focused on the application of HR Analytics in talent management.

Data Collection Methods

Analysis of existing literature, including case studies, industry reports, and academic research. The data aimed to gather practical insights and real-world experiences on implementing HR Analytics.

Review of Literature

In recent years, the field of Human Resources (HR) has witnessed a significant shift towards the use of analytics to make data-driven decisions. One area where HR analytics has gained considerable attention is talent management. The purpose of this literature review is to explore the implications of HR analytics on talent management and provide an overview of the current research and practices in this domain.

Talent Management:

The term "Talent" is originated in its current usage from a famous 2001 article "The War for Talent". The war for talent is a term devised by Steven Hankin of McKinsey & Company in 1997 and then followed in a book by Ed Michaels, Helen Handfield-Jones, and Beth Axelrod, Harvard Business Press, 2001. In simple terms, talent is a natural ability of a person or a special ability of a person to perform any task in a natural way.

Talent management is a set of sustainable organizational strategies in the modern world that use human capital to the competitive advantage of the organization, as well as portfolio of integrated HR activities that result in placing the right person with the right competencies in the right job at the right place, and at the right cost. This definition seems to have been popularly perceived and implemented by global and innovative firms these days. As Talent management is becoming an everyday term in HR practice, academic researchers are also eventually in a sought to systematically organize the literature stream and consider it an area of research.

HR Analytics:

HR Analytics is relatively a fresh interference in the larger domain of Human Resource Management. It is also often referred to as people analytics or talent analytics or workforce analytics. It involves the use of data and statistical methods to gain insights and make informed decisions about human capital management. It encompasses the collection, analysis, and interpretation of HR-related data to optimize talent-related processes, including recruitment, performance management, training and development, and succession planning.

There has been a six-step roadmap developed by Mondore, Douthitt, and Carson (2011) in their study on HR analytics. The roadmap provides insights on how to include HR Analytics so as to ensure that it aligns with HR strategies and desired organizational outcomes. The various steps involved and found in the research findings include identifying the most significant outcomes of HR, creating a cross functional data plan for relevant usage, implementing adequate measures to assess crucial outcomes, drafting and executing the strategic plan, measuring and modifying it post-implementation and making other necessary adjustments.

In the present context, researchers have been interested in measuring the value and performance of HR activities to provide the HR practices and process with tools to improve decision-making and strengthen its link with core functions and strategies of the organization using HR metrics and statistical models. This is where HR Analytics comes into playing its role. The significance of HR Analytics is that it enables organizations to make evidence-based strategic business decisions, and thereby supports managing talent within the organization leading to an increase in organizational performance.

Types of HR Analytics:

The Analytics may be classified into three types: descriptive analytics, predictive analytics, and optimization Analytics (Watson, 2010; Narula, 2015). The first level of analysis is Descriptive Analytics is about the historical data, behavior, and outcomes. It is only describing the relationship Fitz (2009). It includes data visualization, ad hoc reports, drilling-down, dashboards/scorecards, SQL Queries. Descriptive analysis can be used to find out turnover rates, cost per hire, absence rates.

Predictive Analytics which is the second level of analysis covers prediction of future behavior and outcomes from past data. This can include Data Mining (for instance, correlations between data), decision trees, pattern recognition, forecasting, root-cause-analysis, and

predictive modeling (what happens next). Predictive modeling will facilitate the HR managers in predicting attrition rates, and also the possibility of employee success on job likely based on recruitment/selection method used.

The third level of analysis is Optimization Analytics, which encompasses not just the attainment of optimal outcomes leveraging the scarce resources. Techniques such as linear programming, simulations, mathematical modeling and implementation are employed to determine the optimal alternative training investment that will help achieve organizational effectiveness (Narula, 2015)

Data-Driven Culture in HR

In today's world, the need for high-performing talent has always been demanding and ever growing but it has never been easy in any field or industries. This has created a need for leveraging data analytics in practice. There are always several benefits on adopting data driven culture, not only in HR but in every domain and stream all around. Through the data-driven culture in decision making, HR leaders will be in a better position to hire, retain, utilize and develop their workforce.

Boudreau and Ramstad have come up with the findings that creating value with HR or people analytics requires organizations to be able to support Talent Management decisions with data and measure the efficiency, effectiveness, and impact of HR practice. Establishing a data-driven culture across every function of HR i.e., from talent acquisition to Talent Management to talent performance, to workforce planning to talent engagement and retention is a complex and challenging part. Some of the concerns found seem to be addressed by HR leaders while developing Data-driven culture are:

- Building perspective of HR leaders on thinking about the role of usage of analytics in HR functions
- Prioritizing key areas of business and the need to focus on data for those areas
- Establishing data first culture mindset
- Developing data analytics skills to understand and appropriately leverage the true value of analytics
- Using data in HR function to move from analytics to insights, and use them for predictive outcomes

If we look into various research findings, we can come up as - The Deloitte Human Capital Trends report of 2017 states that 85% of HR leaders in Asia and 81% in Oceania see analytics as a high priority in their organizations. Similarly, if we base on LinkedIn data for Asia Pacific, it is found that there has been a 70% increase in specialized analytics professionals in HR in the last five years. These professionals are the ones who focus solely on analytics in HR and do have a variety of job titles like 'Data Scientist', 'Talent Analytics Director' and even 'Diversity Analytics Specialist'. This clearly shows that several enterprise companies have already established analytics teams, although they can go by different names such as 'talent analytics' or 'people analytics' or 'workforce analytics' or 'HR Analytics'.

Discussion and Findings

The integration of HR analytics in talent management has transformed traditional practices by enabling HR professionals to make evidence-based decisions. By leveraging HR data and advanced analytics techniques, organizations can identify and attract top talent, assess employee performance, predict turnover risks, and design targeted development programs. This integration offers several benefits, including improved decision-making, enhanced talent acquisition and retention, and increased overall organizational performance.

When it comes to HR related measures, this could be actually one of the more difficult areas for evaluating talent. People-related measures is significant in setting strategic goals that formulate a set of "Key Performance Indicators" against which an organization can continuously measure expected vs. actual performance of human resource. HR Analytics applies various methods to get insights into employee data and patterns revealed by the available data. This makes it possible to predict employee behavioral patterns like attrition rates, training costs, and employee contribution.

From the literature and case studies, it is seen that there are different maturity levels in the usage of HR Analytics. Managerial tasks and decision-making are an integral part of the business, which falls under the scope of the people management i.e., human resource management or Talent Management. Decision-making has been identified as one of the most critical organizational processes including employee behavior, work performance, levels of motivation and the amount of stress levied on employees (Griffin and Moorland, 2011).

Some major implications of HR Analytics on Talent management with relevant cases have been discussed below:

Talent Acquisition and Recruitment Analytics

HR analytics has transformed the talent acquisition process by allowing organizations to optimize the recruitment process and enhance the quality of hires. By analyzing past recruitment data, organizations can find patterns in candidate success, refine their job descriptions, and even apply predictive analytics to anticipate future hiring requirements. A study by Gambles and Williams (2012) has shown that HR analytics can support organizations in building employee engagement by providing valuable insight into the needs and preferences

of employees. With this data analysis approach, the time-to-fill positions can be reduced, recruitment costs are minimized and also increase the chances of finding the best-fit talents while ensuring post-hiring engagement.

Impacts of HR Analytics on talent acquisition at Johnson & Johnson (case 1)

By analyzing extensive data, Johnson & Johnson re-evaluated how they performed staffing functions on hiring. Initially, the reasoning was that seasoned hires were better positioned to add more value, and therefore, they can help in reducing attrition. Such was indicated by one of their studies of the performance of 47,000 employees. According to Philips, C. (2016), the company discovered that recent graduate/hire could compete with an existing work with no noticeable difference in terms of performance, but a lower turnover rate. By increasing the volume of new graduate hires by 20% at Johnson & Johnson, attrition was reduced and the quality of performance remained the same. "This shift is a testament to how data can truly enable tremors in the static glass of hiring practices. Using the people analytics, Johnson & Johnson ramped up hiring of fresh graduates by 20 percent, resulting in a drop in turnover with performance remaining intact.

Performance Management and Predictive Analytics:

Performance management is another critical aspect of talent management that can benefit from HR analytics. By analyzing performance-related data, organizations can gain insights into employee productivity, identify high-performing individuals, and detect performance gaps. Baeten et al. (2015) found that HR analytics can help organizations to improve employee performance by identifying high-potential employees and providing them with the training and development they need to succeed. Predictive analytics can be employed to forecast future performance, identify factors influencing performance outcomes, and design targeted interventions to improve individual and team performance.

Impacts of HR Analytics on performance at Clarks

(case 2)

Clarks, a shoe retailer business, examined the relationship between engagement and financial performance. Immediate question they asked was: Is there a link at all between engagement and financial performance? The team collaborated with statisticians who operated the retailer's distribution planning system. The analysis was based on 450 business performance data points. The signals indicated there was indeed a link. Employee engagement does improves the business outcomes. For Clarks, each and every 1% (percentage point) increase in engagement casually resulted in a 0.4 % (percentage point) uplift in business performance. They discovered an optimum team size in the store and that how long a store manager had been in post was a strong predictor of performance. This meant that moving store managers often resulted in poorer performance. This gave the team a blueprint for high-performing stores. They also developed an engagement toolkit managers can use to enhance performance.

Retention and Succession Planning:

HR analytics plays a vital role in talent retention and succession planning strategies. Through the analysis of employee data, organizations can identify flight risk indicators and take proactive measures to retain key talent. Additionally, HR analytics can identify high-potential employees, assess readiness for leadership roles, and facilitate effective succession planning. Cascio (2016) also found that HR analytics can help organizations to reduce employee turnover by identifying factors that are associated with turnover and taking steps to address them. By identifying and developing internal talent, organizations can reduce turnover, maintain continuity, and foster a culture of internal growth and development.

Impacts of HR Analytics on Predicting Employee Turnover at Credit Suisse (case 3)

Credit Suisse a global Investment bank, used predictive analytics to find which employees may leave the organization. Analyzing variables like compensation, promotion history and performance rating, the bank created models to predict turnover. By anticipating these challenges, they were able to develop targeted retention strategies, which reduced both turnover rates and costs. Thereby lowering their attrition rates by 10% as well as additional cost savings.

Increased efficiency:

HR analytics can help organizations to improve the efficiency of their talent management processes. For example, HR analytics can be used to automate tasks, identify redundancies, and streamline processes. We can relate this impact with E.ON case as follows:

Impacts of HR Analytics on Reducing Absenteeism at E.ON (case 4)

The large manufacturing company: E.ON deployed HR analytics to address their high absenteeism rates. Among 43,000+ people in this German energy company, the absenteeism rate was above benchmark. By analyzing employee demographic data, work schedules, health records and job satisfaction surveys, the company pinned down factors that led to absenteeism. What did lead to more absences was not taking a long holiday by employees somewhere sometime in the year, or failing to take a day or two leaves during the year. Managers were then told this information to make holiday approval policies better. They introduced flexible scheduling, wellness programs,

and improved support services for employees, resulting in reduced absenteeism and increased productivity.

Improved employee engagement:

HR analytics can help organizations to improve employee engagement by providing them with insights into employee needs and preferences. For example, HR analytics can be used to identify factors that are associated with employee satisfaction and turnover.

Impacts of HR Analytics on Improving Employee Engagement at Microsoft (case 5)

People analytics were used at Microsoft to measure and improve employee engagement. The company used employee surveys, feedback mechanisms, and performance metrics to collect and analyze data to identify the key drivers of engagement. As a result, Microsoft has taken specific initiatives, including personalized development programs and leadership training, that have led to higher rates of employee satisfaction and productivity. The result was: workplace engagement scores improved by 15% within the organization.

The Future of HR Analytics

HR analytics has gone from a conceptual entity to an effective tool, crafted by HR practitioners. The above case studies also quantify its value from data-driven insights to solid wins and outcomes in retention and engagement, and operational efficiency. In contemporary context, AI is likely to be a key enabler to take HR analytics to a new level and organizations can look forward to more mature insights and actionable outcomes. HR professionals should now welcome such technological evolutions and closely integrate AI with analytics to achieve across organizations tangible business results and improvements.

Challenges in integrating HR Analytics and Talent Management

Just like every coin has two sides, implementing HR analytics on Talent Management has its advantages and disadvantages as well. Snell and Bohlander (2017) stated the value of clarity about business goals prior to consideration of HR analytics is paramount. If it is not understood properly, it can backfire the organization with opportunity loss, financial crunch and unproductive results. HR analytics for talent management has its own set of challenges.

Kiron and Lebowitz (2013) pointed out three important challenges : data quality, data privacy, data access. These can be related with relevant literature findings as follows:

Data Quality Challenges

HR data are typically stored in separate systems including payroll software, learning management systems and recruitment platforms. It becomes particularly complicated to integrate these data sources and give a consolidated view of the workforce. 52 per cent of organizations are dealing with integration issues, where data exists, but it is held in silos, preventing analytics from being effective (PwC 2020). One of the most prominent recent examples occurred in 2018 when Amazon released an AI recruitment tool found to disadvantage female candidates as a result of biased training data (Reuters, 2018). Keeping algorithms free of bias and clear is an ongoing process of observation and readjustment. These scenarios describe those analytics is more about managing data quality for appropriate analysis and predictions.

Data Privacy Concerns

HR analytics involves the analysis of huge volumes of employee data, which is why privacy and data security are huge concerns. Organizations need to adhere to strict data protection laws. Not doing so can lead to criminal sanctions and damage to reputation. For example, a 2022 survey by Deloitte showed how HR leaders considered privacy as the biggest obstacle to the adoption of analytics tools (Deloitte, 2022). They require comprehensive guidelines for how to collect, store, and analyze employee data in ethically and transparently.

Skill Gaps in HR Professionals

HR analytics requires skills in data science, statistics and machine learning—the very skills that most human resources professionals lack today. According to a report published by the Society for Human Resource Management (SHRM), just 35% of HR professionals are confident they can translate complex outputs of analytics (SHRM, 2021). This is often overcoming the skill gap requires large training programs or the hiring of data specialists, both of which adds to operational costs.

Implementing analytics in the HR processes is not without challenges, as employees and management, both, can be resistant to change. Data-driven approaches can sometimes appear like

an intrusion or the pursuit of a fad whereas traditional HR practices often use right intuition and experience. A McKinsey study in 2021 found that 38% of organizations surveyed reported that cultural resistance is an important barrier to advanced HR analytics adoption (McKinsey, 2021). This may hinder the transformation efforts and requires strong leadership commitment to overcome and change management initiatives.

Conclusion

HR Analytics is coming up as a prevalent practice in the HR fraternity that advocates strongly on objectivity rather than subjectivity in HR practices. Therefore, this study is aimed to explore the existing literature to understand the implications and usage of HR Analytics on managing talent and understanding the effect it plays in the improvement of Talent Management practice through data-driven organization culture.

Establishing a data-driven culture across every function of HR seems complex and challenging part but it's leaping to strong need and possibility in almost all the industry. HR Analytics seems highly credible for managing talent for their growth, development, and succession planning because it provides statistically valid data and evidence which can be used in the process of developing new HR and business strategies.

It also seems essential that advocating the use of HR Analytics is singly not sufficient for making the strategic decisions of the organization, rather cultivating data-driven culture is highly significant to support its implications on the organization.

Thus, From the reviewed literature, it is concluded that HR Analytics adoption for Talent Management has been found essential for organizations as its implications seem to well benefit the organizations for managing talents to shape their business accordingly.

Contribution to knowledge

This paper is likely to make a significant contribution to the genre of human resource management by examining the applications of HR Analytics in dealing the spectrum of talent management in an organizational context. Findings are focused on the prospective effectiveness of analytics-based intervention and its significance on data-driven decision making for talent management towards organizations' desirable output. A review of literature available can be further explored to understand significance of HR Analytics and its impact. Better understanding of the importance of Data-Driven Culture should not be limited only to Talent Management but can be helpful also in academic purposes, for managerial levels of organizations in decision-making and to research dimension as a whole to develop the need and understanding of data-driven culture and advantages to the overall ecosystem.

Research limitations

This paper is an outcome of limited reviewed articles and digital sources which may have not covered the very depth of the research. The other limitation is HR Analytics can be empirically tested on Talent Management using various other dimensions. In addition, there is a gap in which both the currently available literature on predictive modeling and the current organizational studies are limited.

Suggestions for future research

Future empirical research can be established using the quantitative methods to test and validate the impact through primary research in different business arena. The researchers can also conduct further studies on the acceptance and barriers to the usage of HR Analytics on Talent Management to understand its dynamics and effect.

According to Hagel et al. (2017,) there is new dialogue on the necessity of interventions by society, and collaboration of different actors at different levels of shared responsibility between employees in organizations, employers and society at large. That will be one of the most significant challenges to Talent Management. This also gives a clue for the relevant future research regarding in terms of not only empirical studies around HR Analytics and Talent Management; but to design the correct models and roadmaps. One aspect of the research that requires a reinforced and quantitative orientation is the ability to view predictive modeling as integral to HR Analytics in an organization culture.

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Unveiling the Future of Employee Performance: A Bibliometric Insight and Systematic Literature Review

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Abstract

Employee performance epitomizes the alignment of an individual's contributions, skills, and behaviour with organizational objectives, assessed predominantly through metrics like productivity and quality. This study delves into the evolving paradigms of employee performance pinpointing key trends and research gaps with the aim to delineate the distinct research trajectories tied to Employee Performance, uncover the evolution of scholarly inquiry surrounding the concept, and propose strategic directions and novel ideas for advancing future research in the field. To achieve this objective, the research employs a bibliometric analysis and systematic literature review by utilizing Scopus database and VOSviewer software to derive comprehensive insights between 2015 to 2023. The findings reveal a shift from traditional evaluative frameworks to multidimensional approaches emphasizing employee engagement, well-being, and Adaptability in a dynamic arena. However, gaps remain, including limited integration of technology-driven performance metrics, neglect of cross-cultural context and lack of longitudinal analyses on performance intervention outcomes. The review highlights future research directions, such as integrating AI and machine learning in performance evaluation, exploring non-Western organizational settings, and examining sustainable performance practices in remote workplaces.

Keywords: *Employee Performance, Work Productivity, Performance Evaluation, Bibliometric analysis*

Introduction

Employees, irrespective of the business domain, are indispensable assets that drive the core functioning and success of any organization. The concept of employee performance has evolved significantly over the years. Employee performance is a cornerstone of organizational success, influencing productivity, innovation, and competitive advantage (Aguinis & Burgi-Tian, 2021) we argue that it is especially important during the crisis to not only continue but also strengthen performance management to communicate a firm's strategic direction, collect valuable business data, provide critical feedback to individuals and workgroups, protect organizations from legal risks, and retain top talent. To do so, we offer a solution to overcome the challenges associated with measuring performance during a crisis. Specifically, we extend and expand upon the well-established Net Promoter Score measure in marketing and introduce the Performance Promoter Score (PPS. The notion of positive organization behavior is believed, can create a positive psychology in the working environment to enhance performance (Avey et al., 2010). Organizations are constantly seeking ways to enhance employee performance to remain competitive in a globalized economy. However, the field of employee performance is vast and fragmented, with research spanning multiple disciplines, including human resource management, organizational behavior, psychology, and even technology studies. This fragmentation makes it challenging for researchers and practitioners to gain a holistic understanding of the key drivers and outcomes of employee performance. Early research focused primarily on individual-level factors, such as motivation, skills, and abilities (Locke & Latham, 2002). However, as organizations have become more complex, researchers have begun to explore the role of contextual factors, such as leadership, organizational culture, and technological advancements, in shaping employee performance (Bass & Avolio, 1994)transactional leadership, their effects form accepted ways of behaving. The Organizational Description Questionnaire (ODQ. Moreover, the COVID-19 pandemic has introduced new challenges and opportunities, such as the shift to remote work and the increasing use of artificial intelligence (AI) in the workplace, which have further complicated the landscape of employee performance research (Gajendran & Harrison, 2007)883 employees. Telecommuting had small but mainly beneficial effects on proximal outcomes, such as perceived autonomy and (lower. Given the complexity and diversity of the field, there is a pressing need for a comprehensive review that synthesizes the extant literature on employee performance. Organizations are constantly seeking ways to enhance employee performance to remain competitive in a globalized economy. However,

the field of employee performance is vast and fragmented, with research spanning multiple disciplines, including human resource management, organizational behavior, psychology, and even technology studies. The trajectory of research on employee performance reveals an expansive yet fragmented corpus, addressing antecedents such as employee wellbeing and work life balance. Despite its breadth, the literature remains compartmentalized, with scant attempts to integrate findings across diverse theoretical and empirical traditions. This paper undertakes a bibliometric analysis in tandem with a systematic literature review to rigorously interrogate the extant scholarship on employee performance. The bibliometric component delineates the intellectual structure of the field, identifying co-authorship network, keyword occurrence network and number of publications over time. The systematic review complements this by synthesizing theoretical frameworks and methodological approaches, offering a granular analysis of the antecedents of the employee performance. This review will meticulously explore diverse perspectives on employee performance, integrating individual characteristics, organizational factors and emerging trend. The synthesis of existing research aims to provide a robust understanding of this critical area of management.

Objectives

The present academic study has following objectives:

1. To identify the individual factors, organizational factors and emerging trends in the field of employee performance.
2. To investigate the role of antecedents in enhancing employee performance.
3. To analyse the prominent theories associated with employee performance research.
4. To access India's role and contribution to the global body of literature on employee performance through a bibliometric analysis.
5. To examine the evolution of research on employee performance over time.

By addressing these objectives, this paper aims to provide a clear and structured overview of the current state of research on employee performance, identify gaps in the literature, and provide future research research directions. The findings of this study will be valuable for both researchers and practitioners, offering insights into the factors that drive employee performance and highlighting emerging trends that are likely to shape the future of work.

Research Methodology

In this study, we adopt a robust and systematic research methodology to identify, evaluate, and analyse pertinent studies, with the goal of developing a comprehensive understanding of the current knowledge landscape in the field of employee performance. To achieve this objective, we utilize a dual approach that integrates bibliometric analysis with a systematic literature review within the domain of employee performance.

Data Collection

The bibliometric record of the articles was extracted from the Scopus using keyword like "employee performance." The Scopus database was chosen for this study as it provides the most extensive collection of abstracts and citations for peer-reviewed literature, ensuring comprehensive coverage and reliability for our analysis (Ballew, 2009). The title, abstract, and keywords fields extracted the articles relevant to this review. A search string was developed to select the journal articles in the English language from the subject areas of psychology, social sciences, business and accounting. Time restrictions were imposed from 2015 to 2023 to increase the study's comprehensiveness. VOSviewer was utilized for data processing, leveraging packages like *bibliometrix* for trend analysis, co-authorship network and keyword occurrence network to illustrate the evolution of research and highlight significant contributions and future research directions.

The final search protocol that was used to extract articles is:

Data Source	Search Syntax
Scopus Database	Title-Abs-Key ("Employee Performance") And Pubyear > 2014 And Pubyear < 2024 And Pubyear > 2014 And Pubyear < 2024 And (Limit-To (Srctype , "J")) And (Limit-To (Pubstage , "Final")) And (Limit-To (Doctype , "Ar")) And (Limit-To (Subjarea , "Busi") Or Limit-To (Subjarea , "Soci")) And (Limit-To (Language , "English"))

Prisma Framework

Figure 1. Prisma Framework

The Need for a Comprehensive Review

Despite the wealth of research on employee performance, the field remains fragmented, with studies often focusing on specific antecedents or outcomes without considering the broader context. This fragmentation makes it difficult for researchers and practitioners to gain a holistic understanding of the factors that drive

employee performance and the potential interactions between these factors. Moreover, the rapid pace of technological change and the shifting nature of work have introduced new challenges and opportunities that require further exploration. This paper aims to address these gaps by conducting a comprehensive bibliometric and systematic literature review of the research on employee performance. By synthesizing the extant literature, the study seeks to provide a clear and structured overview of the current state of research, identify key trends, and propose a framework for future research. The findings of this study will be valuable for both researchers and practitioners, offering insights into the factors that drive employee performance and highlighting emerging trends that are likely to shape the future of work.

Results of literature review

Objective 1. Individual-Level Factors Influencing Employee Performance
Skills and Abilities

An employee's performance is significantly influenced by their inherent skills and acquired abilities, which range from technical expertise to interpersonal and problem-solving competencies(Nyakundi et al., 2022). The relevance of these skills varies by job role, with some positions demanding specialized technical knowledge and others prioritizing communication and collaboration(Kareem & Hussein, 2019). While possessing the necessary skills is essential, employees also require opportunities to apply and refine them. Organizations facilitate skill development through training programs, mentorship, and access to resources, which enhance performance, engagement, and job satisfaction. Continuous skill development is critical to adapt to technological advancements and industry changes, ensuring sustained competitiveness.
Motivation and Engagement

Employee motivation and engagement are critical determinants of performance(K. Sathish & Nallawar Vamshi Krishna, 2024). Motivation drives effort, persistence, and commitment, while engagement reflects a psychological connection to work, fostering involvement, enthusiasm, and ownership. Theoretical frameworks such as Maslow's hierarchy of needs (Dharma, 2018) and Herzberg's two-factor theory Saad, (2018) provide insights into motivation, though their universality and applicability across contexts are often debated. To optimize performance, organizations must implement strategies that enhance motivation and engagement, including professional development opportunities, recognition of contributions, autonomy, and a supportive work environment(Smt. Sumela Chatterjee, 2022)characterized by globalization, heightened stakeholder expectations, and intensifying market competition, organizations are constantly seeking ways to enhance their performance. This research employs a quantitative methodology to investigate the synergistic effects of employee engagement initiatives on organizational outcomes. A sample of 320 participants from diverse sectors was surveyed. The findings indicate a strong positive correlation between strategic employee engagement practices and improved organizational performance metrics. Notably, the study reveals that participative decision-making processes and robust communication channels significantly contribute to heightened employee engagement and, consequently, superior organizational performance. However, the impact of traditional incentive structures showed mixed results, suggesting the need for more nuanced approaches to motivation. These insights offer valuable guidance for HR practitioners in designing and implementing engagement strategies that align with organizational goals and drive sustainable performance improvementsSuch strategies can improve productivity, work quality, and innovation.

Personality and Work Attitudes

Individual personality traits and work attitudes are key determinants of employee performance(Nyakundi et al., 2022). Personality, assessed through frameworks like the Big Five traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism), influences behavior and performance. Conscientiousness, in particular, is a strong predictor of performance due to traits like organization and dependability. Resilience, the capacity to recover from adversity, also enhances performance by enabling employees to navigate challenges effectively. Job satisfaction, reflecting a positive appraisal of one's work, fosters commitment, enthusiasm, and proactive behavior, leading to higher effort and work quality(Premesti & Yuniningsih, 2023). Conversely, negative attitudes, such as cynicism or apathy, can impair performance(Alromaihi et al., 2017). Understanding the interplay between personality, attitudes, and performance is essential for recruitment, training, and performance management. Organizations can use personality assessments to identify desirable traits and implement interventions to cultivate positive attitudes while mitigating the impact of less favorable traits.

Organizational-Level Factors Influencing Employee Performance
Leadership Styles

Leadership style significantly influences employee motivation and performance(Udovita, 2020). Transformational leadership, which emphasizes inspiration, intellectual stimulation, and individualized consideration, is strongly associated with higher employee engagement, satisfaction, and performance. Such leaders articulate a clear vision, empower employees, and foster a supportive environment that encourages creativity and innovation. In contrast, transactional leadership, relying on contingent rewards and rule adherence, may not equally enhance intrinsic motivation or engagement.

Servant leadership, which prioritizes employee needs and development, also positively impacts performance and well-being(Sarwar et al., 2021)altruism, empowerment, trust and service for employees' performance. Data from 230 employees of University of Sargodha, Sargodha were collected. A structured questionnaire consisting of several statements measuring scales was used and the participants were approached personally. Different statistical tools e.g., Confirmatory factor analysis and structural equation modeling were used to analyze data and for hypothesis testing. The results report that empowerment has no significant relation with employee performance, while other dimensions of servant leadership love, altruism, trust and service show a positive significant contribution to improve employees' performance. This study is very helpful to provide solid strategies for the management that would be very beneficial for the educational sector and use servant leadership with an aim of raising morale and to create such environment which is essential for productive work.""International Journal of Management (IJM. While the optimal leadership style depends on organizational context, styles that promote empowerment, engagement, and purpose generally yield the most favorable performance outcomes.

Organizational culture

Organizational culture, defined by shared values, beliefs, norms, and practices, significantly influences employee performance(Simakhajornboon et al., 2024) online surveys were sent to employees in Thailand, which were designed based on previous research and checked for reliability using the Cronbach alpha coefficient. The study received 211 responses, which was a satisfactory number based on calculations from the G*Power program and analysis using partial least squares structural equation modeling (PLS-SEM. A positive culture fosters collaboration, innovation, and high performance by promoting open communication, trust, and mutual respect(Diana et al., 2021). Employees in such environments feel valued and empowered, enhancing job satisfaction, motivation, and commitment. Conversely, a negative culture marked by conflict, mistrust, and lack of support can reduce motivation, increase stress, and lower performance(Kuswati, 2020). The impact of culture on performance is often indirect, shaping employee attitudes, behavior, and interactions, which subsequently affect productivity and organizational contribution. Thus, cultivating a positive and supportive culture is a strategic imperative for enhancing performance and achieving sustainable success.

Work Environment and Resources

The physical and psychological work environment, including workspace design, technology, workload, and resource availability, significantly influences employee performance(Jumady, 2023). A well-designed workspace that enhances comfort, productivity, and collaboration can improve well-being and performance. Access to appropriate technology and tools enables efficient task execution. Conversely, excessive workload, insufficient resources, and poor workspace design can lead to stress, frustration, and reduced performance. Psychological factors, such as supervisor and peer support, are equally critical. A supportive and inclusive environment fosters belonging and encourages optimal contributions, while a hostile or unsupportive setting can diminish morale, motivation, and performance. Organizations must prioritize creating a positive work environment by providing necessary resources and support to maximize employee performance.

Emerging Trends of employee performance

The Role of Technology

Technology is rapidly transforming the landscape of employee performance management(Mitravinda & Shetty, 2022). AI-driven tools are increasingly used for performance appraisal, providing personalized feedback, automating HR processes, and identifying potential performance issues proactively(Samman & Obaidly, 2024). These technological advancements offer the potential to improve the efficiency and effectiveness of performance management, but they also raise important ethical considerations and data privacy concerns(Kambhampati & Rao, 2024). Future research needs to focus on developing ethical guidelines for the use of AI in performance management, ensuring fairness and transparency, and addressing potential biases in AI algorithms. The integration of technology into performance management also necessitates the development of training programs to equip employees and managers with the skills and knowledge to utilize these tools effectively.

The Impact of Globalization and Diversity

Globalization and increasing workforce diversity present both challenges and opportunities for employee performance management(Kareem & Hussein, 2019). Organizations with global teams need to adapt their performance management strategies to account for cultural differences, communication styles, and varying work practices(Wilkins et al., 2017)with a focus on identifying differences between the employees at home and foreign branch campuses. The data for the study were obtained using a questionnaire that was completed by both teaching and non-teaching staff at three institutions in the United Kingdom, three institutions in Malaysia, and two institutions in the United Arab Emirates. A conceptual model was proposed and tested using structural equation modeling. The results indicate that employees at international branch campuses are not as motivated and committed to their organizations as their counterparts at

home campuses. The findings suggest that institutions need to employ different and customized human resource strategies at home and foreign campuses, specifically with the aim of improving employee commitment and performance at the foreign campuses."The development of culturally sensitive performance appraisal methods and the provision of cross-cultural training for managers are crucial for ensuring fairness and effectiveness in global contexts. Diversity, encompassing differences in gender, ethnicity, age, and other factors, also presents challenges and opportunities. Organizations need to develop inclusive performance management practices that value and leverage the diverse skills and perspectives of their employees. Future research needs to explore best practices for managing diverse teams, developing culturally sensitive performance management systems, and ensuring equity and fairness in performance evaluations.

Objective 2. The Role of Antecedents Employee Well-being and Work-Life Balance in Enhancing Employee Performance

Employee well-being and work-life balance are critical factors in enhancing employee performance. High levels of stress and burnout negatively impact well-being, leading to decreased productivity, increased errors, and higher turnover rates(Pradoto et al., 2022)organizations, business process and results are affected and organizational and commercial activities are significantly reduced. OBJECTIVE: This study investigates the impact of work stress and organizational climate on employee performance in the context of WFH in the era of the COVID-19 pandemic in micro, small and medium enterprises (MSMEs. Organizations can mitigate these effects by implementing stress management strategies, promoting work-life balance, and fostering a supportive work environment, which in turn improves performance and retention. Work-life balance is equally vital, as employees who effectively balance work and personal life experience lower stress, higher job satisfaction, and increased productivity. Initiatives such as flexible work arrangements, parental leave policies, and employee assistance programs demonstrate organizational support for well-being, boosting morale, motivation, and performance(Alharbi, 2023). A strong focus on work-life balance also enhances an organization's reputation, aiding in attracting and retaining top talent while reducing absenteeism and turnover.

Objective 3. Theories of employee performance

The employee performance literature predominantly applied the Social Exchange Theory (Blau, 1964)that explains relationships in terms of costs and benefits, and suggests that positive and mutually beneficial relationships are developed over time as parties demonstrate a willingness to reciprocate positive actions whereas Social Identity Theory suggests that individuals derive a sense of self-esteem and belonging from their membership in social groups, such as their work teams or organization. Individuals may therefore respond more positively to actions that are perceived to benefit their group or organization, such as socially responsible corporate activities. Goal-Setting Theory(Locke & Latham, 2005) is applied to employee performance, suggests that clear, challenging, and specific goals can improve performance by focusing employee attention and effort(Gan et al., 2020) Consistent employee performance management, which involves providing regular feedback and aligning goals with organizational objectives, has been found to enhance individual innovation. Conservation of Resources Theory (Hobfoll et al., 1990) proposes that individuals strive to acquire and protect resources, such as skills, knowledge, and support, and that the perceived loss or threat to these resources can lead to stress and reduced well-being(Clarke & Mahadi, 2017). This theory has been applied to explain the relationship between human resource management practices, employee performance, and well-being. AMO Framework explains the Abilities-Motivation-Opportunity framework postulates that employee performance is influenced by a combination of factors, including the employee's abilities and skills, their motivation to perform, and the opportunities provided by the work environment to perform effectively(Chen & Wei, 2020). Effective training programs can improve employee performance by enhancing abilities, motivating workers, and providing opportunities to practice new skills. Deontic Justice Theory is built on existing theories of organizational justice to posit that individuals may act fairly and respond negatively to perceived injustice because of an inherent desire to do the right thing, rather than for self-serving or group-based reasons(Lyubykh et al., 2022). This suggests that employee perceptions of fairness are not solely driven by self-interest but also by moral principles whereas Trait Activation Theory (Tett & Burnett, 2003) proposes that individual personality traits can be activated by specific job situations or environmental cues, leading to variations in employee behavior (Nyberg et al., 2016). The theory suggests that employees with high levels of core self-evaluation may be more likely to engage in helping behavior when faced with shared stressors at work, while those with low core self-evaluation may withdraw from such challenges.

Author(s)	Sample Characteristics	Analysis	Analysed Variables	Relevant Results
(Bisht & Mahajan, 2021)	361 employees and 29 supervisors from an operational apparel manufacturing facility in North India.	Hierarchical Linear Modeling	Core self-evaluations, Shared challenging stressors, Shared hindrance stressors, Job performance	When faced with shared challenging stressors, employees with high levels of CSE exhibited higher job performance, while those with low CSE only demonstrated high job performance when shared hindrance stressors were low.
(Chen & Wei, 2020)	504 employees from 55 teams in Chinese companies.	Multiple Regression Analysis	Social media use for vertical communication, social media use for horizontal communication, Leader-member exchange, Team-member exchange, Employee performance	Social media use for vertical communication had a positive impact on leader-member exchange, which in turn positively impacted employee performance. Social media use for horizontal communication positively affected team-member exchange, which also positively impacted employee performance.
(Ni et al., 2022)	Study 1: 450 participants from Prolific. Study 2: 186 employees and 29 immediate leaders in a food company.	Confirmatory Factor Analysis, Path Analysis	Helping coworkers in a crisis, receiving gratitude expression from coworkers, Crisis self-efficacy, perceived social impact, task performance, Adaptation to a crisis, Helping behavior toward leaders	Helping coworkers, especially during times of crisis, can induce positive psychological mechanisms, including enhanced crisis self-efficacy and perceived social impact, which in turn leads to improved task performance and adaptation to the crisis. The perceived novelty and criticality of the crisis situation can moderate these relationships.
(Lyubykh et al., 2022)	443 employee-supervisor dyads from a variety of organizations in the United States.	Bayesian multilevel structural equation modeling	Supervisor age, Supervisor gender, Supervisor race, Employee age group, Employee gender, Employee race, Baseline conscientiousness, Attributed conscientiousness, Abusive behavior	Supervisors attributed higher levels of conscientiousness to their employees in the "combined" condition, in which they were told their employee was both a good performer and a good citizen, compared to the control condition, in which they received no information about the employee. Supervisors attributed lower levels of conscientiousness to their employees in the "external" condition, in which they were told their employee was a good organizational citizen but a poor performer.

(Nikolova et al., 2022)	5,192 employees from 140 Belgian organizations.	Hierarchical Linear Modeling	Job insecurity, Employee performance	Job insecurity was negatively related to task performance and organizational citizenship behavior and positively related to counterproductive work behavior. The negative relationship between job insecurity and performance was stronger when employees perceived that their job insecurity was controllable
(Chadi et al., 2017)adding realism to the ongoing research of task meaning. Owing to an unexpected project cancelation, we are able to study how varying the information provided about the meaning of previously conducted work-without the use of deception, but still maintaining a high level of control-affects subsequent performance. We observe a strong decline in exerted effort when we inform workers about the meaninglessness of a job already done. Our data also suggests that providing a supplemental alternative meaning perfectly compensates for this negative performance effect. Individual characteristics such as reciprocal inclinations and trust prompt different reactions. The data also show that the meaning of work affects workers' emotions, but we cannot establish a clear relationship between emotional responses and performance.",,"When the meaning of work has disappeared: Experimental evidence on employees' performance and emotions",	102 recently employed workers performing the same task in a temporary job	Regression Analysis	Meaning of work, Reciprocity, Task performance	Employees whose work had no meaning, or whose work served an alternative purpose, performed better when they were more reciprocally inclined.
(Meijerink et al., 2021)	8,509 employees	Meta-analysis, Structural Equation Modeling	Descriptive reports of high-performance work practices (HPWPs), Evaluative reports of HPWPs, Job attitudes, Personal/job resources, Employee performance	Descriptive reports of HPWPs were more strongly related to personal/job resources, while evaluative reports were more strongly related to job attitudes. Both job attitudes and personal/job resources partially mediated the relationship between both types of HPWPs and employee performance.
(Buil et al., 2019)it explores the mediating role of organizational identification and work engagement in the relationship between transformational leadership and job performance and organization-directed citizenship behaviors. Additionally, it examines whether proactive personality moderates the effect of transformational leadership on identification and engagement. Data from 323 frontline hotel employees were analyzed using partial least square regression. Results show that identification and engagement fully mediate the relationship between transformational leadership and organizational citizenship behaviors, whereas engagement partially mediates the link between transformational leadership and job performance. Results indicate a sequential mediation effect of identification and engagement on employee performance. Finally, findings show that proactive personality strengthens the effect of leadership on identification and engagement. The study provides information for hotel managers about why and under what circumstances employees perform the way they do.	570 employees and 110 supervisors in a manufacturing organization located in Spain.	Structural Equation Modeling	Supervisor work engagement, Employees' work engagement Employees' affective commitment, Employees' in-role performance, Employees' organizational citizenship behavior (OCB)	Supervisor work engagement was positively related to employees' work engagement and affective commitment, which in turn was positively related to employees' in-role performance and OCB.

(Yu et al., 2022)we examined the curvilinear relationship between CP and employee performance through a sample of 592 employees in China. The results showed that CP had an S-shaped effect on employee performance. In other words, corporate philanthropy, either in an amount too small or too large beyond a threshold, will not improve employee performance. Furthermore, we also found that the S-shaped relationship was moderated by employee benevolent attribution. Implications for research and practice, research limitations, and future research directions are discussed subsequently.”,	348 employees in China.	Correlation, Regression Analysis	Unethical leader behavior, Leader-member exchange (LMX), Employee deontic justice, Employee performance	Unethical leader behavior was negatively related to LMX and employee deontic justice, and LMX and employee deontic justice were positively related to employee performance.
(Bradler et al., 2016)public recognition on employee performance. We hired more than 300 employees to work on a three-hour data-entry task. In a random sample of work groups, workers unexpectedly received recognition after two hours of work. We find that recognition increases subsequent performance substantially, and particularly when recognition is exclusively provided to the best performers. Remarkably, workers who did not receive recognition are mainly responsible for this performance increase. Our results are consistent with workers having a preference for conformity and being reciprocal at the same time.	627 students from German universities who performed a data-entry task.	Regression Analysis	Employee recognition, Employee performance	Receiving a thank-you card, regardless of whether it was given to all workers or only to the best performers, increased performance compared to a control group.
(Edwards & Kudret, 2017)	438 employees in a multinational telecommunications company in Turkey.	Confirmatory Factor Analysis, Structural Equation Modeling	Procedural justice- Corporate social responsibility (CSR), Affective commitment, Organizational pride, In-role performance	Procedural justice was positively related to the four dimensions of employees’ perceptions of CSR, which in turn, were positively related to their affective commitment and organizational pride. However, the relationship between employees’ perceptions of CSR and their in-role performance was not significant.
(Buil et al., 2019)it explores the mediating role of organizational identification and work engagement in the relationship between transformational leadership and job performance and organization-directed citizenship behaviors. Additionally, it examines whether proactive personality moderates the effect of transformational leadership on identification and engagement. Data from 323 frontline hotel employees were analyzed using partial least square regression. Results show that identification and engagement fully mediate the relationship between transformational leadership and organizational citizenship behaviors, whereas engagement partially mediates the link between transformational leadership and job performance. Results indicate a sequential mediation effect of identification and engagement on employee performance. Finally, findings show that proactive personality strengthens the effect of leadership on identification and engagement. The study provides information for hotel managers about why and under what circumstances employees perform the way they do.	456 hotel employees from 12 Spanish hotels.	Structural Equation Modeling	Transformational leadership, Organizational identification, Work engagement, Job performance (JP), Organizational citizenship behavior (OCB)	Transformational leadership was positively related to organizational identification and work engagement, which, in turn, were positively related to both JP and OCB. Additionally, organizational identification mediated the relationship between transformational leadership and work engagement.

Table 1. Overview of literature review

Bibliometric analysis

Bibliometric analysis has been applied on 2,015 documents to gauge the global and national trends in the academic exploration of employee performance. The intention for keeping 2,015 documents for bibliometric analysis was to gain a richer insight into the publication trends without limiting the database to just ABDC listed journals.

Keyword occurrence network

Figure 2 is generated using VOSviewer, displays a keyword co-occurrence network with color-coded clusters representing thematic groups: the **red cluster** likely includes keywords related to employee attitudes, job stress, and organizational commitment, focusing on employee well-being and organizational behavior; the **green cluster** centres around hospitality, tourism, and team performance, reflecting themes in the service industry and team dynamics; the **blue cluster** encompasses terms like job rotation, organizational support, and employee training, highlighting human resource management and employee development; and the **yellow cluster** includes spiritual leadership, workplace spirituality, and customer satisfaction, emphasizing leadership styles and their impact on workplace culture and customer relations.

Keywords Occurrence Network

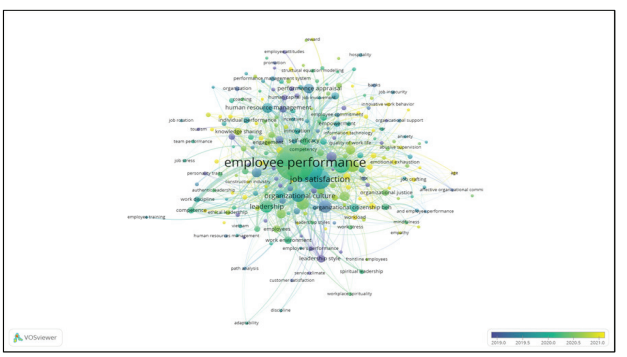


Figure 2. Keyword Occurrence network in employee performance domain.

Co-authorship network

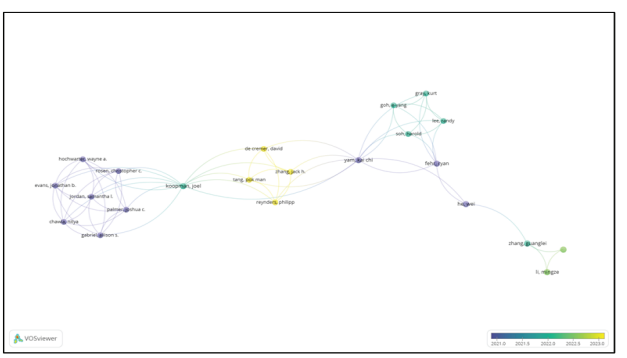


Figure 3. Co-authorship network in employee performance domain.

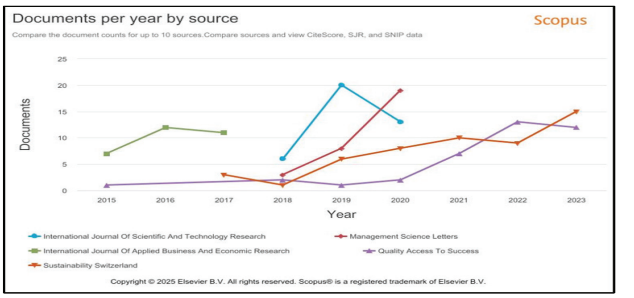


Figure 4. Document per year by source.

Figure 3 represents a co-authorship network visualization, created using VOSviewer. It shows connections between authors based on their collaborations in research or publications. The network highlights how these authors are linked through joint work, with nodes representing authors and lines indicating co-authorship relationships whereas Figure 4 appears to be a graphical representation of document counts per year from various academic sources, likely related to research on employee performance. It compares the number of documents published annually by up to 10 sources, including journals like the "International Journal of Scientific and Technology Research," "Management Science Letters," and "Sustainability Switzerland." The data spans from 2015 to 2023, showing trends in publication output. It helps in understanding the evolution of research in the field and identifying key journals that contribute to the discourse on employee performance.

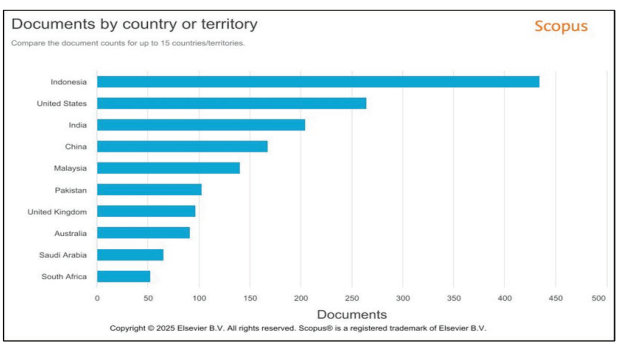


Figure 5. Country-wise Distribution of the documents.

Objective 4, Figure 5 presents a bar chart from Scopus titled "Documents by country or territory," comparing the number of documents published in up to 15 countries/ territories. Indonesia leads with the highest count, surpassing 400 documents. It is followed by the United States and India, which both exceed 300 documents. China, Malaysia, and Pakistan also demonstrate significant contributions, ranging between 150 and 250 documents. The United Kingdom, Australia, Saudi Arabia, and South Africa show moderate contributions, each below 150 documents. This chart highlights Indonesia's dominant academic output among the represented nations.

Objective 5, Figure 6 is a line graph depicting the evolution of research on employee performance over the years, from 2015 to 2023. The graph shows a general upward trend in the number of documents, indicating an increase in academic and research output over this period. This trend could reflect the growing interest and publication activity in various fields, including studies on employee performance

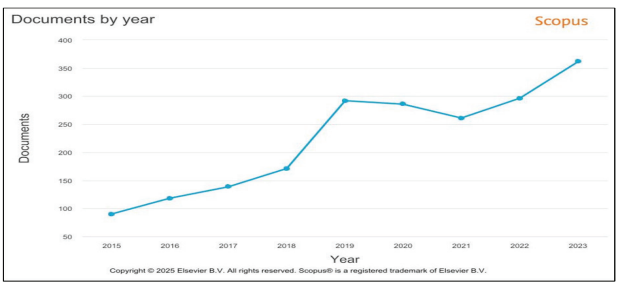


Figure 6. Year-wise distribution of Documents.

Discussion

The discussion highlights key findings on the employee performance, noting the significant contribution of the Indonesia due to its diverse work environments, research institutions, and funding mechanisms. The Indonesia has focused on addressing challenges posed by its dynamic labor force, making it an ideal setting for employee performance. Future research opportunities lie in exploring advancements in creative intelligence and human-technology interactions in the workplace. The findings of this study have significant theoretical and practical implications. Theoretically, the identification of factors offers a comprehensive framework for understanding the factors affecting employee performance, guiding future research and theory development, particularly in emerging areas like remote work, AI, and employee well-being. Practically, organizations should invest in leadership development to foster engagement and performance, embrace digital transformation to enhance productivity and innovation through AI and technology, and prioritize employee well-being by promoting work-life balance and providing support, ultimately driving overall performance.

Conclusion

This paper presents a comprehensive bibliometric and systematic literature review of the extant research on employee performance. This literature review has synthesized a substantial body of research on employee performance, encompassing a wide range of individual-level and organizational-level factors. The review has highlighted the critical importance of employee performance for organizational success, emphasizing the need for a comprehensive and multifaceted approach to performance management. The review has also identified several emerging trends, including the increasing role of technology, the impact of globalization and diversity, and the growing emphasis on employee well-being. Future research needs to address these emerging challenges and refine performance management strategies to meet the demands of a rapidly evolving world. Organizations must adopt a holistic perspective, considering both individual needs and organizational context, to foster a high-performing and engaged workforce that contributes to sustained organizational success. The effective management of employee performance is not merely an operational task but a strategic imperative for achieving long-term organizational goals. The study concludes by proposing a conceptual framework for future research and offering theoretical and practical implications for organizations aiming to enhance employee performance.

Limitations and Future Research Directions

While this study provides a comprehensive review of the literature on employee performance, it is not without limitations. First, the study is limited to articles published in English and indexed in the Scopus database, which may exclude relevant research published in other languages or databases. Future research could expand the scope of the review to include additional databases and languages. Second, the study focuses on the factors and emerging trends of employee performance but does not explore the antecedent and outcomes which influence performance. Future research could explore the mediating and moderating factors that link antecedents to outcomes, providing a more nuanced understanding of employee performance. Future research could focus on emerging areas, exploring their impact on employee performance and identifying best practices for organizations. Despite the significant body of research on employee performance, several areas warrant further investigation. Longitudinal studies are needed to understand the long-term effects of different performance management interventions and to assess their sustainability. More research is also needed on the effectiveness of different performance management strategies in diverse organizational contexts and across different industries. The ethical implications of using AI in performance management require further scrutiny, and research is needed to develop robust frameworks for ensuring fairness and mitigating potential biases. Furthermore, more research is needed on the interaction between individual-level and organizational-level factors, examining the complex interplay between motivation, leadership, organizational culture, and performance. Finally, future research should investigate the impact of performance management on employee well-being and work-life balance, ensuring that performance management practices do not inadvertently create undue stress or compromise employee health.

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Life Satisfaction Research Across Three Decades: Trends and Patterns via Bibliometric Analysis Using VOS viewer and R

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Abstract

Life satisfaction is a critical aspect of subjective well-being linked to numerous positive outcomes such as enhanced mental health, productivity, and job satisfaction. Despite extensive research across diverse disciplines, the literature on life satisfaction remains fragmented, often split between personality-driven (personological) and situational perspectives. This theoretical divide has limited the development of a cohesive framework, hindering the integration of socio-economic and cultural dimensions into life satisfaction research. The present study aims to bridge this gap by synthesizing research from the past three decades and identifying core research clusters, emerging trends, and interdisciplinary linkages within the field. To achieve these objectives, a dual-method approach combining bibliometric mapping and interpretative analysis was employed, offering both a structural and philosophical understanding of life satisfaction literature. The findings reveal four primary research clusters: psychological well-being across cultural contexts, socio-economic influences on well-being, life satisfaction in social and professional domains, and well-being in youth across cultures. The study also highlights a shift towards examining the socio-economic, cultural, and professional dynamics influencing life satisfaction. These insights underline the need for cross-cultural and longitudinal studies to capture the nuances of life satisfaction in an interconnected world. The implications of this review extend to organizational policy, public health, and social welfare, providing a foundation for developing holistic strategies to enhance well-being in diverse populations. This study advances a comprehensive, multi-dimensional framework for understanding life satisfaction, offering valuable directions for future research.

Keywords: *Life satisfaction, Subjective Well-Being, Review, bibliometric analysis, VoS Viewer, R Studio*

Introduction

Life satisfaction is a vital aspect of an individual's overall well-being. In utilitarian moral philosophy, it is considered the "ultimate goal" of life (Ehrhardt et al., 2000). According to this view, life satisfaction can be viewed as an attitude: "a summary evaluation of objects along a dimension ranging from positive to negative" (Petty et al., 1997). In other words, Life satisfaction is an evaluative summary of how much one likes or dislikes their life i.e., the attitudinal object (Heller et al., 2004). According to (Frisch et al., 1992), life satisfaction or quality of life refers to an individual's subjective assessment of how well their most important needs, goals, and wishes have been met. Every decision a person makes, whether in personal or professional contexts, aims to enhance life satisfaction. As a result, factors such as a fulfilling job, higher income, good mental and physical health, and supportive social relationships are commonly associated with higher levels of life satisfaction (Raza et al., 2020).

Life satisfaction primarily falls under subjective well-being (Ferreira et al., 2020). It is often linked to quality of life, physical and mental health, positive social connections, recreation, and personal fulfillment (Qu & Zhao, 2012).

Life satisfaction has also been linked to numerous positive outcomes, including increased happiness, mental wellness, creativity, and productivity (Pasupuleti et al., 2009; Qu & Zhao, 2012). Research indicates that higher levels of life satisfaction contribute to additional benefits such as lower mortality rates, fewer sleep complaints, reduced burnout, and improvements in job satisfaction, job performance, employee well-being, and engagement (Erdogan et al., 2012; Ferreira et al., 2020; Lindblom et al., 2020).

Cheerfulness directly impacts life satisfaction, but self-esteem and behavioral activation influence much of this effect. Cheerful individuals tend to have higher self-esteem, which in turn positively affects their life satisfaction. Cheerfulness promotes life satisfaction by boosting self-esteem and encouraging active engagement in rewarding behaviors, with self-esteem being the stronger mediator (Lau et al., 2020).

Recovery experienc es during vacations, specifically

psychological deta chment, relaxation, autonomy, and mastery, positivel y influence life satisfaction, with mastery (engagemen t in challenging, growth-oriented activities) exerti ng the most substantial effect. These restorative experi ences foster creative behaviors that enhance occupational engagement and career satisfaction, improving overall life satisfaction (Kawakubo & Oguchi, 2019).

The association of life satisfaction with a wide array of positive outcomes has attracted researchers from diverse fields, prompting rigorous efforts to conceptualize and operationalize this concept over the past few decades (Diener et al., 1985; Gregg & Salisbury, 2001; Margolis et al., 2019; Neugarten et al., n.d.; Pavot & Diener, 2008). However, researchers have approached life satisfaction from two distinct perspectives: the top-down (personological) approach, which suggests that personality traits and dispositions influence an individual's satisfaction across various life domains, and the bottom-up (situational) approach, which views life satisfaction as an accumulation of satisfaction across different life domains (Greguras & Diefendorff, 2010; herpen Lapierre et al., 2008; Simon et al., 2010). This divergence in theoretical perspectives has led to fragmented literature and conceptual ambiguity (Heller et al., 2004; Saris et al., 1996), reducing the field's cohesiveness and hindering the development of a comprehensive theory. While existing reviews have acknowledged this disintegration and explored life satisfaction's antecedents, consequences, and relates across settings (Erdogan et al., 2012; Proctor et al., 2009), the foundational intellectual structure of the literature remains largely unexplored.

The critical role of daily positive experiences in fostering engagement and improving life satisfaction, highlighting the importance of work engagement as a mediator in the relationship between daily work experiences and overall well-being (Junça Silva et al., 2023).

State of Life Satisfaction Literature Before 1991

Life satisfaction emerged as a research variable in the early 20th century, capturing the attention of researchers, psychologists, and sociologists. The primary focus has been understanding the subjective assessment of one's well-being and the factors influencing it. Scholars have examined life satisfaction from various theoretical perspectives. Notable among these is social comparison theory (Festinger, 1954), which posits that individuals gauge their life satisfaction by comparing their life situations and possessions with others. Another influential theory is adaptation-level theory, which suggests that the impact of a stimulus fades over time. For instance, while a pay raise may initially boost satisfaction, over time, the individual adapts, and satisfaction levels revert to a baseline (Paul & Guilbert, 2013).

Need theory fundamentally suggests that individuals can sustain or enhance their well-being by fulfilling these needs (Diener & Lucas, 2000). Various definitions of basic needs have been introduced, with a relevant one by (Ryan & Deci, 2000), describing a ''a basic need, whether it be a physiological need or a psychological need, is an energizing state that, if satisfied, conduces toward health and well-being but, if not satisfied, contributes to pathology and ill-being'' (Ryan & Deci, 2000).

However, considerable research has focused on the relationship between job and life satisfaction (Rice et al., 1980; Tait et al., 1989), examining it through the spillover, compensation, and segmentation hypotheses (Rain et al., 1991). Despite these efforts, a theoretical or empirical agreement remains elusive. Researchers have also identified gaps, including the lack of reliable and standard measurement tools and a need for cross-cultural studies (Rice et al., 1980; Wright & Larsen, 1993). Additionally, the prevalence of cross-sectional designs has limited insights into causal relationships and changes in satisfaction over time.

Objectives of the Study

Building on this background, this article seeks to review the existing literature, reveal the foundational structure of the life satisfaction field, identify prominent research clusters, and highlight significant shifts within the field. This study aims to enrich the life satisfaction literature by achieving the following objectives:

1. To review the literature on life satisfaction from the past three decades, identifying distinct research streams across various contexts.

2. To examine and uncover notable shifts and emerging patterns in life satisfaction research over time.

3. To propose meaningful insights and opportunities to inform and guide future research efforts.

Scope of the Review

To outline the scope of this study, we offer an overview of the various conceptualizations of life satisfaction and the commonly examined correlates associated with this central concept. Researchers have used subjective well-being as a framework to study happiness scientifically, with life satisfaction identified as a key component of subjective well-being (Erdogan et al., 2012). Happiness, which infuses in all aspects of an individual's life, emphasizes the importance of life satisfaction. Scholars have investigated life satisfaction in both personal and professional domains, examining its connections with a wide range of psychological, social, interpersonal, and intrapersonal factors across diverse groups (Enkvist et al., 2012; Kim & Kim, 2012; Lyons et al., 2016; Meléndez et al., 2009). In the professional domain, life satisfaction has been associated with career adaptability, career choices,

job satisfaction, and self-efficacy (Jaensch et al., 2015; Lounsbury et al., 2004). Accordingly, this review covers studies that explore life satisfaction within both personal and professional contexts.

Additionally, life satisfaction has been analyzed in relation to experiences that shape an individual's life. A substantial body of research explores the links between life satisfaction and leisure, travel, and creative activities (Adams-Price et al., 2018; Friman et al., 2017; Morris, 2015; Olsson et al., 2020a). Therefore, our review includes literature that examines the relationship between life satisfaction and travel and leisure activities.

Lastly, as consumers, individuals achieve satisfaction by fulfilling their needs and desires through goods and services. This consumer satisfaction, related to consumption choices, circumstances, and social relationships, is also connected to life satisfaction (Boujbel & D'Astous, 2012; De Oliveira & Huertas, 2015; Grzeskowiak et al., 2016; Xiao & Li, 2011). Thus, the scope of this review encompasses studies investigating consumer behavior and its relationship with life satisfaction.

Methods

Approach

To accomplish the objectives of outlining distinct research clusters and identifying recent trends within the field, this study employs a dual approach, integrating bibliometric and interpretative analyses. The choice to utilize bibliometric analysis is rooted in the inherently multi-disciplinary nature of the concept, where substantial heterogeneity within the literature renders traditional review approaches less effective for uncovering domain-specific patterns. Bibliometric analysis offers a distinctive lens through which the structural composition of the literature quantity can be visually represented. To complement this, an interpretative analysis has been conducted to examine the identified clusters further, fostering a comprehensive understanding of the philosophical orientations inherent within these groupings. This interpretative approach also addresses the limitations of bibliometric analysis, as discussed by Sprong et al. (2021). The overall review is structured according to the POWER (planning, operationalizing, writing, embedding, and reflecting) framework (Rana et al., 2023), which ensures a rigorous analytical process. Subsequent sections provide detailed descriptions of the data collection methods and the analytical techniques applied in both the bibliometric and interpretative phases.

Data Collection

The Scopus database was employed to gather data for the bibliometric analysis, chosen due to Scopus's status as the largest repository of peer-reviewed literature abstracts and citations (Ballew, 2009) along with the Web of Science. Web of Science Core Collection has limited metadata for older records, particularly before the 1990s, affecting topic searches and historical analysis. This limitation can lead to the underrepresentation of early works in bibliometric studies. Researchers are advised to adjust methods to address these gaps (W. Liu, 2021). The data extraction focused on the articles' titles, abstracts, and keyword fields to ensure relevance. A search query was developed to identify journal articles in English published between 1990 and 2025.

The search was further refined by limiting the subject domains to psychology, social sciences, business, accounting and management, and arts and humanities to enhance the study's impact and predictive validity. Keywords were selected based on the central concept and related terminology, such as 'life satisfaction,' 'satisfied life,' and 'satisfaction in life.' However, an initial screening revealed that some terms were commonly associated with studies beyond the intended scope, leading to the exclusion of ambiguous terms. The final search terms included 'life satisfaction,' 'satisfaction with life,' 'satisfaction in life,' 'overall satisfaction,' and 'overall life satisfaction.' The final search was executed on October 20, 2024. The specific query used for data extraction was as follows:

TITLE-ABS-KEY ('Life satisfaction' OR 'Satisfaction in Life' OR 'overall satisfaction' OR 'Satisfaction with life' OR 'overall life satisfaction') AND PUBYEAR > 1989 AND PUBYEAR < 2026 AND (LIMIT-TO (SUBJAREA, 'PSYC') OR LIMIT-TO (SUBJAREA, 'SOCI') ORLIMIT-TO (SUBJAREA, 'BUSI') OR LIMIT-TO (SUBJAREA, 'ARTS') AND (LIMIT-TO (DOCTYPE, 'ar') OR LIMIT-TO (DOCTYPE, 're') AND (LIMIT-TO (LANGUAGE, 'English') AND (LIMIT-TO (SRCTYPE, 'j') AND (LIMIT-TO (PUBSTAGE, 'final')).

The initial search query retrieved 2,907 items from Web of Science and 19,933 articles from Scopus. After screening for duplicate entries, 1,849 unique articles were identified. A thorough examination was then conducted to ensure alignment with the A and A quality categories, resulting in the exclusion of an additional 17,046 records. Consequently, 3,945 articles remained in the dataset. These articles subsequently underwent a secondary screening process, focusing on abstract review to enhance the relevance and specificity of the dataset for bibliometric mapping. This refinement process led to the exclusion of 3,515 additional items, leaving a final set of 394 articles for inclusion in the bibliometric mapping analysis.*

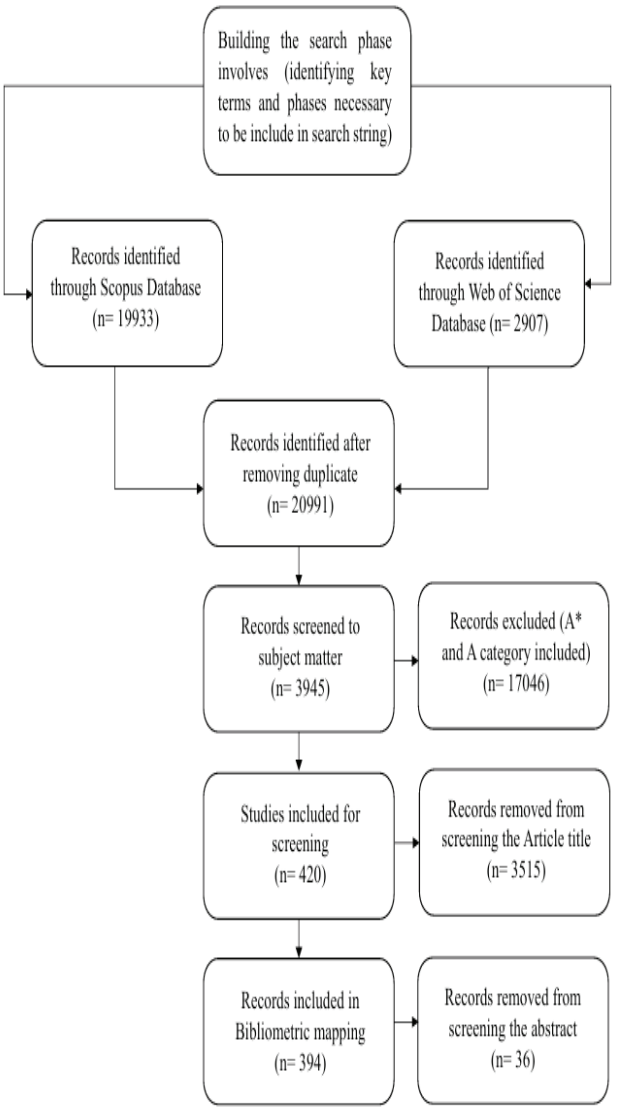


Figure 1. *Article Selection Process*

Bibliometric Mapping

Within the bibliometric analysis, the bibliometric coupling technique was employed to simultaneously map the literature and identify research clusters (van Eck & Waltman, 2010; Waltman et al., 2010). This method has seen extensive application across recent studies in the social sciences (Lazar & Chithra, 2021; Prieto-Jiménez et al., 2021; Rodrigues et al., 2020; Sánchez-Teba et al., 2021), engineering (Goksu, 2021; Y. Liu & Avello, 2021a), and decision sciences (Fellnhofer, 2018; Kokol et al., 2015).

The study applied bibliographic coupling to reveal the network structure of the existing literature, where each article is represented as a node connected to others based on shared citations. Link strength is determined by the number of references between articles, making this technique particularly effective for identifying clusters, as articles with numerous shared citations often exhibit similar theoretical perspectives and contextual orientations.

VOS viewer software (Jan van Eck & Waltman, 2020) facilitated the analysis, employing the Visualization of Similarity (VOS) technique to create distance-based maps, where the proximity of nodes reflects their relatedness. The VOS technique's capacity to identify clusters depends on the required granularity, modifiable through parameters such as clustering resolution (ɣ) and minimum cluster size. A higher resolution parameter yields more clusters, while a specified minimum cluster size ensures that each cluster contains a defined number of articles. For this study, the minimum cluster size was set at 10, with a clustering resolution of 0.95 (ɣ = 0.95), resulting in a four and seven-cluster solution. These parameters were selected to ensure the identified clusters exhibited strong thematic cohesion regarding the focal concept.

Interpretative Analysis

The two-dimensional map produced through bibliometric mapping revealed distinct research clusters. To undertake a detailed examination of these clusters and facilitate comparative analysis, titles, abstracts, and keywords of the included articles were systematically reviewed. Furthermore, findings from the bibliometric mapping, along with the co-occurrence of authors' keywords, were utilized to identify key articles within each cluster. A thorough reading of these key articles provided a nuanced understanding of each cluster's philosophical orientation and conceptual positioning relative to other clusters (see Tables 1 and 2). This interpretative analysis enabled the precise labeling of four and seven clusters, elucidating the diverse research streams emerging within the literature.

Table 1. Characterization of Clusters

Cluster	Colour	Names	Overview	Exemplary articles
C1	Red	Life Satisfaction and Psychological Well-being Across Cultural and Societal Contexts	Examines factors influencing life satisfaction. Highlights differences between collectivist and individualist societies. Explores the impact of income and social cohesion on well-being. Studies individual traits like emotional intelligence and personality. Emphasizes the role of social relationships across ages. Shows life satisfaction as shaped by culture, economics, and personal traits	(Abbott et al., 2016), (Judge et al., 2005), (Langan-Fox et al., 2009), (Castellani et al., 2016), (Caprara et al., 2012), (Ng et al., 2024), (Langan-Fox et al., 2009), (Castellani et al., 2016), (Silva et al., 2015), (Gouveia et al., 2009), (Yoon et al., 2022), (Choi & Nae, 2022), (Extremera & Rey, 2016), (Friman et al., 2017), (Hirschi, 2009), (Joshanloo, 2024), (Jovanović, 2015, 2022), (Kong & Zhao, 2013), (Langan-Fox et al., 2010), (Y. Liu & Avello, 2021b), (Olsson et al., 2020b), (Phillips, 2018; Phillips et al., 2018), (Rey & Extremera, 2015), (Sun et al., 2014)
C2	Green	Life Satisfaction, Temporal Perspectives, and Socio-economic Influences on Well-being	Explores how past, present, and future outlooks affect life satisfaction. Studies concepts like optimism, pessimism, and social comparison. Analyzes the impact of income levels on well-being. Examines self-evaluation and temporal self-assessment. Highlights the link between economic conditions, temporal perspectives, and well-being.	(Boyce & Wood, 2011), (Busseri et al., 2007), (Cheung & Lucas, 2016), (Cho & Tay, 2016), (Diener & Diener, 1995), (Dumludag, 2013), (Easterlin et al., 2011; Easterlin & Plagnol, 2008), (Georgellis et al., 2009, 2022), (Gomez et al., 2013), (Headey & Muffels, 2018), (Heidemeier, 2017), (Heintzelman & Bacon, 2015; Heintzelman & Diener, 2019), (Hong & Han, 2014), (Oishi, 2006; Oishi & Roth, 2009), (Schimmack et al., 2002, 2004), (Stavrova, 2015; Stavrova et al., 2016a, 2016b)
C3	Blue	Life Satisfaction and Well-being in Social and Professional Contexts	Examines the role of social and workplace environments in life satisfaction. Highlights workplace support, quality of work life, and social relationships. Explores self-efficacy in career and problem-solving. Considers factors like gender and knowledge sharing as moderators. Emphasizes the link between professional dynamics, social interactions, and well-being.	(Asan et al., 2024), (X. Zhao et al., 2016), (Jiang et al., 2018), (Jiang & Hu, 2016), (Le et al., 2018, 2021, 2023), (Qu & Zhao, 2012), (X. Zhao et al., 2016; X. R. Zhao et al., 2011)
C4	Yellow	Life Satisfaction and Well-being in Youth Across Cultural and Socio-economic Contexts	Examines how cultural and socioeconomic factors influence life satisfaction in children and adolescents. Key themes include the role of cultural values (e.g., collectivism vs. individualism), socio-economic indicators, and psychological factors like self-esteem and coping mechanisms. Studies focus on how these influences vary across regions and impact youth's subjective well-being, providing insights into how social, economic, and cultural environments shape life satisfaction in young populations.	(Gilman et al., 2004), (E. S. Huebner et al., 1999; S. E. Huebner et al., 2006), (Park et al., 2004; Park & Huebner, 2005), (Suldo et al., 2014), (Vassar et al., 2008; Vassar & Hale, 2007)

Source: *Reviewed studies*

Table 2. Characteristics of the cluster for keywords

Cluster	Colour	Names	Overview	Terminology
C1	Red	Psychometrics of Life Satisfaction and Mental Health	This cluster focuses on the study of life satisfaction and mental health, particularly how these constructs can be measured using psychometrics. The keywords reflect a strong emphasis on personal satisfaction, comparative studies, and mental health evaluations, often employing longitudinal study methods.	adult, comparative study, emotion, female, human, humans, longitudinal studies, longitudinal study, male, mental health, personal satisfaction, psychometrics, psychometry, quality of life satisfaction, satisfaction with life scale, self concept
C2	Green	Work-Life Dynamics and Socioeconomic Well-Being	Explores work-life balance and well-being within socioeconomic contexts. Highlights job satisfaction, life satisfaction, and organizational commitment. Includes perceived social support, linking psychological and economic aspects of well-being.	china, economic freedom, general self-efficacy, job satisfaction, life satisfaction, meaning in life, older adults, optimism, organizational commitment, perceived social support, positive orientation, retirement, self-employment, self-esteem, work-family conflict
C3	Blue	Psychosocial Well-Being and Adaptability Across Life Stages	This cluster investigates well-being across different life stages, from adolescence to aging. It covers various factors like anxiety, career adaptability, financial satisfaction, and cultural intelligence, examining how these influence life satisfaction and adaptability.	adolescents, aging, anxiety, career adaptability, cultural intelligence, depression, financial satisfaction, future time perspective, gender, hope, overall life satisfaction, self-compassion, self-efficacy, socioeconomic status, well-being
C4	Yellow	Cross-Cultural Analysis of Well-Being and Social Values	Examines social trust, subjective well-being, and social values across cultures. Analyzes data from Asia, Europe, and the U.S. Uses the ordered logit model to study these relationships.	asia, belief in a just world, bhps, culture, europe, european social survey, happiness, international comparison, ordered logit model, relative income, social trust, subjective wellbeing, turkey, united states, value
C5	Purple	Emotional Well-Being, Resilience, and Individual Differences in Adolescence	This cluster focuses on the emotional and psychological development of adolescents. It emphasizes understanding individual differences and coping mechanisms for stress and loneliness.	adolescence, affect, affect balance, core self-evaluations, emotional intelligence, health, individual differences, loneliness, mindfulness, negative affect, positive affect, resilience social support stress
C6	Sea Green	Psychosocial and Economic Determinants of Well-Being in Youth and Society	This cluster investigates how socioeconomic factors, such as income, unemployment, and religion, influence the well-being of youth and society. It integrates concepts from positive psychology, self-determination theory, and affective well-being.	affective well-being, children, germany, gratitude, income, measurement, positive psychology, religion, religiosity, self-determination theory, unemployment, wellbeing, youth
C7	Orange	Personality Traits, Life Events, and Well-Being in the Context of Socio-Economic Inequality	Focuses on personality traits like extraversion and neuroticism and their impact on well-being. Explores the role of life events, income inequality, and work engagement. Highlights effects on personal and emotional outcomes in various life areas.	big five, extraversion, income inequality, life domains, life events, longitudinal, neuroticism, personality, personality traits, positive emotions, subjective well-being, work engagement

Source: *Reviewed studies*

Results

Life Satisfaction as a Growing Research Area

Annual Scientific Production

The number of published articles per year from 1992 to 2024 is shown in Figure 2. This data allows us to infer trends in scientific output within the studied domain over three decades.

From 1992 to around 2005, there was a gradual increase in articles published annually, indicating a steady but relatively low level of interest in this research area during the early years. Between 2005 and 2016, there was a marked increase in publications, with a peak occurring around 2016-2017. This trend suggests a growing recognition of the topic's relevance and an intensified focus on related research questions, possibly due to an increased awareness of well-being and life satisfaction in both social and scientific discourse.

However, from 2017 onward, the annual publication rate fluctuates significantly, showing periodic declines. The most recent years (2023-2024) indicate a sharp drop in scientific output, which may suggest several factors: a saturation in foundational research, shifts in research focus, or external factors (e.g., global events such as the COVID-19 pandemic) impacting publication rates. The dramatic decrease in 2024 could also reflect delays in publishing or shifts in academic interest to emerging themes or methodologies within related domains.

Overall, the trend depicted by this chart reflects an initial growth phase, followed by a peak and subsequent instability, suggesting both maturation in the research field and potential challenges or changes in publication dynamics in recent years.

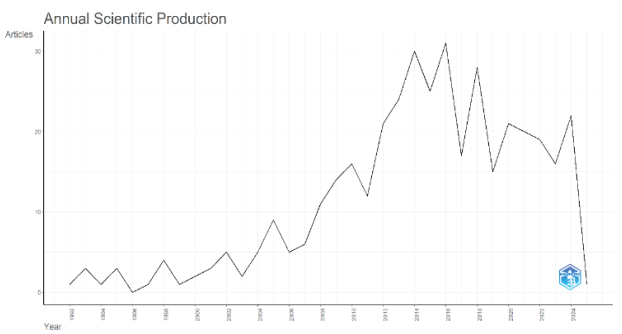


Figure 2. Number of Articles over Time using R Software

Most Relevant Sources

The interdisciplinary nature of research on life satisfaction and well-being, with contributions spanning psychology, economics, social science, and intercultural studies. Social Indicators Research leads with 130 articles, underscoring its role as a primary publication outlet for research in this domain, likely due to its broad focus on social metrics and well-being indicators. Personality and Individual Differences follows with 82 articles, reflecting a significant interest in the role of personality traits and individual variability in life satisfaction.

The Journal of Research in Personality and Journal of Economic Psychology, each contributing 10 articles, further emphasize the focus on individual traits and economic factors in well-being studies. Other sources, including the Journal of Personality and Social Psychology and the Journal of Career Assessment, offer specialized perspectives on social psychology and career-related aspects of satisfaction, suggesting subfields where life satisfaction intersects with career and personal development.

The Journal of Cross-Cultural Psychology, the European Journal of Personality, and the International Journal of Intercultural Relations suggest a growing interest in understanding life satisfaction across different cultural contexts, aligning with global trends in cross-cultural psychology and international well-being studies. This distribution of publications across various journals indicates that life satisfaction and well-being research is not confined to a single field but rather attracts a diverse array of scholars, highlighting its relevance across individual, social, economic, and cultural dimensions.

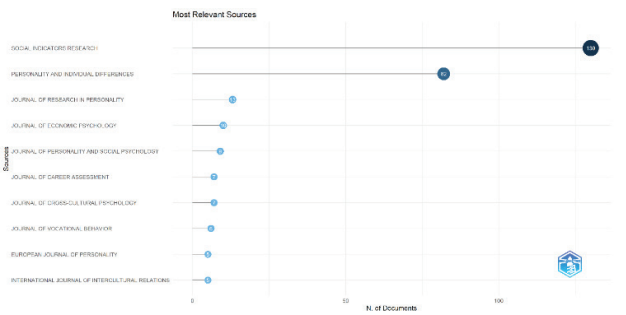


Figure 3. Number of Articles per Academic Journal (Top 10 Journals with Maximum Articles) using R Software

Source: *Reviewed studies' metadata*

Research Streams

The bibliographic coupling and co-occurrence analysis of authors' keywords, conducted using the VOS technique, identified four and seven distinct yet interrelated study groups, as depicted in Figures 4 and 5. The descriptive statistics for these clusters, including the average number of citations per article, and total citations, are provided in Tables 1 and 2. According to Table 1, the cluster with the highest concentration of papers is "Life Satisfaction and Psychological Well-being Across Cultural and Societal Contexts" (C1), while Table 2 highlights "Psychometrics of Life Satisfaction and Mental Health" (C1) as the most prominent in terms of paper count, demonstrating a strong academic interest in exploring Life Satisfaction in diverse contexts. The analysis underscores a vibrant academic interest in Life Satisfaction research, particularly within

psychological well-being and cultural dynamics. The clusters reveal not only established areas with significant scholarly attention but also emerging fields focused on cultural perspectives of Life Satisfaction. This growth indicates a continued expansion and evolution of research within this domain, covering the way for future studies to explore refined intersections between Life Satisfaction, cultural contexts, and broader societal impacts.

Bibliographic coupling

Cluster 1

C1 (Red Cluster) stands out for its productivity, with 38 articles, the highest among all clusters. Despite this large volume, the cluster's average citation per article (316.1) suggests that while its publications are influential, their impact on an individual basis does not reach the levels seen in C2. This may indicate that C1's research is more wide-ranging or diverse, potentially addressing broader topics or reaching more extensive academic networks, but without achieving the concentrated impact per article that defines other clusters.

Cluster 2

C2 (Green Cluster) emerges as the most impactful in terms of average citations per article, with a figure of 360.0. Despite having fewer articles (30) than C1, C2's higher average citation count implies that its work is highly valued, either due to groundbreaking findings, a focus on niche areas of high interest, or the authors' reputations in the field. The discrepancy between C2's fewer articles and its higher citation impact suggests a strategy focused on quality over quantity, with each article contributing significantly to the academic discourse.

Cluster 3

C3 (Blue Cluster), with 11 articles and 1,273 total citations, reflects a comparatively lower academic influence. Its average of 115.7 citations per article suggests that its contributions, while valid, may either target less prominent topics, reach a smaller academic audience, or include articles with a shorter citation lifespan. C3's low average might indicate that its publications are not as widely referenced or could represent research in an emerging or highly specialized area that has not yet gained widespread traction.

Cluster 4

C4 (Yellow Cluster), with the same number of articles as C3 (11), shows a much stronger performance, with 2,283 total citations and an average of 207.5 citations per article. This indicates a more significant academic impact, suggesting that C4's research resonates more with the academic community. Its relatively higher citation rate than C3 suggests that C4's work is either more widely applicable or better integrated into current research trends.

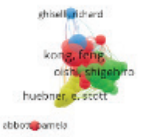


Figure. 4 Bibliographic map with cluster.

Table 3. Cluster Description for Bibliographic Map

Cluster	Colour	No of article	Total citations	Average citation per article
C1	Red	38	12013	316.1
C2	Green	30	10800	360.0
C3	Blue	11	1273	115.7
C4	Yellow	11	2283	207.5

Co-occurrence Author's Keywords cluster

The table 2 provides a clear overview of the academic influence across seven clusters by measuring total occurrences and average occurrences per article. C2 (Green Cluster) emerges as the most impactful; despite having only 15 articles, it significantly outperforms the others with 436 total occurrences and an impressive average of 29.07 occurrences per article, indicating that its research is highly influential and widely referenced. C7 (Orange Cluster), though contributing fewer articles (12), shows strong influence with 128 total occurrences and an average of 10.67 per article, suggesting that each publication has a considerable academic impact. C5 (Purple Cluster) also displays a strong presence with 14 articles and an average of 8.14 occurrences per article, indicating moderate influence. In contrast, C1 (Red) and C3 (Blue) clusters, with 17 and 15 articles, respectively, demonstrate similar performance with moderate impact (averages of 6.41 and 6.47), while C4 (Yellow Cluster), with an average of 5.93, follows closely behind. C6 (Sea Green Cluster) has the lowest impact with 13 articles and an average of just 4.08 occurrences per article, suggesting that its research may either target a more niche audience or is yet to gain broader recognition. Overall, this analysis highlights the varying academic influence across the clusters, with C2 leading in impact and C6 reflecting the lowest.

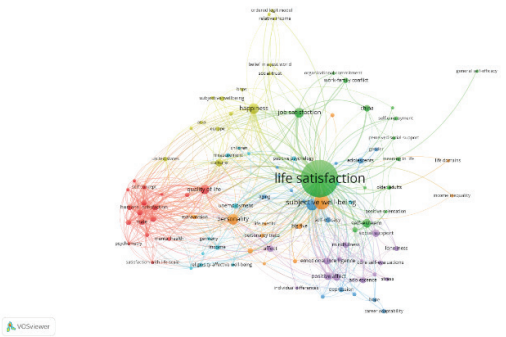


Figure 5. Co-occurrence Author's Keywords cluster

Linkages Across Clusters

Bibliographic coupling

The proximity and mild linkages among clusters in the bibliometric map indicate that different research streams from the literature are interlinked. The absence of huge voids among the clusters, especially between cluster 2 and cluster 4, suggests the permeability of the cluster boundary and the interrelatedness of the articles. The presence of such interlinkages, however, does not weaken the existence of clusters. The literature does have different research streams in it. The presence of interrelatedness only indicates researchers' effort to explore the connections that might exist among different clusters.

Co-occurrence Author's Keywords cluster

Cluster C1 *(Psychometrics of Life Satisfaction and Mental Health) is the foundation, focusing on developing and applying measurement tools for life satisfaction and mental health. These psychometric tools allow researchers to quantify well-being constructs, which are essential for evaluating the elements explored in other clusters. C1's emphasis on standardized measurement enables a consistent framework for examining well-being across diverse contexts.* **Clusters C2** *(Work-Life Dynamics and Socioeconomic Well-Being) and* **C6** *(Psychosocial and Economic Determinants of Well-Being in Youth and Society) both examine the role of socioeconomic factors in shaping well-being. C2 delves into the interplay between work-life balance and well-being within a socio-economic framework, emphasizing factors like job satisfaction, organizational commitment, and perceived social support. In contrast, C6 takes a broader societal approach, examining how income, unemployment, and religion affect well-being in youth and across society. Both clusters highlight the impact of external socio-economic conditions, providing context-specific insights that demonstrate how these factors influence both individual and societal wellness.* **Cluster C3** *(Psychosocial Well-Being and Adaptability Across Life Stages) offers a lifespan perspective on well-being, adaptability, and resilience, exploring these constructs across different stages of life, from adolescence to aging. This cluster bridges the foundational aspects of well-being provided by C1 with the specific socio-economic factors discussed in C2 and C6. It also links with* **C5** *(Emotional Well-Being, Resilience, and Individual Differences in Adolescence), which focuses on emotional development and resilience during adolescence. The insights from C3 show how early emotional resilience can have lasting effects throughout life, fostering adaptability and overall well-being.* **Cluster C4** *(Cross-Cultural Analysis of Well-Being and Social Values) introduces an international comparative approach, examining how cultural contexts impact well-being. This cluster provides a cross-cultural perspective that overlays the other clusters, offering insights into how cultural differences influence factors like work-life balance (C2), resilience (C5), and the impact of personality on well-being (C7). By integrating cultural analysis, C4 demonstrates the varying impacts of social values, subjective well-being, and social trust across diverse regions, thereby enhancing the generalizability of the framework.* **Cluster C5** *concentrates on the emotional and psychological development of adolescents, including resilience, mindfulness, and coping mechanisms for stress and loneliness. This cluster contributes to an understanding of the foundation of well-being established during adolescence, which resonates through later stages of life, as explored in C3.* **Cluster C7** *(Personality Traits, Life Events, and Well-Being in the Context of Socio-Economic Inequality) emphasizes individual personality traits and life events, highlighting how extraversion and neuroticism impact well-being, particularly under socio-economic inequality. C7 intersects with C2 and C6 by showing how personality traits can buffer or amplify the effects of external socio-economic factors, adding a personal dimension to the socio-economic influences on subjective well-being. Together, these clusters create a comprehensive framework that connects individual characteristics, developmental stages, socio-economic factors, and cultural contexts. By integrating insights across these areas, the framework provides a holistic understanding of well-being across the lifespan, accommodating variations due to personal, social, and cultural influences.*

Global Distribution of Scientific Production by Country

Darker shades in map represent higher levels of scientific production, with prominent contributions from countries like the United States, China, and Australia. In contrast, countries with lighter shades have lower levels of scientific output. This visualization provides insights into regional disparities in scientific production, with significant concentrations of research activity in North America, Europe, and East Asia. The data highlights the

scientific productivity of different countries and may reflect factors such as research investment, infrastructure, and academic resources.

Table 4. Country Scientific Production

Region	Freq
USA	272
CHINA	174
AUSTRALIA	78
UK	63
GERMANY	56
CANADA	54
SOUTH KOREA	37
SPAIN	36
SWITZERLAND	36
ITALY	34

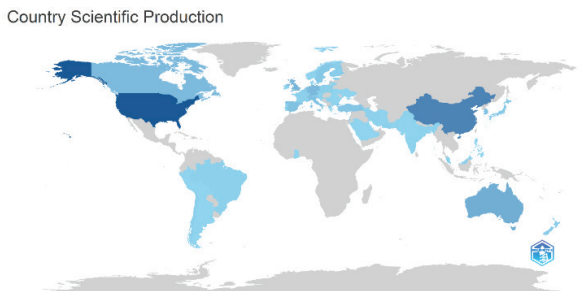


Figure 6. Country Scientific Production

Key Topics in Life Satisfaction and Quality of Life Research

This word cloud offers an extensive view of the diverse topics explored in life satisfaction and quality of life research. Central themes include core concepts such as "quality of life," "life satisfaction," and "personal satisfaction," which reflect the field's primary focus on well-being and subjective happiness. The words "male," "female," and "human" indicate an emphasis on demographic distinctions, while age-related terms like "adult," "adolescent," "young adult," "middle aged," and "elderly population" signify a broad spectrum of life stages covered in these studies.

Additional key themes, such as "socioeconomic status," "income," and "socioeconomic indicator," suggest a strong focus on economic and social influences on quality of life. Methodological approaches are highlighted through terms like "major clinical study," "comparative study," "controlled study," "theoretical study," and "regression analysis," indicating the research's quantitative and comparative nature. Geographic locations, including "United States," "China," and "Germany," show the global scope of these studies.

Furthermore, specific psychological and social factors such as "self concept," "social behavior," "social support," and "personality" reveal an interest in how individual and interpersonal dynamics contribute to life satisfaction. Overall, this visualization summarises a rich array of factors and methodologies used to understand the complexities of life satisfaction and quality of life across different demographics and regions.



Figure 7. Life Satisfaction word cloud

Cumulative Research Publications by Source Over Time

This line chart illustrates the cumulative number of research publications over time from various academic journals focusing on psychology, personality, and social indicators. The x-axis represents the years, spanning from 1992 to 2024, while the y-axis shows the cumulative occurrences of publications. Each line represents a different journal, with noticeable growth patterns in publication volume.

The journal "Personality and Individual Differences" (in purple) has a significantly higher number of publications compared to the others, showing a steady rise, especially from 2002 onwards. "Journal of Personality and Social Psychology" (in blue) follows with a steady increase since the late 2000s. Other journals, including "Journal of Economic Psychology," "Journal of Research in Personality," and "Social Indicators Research," show more gradual growth in their cumulative publications. This chart highlights the expansion of research output in these fields, with marked growth in particular sources over recent years, reflecting an increasing academic focus on personality, social psychology, and economic indicators related to individual differences.

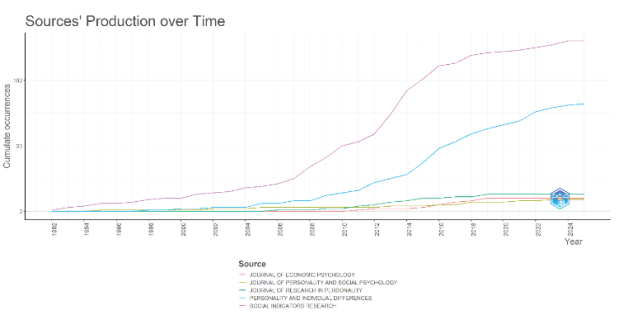


Figure. 8 Sources' Production over Time

Thematic Map of Research Topics in Life Satisfaction and Quality of Life

This thematic map provides a structured overview of research topics within the domains of life satisfaction and quality of life, categorized into four quadrants based on their centrality (relevance) and density (development). In the "Motor Themes" quadrant (top right), topics like "life satisfaction," "human," and "female" are highlighted as highly central and well-developed, indicating that these are core areas driving the research field. These themes are likely interconnected with multiple studies and represent significant, ongoing areas of academic interest. The "Niche Themes" quadrant (top left) is currently empty, implying a lack of isolated yet advanced topics within this field. Similarly, the "Basic Themes" quadrant (bottom right), which typically features central but less-developed foundational topics, is unoccupied, suggesting a comprehensive development in primary themes. In the "Declining or Emerging Themes" quadrant (bottom left), we find terms such as "quality of life," "socioeconomic status," and "socioeconomic indicator," which may indicate areas either emerging in importance or seeing less emphasis in recent research. Overall, this thematic map visually depicts the structure of current research, underscoring prominent areas of focus while highlighting potential directions for future exploration.

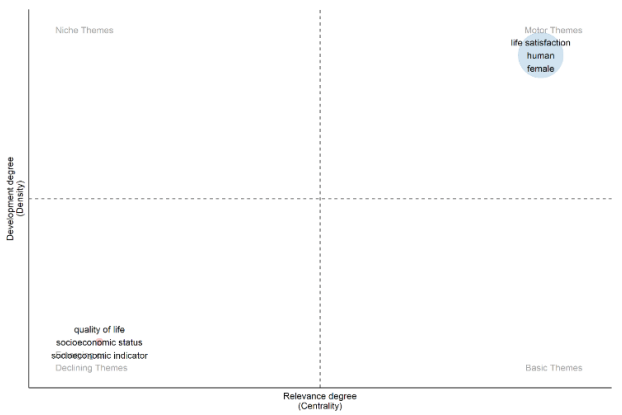


Figure 9. Thematic Map of Life Satisfaction

Author Contributions to Research Over Time

Authors such as **Diener E.** and **Huebner E. S.** have contributed consistently over several decades, with notable peaks in production and impact, highlighting their long-standing influence in the field. Authors like **Kong F.** and **Schimmack U.** show more recent contributions, with higher citation impact in some years, indicating newer but potentially influential work. The chart offers a visual summary of each author's research trajectory, indicating productivity and the academic influence of their work over time.

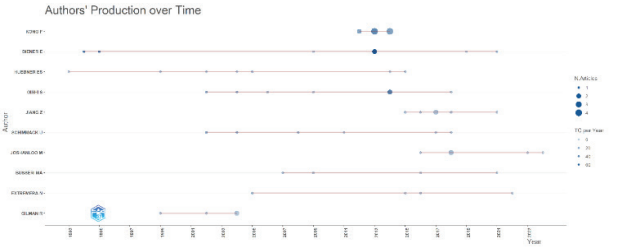


Figure. 10 Author Contributions for Life Satisfaction

Average Citations per Year in Research Publications

This line chart shows the average number of citations per year for research publications in a specific field, spanning from 1991 to 2024. The y-axis represents the average citation count, while the x-axis represents the years. There is a noticeable peak around 1994, with citations reaching over 40, indicating a highly influential publication or set of publications from that period. After the peak, citation averages fluctuate with minor rises and falls but generally trend downward over the years, showing a decline in average yearly citations for this body of work. This trend may suggest a shift in research focus, saturation of foundational topics, or increased diversity in research outputs diluting citation concentration.

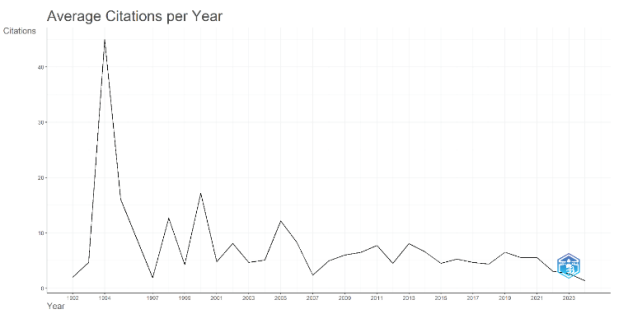


Figure. 11 Average Citations per Year for Life Satisfaction

Scientific Research Output by Country Over Time

This line chart displays the cumulative number of scientific articles produced by five major countries—Australia, China, Germany, the United Kingdom, and the United States—from 1992 to 2023. The y-axis shows the total number of articles, while the x-axis represents the years.

The United States (in purple) leads in research output, with a steady and significant increase over time, reaching over 200 articles by 2023. China (in yellow) shows rapid growth around the mid-2000s, eventually becoming the second-highest producer, demonstrating a sharp increase in scientific output in recent years. The United Kingdom, Germany, and Australia follow with relatively lower but consistent growth, indicating sustained contributions to scientific research. This chart illustrates historical and recent trends in research

productivity, highlighting the increasing prominence of China alongside traditionally leading research nations.

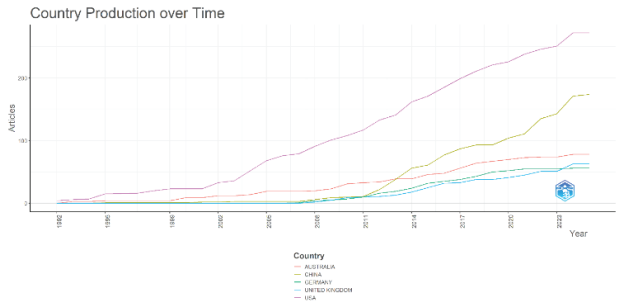


Figure 12. Country Production over time

Developments over Time

This network visualization provides an analytical overview of interconnected research themes within the domain of life satisfaction, generated through co-occurrence analysis. Central themes like "life satisfaction" and "subjective well-being" are the largest nodes. They highlight their pivotal role in the field and their dense interconnections with various subtopics, illustrating a multidisciplinary approach to studying well-being. Key thematic clusters emerge, providing deeper insights into the primary dimensions of life satisfaction research.

One major cluster revolves around **psychological and emotional dimensions**, including themes such as "happiness," "self-esteem," "positive affect," and "personality traits," signifying the foundational role of internal affective characteristics in determining life satisfaction. This group strongly connects with positive psychology, emphasizing individual well-being and personal attributes. Another prominent cluster focuses on **social and relational factors** like "social support," "work-family conflict," and "organizational commitment," illustrating the importance of interpersonal relationships and social networks in influencing life satisfaction. This emphasis underscores that well-being is not only shaped by internal states but also significantly mediated by social interactions and support systems.

The network also highlights **work and career-related themes**, such as "job satisfaction," "career adaptability," and "income inequality," suggesting that professional fulfillment and economic stability are central to life satisfaction. This cluster signals a frequent overlap between life satisfaction research and organizational studies, as job satisfaction and economic security are key factors impacting overall well-being. Another important grouping includes **economic and socio-demographic influences** like "income inequality," "unemployment," and "relative income," showcasing how external, structural factors contribute to subjective well-being, especially in demographic and cross-national studies.

The color gradient from green to yellow represents the evolution of research topics over time. Early studies (green nodes) concentrated on core concepts like "life satisfaction" and "quality of life," while more recent research (yellow nodes) has incorporated nuanced themes such as "career adaptability," "general self-efficacy," and "positive psychology." This progression highlights a shift towards more specialized perspectives, reflecting how life satisfaction research has adapted to the complexities of modern life. In summary, this network visualization demonstrates the breadth of life satisfaction research and its evolution from foundational psychological studies to an expanded, multidisciplinary focus, incorporating social, occupational, and economic dimensions that collectively shape an individual's experience of life satisfaction.

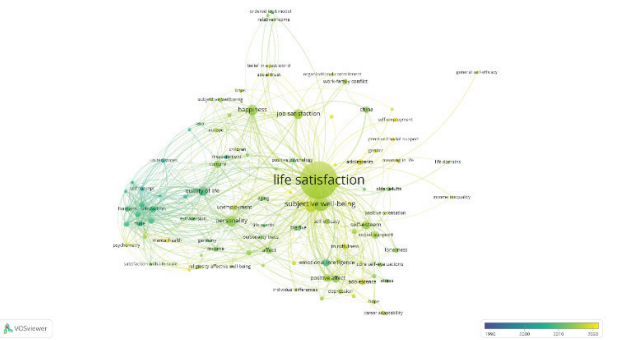


Figure 13. Network Visualization of Research Themes Related to Life Satisfaction

A shift Towards C4 and C6

Inspecting the illustrates distinct thematic clusters within the life satisfaction research field, each represented by a different colour. The **Red Cluster** on the left encompasses foundational topics like "quality of life," "mental health," and demographic variables such as "gender" and "age," representing traditional research areas that focus on general well-being and demographic influences. The **Green Cluster** in the center-right highlights themes related to "job satisfaction," "work-family conflict," and "organizational commitment," indicating a strong focus on how work-related and socioeconomic factors contribute to life satisfaction. The **Blue Cluster** at the bottom includes psychological themes like "emotional intelligence," "resilience," and "adolescence," emphasizing the role of personal and developmental factors in shaping well-being. The **Yellow Cluster** on the top-right brings attention to societal issues such as "social trust," "belief in a just world," and "income inequality," signaling an interest in how socioeconomic conditions and societal values influence subjective well-being. Overall, the visualization shows a clear shift toward the green and yellow clusters, suggesting that recent research increasingly emphasizes the impact of socioeconomic structures, workplace dynamics, and cultural values on life satisfaction, reflecting a growing interdisciplinary approach that connects individual well-being with broader societal contexts.

The Movement Towards Interlinked Areas

The field of life satisfaction research is increasingly converging on interlinked areas that connect individual well-being with broader socio-economic, cultural, and workplace dynamics. Previously focused primarily on personal attributes and demographic factors, recent research now emphasizes job satisfaction, work-life balance, income inequality, and social trust. This shift, as reflected in the overlapping Green and Yellow clusters, underscores a growing recognition that well-being is shaped not solely by individual characteristics but also by socio-economic and cultural environments. This interdisciplinary movement promotes a more comprehensive understanding of life satisfaction, accounting for the complex interplay between individual, organizational, and societal factors.

Discussion

The findings of this study reveal a significant evolution in life satisfaction research, shifting from an emphasis on individual and demographic factors to a more comprehensive, interdisciplinary approach that includes socio-economic, cultural, and organizational dimensions. Through bibliometric analysis, the study identified distinct thematic clusters—such as work-life balance, job satisfaction, income inequality, and social trust—that highlight an increasing recognition of the complex, multifaceted nature of life satisfaction. This shift, evident in the prominence of the Green and Yellow clusters, reflects a growing scholarly consensus that life satisfaction is not determined solely by individual characteristics but is significantly shaped by broader socio-economic structures and cultural contexts.

The emphasis on workplace and socio-economic factors aligns with contemporary concerns around economic stability, social inequality, and workplace dynamics. The Green cluster underscores the role of work-life balance, job satisfaction, and organizational commitment in shaping life satisfaction, suggesting that employment-related factors are critical in understanding individual well-being. This focus on workplace dynamics is timely, given recent global changes in work environments, including the rise of remote work and flexible schedules, which impact employees' well-being and job satisfaction.

The analysis also reveals a substantial interest in cross-cultural studies, as evidenced by the Yellow cluster, which includes themes such as social trust and income inequality. This focus suggests an expanding awareness of cultural and societal influences on life satisfaction, with researchers increasingly exploring how cultural norms, social values, and economic disparities interact to shape well-being across different contexts. Cross-cultural perspectives enrich the literature by offering comparative insights and expanding the generalizability of findings, thereby supporting the development of a more global understanding of life satisfaction.

Despite these advancements, the study highlights several ongoing challenges and research gaps. A prominent issue is the need for methodological rigor and consistency in measuring life satisfaction across different cultures and socio-economic backgrounds. Variability in definitions and interpretations of well-being across studies can complicate comparisons and hinder the development of a cohesive theoretical framework. Additionally, the complexity of capturing socio-economic and workplace factors requires robust, nuanced research designs, including longitudinal studies, to better understand how life satisfaction evolves in response to external changes.

Future research could further expand on integrating life satisfaction with emerging themes in the socio-economic and digital landscapes. Given the growing relevance of remote work and gig economies, studies examining the impact of these employment models on well-being are warranted. Similarly, the digital transformation of social interactions and work environments offers a new dimension for life satisfaction research, especially with work-life balance, mental health, and social connectedness. Another important avenue is exploring life satisfaction among marginalized or underrepresented populations, whose experiences may diverge significantly from dominant narratives in the literature.

In conclusion, this study underscores a transformative phase in life satisfaction research, moving toward an inclusive, multi-dimensional framework that accounts for the interplay of individual, organizational, and societal factors. The interdisciplinary trajectory of this field highlights the necessity of examining life satisfaction within broader socio-economic and cultural contexts, providing a foundation for more sophisticated, inclusive research that can address the complexities of well-being in an interconnected, globalized world.

Future Research Directions

Building on this review, this section identifies key areas for future exploration in life satisfaction research. The following sections will delve into specific research opportunities within each theme, as well as broader directions that arise from the findings of this study.

Cluster 1: Life Satisfaction and Psychological Well-being Across Cultural and Societal Contexts

Future research within this cluster could benefit from a deeper examination of cultural factors influencing life satisfaction, focusing on how cultural values, norms, and societal structures shape well-being across different populations. Comparative, cross-cultural studies could explore differences between collectivist and individualist societies, and longitudinal designs could help capture

how cultural shifts impact life satisfaction over time. Additionally, research might address how globalization, migration, and identity shifts affect well-being in multicultural settings.

Cluster 2: Life Satisfaction, Temporal Perspectives, and Socioeconomic Influences on Well-being

Studies in this cluster could expand by examining how temporal perspectives—such as future orientation or present-mindedness—interact with socio-economic factors to shape life satisfaction. For instance, future research could investigate how perceptions of financial stability and economic mobility influence life satisfaction among different age groups. Research could also explore how societal expectations around economic success affect individuals' life satisfaction, and how interventions that promote optimism or resilience can mitigate the adverse effects of economic hardship.

Cluster 3: Life Satisfaction and Well-being in Social and Professional Contexts

Future research might examine how emerging work structures, such as remote work and gig economies, impact well-being and job satisfaction. Additionally, studies could investigate how specific organizational factors such as job autonomy, work-life integration policies, and social support within the workplace contribute to employees' overall life satisfaction. Comparative studies across industries and countries would help clarify how workplace culture and policies influence well-being in diverse settings, providing insights into organizational practices that promote satisfaction.

Cluster 4: Life Satisfaction and Well-being in Youth Across Cultural and Socioeconomic Contexts

In this cluster, future studies could focus on understanding the unique factors that impact life satisfaction among children and adolescents across different socio-economic backgrounds and cultural settings. Research could explore how family dynamics, educational experiences, and access to social support systems contribute to youth well-being. Furthermore, investigating how socioeconomic conditions such as poverty or income inequality affect life satisfaction in young people would offer critical insights into early-life factors that shape long-term well-being.

Cluster 5: Emotional Well-being, Resilience, and Individual Differences in Adolescence

Research within this cluster could further investigate the role of resilience, emotional intelligence, and coping strategies in adolescent life satisfaction. Future studies might explore how interventions that promote mindfulness, social-emotional learning, and self-regulation skills influence well-being in adolescents. Additionally, examining the long-term effects of early emotional resilience on adult life satisfaction could help identify key developmental stages and skills critical for sustaining well-being over the life course.

Cluster 6: Psychosocial and Economic Determinants of Well-being in Youth and Society

Future research could explore the interplay between socio-economic conditions (such as income level, employment status, and education) and life satisfaction across different stages of life. Studies might also examine how access to healthcare, community resources, and social safety nets impact well-being. Given the increasing focus on youth well-being, longitudinal studies could provide valuable insights into how early economic and social conditions influence long-term life satisfaction.

Cluster 7: Personality Traits, Life Events, and Well-being in the Context of Socio-Economic Inequality

Research in this area could benefit from further exploration of how personality traits (e.g., extraversion, neuroticism) interact with socio-economic challenges to influence life satisfaction. Studies might examine the moderating role of personality on the relationship between life events, such as job loss or financial hardship, and subjective well-being. Additionally, research could investigate how interventions to enhance adaptive personality traits, such as resilience and openness to change, can buffer the adverse effects of socioeconomic inequality on life satisfaction.

Possible Challenges

Future research on life satisfaction will likely face several challenges. One major issue is consistency in measuring life satisfaction across diverse cultural and socio-economic contexts. Variability in how well-being is defined and interpreted across studies can limit comparability and complicate efforts to develop a cohesive theoretical framework. Additionally, as life satisfaction increasingly intersects with socio-economic and environmental factors, researchers may encounter methodological complexities in capturing these influences accurately. Ensuring longitudinal rigor in studies, especially in contexts of economic instability, environmental stressors, or cultural shifts, presents further challenges to understanding how life satisfaction evolves.

Overall Directions

Overall, the future of life satisfaction research is moving toward an interdisciplinary, context-sensitive approach. Studies should aim to integrate socio-economic, cultural, and workplace dimensions, examining how these factors collectively shape well-being. As the global landscape becomes more interconnected and complex, it will be crucial for researchers to consider the broader social and environmental contexts that influence life satisfaction, including digital transformation, economic models, and climate-related stressors. Embracing cross-

cultural perspectives and expanding research to include underrepresented populations will also be essential to provide a more comprehensive understanding of life satisfaction.

Emerging Topics

Several emerging topics are gaining traction in life satisfaction research. The impact of digitalization on well-being, especially through remote work, social media, and digital consumption, is becoming increasingly relevant as individuals' lives are reshaped by technology. The gig economy and non-traditional employment models also represent a new area for exploration, focusing on how job security, benefits, and flexibility affect life satisfaction. Additionally, environmental factors like climate change and sustainability are now seen as influential in life satisfaction, highlighting the need to study the relationship between ecological well-being and personal satisfaction.

The Existing Gap

A significant gap in life satisfaction research lies in understanding well-being across diverse socio-economic and cultural contexts, as much of the existing literature focuses on Western, high-income populations. Furthermore, while the importance of socio-economic and workplace factors is increasingly acknowledged, the specific mechanisms through which these factors influence life satisfaction remain underexplored. The lack of longitudinal studies that capture changes in life satisfaction over time also limits our understanding of how individuals' well-being adapts to shifting socio-economic conditions and life stages.

Average Publication Year

The average publication year in this review highlights the rapid growth of life satisfaction research over the last two decades, with a notable increase in publications after 2010. This trend suggests a growing academic interest in life satisfaction related to contemporary issues, such as socio-economic inequality, cultural diversity, and digitalization. However, it also points to a need for studies that build on this knowledge by examining emerging issues shaping life satisfaction in a modern context.

Limitations of the Study

This review offers critical insights into the trajectory and emerging areas of life satisfaction research, yet certain limitations should be considered. Primarily, the reliance on bibliometric analysis within the Scopus and WoS database, while extensive, may not capture the full breadth of relevant literature, particularly studies published outside of indexed journals or in languages other than English. This reliance could lead to a Western-centric bias, limiting representation from diverse cultural contexts and perspectives.

Moreover, bibliometric methods, though effective for mapping research patterns and thematic clusters, may not capture the nuanced theoretical and methodological distinctions within individual studies. The use of co-occurrence and bibliographic coupling assumes thematic similarity based on citation and keyword overlap, which may not always reflect true conceptual or methodological alignment. Additionally, the cross-sectional approach used in this review provides a snapshot of the current state of research but may miss recent shifts in themes and trends that are dynamically evolving.

Lastly, this review's focus on specific keywords and established themes may overlook emerging concepts and interdisciplinary perspectives on life satisfaction. Addressing these limitations in future research by incorporating broader data sources, longitudinal methodologies, and an expanded range of themes would yield a more comprehensive and inclusive understanding of life satisfaction.

Conclusion

This review highlights the evolution of life satisfaction research, revealing an expanding interdisciplinary focus that integrates individual, socio-economic, cultural, and organizational dimensions. Over the past three decades, the field has progressed from examining life satisfaction as a largely individual construct to exploring its connections with broader social and economic contexts, reflecting a more holistic understanding of well-being. The analysis identified key thematic clusters such as work-life balance, socio-economic influences, and cross-cultural perspectives that underscore the diverse factors contributing to life satisfaction.

Emerging themes, including digitalization, environmental sustainability, and the impact of new economic models, indicate that life satisfaction research is becoming increasingly responsive to contemporary societal shifts. This expanded focus not only enriches theoretical frameworks but also highlights practical implications, as findings can inform organizational policies, public health initiatives, and social welfare strategies aimed at enhancing well-being.

However, this study also underscores several limitations, particularly the need for longitudinal and cross-cultural studies to capture the complexities and dynamics of life satisfaction in diverse populations. Future research should address these gaps by employing comprehensive, context-sensitive approaches considering rapidly evolving social and economic landscapes. In sum, this review affirms the importance of an integrated, multi-dimensional approach to life satisfaction, paving the way for a richer understanding of well-being in an increasingly interconnected world.

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Impact of Technology: Challenges and Opportunities for Women Entrepreneurs in Nepal

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Abstract

This paper highlights about the technological advancement worldwide and its impact on the women entrepreneurs in developing countries like Nepal. Technological advancement has created a lot of opportunities for the people like AI, blockchain, IoT and Fintech worldwide but along with it this has also provided numerous challenges. Change is inevitable and it is very important to incorporate such technological changes. Women entrepreneurship is itself a big challenge faced by the women in developing countries where gender biasness has a dominant effect, there are challenges in accessing funds, difficulties in maintaining work life balance and overall, there are technical skill gaps along with cybersecurity and digital risks. Women face digital literacy gaps too. The objective of this paper is to examine these dynamics through literature review and case studies of successful women led tech enabled businesses in Nepal like the story of founders of Kimbu Tech, UG Cakes, etc. identifying the policy gaps, unavailability of resources and knowledge shedding light on transformative role of technology in empowering women entrepreneurs. It concludes by recommending policy measures, capacity-building programs, and public-private partnerships to bridge the digital divide and support women's participation in Nepal's growing entrepreneurial ecosystem. Stories related to Women entrepreneurs at the local and rural level must be highlighted to encourage more women participation in business.

Keywords*:Women entrepreneurship, Technology, challenges, opportunities*

Introduction

Technological advancement is the necessity of today's world. Technology has emerged as a powerful tool for entrepreneurship, offering women in Nepal numerous opportunities to innovate, expand their businesses, and access global markets. Women entrepreneurs require strong network connection and support system which also includes leveraging the digital age, amplifying women voice, participating in global supply chains and shifting cultural mindset for long term success. In this challenging environment, women entrepreneurs who can adopt these technological shifts will significantly enhance success in the emerging economies. The integration of digital tools has enabled women to step beyond conventional roles and increased the level of confidence and creativity in women.

Technology has significantly made various impacts on the women led business. From e commerce platforms like Khalti that facilitate direct consumer sales to mobile banking services that promote financial services, technology has empowered women to create scalable and sustainable ventures. Due to socio cultural constraints women entrepreneurship has not been able to flourish in the directed way but technology acts as a bridge to connect women entrepreneurs with global opportunities and resources.

Along with opportunities and transformative roles, women entrepreneurs also face several challenges while adopting technology. Problems and challenges such as unequal access to digital infrastructures, limited knowledge about the digital platforms, lack of financial resources and mentorship are some of the reasons due to which the women entrepreneurs are unable to take full advantages of the technological advancements. The major challenge for women entrepreneurs still lies in the gender biasness and cultural norms in developing countries like Nepal which create additional hurdles in entrepreneurial journey of women in technology. The diffusion of technology has accelerated across the world, and while billions of people still lack access, information technology and communication technology (ICT) has reshaped the way in which individuals and people within companies interact. (Haque, Rahman, Afrad, Hasan, & Rahman, 2023)

Objectives

The objectives highlighted in this paper are as follows:

1. To analyze the role of technology in women entrepreneurship.
2. To identify the challenges and opportunities of adopting technology in women led businesses
3. To examine the success stories of women entrepreneurs in Nepal who utilized the technology to overcome the traditional barriers.
4. To understand the extent of digital gaps in Nepal and provide strategies to promote gender equality and empower women to take leadership roles in entrepreneurial system through use of technology.

Methodology

This study uses Secondary Data i.e. the study highlights on the findings from the literature reviews and case study of the technology driven businesses led by women entrepreneurs. The study focuses on finding the literature gaps and ways to eliminate those gaps to propose strategies that help to eliminate the challenges that hinder the women in flourishing their businesses. The data has been collected from different scholars and research articles, published books and journals, websites focusing on the women entrepreneurial aspects using technology.

Literature Review:

Advanced ICT is an enabling technology that can go hand in hand with any wealth-generating operations that can, in turn, involve skill enhancement and create new business demands, and it is definitely a key solution for comprehensive growth starting from poverty elimination and women empowerment (Kişi,

N. (2019).The primary reasons for the rise of these leading women in the entrepreneurship economy and the growth of SME's are the policies resulting from speculations in new knowledge, internationalization and global markets, and the developments in advanced ICTs (Sharafizad, Journal of Systems and Information Technology 18:331–345, 2016).

Bhatta (2022) studied on Problems and Prospects of Women Entrepreneurship in Nepal. His objective was: to analyze the various problems faced by women entrepreneurs in establishing and running a business enterprise, to explore the steps taken by the government and non-governmental and to offer suggestions to overcome the problems. His research was based on secondary data. His recommendations were: Government and policy makers should play their role toward preventing gender discrimination and domestic violence against women and upholding their right to work for women entrepreneurs. They should develop effective policies, rules and regulations to enhance women entrepreneurship.

Khatri (2022) studied on Women Entrepreneurship in Nepalese Context: A Critical Study of Its Problems and Suggestions. This paper analyses the problems of women entrepreneurs as financial constraints, marketing problems, and lack of human resources, lack of raw materials, Stiff competition, and High cost of production, Limited managerial ability, Absence of Entrepreneurial Attitude, patriarchal Society, and Family Conflicts etc. The study is based on Secondary Data. The findings suggest that Development of entrepreneurship is the need of the hour in Nepal. Women entrepreneurs are to be enabled to possess entrepreneurial qualities and skills not only to meet the changing trends and challenging in global markets, but also to become competent persons. It can sustain in the local economic area as women entrepreneurs.

Karki & Xheneti (2018) studied on Formalizing women entrepreneurs in Kathmandu, Nepal. They explored whether formalization of women entrepreneurial activities in formal economy supports SDGs through ensuring empowerment and equality. They used primary source of data by interviewing 30 females in formal and informal entrepreneur activities. The finding is that informal entrepreneurial activities

improve women confidence and life aspirations. There are a few limitations whereas formalization empower women at household and community level.

Dwibedi (2015) studied on Women entrepreneurship and innovations: A critical analysis. This paper endeavors to explore studies related to women entrepreneurship and innovation and how it leads to success and growth of an enterprise. The study is based on Secondary Data. The finding shows that increased female entrepreneurial activity heralds a progress for women's rights and optimization of their economic and social living index. Women entrepreneurship is synonymous with women empowerment. Parallel to the male counterparts, female entrepreneurs are catalytic in job creation, innovation and more than tangible contribution to the GNP of the country. An economy thrives when women get a level playing field as men. Innovation works as a catalyst or an instrument for entrepreneurship.

(Haque, Rahman, Afrad, Hasan, & Rahman, 2023) studied on Impact of mobile phone usage on empowerment of rural women entrepreneurs. This research investigates the influence of mobile phone utilization on the empowerment of female entrepreneurs in rural farming communities. Data were gathered from 150 female agricultural entrepreneurs in the rural regions of Bangladesh. The results advocate that mobile phone utilization assists rural female farmers in augmenting their empowerment. It is thus recommended that policymakers and developmental organizations prioritize mobile technology as a tool to empower rural women in Bangladesh. This can be realized by enhancing accessibility, confronting socio-cultural barriers, and fostering digital literacy.

Irene, B.N.O. (2019) studied Technopreneurship: A Discursive Analysis of the Impact of Technology on the Success of Women Entrepreneurs in South Africa. The purpose of this study is to provide insight and add to the discourse on the ongoing challenges regarding the implications of technology on the strategic business decisions of women and in developing economies such as South Africa. The study is based on qualitative data. His findings revealed that in this era of technology proliferation, it is almost impossible to separate a successful business from the role played by technology. The literature is increasingly showing that women remain relatively less tech-savvy than their male counterparts. Thus, the implications of this lag for women-owned businesses are clear.

Khanal (2019) studied on Emerging Issues and Challenges of Women Entrepreneurship (A case study of Kathmandu Valley). The objective of the study was to identify and measure the impact of various issues and challenges faced by these women in doing their businesses. Based on the primary research, the data were collected by means of personal interview, questionnaire and observation of 400 women's entrepreneurship ventures in Kathmandu Valley. The survey results indicated that the problems created by political instability, financial problems and lack of support from their family are major challenges during the start-up of their businesses. Similarly, bureaucratic problems are experienced by women entrepreneurs in Kathmandu, Nepal.

(Ndou, Mele, Hysa, & Mansi, 2024) presented a paper where they studied on Empowering Women for Technology Entrepreneurship: Opportunities and Challenges. This paper aims to underline how the new emerging digital technologies could empower women entrepreneurship by supporting them in overcoming the constraints they face as well as in creating a more favorable network environment. We will do this by analyzing the state of the art of the research regarding entrepreneurship practices by women considering the literature that has focused on this theme up to now. A structured literature review methodology was used for this paper. A conceptual discussion on how the Digital Technologies opportunities in overcoming some of the constrains women tackle in their entrepreneurship process and which are the main research streams that emerge for future investigation on the theme, is provided. The major implication is to advance knowledge and practice in the area of gender in management and use of Digital Technologies by focusing upon empirical research, theoretical developments, practice and current issues.

(Suseno & Abbott, 2021) studied on Women entrepreneurs' digital social innovation: Linking gender, entrepreneurship, social innovation and information systems. This article responds to increasing discourses on digital social innovation (DSI) from the perspectives of women entrepreneurs. Using the individual differences theory of gender and information technology (IDTGIT), this research explores how digital technology is used by women entrepreneurs to create opportunities in response to the challenges associated with individual identity, individual influences, social influences and structural influences. The methodology of the study was qualitative study using interviews with 17 women

entrepreneurs in Australia. The researcher found that technology plays a role in helping women entrepreneurs to pursue social innovation in two different ways: through social innovation that is embodied by technology and social innovation that is enabled by technology. Our findings further indicate the social impact of DSI in the areas of education, employment, environment and climate, community development and progress and healthcare.

A crucial sector in the Nepalese economy, micro, small, and medium-sized enterprises (MSMEs) account for 90 percent of all businesses and 45 percent of all jobs, employing 2.7 million people. Despite its contributions, the sector remains underserved – particularly with women-led enterprises that face gaps in skilling and financial support. Accelerate My Business filled this gap by providing business, financial, and digital literacy training and mentoring to women entrepreneurs, helping them broaden their economic prospects in the digital economy. (Accelerate My Business Empowers Women Entrepreneurs in Koshi, Nepal, 2024)

Case Studies:

Aanchal Kunwar leads Daraz Nepal, a prominent e-commerce platform that connects buyers and sellers across the country. She enhanced the Daraz App usability by incorporating local language and payment gateways optimized inventory management and personalized customer experiences as well as expanded the platform's seller bas by providing digital training to small and medium enterprises (SMEs). The challenges according to her interview in Business 360 highlights about convincing consumers trust in online payments i.e. many sellers especially women, struggled to adapt to the e- commerce platforms along with geographical challenges in rural areas. I Don't Believe in Short Term Wins. (2025).

Nikita Acharya is the founder of UG Cakes. She noticed the lack of an accessible and curated online shopping destination for women. Understanding the concerns of their customers, they prioritized transparent service and ensured that every customer interaction fostered trust. They faced everything from logistical nightmares to educating the market on the convenience and safety of online shopping. However, their determination and creative problem-solving saw them through the toughest phases. (Acharya, 2025). The major difficulty is building credibility in the

online retail and food industry along with facing skepticism from stakeholders and investors.

Karvika Thapa is the CEO of Kimbu Tech. She leads a quality team of Nepali women and men who provide software development, maintenance, and support services for companies in Nepal, Israel, and the US. Having already created a space for women in tech, she dreams of a time when women not only work as IT experts and programmers but also become leaders in the field. (Thapa, The Kathmandu Post, 2025) Women often struggle with entrepreneurship and career advancement because they are typically not the primary household earners. Additionally, banks and financial institutions require collateral for loans, forcing women to rely on either their natal families, which they

have moved away from, or their new families, where they may not yet have strong financial support. This systemic issue further hinders their ability to establish and grow their careers independently. Creative financing options such as crowdfunding, invoice financing, collateral-free loans, and startup funds are essential to broaden access to capital. The government's initiative to select 183 startups for collateral-free loans from over 1,600 applications is a positive step, but additional tax incentives are needed to further support and stimulate these types of ventures. (Thapa, 2024)

Literature Gaps

A few literature gaps that I have identified while going through the literature reviews are:

1. The studies conducted focus on national or international trends but studies have not analyzed the role local ecosystems.
2. There are limited studies that investigate the effectiveness of government and institutional policies in facilitating technology adoption among women entrepreneurs.
3. Few studies explore how women perceive technology whether as a barrier, an opportunity or both. There are studies done but few on national level but rarely on local levels of Nepal
4. The studies rarely differentiate the challenges of technology in business sectors like: agriculture, handicrafts or retail sectors
5. Accelerate my business facilitated the women entrepreneurs by providing them training in Koshi, Nepal but still there are very few study that discusses such efforts to empower women entrepreneurs through technological skills.
6. There are many women entrepreneurs who have excelled in today's generation in the field of technology but the women entrepreneurs who are working at local levels have not been highlighted.
7. The challenges faced by women entrepreneurs are not studied as much in comparison of male entrepreneurs which clearly shows the gender biasness. Also, if there are two co-founders for a certain start up the male founder is highlighted as the founder but females lack the first position in many cases.

Conceptual Framework

Moderating Variable

- Enhanced market Reach
- Networking
- Digital Literacy Gaps
- Gender biasness
- Lack of technology and related facilities in rural areas

Findings

The adoption and enhancement of technology highlights both significant opportunities and challenges in the success of women entrepreneurs in Nepal. The advancement in technology has given several opportunities to the entrepreneurs to flourish their businesses. The women entrepreneurs are getting opportunities like:

Global Reach: Digital platforms are increasing and enabling women entrepreneurs to reach broader markets locally and globally. So there is chances of expansion of the customer base as done by women founders of Kimbu Tech, Sajilo Marmat Sewa etc. so building networks and online marketing become an asset with the help of technology.

Digital Marketing: Businesses are developing digitally as utilization of digital marketing is enhanced

E- Commerce: development of Fintech and e- commerce platform has helped in online payment systems that helps to secure transactions which builds confidence in women entrepreneurs.

The challenges faced by the women entrepreneurs include:

Socio Cultural Barriers: The societal norms and values limit the scalability of women entrepreneurs. This also restricts women's access to information and resources affecting their capacity to adopt digital advancements in their start-ups and businesses.

Women often struggle with entrepreneurship and career advancement because they are typically not the primary household earners.

Gender Biasness: Companies like Sajilo Marmat Sewa, Khalti are prominently known by their male founders where female owners are not highlighted in the national or international platforms. As Acharya said, it is difficulty in building credibility in the market specially by women entrepreneurs.

Lack of Infrastructure: There is lack of proper network and technology in several rural areas of Nepal. Technology enhanced devices are not available in many parts of the nation so adoption of advanced technology is also a hindrance.

Digital Literacy Gaps: As noted from the stories of successful women entrepreneurs, it is difficult to convince and educate people about the digital advancements and building trust about the financial security of the people. There is limited exposure to digital platforms along with very low participation in training programs the create difficulties to show the abilities of women to effectively utilize the technological tools.

Lack of reach in the rural areas: The local women led business-like agriculture, handicrafts, pottery etc. can

flourish very well with the help of technology but lack of knowledge in women entrepreneurs and lack of

technology tools hinder the capabilities of the women entrepreneurs.

Recommendation

There are many women entrepreneurs whose success stories have not been highlighted so this study also emphasizes on the need to learn about the such women entrepreneurs who have been working in rural areas at local level to flourish the national economy. Digital Literacy programs and training programs must be implemented to bridge the knowledge gaps helping the women entrepreneurs to take complete advantage of technology. Women participation can be encouraged by giving different incentives. Boosting financial independence of women i.e. giving loans to women entrepreneurs at lower rates in every sector and areas. Adopting policies that support to address cultural barriers and promote gender equality is a necessity. Public-private partnerships can also help to bridge the digital divide and support women's participation in Nepal's growing entrepreneurial ecosystem

Conclusion

Success doesn't come without struggle and for developing country like: Nepal due to the socio- cultural barriers it is even more difficult for women to manage both families and work. Being a male dominant society there is a myth that only men can handle the advanced technology and so can show their abilities in enhancement of their businesses. So, people also rely on men- led businesses rather than women led businesses specially in the rural areas. It is difficult to convince the customers that women entrepreneurship is equally reliable and contributes better in the national economies but many such stories get hidden as women are more confined in their household works rather than coming forward and building heir career as entrepreneurs. Even if women have contributed in the development of their businesses by adoption of enhanced technologies their stories remain into darkness. Even many women do not have confidence to learn new technologies as they fear they might make loss rather than making profit as they lack technological confidence. Women specially in rural areas still use outdated techniques as they fear to learn anything new. So women participation and awareness is crucial to develop the businesses which will definitely gear up the speed of national economy.

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Enhancing Creativity in Higher Education Through Big Data Analytics and Design Thinking Methodologies

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Abstract

This study investigates the impact of integrating big data analytics tools, business design thinking, and scenario planning methodologies into higher education curricula to enhance student creativity. By employing a mixed-methods approach, we examined the outcomes of three student groups undertaking distinct educational frameworks. The findings highlight that utilizing tools such as the Ucinet program in combination with creative business strategies fosters innovative problem-solving. This paper discusses the implications of these methodologies for educational practices, offering a framework to incorporate big data into learner-centered creativity enhancement.

Keywords: *Big Data, Ucinet, Creativity, Design Thinking, Scenario Planning*

Introduction

The 21st century marks a transition from the "Age of Knowledge" of the 20th century to the "Age of Creativity" (Lee et al., 2022), highlighting the increasing importance of creative thinking. Creativity is a critical determinant of competitiveness for both individuals and organizations, and its significance is increasingly emphasized in educational contexts (Sternberg, 2005). Particularly, rapid technological advancements and globalization have heightened the necessity of creative thinking to solve complex societal problems and generate new values in uncertain environments (McWilliam, 2009). Consequently, educational systems, including university curricula, are shifting from instructor-centered to learner-centered approaches, requiring innovative strategies to cultivate creative thinking skills (Guilford, 1950).

One of the most prominent issues and trends in contemporary education is programming education leveraging big data. Big data analytics allows for the examination of vast datasets to derive meaningful patterns and insights, facilitating new perspectives (Mayer-Schönberger & Cukier, 2013). In the educational domain, analyzing learners' behavioral data enables the development of personalized educational content and the analysis of interaction patterns among instructors, learners, or peer groups, thereby enhancing collaborative skills (Ferguson, 2012). Thus, the advancement of big data analytics presents novel opportunities for fostering creativity among learners. Ongoing research explores effective strategies for integrating big data education into practical educational environments.

Among various big data analytical tools, the Ucinet program stands out as specialized software for analyzing and visualizing network relationships, whether at the individual or organizational level (Borgatti, Everett, & Freeman, 2002). By focusing on relationships, Ucinet facilitates learners' interpretation of outcomes from multiple perspectives during problem-solving processes, playing a pivotal role in fostering creative thinking (Freeman, 2004). Specifically, Ucinet enables learners to derive insights based on relational dynamics and propose innovative solutions for complex problems (Borgatti et al., 2013).

In business education and research, various tools are utilized to enhance learners' creativity. Among these, the Business Design Thinking methodology is recognized as a powerful tool for creative problem-solving (Brown, 2009). Design Thinking focuses on defining problems from a user-centered perspective and exploring diverse ideas to identify optimal solutions, thereby maximizing learners' creative thinking (Kelley & Kelley, 2013). This methodology is easily applicable in educational settings and serves as an essential business analysis tool to improve learners' creative problem-solving capabilities (Plattner, Meinel, & Leifer, 2011). In addition to Design Thinking, Scenario Planning is another prominent tool employed to stimulate creativity. Scenario Planning involves predicting multiple future scenarios and devising strategies accordingly, encouraging learners to adopt creative perspectives (Schoemaker, 1995). By logically considering diverse possibilities in uncertain circumstances, Scenario Planning helps learners interpret

problems from novel angles and derive creative outcomes (Ringland, 2006). Together, Design Thinking and Scenario Planning are critical tools for enhancing creativity in educational contexts (Wright, Cairns, & Bradfield, 2013).

This study aims to propose a problem-based learning model that combines network analysis using the Ucinet program with Business Design Thinking and Scenario Planning methodologies. The objective is to explore strategies for simultaneously enhancing learners' creative thinking and problem-solving abilities while validating the practical applicability of this approach in educational environments. Specifically, the study seeks to investigate methods for utilizing the Ucinet program to foster creativity among learners and propose a new problem-based educational model that integrates Business Design Thinking and Scenario Planning methodologies beyond conventional program-focused training.

Theoretical Background

2.1 Definition of Creativity and the Importance of Problem-Based Learning

Creativity can be defined as the ability to propose novel ideas and apply them to resolve given problems (Amabile, 1996). It encompasses not only the generation of original thoughts but also the capacity to implement these ideas to achieve tangible outcomes. Creativity is a critical element that drives innovation and sustained progress, extending beyond individual competence to play a vital role in education, business, and society at large (Sternberg, 2006). Particularly in the era of the Fourth Industrial Revolution, the complexity and unpredictability of modern problems have escalated to unprecedented levels. The capacity for creative problem-solving has thus become a key determinant of both individual and organizational competitiveness (Fisher, 2013).

To enhance learners' creativity, recent university education has actively adopted Problem-Based Learning (PBL). PBL enables learners to acquire knowledge through the process of addressing real-world or corporate problems and applying the acquired knowledge to practical scenarios (Barrows & Tamblyn, 1980). Unlike traditional lecture-based methods, PBL encourages learners to actively participate by defining problems and seeking solutions independently. This approach extends beyond mere knowledge transmission, systematically cultivating critical thinking and creative problem-solving skills (Jonassen, 1997). PBL, therefore, focuses on developing the cognitive abilities necessary for addressing complex real-life challenges, thereby contributing significantly to the ultimate goal of education: the ability to apply learned knowledge effectively.

PBL is intrinsically linked to the development of creativity. The process of solving problems requires diverse perspectives and innovative solutions. Additionally, implementing these solutions offers learners experiences distinct from conventional educational methods. Creative problem-solving involves not merely identifying a single answer but exploring and constructing multiple alternatives and approaches, making it an effective method for maximizing learners' creativity (Jonassen, 1997). Consequently, PBL serves as an essential process for enhancing learners' creative thinking capabilities, a crucial component of modern education (Barrows & Tamblyn, 1980).

Amid rapid technological advancement and increasing uncertainty, creativity has transitioned from being an optional asset to a core competency essential for securing competitiveness at both individual and organizational levels. Recognizing the importance of creativity, integrating it effectively into education through the adoption of PBL is imperative. By engaging in PBL, learners can develop essential core competencies and maximize their capacity to adapt flexibly to evolving societal demands.

Business Design Thinking Methodology

Design Thinking is a user-centered problem-solving methodology designed to foster innovation and creative thinking (Brown, 2009). It is particularly effective in addressing complex and unstructured problems and has been widely adopted in various business contexts. The core principle of Business Design Thinking is to derive innovative and practical solutions to problems by focusing on user needs and experiences throughout the process (Plattner, Meinel, & Leifer, 2011). This approach departs from traditional corporate analysis and results-oriented methods by continuously reflecting user perspectives from problem definition to solution implementation, making it a distinctive and unique methodology (Kelley & Kelley, 2013).

The typical Business Design Thinking methodology involves five stages, developed by Stanford University's d.school. The first stage is Empathize, where problem solvers deeply understand users' needs and emotions through diverse research methods such as interviews, observations, and surveys. This stage provides critical insights that form the foundation for all subsequent stages (Brown, 2009). The second stage, Define, focuses on analyzing data obtained during the Empathize stage to clearly articulate the problem. This stage involves identifying the root causes of the issue and concretizing the core problems faced by users. Proper problem identification is crucial as it directly influences idea generation and solution development in later stages. A clear and accurate problem definition serves as the starting point for creative solutions and provides direction for the problem-solving process (Kelley & Kelley, 2013).

The third stage, Ideate, involves generating a wide range

of ideas using creative techniques such as brainstorming. All ideas generated during this stage are accepted without criticism, aiming to produce as many ideas as possible. This approach fosters an environment conducive to generating innovative ideas and expands thinking from diverse perspectives (Brown, 2009). The fourth stage, Prototype, entails creating tangible models or prototypes based on the most promising ideas for problem resolution. This stage allows problem solvers to implement and test their solutions in practice, providing an opportunity to evaluate how theoretical ideas function in the real world (Kelley & Kelley, 2013). The final stage, Test, involves testing the prototype in real usage environments, analyzing results, and evaluating its effectiveness. This stage primarily collects user feedback and iteratively improves the product. Rather than merely returning to the prototype stage, this process often revisits problem definition or ideation stages to better incorporate user needs. This iterative and cyclical nature of Design Thinking ensures the delivery of optimal solutions to users (Kelley & Kelley, 2013).

Business Design Thinking facilitates creative thinking and contributes to the derivation of innovative, user-centered solutions through its five stages. This methodology can be applied across various fields, including business, education, and social problem-solving, to promote creativity and innovation. Furthermore, it serves as a critical tool in Problem-Based Learning (Dorst, 2011; Kelley & Kelley, 2013).

Scenario Planning Methodology

Scenario planning is a strategic tool developed to predict various future scenarios and devise corresponding strategies (Schoemaker, 1995). This methodology provides decision-makers with a framework to consider multiple potential outcomes in highly uncertain environments and explore diverse strategic solutions to complex problems. The primary objective of scenario planning is not merely prediction but simulation of multiple future possibilities, enabling organizations or individuals to effectively prepare for and adapt to future developments (Ringland, 2006).

Scenario planning typically involves four stages (Schoemaker, 1995; Ringland, 2006). The first stage is identifying key factors likely to influence the future, encompassing a broad range of variables such as economic, social, technological, and environmental factors surrounding the organization. These variables are analyzed to understand how they may interact in the future. Identifying key factors serves as the foundation for scenario development, enabling the anticipation of diverse potential futures. This stage requires the integration of existing data with creative thinking, considering even unforeseen possibilities (Schoemaker, 1995).

The second stage involves generating various future scenarios. Detailed descriptions are added to each scenario to reflect how multiple interacting variables might shape future conditions. Rather than focusing on simplistic positive or negative outcomes, this stage demands a multi-faceted approach that incorporates creative thinking to transcend established patterns and explore innovative solutions (Ringland, 2006).

The third stage centers on developing strategic responses to the constructed scenarios. This involves formulating strategies that an organization might adopt if specific scenarios were to materialize and assessing the practical effectiveness of these strategies. This stage is the core of scenario planning, emphasizing the need for flexible strategies to address diverse possibilities and equipping organizations with actionable measures to navigate uncertain futures effectively (Schoemaker, 1995).

The final stage is the continuous review and updating of scenarios. As the future evolves, scenario planning must not remain a one-time exercise but instead involve ongoing revision and refinement. By incorporating new data and insights, the accuracy of future predictions can be enhanced, and corresponding strategies can be adjusted to become more effective and precise (Ringland, 2006).

Scenario planning serves as a vital tool for stimulating organizational creativity (Van der Heijden, 2005; Ramirez et al., 2015). It is instrumental in exploring diverse solutions to complex problems and transcends simple forecasts by considering multiple possibilities simultaneously. This approach equips learners with the ability to creatively select and logically explain variables, fostering skills necessary for addressing multifaceted challenges (Schoemaker, 1995).

Ucinet Program and Creativity

The Ucinet program is specialized software widely used for social network analysis (SNA) and data visualization (Borgatti, Everett, & Freeman, 2002). It is an essential tool for analyzing complex network structures, allowing the quantitative measurement of relationships and interactions between nodes (individual elements) and edges (connections between nodes). Through Ucinet, users can gain insights into the structural complexity of networks and analyze patterns and strengths of relationships.

One of Ucinet's core features is its ability to visually represent relationships and interactions within a network. It facilitates intuitive comprehension of the connections and strengths between components through various graphs and charts. By leveraging these analytical insights, Ucinet promotes creative thinking by enabling learners to understand network structures and explore problem-solving strategies (Borgatti et al., 2013). Network analysis allows learners to visually represent complex data relationships, generating new insights from diverse perspectives. For instance, identifying a central node

within a network can reveal its pivotal role, aiding learners in devising creative solutions based on such key nodes (Freeman, 2004).

Ucinet supports not only the analysis of relationships between nodes but also an understanding of the structural aspects of networks (Wellman, 1988). By analyzing the overall network, learners can determine which nodes or relationships should be prioritized for problem resolution and devise creative strategies for addressing network-related challenges. Integrating Ucinet with other business tools such as Business Design Thinking and Scenario Planning can further enhance learners' problem-solving abilities and creativity (Brown & Katz, 2011; Hargadon & Sutton, 1997; Goodwin & Wright, 2010; Chermack, 2011).

Research Methodology

Research Participants

The research participants were divided into three groups for comparative analysis. Group A consisted of 30 students enrolled in the course Social Network Analysis: Theory and Practice. Groups B and C included 42 students each from two separate sections of the course Management Information Systems.

Group A was composed of interdisciplinary students from majors such as Business Administration, Cultural Content, Industrial and Management Engineering, and Information and Social Media Studies. Group B included students from diverse fields such as Business Administration, Sports Culture, English and American Literature, French Studies, and Korean Language and Literature. Group C consisted of students majoring in Business Administration, Economics, Anthropology, Cultural Content, Japanese Studies, and Information and Social Media Studies. The distribution of majors in each group is summarized in Table 1.

Table 1. Distribution of Research Participants by Major

A Group		B Group		C Group	
Major	Number	Major	Number	Major	Number
Business	14	Business	37	Business	20
Culture Contents	1	Sports Culture	1	Cultural Anthropology	3
Industrial Management	3	English Culture	1	Culture Contents	3
Information Social Media	5	France	1	Japanese	3
Economics	7	Korean Language	2	Information Social Media	1
				Chinese	4
				France	7
				Korean Language	1
				Economics	1
Total	30	Total	42	Total	43

Each group engaged in team projects to achieve the research objectives. In Groups A and C, team compositions were determined by instructors considering individual characteristics (e.g., MBTI) and majors. The detailed composition of Group A teams is shown in Table 2.

Table 2. Team Composition for Group A

Team	Name	Major	MBTI	Team	Name	Major	MBTI
1	Park00	Business	ENTP	5	Lee00	Business	INFJ
	Shin00	Business	INTP		Kim00	Information Social Media	ISFJ
	Kim00	Business	INFJ		Moon00	Information Social Media	ISFJ
	Park00	Economics	INTP	6	Park00	Business	ENFJ
2	Yang00	Business	INFJ		Shin00	Business	ESFJ
	Kim00	Business	INFJ		Ahn00	Business	ESFJ
	Oh00	Economics	INFJ		Jung00	Economics	ESFJ
3	Hyun00	Business	INFP	7	Kim00	Economics	INTJ
	Myung00	Business	INFP		Kang00	Economics	INTJ
	Kim00	Business	INFP		Park00	Industrial Management	INTJ
4	Yoo00	Business	INFJ	8	Kong00	Economics	ISTP
	Lee00	Business	INFJ		Joo00	Economics	ISTP
	Lee00	Business	INFJ		Seol00	Information Social Media	ISTP
				9	Lee00	Culture Contents	ISFP
					Lee00	Industrial Management	ISTP
					Park00	Industrial Management	ISTJ

For Group B, the instructor instructed students to form teams autonomously, without consideration of their majors or individual characteristics. This self-organized approach resulted in nine teams with sizes ranging from three to six members. The detailed composition of Group B teams is outlined in Table 3.

Table 3. Team Composition for Group B

Team	Name	Major	Team	Name	Major
1	Ko00	English Culture	5	Son00	Korean Language
	Lee00	Sports Culture		Jang00	Business
	Shin00	Business		Wang00	Business
	Jung00	Business		Jang00	Business
2	Lee00	Business	6	Jang00	Business
	Cho00	Korean Language		Bang0	Business
	Lee00	Business		Ma00	Business
	Noh00	Business		Mo00	Business
	Kim00	Business		Cho00	Business
3	Park00	Business	7	Gam0	Business
	Lee00	Business		Jang00	Business
	Oh00	Business		Cho00	Business
	Wang00	Business		Joo00	Business
	Kim00	Business		Huh00	Business
4	Joo00	Business	8	Wang00	Business
	Yang00	Business		Woo00	Business
	Jang0	Business		Kang00	Business
	Nam00	Business	9	Roi0	Business
	Kyung00	Business		Park00	Business
	Wang00	Business		Shin00	France

Similar to Group A, team compositions for Group C were organized by the instructor, accounting for individual characteristics and majors. Group C comprised nine teams with three to five members each. Detailed compositions are provided in Table 4.

Table 4. Team Composition for Group C

Team	Name	Major	MBTI	Team	Name	Major	MBTI
1	Choi00	Business	ISFJ	5	Lee00	Business	ESTJ
	Choi00	Cultural Anthropology	ISFJ		Ah000	Business	ESTJ
	Cho00	Culture Contents	ISFJ		Duh00	Business	ESTJ
	Choi00	France	ISFP		Ah00	Business	ESTJ
	Lee00	France	ISFP	6	Yang00	Business	ISTJ
2	Hwang00	Business	INFP		Jang0	Business	ISTJ
	Yoo00	Business	INFP		Ma00	Business	ISTJ
	Park00	Culture Contents	INFP	7	Bu000	Business	ENFJ
	Choi00	Korean Language	INFP		Ru0000	Business	ENFJ
	Han00	Information Social Media	INTP		Je00	Cultural Anthropology	INTJ
3	Se00	Business	INTJ		Kim00	France	INTJ
	Kang00	Japanese	INFJ		Hong00	France	INTJ
	Park00	Japanese	INFJ	8	Do00	Business	ESTJ
	Ryu00	France	INFJ		Lee00	Business	ESFP
4	Jung00	Business	ENTP		Choi00	Business	ESFP
	Lee00	Economics	ESFJ		Woo00	Chinese	ESFP
	Lee00	Chinese	ESTJ	9	Kyung00	France	ISTJ
	Ahn00	Chinese	ESTJ		Lee00	France	ISTJ
					Oh00	Culture Contents	ISTJ
					Jang00	Chinese	ISTJ

Learning Curriculum

Group A followed a curriculum designed to enhance creativity through big data analysis. Over the 16-week course, students first studied theories and concepts related to social network analysis during the first four weeks. In weeks five and six, they explored the structural characteristics of social networks. During the seventh week, students learned methodologies for developing business model strategies, followed by a midterm examination in the eighth week. From weeks nine to twelve, students engaged in practical exercises using the Ucinet software, conducting network structural analysis, including cohesion, centrality, cluster analysis, data visualization, and hypothesis testing. The thirteenth to fifteenth weeks were dedicated to team presentations, and the course concluded with a final examination in the sixteenth week.

Groups B and C followed a curriculum focused on the strategic and practical aspects of information systems. During the first two weeks, students were introduced to the fundamentals of business and information systems. Weeks three and four focused on the strategic utilization of information systems, while weeks five and six addressed how information systems can drive business innovation. The seventh week was devoted to studying the role of information systems in supporting business activities, followed by a midterm examination in the eighth week. In the ninth week, students explored methodologies for developing business model strategies. Week ten covered the management and support functions of information systems, while week eleven focused on the adoption and management of these systems. In the twelfth week, students studied databases and big data analytics, and the thirteenth week focused on digital transformation. The fourteenth and fifteenth weeks were allocated for team presentations, with the course concluding in the sixteenth week with a final examination.

To address the limitations of a classroom-based study, the Empathy stage of the Business Design Thinking methodology was adjusted. Group A was instructed to identify user needs and problems using big data, while Groups B and C conducted this stage using data collected by their respective teams. Additionally, the Prototype and Testing stages were modified to include feedback from team members' acquaintances or domain experts.

Table 5. Curriculum of Each Group

A Group		B and C Gourp	
Week	Lecture Content	Week	Lecture Content
1 week	Orientation	1 week	Orientation
2 week	Theory and concepts of social network analysis 1	2 week	Management and information systems
3 week	Theory and concepts of social network analysis 2	3 week	Strategic use of information systems1
4 week	Theory and concepts of social network analysis 3	4 week	Strategic use of information systems2
5 week	Structural characteristics of social networks 1	5 week	Management innovation using information systems 1
6 week	Structural characteristics of social networks 2	6 week	Management innovation using information systems 2
7 week	Business model strategy development methodology	7 week	Support for management activities
8 week	Midterm exam	8 week	Midterm exam
9 week	Cohesion and centrality analysis	9 week	Business model strategy development methodology
10 week	Cluster analysis and 2-mode network analysis	10 week	Information systems and management support systems
11 week	Data visualization and hypothesis formulation	11 week	Adoption and management of information systems
12 week	Final data analysis before team presentations	12 week	Databases and big data
13 week	Team presentations	13 week	Digital transformation
14 week	No class (Memorial Day)	14 week	Team presentations
15 week	Team presentations	15 week	Team presentations
16 week	Final exam	16 week	Final exam

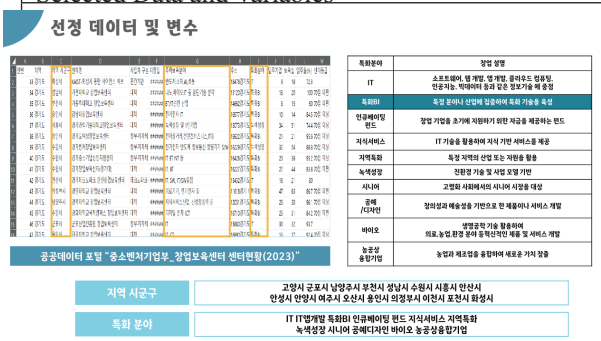
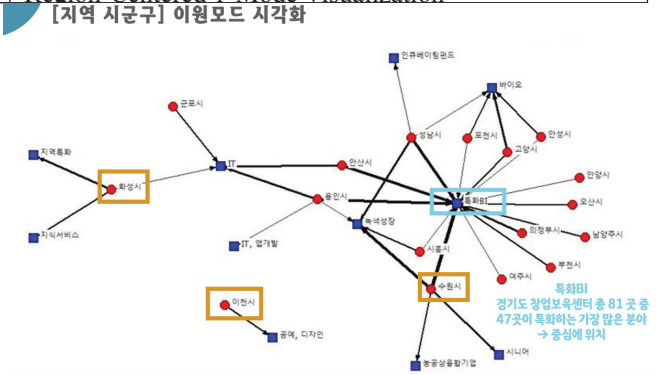
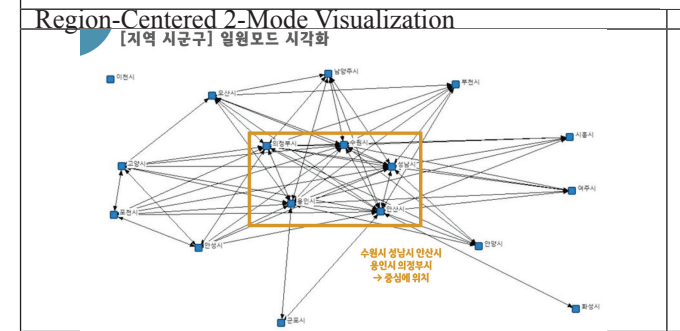
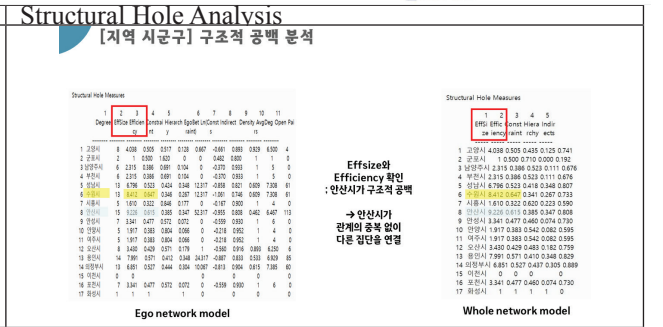
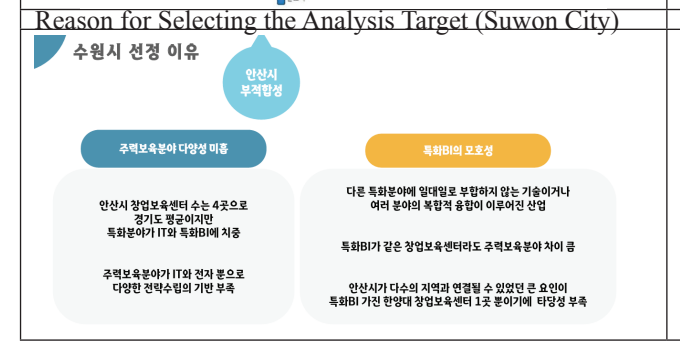
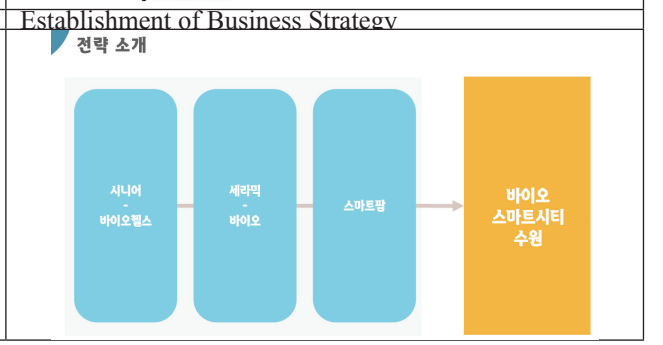
Research Results

Results of Group A

Group A aimed to enhance creativity through network-based big data analysis. Since some team members lacked experience in data crawling, the groups utilized publicly available big data from sources such as government open data platforms and Kaggle. Prior to selecting datasets, each team was instructed to identify a target company for analysis and select datasets closely related to the industry of the chosen company. The creative outcomes of Group A's team projects are as follows:

Team 1 analyzed the current status of startup incubation centers to propose management strategies for regional development. Although the database used by Team 1 contained various data fields, the analysis focused on regions and specialized sectors through network analysis (Table 6).

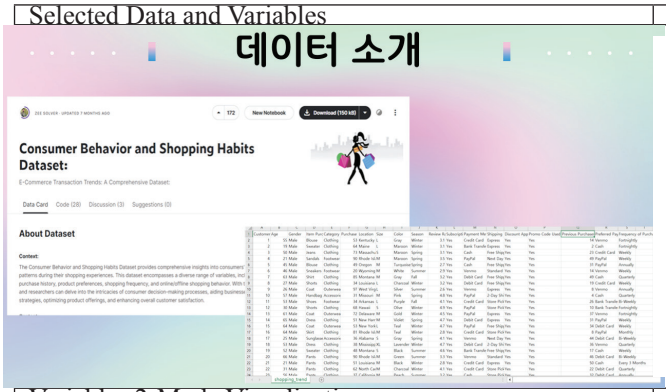
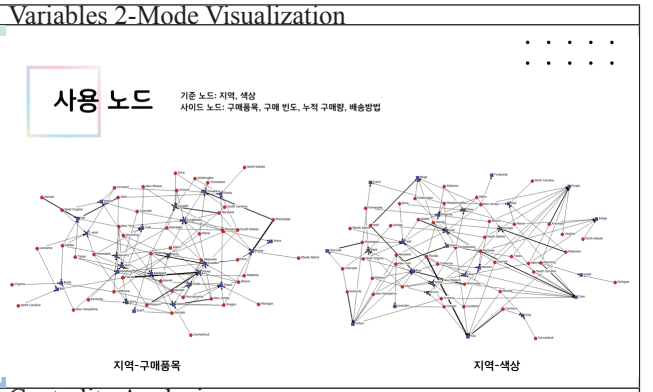
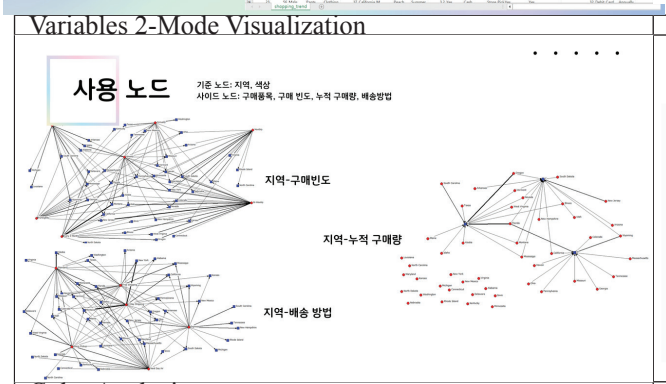
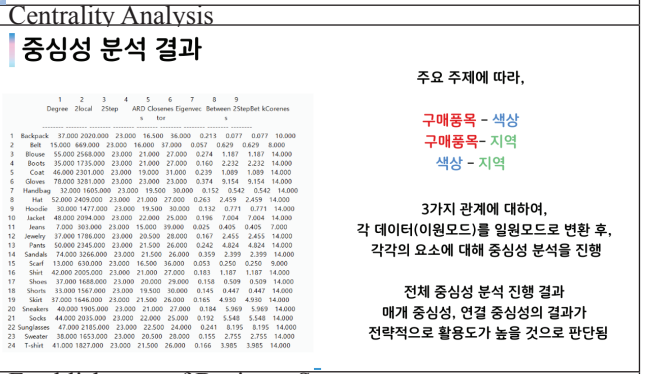
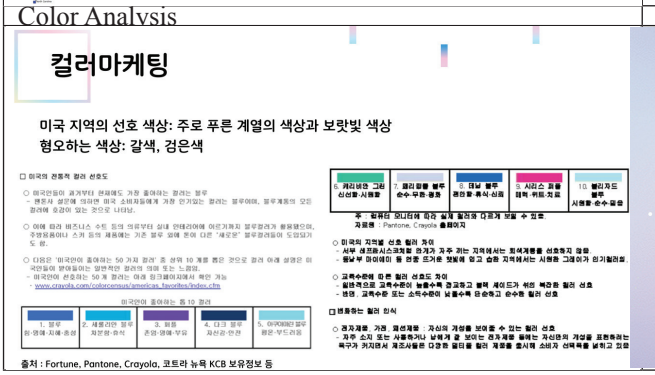
Table 6. Key Findings of Team 1's Project

Selected Data and Variables	Region-Centered 1-Mode Visualization
	
Region-Centered 2-Mode Visualization	Structural Hole Analysis
	
Reason for Selecting the Analysis Target (Suwon City)	Establishment of Business Strategy
	

The innovative aspects of Team 1's project included integrating the Suwon Senior Startup Incubation Center and the Kyung Hee University Global Campus Incubation Center in Suwon to promote biohealth and future sciences as strategic focus areas. This strategy was based on preliminary analysis indicating a higher senior population in Gyeonggi Province compared to other regions and Kyung Hee University's specialization in biohealth and future science research. Additionally, the team proposed a ceramic-bio strategy by creating a cluster centered on Suwon, incorporating the Seoul National University AgriBio Innovation Center and the Korea Ceramic Technology Institute in Bucheon. This strategy aimed to develop creative products leveraging biotechnologies. Finally, the team suggested a smart farming strategy by integrating centers such as Sungkyunkwan University's Startup Incubation Center, the Seoul National University AgriBio Innovation Center, and the Ansan Techno Park in Suwon. By considering not only Suwon City but also neighboring cities, Team 1 formulated multiple creative strategies, reflecting a broad consideration of alternatives and possibilities.

Team 3 conducted an analysis linking consumer behavior and shopping habits to product color in the U.S. market. Their database included categories such as regions, purchased items, colors, and purchase frequency. Using these, they performed a network analysis of relationships among factors (Table 7).

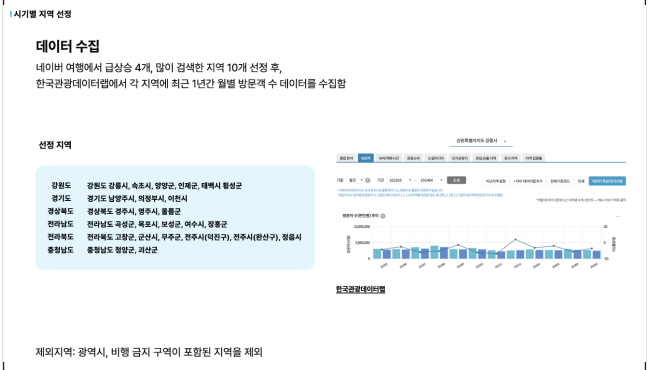
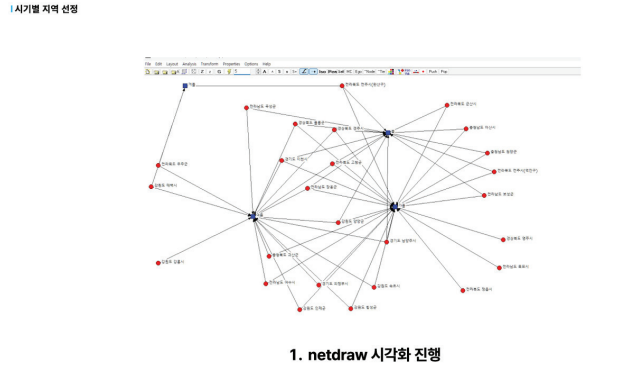
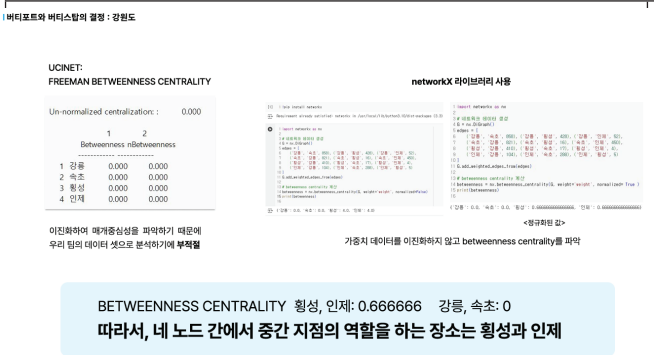
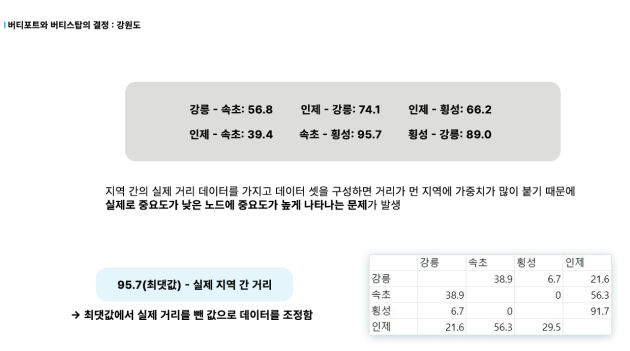
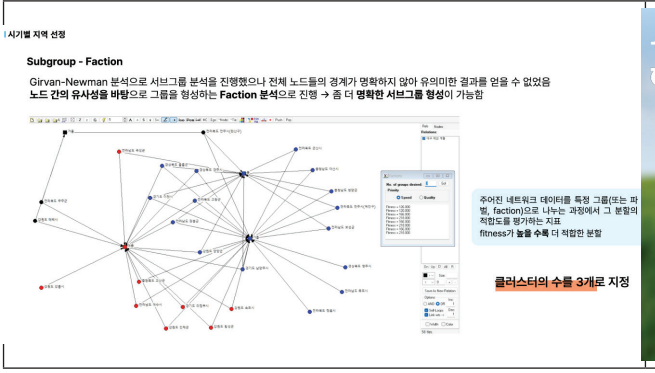
Table 7. Key Findings of Team 3's Project

Selected Data and Variables	Variables 2-Mode Visualization
	
Variables 2-Mode Visualization	**Centrality Analysis**
	
Color Analysis	**Establishment of Business Strategy**
	

Team 3 developed a color marketing strategy for corporate survival in the U.S. e-commerce market. They analyzed the relationships between region and purchased items, region and color, and region and purchase frequency. Ultimately, they identified significant results between color and season, color and items, and color and regions. By conducting centrality analysis, they highlighted Florida as a high-connectivity region and Montana as a hub. The results showed that vibrant colors such as purple and magenta had higher purchase rates. Based on these findings, the team proposed strategies for optimizing logistics operations, determining regional product offerings through color marketing, and improving supply chain efficiency.

Team 4 developed a business model for domestic tourism using Urban Air Mobility (UAM), which features vertical take-off and landing capabilities without requiring runways, enabling integration with existing urban transportation infrastructure (Table 8).

Table 8. Key Findings of Team 4's Project

Selected Data and Variables	Variables 2-Mode Visualization
	
Centrality Analysis	**Stop Point Analysis**
	
Clustering Analysis	**Establishment of Business Strategy**
	

To determine UAM landing locations, Team 4 classified sites into verti-hubs, verti-ports, and verti-stops and emphasized transitioning UAM from mere public transport to tourism purposes. Using data from the Korea Tourism Data Lab on monthly visitor numbers over the past year, they excluded metropolitan cities and no-fly zones. Their analysis revealed that summer attracted the highest visitors (e.g., Gangneung City), followed by spring, winter, and fall. Cluster analysis identified three clusters, with certain regions (e.g., Ulleung County, Gyeongju City, Icheon City) showing high relevance to spring and fall, while others (e.g., Yeosu City, Sokcho City, Gangneung City) were associated with summer. Due to insufficient data, winter-related regions were excluded from further analysis. Based on cluster analysis, they selected Jeollabuk-do and Gangwon-do as regions most suitable for UAM utilization.

For selecting verti-port and verti-stop locations, Team 4 used centrality and betweenness analysis, identifying Inje County in Gangwon-do and Gochang County in Jeollabuk-do. They proposed tourism routes featuring regional landmarks and specialties, offering creative ideas for verti-port interior designs as part of a "sky taxi" travel concept.

Results of Group B

Group B consisted of students enrolled in the course Management Information Systems, and the teams were formed autonomously by the students. The instructor tasked the teams with developing innovative and creative strategies that

incorporated technologies not currently utilized by existing companies. Additionally, the teams were instructed to apply the scenario planning methodology to describe future scenarios based on the present and to use traditional management tools such as PEST and SWOT analyses to enhance logical reasoning.

Team 2 selected Starbucks Korea as their case study. They utilized a modified version of PEST analysis known as STEEP analysis alongside SWOT analysis and applied the scenario planning methodology to develop future strategies (Table 9).

Table 9. Key Findings of Team 2's Project

SWOT Analysis



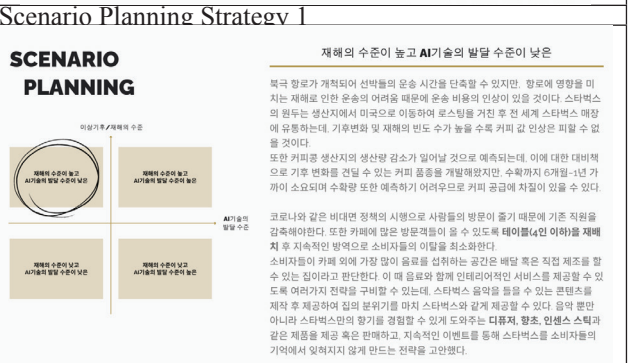
STEEP Analysis



Scenario Planning



Scenario Planning Strategy 1



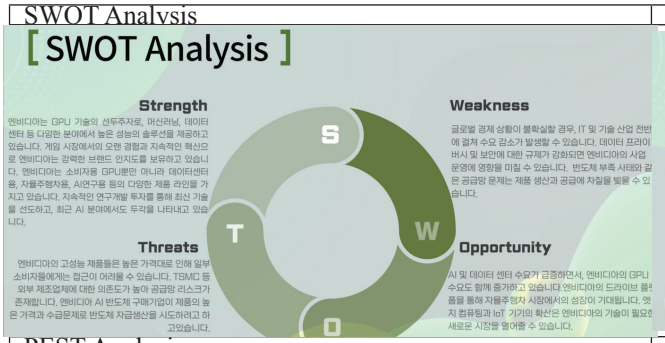
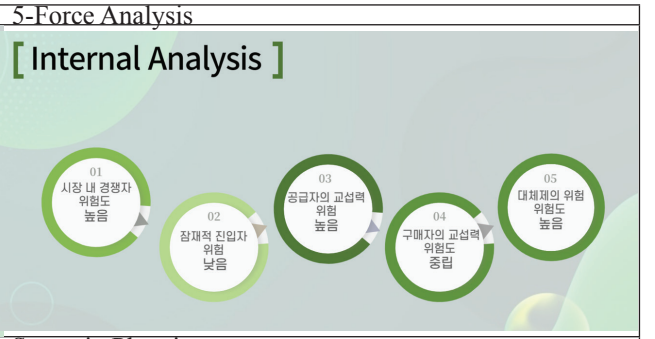
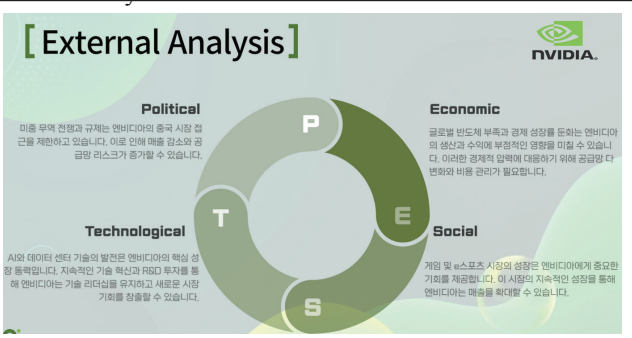
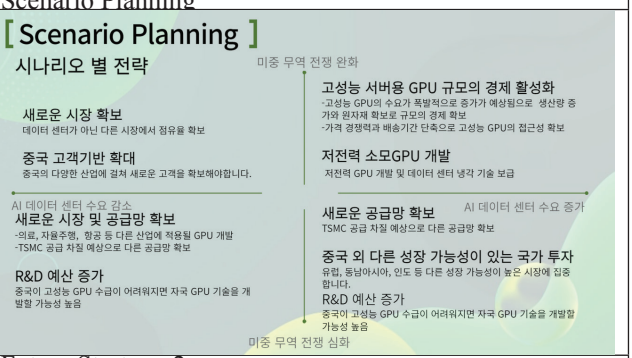
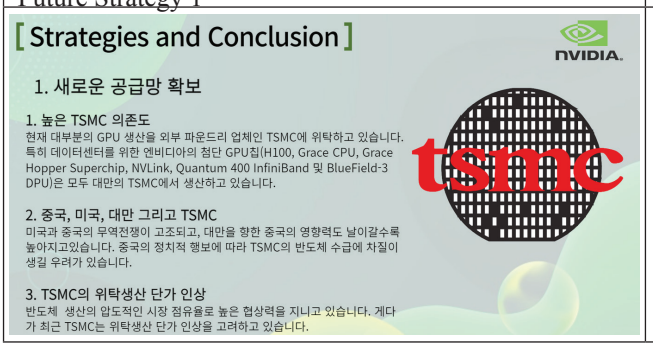
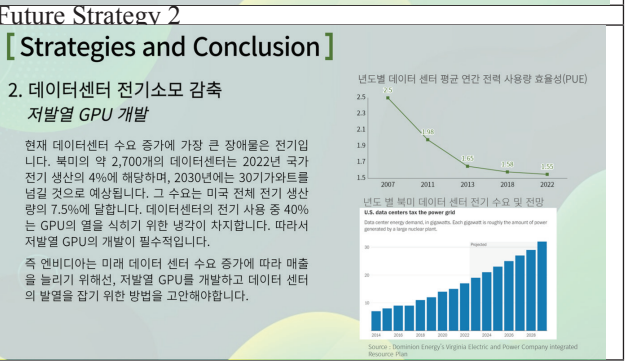
Scenario Planning Strategy 2



Team 2 effectively employed established management tools within the scenario planning framework. They examined how technological advancements and changes could influence Starbucks Korea's future strategies. The team identified climate change and the level of AI technology development as key factors and generated four possible scenarios. For instance, they predicted that severe climate change would lead to higher international coffee bean prices, directly affecting Starbucks Korea. Additionally, advancements in AI technology were anticipated to integrate into operations such as kiosks, robotic preparation systems, and expanded functionalities of the Siren Order app, influencing all facets of Starbucks Korea's consumer interactions.

Team 9 analyzed NVIDIA as their subject. Following the instructor's guidance, they utilized tools like the 5 Forces model and SWOT analysis for internal analysis and PEST analysis for external evaluation (Table 10).

Table 10. Key Findings of Team 9's Project

SWOT Analysis	5-Force Analysis
	
PEST Analysis	**Scenario Planning**
	
Future Strategy 1	**Future Strategy 2**
	

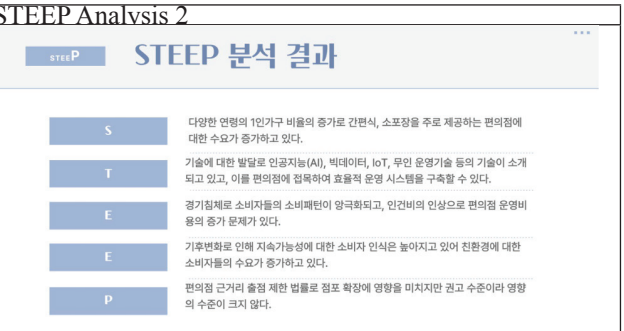
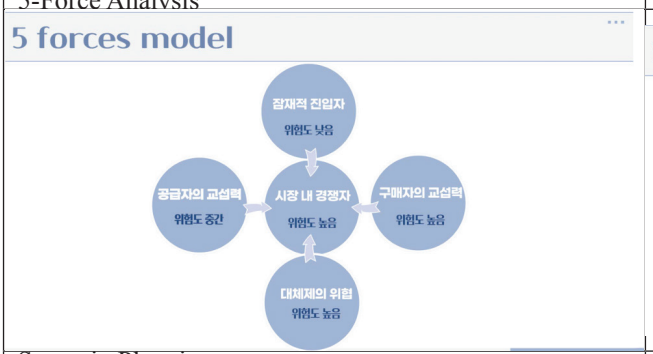
Team 9 identified U.S.-China trade tensions and AI data center demand as critical factors impacting NVIDIA's future strategies. In the worst-case scenario, where trade tensions worsen and demand for AI data centers declines, the team recommended developing GPUs for new markets such as healthcare, autonomous vehicles, and aviation to secure alternative supply chains and revenue streams. Conversely, in a scenario where trade tensions ease and AI data center demand grows, the team advised focusing on high-performance GPUs for servers and energy-efficient GPUs to capitalize on emerging opportunities.

Results of Group C

Group C teams were assigned by the instructor based on students' majors and MBTI profiles, with project requirements identical to those of Group B. Key results from Group C's team projects are as follows:

Team 4 analyzed Seven-Eleven, a convenience store brand under the Lotte Group, focusing on its competitive positioning in an increasingly saturated market. They conducted macro-environmental analysis, micro-environmental analysis, and scenario planning in sequence (Table 11).

Table 11. Key Findings of Team 4's Project

STEEP Analysis 1	STEEP Analysis 2
	
5-Force Analysis	SWOT Analysis
	
Scenario Planning	Future Strategy
	

Instead of predicting changes in key factors, Team 4 developed four distinct scenarios: high inflation and consumer polarization, technological advancements, increased demand for ultra-fast delivery, and shifts in consumer attitudes. For the scenario involving changing consumer trends, they proposed combining convenience stores with fitness centers, inspired by the rise of unmanned gyms in Japan. This strategy leveraged the proximity of convenience stores to residential areas and the growing demand for affordable gyms, presenting a creative and impactful future strategy.

Team 5 also analyzed Starbucks Korea, similar to Group B's Team 2. They described Starbucks' current technological capabilities, conducted STEEP and SWOT analyses, and identified key variables for scenario planning (Table 12).

Table 12. Key Findings of Team 5's Project

Team 5 highlighted factors such as increased consumer interest in health, advancements in mobile technology, and stricter consumer protection policies as significant influences on Starbucks Korea's operations. SWOT analysis revealed that while the brand had strong recognition, its reliance on a single product category posed risks in the face of economic instability. Based on these findings, they selected coffee bean supply and environmental regulations as critical variables for scenario planning. In the worst-case scenario, where regulations tighten, and coffee bean supplies are disrupted, they anticipated the need for enhanced inventory management and diversification of business lines. Conversely, if regulations remain stable and supply issues are resolved, they recommended leveraging digital transformation and technological innovation to seize growth opportunities.

Conclusion

Research Conclusion

This study explored the impact of integrated education combining big data analysis tools, business design thinking, and scenario planning methodologies on enhancing university students' creativity. The findings of this research can be summarized as follows. First, the use of the Ucinet program to analyze networks within big data, combined with traditional business tools such as business design thinking and scenario planning, was found to enable the development of creative strategies. In particular, Group A demonstrated a process of selecting and collecting data that involved considering multiple possibilities before making decisions. Through this process, the group engaged in critical thinking about the meaning of data and identified what was essential for their analysis. This finding highlights the importance of data interpretation skills for learners conducting big data analysis. Compared to Groups B and C, Group A showed a more creative approach to problem-solving, suggesting that integrating big data analysis tools with creativity-based frameworks can significantly enhance creativity.

Second, the composition of teams based on learners' characteristics appears to have a direct impact on creativity. While Group B allowed learners to form teams autonomously, Group C teams were organized by the instructor, taking into account individual characteristics. Comparing the outcomes of these two groups, it was observed that Group B primarily produced predictable results by analyzing existing data. On the other hand, Group C developed creative strategies that underscored the importance of diverse perspectives within teams. For example, Team 4 in Group C proposed a strategy combining convenience stores with fitness centers, which seemed to be influenced by the presence of Japanese Studies majors on the team. This result indicates that integrating diverse knowledge during team collaboration can lead to innovative and creative strategies. These findings emphasize the necessity of forming interdisciplinary teams in educational settings.

Third, fostering creativity requires learners to be flexible in shifting perspectives, moving from analyzing past data to devising future strategies based on current insights. This process involves logically explaining the changes in perspectives, which posed challenges for many learners due to a lack of prior training. To address this issue, instructors actively provided feedback and support throughout the study. This intervention highlights the need for future education to strengthen learners' ability to adapt to perspective changes, a skill critical for creative thinking and problem-solving.

Recommendations and Expected Impacts for Educational Practice

The results of this study provide several recommendations for educational practices aimed at enhancing creativity. Recent advancements in generative artificial intelligence have reduced the need for learners to generate code manually. For instance, big data analysis services like TEXTOM, which allow users to set keywords and websites for automated data collection, have diminished the importance of coding skills. Instead, the ability to interpret and understand the meaning of data is becoming increasingly vital. Therefore, it is recommended that educators shift the focus of their instruction from teaching analytical tools to fostering comprehensive skills such as designing objectives and planning for big data analysis.

This study also proposes a framework for enhancing learners' creativity. The framework emphasizes the importance of planning, data interpretation, and the strategic application of big data in fostering creative thinking. If big data analysis education is implemented based on this framework, several positive impacts can be expected. First, learners will develop not only analytical skills but also the ability to utilize data effectively. They will learn to identify the data necessary for problem-solving, analyze it, and propose solutions, thereby strengthening their comprehensive capabilities. Second, learners' creativity and logical thinking skills will improve, enabling them to establish innovative business models and strategies. This will involve logically linking and explaining environmental factors that influence corporate strategies, resulting in more effective decision-making. Third, the tools utilized in this study are expected to gain wider adoption. These tools are not limited to management studies and can be effectively applied in various disciplines. By adapting these tools to suit specific academic and research contexts, both instructors and learners are likely to achieve satisfying outcomes.

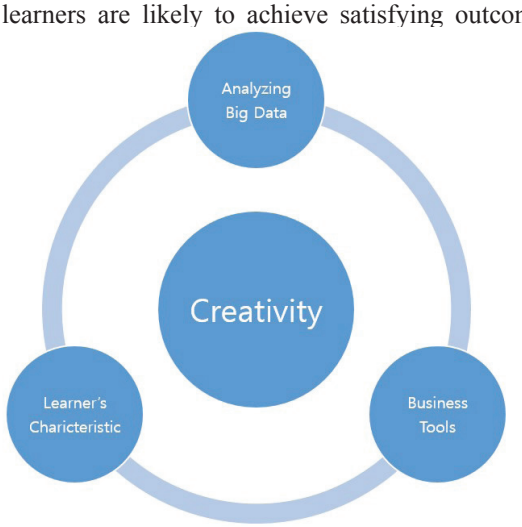


Figure 1. Framework for Improving Learner's Creativity

Overall, the findings and recommendations of this study underscore the potential of integrated education to prepare learners with the creativity and analytical skills necessary to navigate the challenges of modern business and academia. By fostering an environment that emphasizes planning, interpretation, and strategic application, educational practices can significantly contribute to enhancing learners' creative potential.

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Exploring the Industry and Academia Gap in Nepalese Hospitality Industry

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Abstract

Purpose- The motivation behind this study is to explore the gap between industry and academia in the Nepalese hospitality industry and to identify the root cause factors to mitigate this gap.

Design/methodology/approach- In this study, an exploratory research design has been used. Semi-structured interviews were conducted with employees from the hospitality industry and faculty members of hospitality programs. The study sample consisted of five faculty members and five employees from the hospitality sector using a purposive sampling method. Thematic analysis was utilized to identify the sub-themes and themes.

Findings- The findings show that graduates are not adequately prepared in terms of knowledge, ability, and attitude, industry-specific trends and development skills (industry-academia expectation gap), communication and critical thinking, collaboration between academia and industry, resource constraints are the major gaps identified between industry and academia.

Practical implications- This study emphasizes the collaborative engagement of industry and academia to bridge the industry- academia gap. Based on the finding of this study, the academia and industry might work together to strengthen the identified key factors and reduce the gap between them.

Originality/value- This study contributes to fulfill the gap between industry and academia in the Nepalese hospitality industry and add value in the body of theoretical and empirical knowledge.

Keywords: *Industry, Academia, Hospitality industry, Interview, Thematic analysis*

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Gautama Buddha: The First Traveler-Exploring his Journey as the Foundation of Transformative Travel and its Impact on the Development of Modern Tourism

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Abstract

The concept of travel has long been associated with personal growth, self-discovery, and the enhancement of social connections. Gautama Buddha, widely regarded as one of the first significant travelers in history, not only pioneered the transformative power of travel but also provided profound philosophical insights that continue to shape modern travel. This paper explores buddha's journey as a transformative path, where travel was not just a physical movement but an essential tool for spiritual awakening and personal productivity. By analyzing buddha's renunciation of royal life and his quest for enlighten, this study positions Buddha as a precursor to the idea that travel is integral to human development physically, mentally, and socially. Furthermore, the paper examines how his teachings on mindfulness, the middle path, and suffering laid the groundwork for modern travel philosophies that emphasize mental rejuvenation, confidence-building, and social connection. It explores how contemporary theories suggest that travel enhance productivity by offering mental refreshment and helps individuals overcome the metaphorical "hangovers" of daily life. Travel, it argues, serves as a social bridge, fostering connections between people and culture, while building confidence through new experiences and perspectives. Through a comparative analysis of early human migrations and Buddha's teachings, this paper highlights how travel continues to be a key tool for personal and collective well-being in todays globalized world.

Keywords: *Gautama Buddha, first traveler, transformative travel, spiritual tourism, mindfulness, Middle Path, personal growth, productivity, social connection, confidence-building, travel as rejuvenation, modern tourism.*

Introduction

The idea of travel as a transformative, enriching experience is not new. While many contemporary scholars point to various historical figures or explorers as Herodotus, Alexander the Great, or Marco Polo as the "first travelers" this paper argues that Gautama Buddha, in his journey from royal privilege to spiritual enlightenment, was the first true traveler and the philosophical origin of what we now understand as transformative travel and modern tourism.

His travels, both literal and metaphorical, shaped not only his path to enlightenment but also contributed to the brooder development of a philosophy that values travel as a means of personal growth, social connection, and human wellness. As the tourism industry continues to grow, Buddha's journey serves as a timeless model for transformative travel that nurtures personal growth, social connectivity, and the well-being of individuals and societies alike.

Overview of the Topic

This paper explores the role of Gautama Buddha as the first significant traveler, whose journey not only served as a path to spiritual enlightenment but also laid the foundations for the concept of transformative travel. In his quest for understanding suffering and achieving liberation, Buddha's travels offer profound philosophical insights that continue to influence modern travel practices. The study draws connections between his physical journey and its deeper spiritual implications, proposing that Buddha's travels were the first model of transformative travel where physical movement facilitates inner growth, social connection, and personal rejuvenation.

Objectives and Scope of the Paper

The primary objective of this paper is to analyze Buddha's journey as the origin of transformative travel and to examine its impact on the evolution of modern tourism. By focusing on Buddha's life and travels, the paper aims:

- To analyze Gautama Buddha as the first transformative traveler
- To explore Buddha's philosophical influence on modern travel and tourism.
- To evaluate the social and ethical impacts of travel inspired by Buddha's philosophy

Additionally, the paper will also, examine the ways in which travel both as a physical journey and as a spiritual practice can serve as a tool for personal productivity, mental rejuvenation, and social connectivity, offering a fresh perspective on the growing trend of transformative and spiritual tourism.

Comparison and different claims of the "First Traveler"

Many historical figures have been identified as pioneering travelers who shaped the early history of exploration and cultural exchange. Among these, Herodotus, Alexander the Great, and Marco Polo are frequently cited as ''first travelers,'' each contributing significantly to the documentation of foreign cultures and the expansion of geographical knowledge. According to Boardman, (1999) Herodotus (5th Century BCE) often referred as the "Father of History,'' and was among the first to travel extensively to document the cultures and histories of various peoples, his journeys across Egypt, Persia, and Greece were not just exploration but to understand diverse customs and politics, contributing to historical thoughts. His travels led him to develop the idea of ethnography, laying the groundwork for later exploration of cultures.

However, Gautama Buddha (563-483 BCE) predates Herodotus (484-425 BCE) by a few decades, making Gautama Buddha the earlier Rahula, (1974). Gautama, born Siddhartha Gautama around the 6th century BCE in the Lumbini region (Presently Nepal), led a sheltered life with the confines of his royal palace Rahula, (1974). Shielded from the harsh realities of life, Gautama was married, and lived in luxury, until a pivotal moment when ventured beyond the palace walls. This marked the beginning of his journey, which eventually led to his spiritual awakening.

As Siddhartha left the palace for the first time, he encountered the ''Four Sights'' an old man, a sick man a dead man, and a holy man. These encounters shook him deeply, causing him to realize the universal suffering that all human beings endure Gethin, (1998). Moved by these revelations, Siddhartha renounced his royal life and began his travels in search of answers to life's suffering. Buddha's travels took him across northern India, where he sought wisdom form various spiritual teachers and ascetics. His journey involved periods of intense meditation and ascetic practices, trying to reach a deeper understanding of life's existential questions. However, after years of extreme fasting and self-mortification, he realized that neither extreme indulgence nor extreme asceticism was the path to enlightenment Rahula, (1974).

Alexander the Great (356-323 BCE) is known for his conquests, Alexander's travels spread Hellenistic culture across a vast region, from Greece to Egypt and into India. His travels are often viewed through the lens of military expansion and cultural diffusion Gibbon, (1776). While alexander's travels certainly increased cross-culture exchanges, they were politically driven and aimed at consolidation of power rather than the pursuit of spiritual growth or social empathy.

Similarly, Gautama Buddha, born almost 200 years earlier than Alexander the Great, however Buddha's journey was a quest for spiritual enlightenment, while Alexander's travels were part of his military and imperial ambitions Cartledge, (2004). Similarly, scholars like Gibbon, (1776) & Cohen, (1984) have argued that figures like Alexander the Great or even Marco Polo could be regarded as the ''first travelers,'' given their explorations across vast territories. Cohen, (1984) highlights that these historical figures not only traveled for conquest but also for cultural exchange, marketing a significant moment in the development of cross-cultural travel and exchange. However, these perspectives fail to encompass the deeply philosophical and spiritual dimension of travel. While these figures certainly expanded geographical boundaries, their travels were often motivated by political or economic motives, not by a search for self-awareness or a philosophical quest for a universal understanding. in contrast, Buddha's journey was driven by the quest for enlightenment and the improvement of human well-being through understanding suffering a purpose that has closer ties to modern notions of travel as a means of personal transformation Cohen & Cohen, (2012).

Gautama Buddha can indeed be regarded as the first traveler in the truest sense of the term. Unlike the migrations of prehistoric humans, whose travels were driven by basic survival needs, Buddha's journey represents an early instance of transformative travel aimed at personal and spiritual growth. His movement across India, from his royal life to his engagement with different teachers, and ultimately to his enlightenment, marked a shift in the purpose of travel from physical survival and material acquisition to profound philosophical and spiritual exploration.

Therefore, Buddha's travel was not only among them the first documented instances of purposeful travel, but they also laid the philosophical foundation for the ways we now understand and engage in transformative travel, making him the first true traveler in both historical and philosophical sense.

Prehistoric and Ancient Travel (Before 3000 BCE)

Early human migration was primarily driven by survival needs such as changing climates, food scarcity, and the search for more favorable living conditions. It is believed that Homo sapiens originated in Africa and gradually spread across the globe, travelling by foot and following animal herds or seeking better environments Klein, (2009). A pivotal migration event occurred around 15,000 BCE, when early humans crossed the Bering land bridge from Siberia into North America, marking one of the earliest significant transcontinental migrations Goebel, Water, & O'Rourke, (2008).

As human civilization advanced, trade networks began to flourish, playing a significant role in cultural and economic exchanges. One of the most prominent trade routes was

the silk road, established around the 2nd century BCE, connecting China with Central Asia, the Middle east, and Europe. This network allowed for the exchange of not only goods like silk, spices, and precious metals, but also ideas, technologies, and cultural practice Whitfield, (1999). In ancient Egypt and Mesopotamia, rivers such as Nile and the Tigris-Euphrates served as vital trade, agricultural, and military routes Parker, (2016).

Classical and Medieval Travel (3000 BCE – 1500 CE)

The history of Greek and Roman travel is marked by significant explorations and advancements in transportation that enabled long-distance travel and cultural exchanges. The Greeks, particularly after the time of Alexander the Great (356-323 BCE), expanded their reach across regions such as Egypt, Persia, and Parts of India, founding colonies and engaging in extensive maritime explorations. Greek navigators, renowned for their seafaring skills, laid the foundation for later accounts of long-distance travel, with Herodotus providing one of the earliest written records of such explorations Boardman, (1999). The romans also advanced maritime travel, developing ships that allowed them to traverse the Mediterranean and beyond, making travel more accessible to wealthy elites, merchants, and soldiers Freeman, (2001).

The medieval period (5th -15th century) saw continued advancements in exploration and travel, particularly through Viking explorations (c. 800 – 1000 CE), which extended across the North Atlantic, reaching Vinland (modern-day newfoundland), Iceland, and Greenland Jones, (2013).

Additionally, the Crusades (11th – 13th century) significantly impacted travel, as Christian pilgrims and military forces made long journeys to the Holy Land and Jerusalem, enhancing connection between Europe, the Middle East, and North Africa Tyerman, (2006). In the late 13th century, Marco Polo (1271 – 1295 CE), a Venetian merchant, traveled to China and Central Asia, documenting his experiences in ''The travel of Marco Polo,'' which sparked European interest in East Polo, (1993). His accounts of the wealth, technologies, and wonders of distant lands fueled curiosity and contributed to the growing fascination with cross-culture exchanges that would later define the age of exploration.

Renaissance and Early Modern Travel

The age of exploration (15th – 17th century) marked a transformative era in global travel, beginning with Christopher Columbus's 1492 voyage across the Atlantic, which opened the Americas to European exploration and colonization Sobel, (2001). Columbus's discovery set the stage for a series of significant expeditions by explorers like Vasco da Gama, Ferdinand Magellan, and John Cabot, who further expanded global trade connectivity, establishing vital sea routes to Africa, Asia, and the Americas Kowalski, (2011). The Spanish and Portuguese empires played a crucial role in this period, creating vast colonial empires across the Americas, Africa, and Asia, and dominating early transatlantic and transpacific travel. The Columbian Exchange the movement of people, crops, animals, and diseases had profound effects on global travel patterns, dramatically reshaping societies in both the old and new worlds Crosby, (1972).

The age of exploration was also marked by significant scientific advances in navigation and cartography, such as the development of more accurate maps and the widespread use of navigational tools like the compass, astrolabe, and sextant, which made long distance voyages safer and more efficient Parker, (1992). These advancements contributed to the establishment of colonial trade routes linking Europe, Africa, and the Americas, laying the groundwork for the transatlantic slave trade and the rise of global commerce Klein, (2003).

The Industrial Revolution and Modern Travel (1800 – 1945)

The early 19th century saw the rise of railroads, which revolutionized land travel. The first successful steam-powered railway, the Stockton and Darlington Railway, opened in 1825 in England, marking the beginning of a global transportation Frost, (1998). These steam-powered vessels replaced clipper ships and reduced the time to cross the Atlantic Ocean to about a week, expanding international trade and travel Hughes, (2014).

The birth of modern tourism is often credited to Thomas Cook, who, in the 1840s, pioneered the concept of organized travel by offering package tours for middle-class travelers. This innovation made travel more accessible to a broader audience and played a key role in the establishment of tourism industry Ritzer, (2010). The Victorian grand tour further expanded the concept of leisure travel to the middle class, with people beginning to visit destinations like the Swiss alps and the mediterranean. The development of automobile in 19th century revolutionized personal mobility and early 20th century the aviation came into the action which made the travelling more global Mack, (2016), & Crouch, (2003).

Post-War and Contemporary Travel (1945 – Present)

Following World War II, the development of commercial jets in the 1940's to 1970s revolutionized air travel, making it faster, more affordable, and assessable to a broader population. The introduction of the Boeing 707 in 1958 made long-distance air travel routine, and by the 1970s. air travel become increasingly common for middle-class travelers Wensveen,

(2013). The digital age in the 1990s-2000s brought about the rise of online travel agencies like Expedia and Priceline, which revolutionized how people booked trips,

while apps like google maps transformed navigation Buhalis, (2003). The sharing economy in the 2010s, with platform like Airbnb, uber, and BlaBlaCar Cohen & Sundararajan, (2015) has been allowed people for personal travel. Finally, private space travel, pioneered by companies such as SpaceX, Blue Origin, and Virgin Galactic since the 2000s, has opened new frontiers for human exploration, bringing the possibility of space tourism into reality Zengler & Lister, (2018).

Buddha's Philosophy of Travel and its Influence on Modern Tourism

Buddha's travels embody the idea of transformative travel, a journey that leads to self-discovery

and societal empathy. His travels were marked not by a quest for material wealth or territorial

expansion, but by a deep desire to understand the human condition and alleviate suffering,

Guthrie (2019). This framework of travel for personal growth has deeply influenced modern

tourism, particularly in practices such as wellness tourism, spiritual retreats, and cultural

exchange programs. Today, modern tourism is often seen as a tool for personal healing, selfawareness,

and cross culture understanding, much like the transformative journeys Buddha

undertook McKercher, (2015). The mindfulness and compassion that Buddha emphasized in his

teachings have inspired modern forms of travel that focus on well-being, sustainability, and

ethical engagement with the world Guthrie, (2019). Buddha's legacy, therefore, plays a

significant role in shaping the philosophical underpinnings of contemporary travel and tourism.

Oster, (2017) highlights how Buddha's principles such as mindfulness, compassion, and the

alleviation of suffering are now core values in the wellness and suitable tourism industries. In

modern tourism, these values are translated into practices like eco-tourism, slow travel, and

volunteer tourism, which aim to balance personal enjoyment with a responsibility to the

environment with a responsibility to the environment and local communities.

Research Findings

Gautama Buddha, often hailed as the first true traveler. Redefined the concept of travel,

intertwining it with spiritually, empathy, and self-awareness. Unlike conventional travelers,

whose journeys were driven by personal gain or discovery, Buddha's travels were rooted in a

deep quest for understanding human suffering and offering solutions. His travels were not merely

about moving through space, but about connecting with different people, culture, and regions,

which later formed the foundation of the transformative travel philosophy that is widely promoted today. Buddha's movement across the India particularly his journeys to significant locations such as Lumbini, Bodh Gaya, Sarnath, and Kushinagar was far more than physical transit, it was a spiritual exploration that led to profound social and philosophical insights Harvey, (2013).

Buddha's influence extended across a vast geographical and cultural landscape, influencing not

only the people in India but also spreading beyond the subcontinent. His journeys to places like

Sarnath, where he gave his first sermon, and Bodh Gaya, where he attained enlightenment under

Bodhi tree, symbolized the merging of personal introspection with global societal awareness. His

travel across the Indian subcontinent made him not just a philosophical figure, but a spiritual

traveler who sought to engage with different societies in ways that encouraged empathy,

kindness, and a deeper understanding of the human conditions. In each place he visited, Buddha

observed the societal structures, witnessed suffering, and advocated for solutions rooted in

mindfulness, kindness, and compassion values that are core to modern concept of sustainable

tourism and experiential travel Robinson, (2019) & Harvey, (2013).

Furthermore, Buddha's role as the first traveler is not just confined to his physical movements

across geographical boundaries, it is intricately linked to his ability to transform the meaning of

travel itself. Where conventional travelers often seek external material wealth or better living

conditions, Buddha's travel led him to the realization that true well-being is found in spiritual

growth, compassion, and enlightenment. This idea of travel as a means of fostering well-being,

and understanding between people, forms the backbone of

modern transformative travel. Klein,(2009). These types of travel, where individuals seeks personal development, ethical engagement, and emphasized that travel should go beyond leisure and entertainment and serve as a tool for promoting global peace, compassion, and well-being values that contemporary tourism

must strive to uphold Robinson, (2019). In the contemporary world, where travel has become a massive global industry, Buddha's

teachings are profoundly relevant. Modern travel, often driven by consumerism and self-interest, can sometimes lead to environmental degradation, cultural appropriation, and economic disparity. However, the idea of travel as a transformative experience might be one that promote all well-being, mindfulness, and sustainability which has gained significant traction in the 21st century. Eco-tourism, spiritual retreats, and volunteer tourism are growing sectors of the travel industry that emphasized ethical and conscious engagement with the world. Buddha's travel philosophy aligns with these concepts, urging travelers to connect with the real world by focusing on the welfare of others and cultivating kindness towards all living beings Whitfield, (1999). Therefore, modern travelers must be mindful of the implications of their movements on both society and the environment, reflecting Buddha's deep understanding that true travel leads to greater harmony and peace, both internally and externally.

Conclusion

Gautama Buddha's travels were far ahead of his time, as they were driven by a deep philosophical quest to understand the nature of human suffering, society's imbalances, and the path to spiritual liberation. In his travels across ancient India, he not only interacted with a

variety of cultures but also examined the socio-economic conditions of different societies. Unlike many historical figures who traveled for political, economic, or military purposes, Buddha's travel was based on selfness mission to alleviate suffering and promote peace. His teachings on

the Four Noble Truths and the Eightfold Path laid the foundation for what we now understand as transformative travel, a journey not only through physical space but also through personal reflexional, compassion, and self-awareness Harvey, (2013). Buddha's philosophy encourages

travelers to beyond mere consumption and materialism, advocating instead for mindfulness

engagement with the world.

In contemporary society, Buddha's example resonates strongly with the growing interest in

sustainable tourism, experiential travel, and ethical tourism. As global tourism has become a significant economic driver, it is essential to balance the demand for travel with the responsibility to respect and preserve local cultures, ecosystems, and communities. Buddha's emphasis on empathy, compassion, and understanding for the welfare of others directly speaks to the challenges of modern tourism, where the effects of over-tourism, environmental degradation, and cultural exploitation are increasingly evident. Thus, his teaching provides a framework for navigating these issues, offering a model of travel that promotes not only personal enlightenment but also the well-being of all beings and the sustainability of the planet Klein, (2009). Buddha's travels serve as a guiding light for modern society, urging us to reframe our understanding of why and how we travel. In a world where travel can sometimes perpetuate inequality and environmental harm, Buddha's model of transformative travel offers a path to more harmonious future. His travels were not about self-aggrandizement or power but were dedicated to the betterment of humanity and healing of the world's suffering. Contemporary travelers, as well as the tourism industry, have a unique opportunity to return to these roots of compassionate and transformative travel, ensuring that travel becomes a force for positive change, both in the individual's life and in the global community. By embracing Buddha's philosophy, modern society can re-envision travel as a means of fostering peace, understanding, and sustainability goals that are desperately needed in today's interconnected and rapidly changing world Robinson, (2019) & Whitfield, (1999).

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Adoption of Sustainable Practices by Homestay Operators and its Influence on Intention of Revisit with Mediation of Experience: Perspective of Tourist in Nepal

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Abstract

Homestay program and has emerged as an iconic rural tourism as it is a better accommodations serving potential economic activity for the people who are involved in it. The study used a quantitative approach with a sample size of 232 to analyze and build an understanding of influence of sustainable homestay services adopted by the operators on satisfaction level of the tourist with a moderation of experience. Findings showed positive significant influence of homestay services on satisfaction as well as experience. Further, the moderation effect of experience upon the satisfaction level was also observed. This study will be helpful for the policy makers to enhance community based tourism so that it helps to promote the development of economically and socially down rural areas particularly in Nepal.

Keywords: *Experiences, Sustainability, Homestays, Tourist, Satisfaction*

Introduction

Adoption of the sustainable practices by the homestays is crucial for the enhancement of the tourist satisfaction and by integrating eco-friendly practices, cultural immersion and community engagement, homestays can create memorable experiences that encourages repeat visits and support the local development. Despite of the benefits provided by tourism activities negative impacts are also seen. Alonso-Almeida (2012) states that tourism related activities have an impact in environment which can be due to movement of tourists around the destinations and diverse activities that local businesses perform to meet the visitor's needs. Similarly, companies associated with tourism have been accused of being high consumer of water, high producers of waste and damages in environment thus creating a major dissatisfaction of the residents(del Mar Alonso-Almeida & Alvarez-Gil, 2018)paying special attention to the environmental performance of green entrepreneurs and its relationship with strategy, brand reputation and long-term business growth. Methodology/approach - Literature review is conducted on conceptual issues and several hotels first-hand experiences that were categorised to provide readers with business-world examples. Findings - This chapter highlights how small- and medium-sized entrepreneurs are the agents who started green innovation initiatives and how larger corporations tested and validated them. A myriad of small green interventions awaits to be undercovered and implemented. Most of them can bring financial improvements to the entrepreneurs as the required initial investments are not necessarily high. Research limitations/implications - This chapter is explorative in nature, based on a literature review and interviews-based analysis of consolidated green initiatives, most of them being successful ones. Practical implications - The forces driving green initiatives are identified and classified. Most important categories of green entrepreneurs are described and emphasis was placed on the managerial and marketing benefits linked to green initiatives and action plans. Originality/value - This chapter presents models and concepts in an integrated way, facilitating a useful knowledge for prospective entrepreneurs wishing to acquire a better understanding of the opportunities and challenges related to eco-friendly business." (del Mar Alonso-Almeida & Alvarez-Gil, 2018 which pinpoints the negative impact of tourism activities. To address the environmental impact of tourism activities green practices has been seen in this sector. Sustainable practices in homestays significantly enhances the overall experiences of the tourists by providing with the unique cultural immersions, environmental stewardship and economic benefits to local communities. Homestays offer tourists with the opportunities to immerse themselves in the local cultures by participating in traditional activities learning about customs and engaging with local communities. This authentic experience enriches tourists understanding and appreciation of the host culture.

Green tourism entrepreneurship involves creating and operating tourism related ventures in a way that minimizes negative impacts on environment and local community but in turn providing maximization in positive contributions. Social entrepreneurship along with corporate social responsibility and sustainable development provides with the ground to understand green entrepreneurship (Tien et al., 2023). Sustainability integrates social and environmental risks with

economic goals, providing a long term perspective that emphasizes adherence to moral principles and ethics. The responsibilities of the stakeholders are determined by means of comprehensive and balanced strategies as well as resources are used wisely for the benefit of both the current and future generations (Font & McCabe, 2017 cited as in Janjua et al., 2023)sustainability tourism marketing and brand equity in rural community-based homestays in Malaysia. This study also examined how the political support by local authorities benefitted this sustainable rural tourism product development. Design/ methodology/approach: Homestays operators from three states in Malaysia–Kuala Lumpur/Selangor, Pahang and Pulau Pinang–participated in the study. Self-administered questionnaires were used to collect responses and to test research hypotheses. Findings: The study's model empirically demonstrated ICT competency, sustainability tourism marketing practices and political support by local authorities' construct which are essential explanatory variables of homestay brand equity. The model shows high levels of consistency between the theoretical design and the empirical results of its constructs, contributing as a new step in the tourism sustainability literature. Research limitations/implications: This study enables us to explain the "triple bottom line" theory when applied in combination with ICT competency, brand equity and newly introduced construct "political support by local authorities". Practical implications: The study results in evidence of crucial implications for policymakers. Policymakers should enhance cost-effectiveness, policy integration (integration of economic, environmental and social goals. By staying with the local families' tourist build connections and gain insights into daily life, fostering a sense of belonging and community. Homestays often involve in eco-friendly activities such as tree planting, wildlife monitoring and waste reduction initiatives. These activities encourage the tourists to respect and protect the environment, enhancing their overall experience. The use of existing homes for homestays reduces the need for new construction, minimizing the environmental impact and preserving natural resources. By choosing homestays, tourist directly support local economies through income generation for host families and increased demand for local goods and services. Homestays create employment opportunities for locals, contribution to improved living standards and community development. In this perspective this study aims at understanding the sustainable practices adopted by homestays and analyzing its role in of tourist satisfaction with a moderation effect of experience with the services provided. Furthermore, the obtained result utilizing the quantitative approach will serve as a basis proposing some recommendations and put forward some knowledge in existing literatures with a purpose of enhancing green entrepreneurship in homestays, also promote the interplay between homestays services, satisfaction and experience.

Literature Sources and Hypothesis Development

Sustainability can be assessed in terms of whether or not the communities have gained achievements in terms of social status, economic gain, gender equity and capacity of institutionalizing accomplishments(Acharya & Halpenny, 2013)homestays are an attractive alternative tourism product. This paper discusses a case study of Barpak, located in the Gorkha District of Western Nepal. The study suggests homestays are congruent with Nepal's destination image. The essence of Nepalese tourism lies in naturally beautiful rural hills and mountains and its indigenous communities with their mystical lifestyle and culture. These natural and cultural attributes can be showcased best through homestays. This paper proposes homestays as a pro-women tourism opportunity that promotes sustainable community development by fostering gender equality. Female ownership of homestay businesses secures women's avenues for income generation and involves them in mainstream development. The study's indicators of development are based on the well-being achieved by the Barpaki community, with a focus on three essential aspects of sustainable development, namely economic, environmental and social. The author's (BPA. Homestay program is typically practiced in remote and rural areas to promote conservation of nature as forests, parks, heritage sites and the increased number of the homestays indicates that this type of tourism is steadily gaining its presence in eco-tourism industry with the benefits for the villagers (Affizzah et al., 2017)Sarawak was conducted and used to examine the perceived value dimensions in tourism context, statistical analysis and structural equation model were used to verify the validity and reliability of scales used. Satisfaction level was measured using tested perceived value with six dimensions that illustrated through structural construct, (i. Upadhayaya (2006)due to unique nature and unspoiled culture amidst a number of ethnic people and races natives in mountains & Himalayan regions, has undoubtedly bigger scope for the development of mountain tourism. Mountain tourism development is not attainable without the greater involvements of local communities, their enthusiastic participations, and sincere contributions. Though a number of efforts through policies and actions are made to enhance local communities' participation in mountain tourism in Nepal, a general look shed light on the on the incomplete and puzzling picture raising a number of issues and questions on real participations of local people without prejudice on participatory decision makings & benefits sharing. The widespread involvement of local people in mountain tourism is not only mandatory for the comprehensive development of mountain tourism, but also for fulfillment of the livelihoods related inevitable needs of mountain people as key local stakeholders. The post-conflict Nepal after the end of a decade long (1996-2006 states that tourism in Nepal is similar to other

countries that is occurred from events like travel and stay of non-residents not leading to permanent stay as well no involvement in any earning related activities by individuals.

Homestays is a term that refers to types of accommodation where the tourists/guest pays to stay at private homes that also facilitates the interaction between a host and/ or family usually living within the premises, and with whom public space is shared(Lynch, 2005). Homestays embraces ranges of accommodation varieties that include some(small) hotels, bed and breakfast establishments and host family types of accommodation which simultaneously span private, commercial and social settings (Sen & Walter, 2020)biodiversity and adventure experiences in 'pristine' natural ecosystems. By contrast, community-based ecotourism (CBE. Homestay concept includes a wide range of variations ranging from cultural homestay, farm stay, heritage homestay, agricultural homestay, leisure homestay, cottage homestay and so on. Leung et al. (2021) homestays can attract tourists who desire to relax in an informal and culturally authentic environment, many researchers underscore that homestays have now become a significant element in the tourism development plan for developing countries. According to Guide (2005) cited as in Basak et al. (2021)the present research sought to look into the connection between sustainable Homestay tourism and tourist's satisfaction in Darjeeling Himalaya. The total number of participants undertaken for this research was 254 domestic and foreign tourists. Once data were obtained, this study evaluated three hypotheses using Structural Equation Modeling (SEM the core idea of sustainability refers to best use of environment's resources essential for growth while protecting ecological processes, biodiversity and natural heritage furthermore, ensuring long term economic sustainability by providing equal economic benefits to all stakeholders, while respecting the ethnic authenticity of the host populations by maintain its created and existing socio- cultural legacy and traditional values. According to Chen & Tsai, (2007) cited as in Affizzah et al. (2017)Sarawak was conducted and used to examine the perceived value dimensions in tourism context, statistical analysis and structural equation model were used to verify the validity and reliability of scales used. Satisfaction level was measured using tested perceived value with six dimensions that illustrated through structural construct, (i overall satisfaction is the extent of overall pleasure or contentment left by tourist, resulting from the ability of trip experience to fulfill one's desires, expectations and needs in relation to trip. Based on a study by Yun and Marion Joppe (2011) cited as in Affizzah et al. (2017)Sarawak was conducted and used to examine the perceived value dimensions in tourism context, statistical analysis and structural equation model were used to verify the validity and reliability of scales used. Satisfaction level was measured using tested perceived value with six dimensions that illustrated through structural construct, (i satisfaction is termed as a post-trip evaluative judgment and emotional feeling that is concerned with a travel experience. Further, satisfaction of tourist is also effected by the level of service provided by tour operator, guides and hospitality establishments significantly affects tourist's satisfaction. Prompt and courteous service, knowledgeable guides and responsive staff can enhance the overall experience. so, the homestay service providers need to pay attention.

Sustainable practices in homestays contribute to the higher tourist satisfaction by offering unique experiences, fostering cultural exchange and promoting environmental responsibility. The positive experiences associated with the sustainable homestays encourage tourist to revisit and recommend these accommodations to others further supporting local communities. Sustainable practices in homestays into only enhances the environmental and economic well-being of local communities but also provide tourist with authentic, culturally immersive experiences that increase overall satisfaction and encourage repeat visits. By providing with the authentic ecotourism experience, these homestays not only satisfy tourist but also contribute to a local economic development and environmental sustainability. Furthermore, tourists are also effected by expectancy, satisfaction and experience when they visit any destinations thereby, influencing their perceptions and behavior. Expectancy value theory suggests that an individual's attitude toward an object or experience is influenced by one's perceived value and expectations (Ajzen & Fishbein, 1975)as well as tendencies toward nonrational attribution, are also discussed from the point of view of a Bayesian information processing model. (53 ref. So when the experience of something is exceeded in terms of what person has expected they tend to be satisfied. In terms of services provided by homestays the gap between the expectation of tourists and the actual experiences they tend to face makes them either satisfied or dissatisfied which effects their decision to revisit and recommending the homestays to their friends and families. In line to this Bigne et al. (2005); Li & Wang (2017) cited as in Osman et al. (2023) states that if the actual experience meets or exceeds their expectations, tourists are likely to be satisfied with their visit. Growing global awareness and initiatives about preserving the environment also has helped in the promotion of rural based tourism as a low impact and environmentally sensitive way of travel, poverty reduction, environmental conservation and social equality.

If rules and regulations are proper that assures sustainable growth, tourism's rewarding industries might potentially generate tourist taxes for the government (Yassin, Shaffril, Hassan, Othman & Samah, 2010 cited as in Ogucha et al., 2015)which creates the need to foster closer linkages between the tourists and the local community members.

As such, many homestay facilities have come up in the recent past to cater for the accommodation needs of the tourists. Yet information on the tourists satisfaction levels regarding the homestay facilities in Kenya currently remains largely unknown. The study therefore determined the influence of facilities and services offered by homestays on tourist satisfaction within the Lake Victoria area of the western tourist circuit. The study was conducted through survey design comprising a randomly selected sample of 20 homestay facilities (with a total of 42 respondents. Moreover, Hunch and Butler (1996) cited as in Ogucha et al. (2015)which creates the need to foster closer linkages between the tourists and the local community members. As such, many homestay facilities have come up in the recent past to cater for the accommodation needs of the tourists. Yet information on the tourists satisfaction levels regarding the homestay facilities in Kenya currently remains largely unknown. The study therefore determined the influence of facilities and services offered by homestays on tourist satisfaction within the Lake Victoria area of the western tourist circuit. The study was conducted through survey design comprising a randomly selected sample of 20 homestay facilities (with a total of 42 respondents pointed out that economic considerations are a primary motivation for increasing local involvement in tourism and also concluded that more local houses become homestays as tourists numbers increase as a result of affordable homestay prices. Homestay operators have to deal with the internal challenges relating to efficient homestay management whereas, inefficient homestay management contributes to their poor performance in terms of low service quality and moderate levels of average occupancy rates(Razalli, 2008)the urge to improve the hotel performance is due to the external factors in the current hospitality environments, which characterized by intense competition and uncertainty such as from terrorism and diseases such as SARS and bird flu. Secondly, the internal factors such as low level of service quality and decreasing average occupancy rates also strengthen the need for such improvement. In addition, the relationships among hotel performance, operations practice and responsiveness have not been fully explored. In line with the resource-based view, this study focuses on how service operations practice (SOP. Five reasons as cultural immersion, community service and development, security and warmth of home, social interaction and cheap price were identified as the reason behind tourists choosing homestays during travel in destinations (Agyeiwaah et al., 2014 cited as in (Leung et al., 2021). Direct economic measures include tourism arrivals, tourism receipts, taxation revenue, contribution to GDP, profits, the rate of return to operators, gross operating surplus, contribution to gross value added, and contribution to net benefit. Indirect revenue measures include the ongoing circulation to income within the destination or the multiplier effect, employment, regional development, revenue leakages and domestic sectoral linkages (Roberts & Tribe, 2008; Weaver & Lawton, 2010 cited as in Balasingam & Bojei, 2019) As stated by Trauer and Ryan(2005) cited as in (Affizzah et al., 2017)Sarawak was conducted and used to examine the perceived value dimensions in tourism context, statistical analysis and structural equation model were used to verify the validity and reliability of scales used. Satisfaction level was measured using tested perceived value with six dimensions that illustrated through structural construct, (i academic and commercial tourism literatures have been conversing on the nature of tourist experience as well as experience of a tourism place, which shows that the quality of experience is primarily determined by the understandings existing between the people at that particular place especially between visitors. Trauer and Ryan (2005) cited as in (Affizzah et al., 2017)Sarawak was conducted and used to examine the perceived value dimensions in tourism context, statistical analysis and structural equation model were used to verify the validity and reliability of scales used. Satisfaction level was measured using tested perceived value with six dimensions that illustrated through structural construct, (i contended that by emphasizing participants unique interests and degree of sustained commitment, tourist activities are service partnerships with emotional attachment. Two components make up involvement: first a desire for the activity and second others who share interests in a social sphere that spans from home to vacation spot.

H1: There is a significant positive influence of services provided by homestay's and guests revisit behavioral intention

H2: Experience with the homestays services influence the behavioral intention of revisit of tourists.

H3: Relationship between sustainable services provided by home based accommodations and behavioral intention of tourist to revisit is mediated by experience from services.

3.Research Methodology

3.1 Sample and data collection

The study used a quantitative approach utilizing a structured questionnaire survey so as to test the hypothesis developed as well as the research framework. Sampling method used to collect the data was convenience sampling particularly targeted towards the tourist national and international having a history of staying in a homestay in Nepal at least once. Pilot study was conducted first in order to check for the understandability and validity of the questionnaires prepared and corrections based on the suggestions provided to increase the simplicity and clarity of the questionnaires were done. Further, non-probability convenience sampling was used. Convenience sampling is perhaps the best way to quickly and efficiently obtain

the information (Approach, 2016). According to Roscoe (1975) cited as in Jalasi and Sylvia Nabila Azwa Ambad (2022) a sample size that is greater than 30 and less than 500 is suitable for most of behavioral studies and a sample size of 200 provides a sound basis for estimation(Hair Jr. et al., 2014)em particular na rea de marketing, pois mais e mais h a necessidade de avaliar vrios constructos e relaes latentes complexas. Tambm, constructos de segunda ordem podem ser modelados fornecendo uma melhor compreenso terica de relaes com boa parcimnia. Modelagens do tipo SEM so, em particular, bem adequadas para investigar as relaes complexas entre os vrios constructos. Os dois mtodos analticos SEM mais prevalentes so os baseados em covarincia SEM (CB-SEM therefore, gathering a sample size of 232 respondents for this study was deemed significant. The questionnaire was distributed among the probable respondents using google form as well some printed form was distributed to individuals who were within the reach as well as contacted personally to encourage to fill the questionnaires so as improve the credibility and increase the number of respondents. Majority of the respondents were male (52.6%) with females constituting of 47.4% of the total sample. 6.5% of the respondents were less than 20 years, respondents aged from 20-30 years were 44 %, 30-40 years' respondents were 30.2 %, 19.4 % respondents were of age group of more than 40 years. Out of total respondents 68.5% were employed and 23.3 % were unemployed and 8.2 % were retired.

3.2 Measures

Validated measure that were based on previous available literatures were used for the constructs in the study. Sustainable homestay services was measured using 8 items which were all based on the review of literatures done in past, Behavioral intention to revisit were measured using 8 items and 3 items (I am planning to revisit home-based accommodations in the near future, I am confident that if I want, I can go and revisit home-based accommodations and I have enough resources, time and opportunities to revisit home-based accommodations) were taken from Meng & Cui (2020)perceived value, and memorability and rest were from the review of available literatures. Satisfaction was measured using 5 items based on review of available literatures. Further experience as a construct was measured using 5 items and 3 items (They made me feel comfortable, they tried to help me as much as they could, I had a good relationship with my host family members, I gained new knowledge from this homestay visit) were taken from Jamal et al. (2011) community-based homestay tourism. A survey of 353 tourists to homestay villages was used to examine both functional and experiential aspects of perceived value, and structural equation models were used to verify the validity and reliability of the scales. Tourist perceived value was tested and illustrated through a parsimonious construct with five dimensions: (i and rest were taken from literatures available. Responses on all items were recorded on a five-point rating Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree).

4.Data Analysis

Table 1

Hypothesis testing

Relationship	Standardized estimates	t stats	P-value	Decision
There is a significant positive influence of services provided by homestay's and guests revisit behavioral intention.	0.335	5.449	0.000	Accepted
Experience with the homestays services influence the behavioral intention of revisit of tourists.	0.467	0.774	0.439	Rejected

R Square

Revisit Intention 0.45

Table 1 show the assessment of impact of sustainable homestay practices on behavioral intention to revisit. The showed that the positive impact of sustainable homestay practices on behavioral intention to revisit was significant (b=0.335, t=5.449, p=0.000<0.05) thus accepting hypothesis 1. However, hypothesis 2 that showed influence of experience on behavioral intention was rejected (b=0.467, t=0.774, p=0.439>0.05).

4.3 Mediation analysis

Mediating role of experience on the relationship between sustainable homestay practices and behavioral intention to revisit was analyzed. Non-significant effect of experience on the relationship between sustainable practices and behavioral intention was observed (b=0.070, P>0.05, VAF =1.057) rejecting hypothesis 3 with a full mediation. Here, Partial mediation shows that sustainable homestay practices has both direct and indirect effects on a behavioral intention, the direct effect is not mediated whereas, the indirect effect is transmitted through satisfaction. Similarly, full mediation is a situation where the mediating variables i.e. experience leads to zero effect between sustainable homestay practices and behavioral intention.

Table 2

Mediation Analysis

Relationship	Total Effects	Direct Effects	Indirect Effects	VAF	Confidence Interval		conclusions
			0.2405		Lower bound	Upper bound	
SHP->EXP->BI	0.2274 (0.0005)	-0.0132 (0.8519)		1.057	0.1484	0.3457	Full Mediation

Note. Mediation analysis of green trust (GT), VAF (Indirect effect/Total Effect)

5. Discussion and Conclusion

Revisit behavior is considered to be the most important manifestation of loyalty (Oliver, 2010) and as per Swarbrooke (1999) cited as in Basak et al. (2021) the present research sought to look into the connection between sustainable Homestay tourism and tourist's satisfaction in Darjeeling Himalaya. The total number of participants undertaken for this research was 254 domestic and foreign tourists. Once data were obtained, this study evaluated three hypotheses using Structural Equation Modeling (SEM it is impossible to achieve sustainability in tourism without tourist satisfaction. Following the notion this study used SEM to analyze the influence of sustainable homestay practices on behavioral intention to revisit with a mediation of satisfaction and experience among tourist. Findings of the study showed the significant influence of the sustainable practices of homestays and behavioral intention to revisit which projected the sensitivity of the tourist towards the sustainable practices followed by the home based accommodations in terms of economic, cultural and environment aspects. Similarly, influence of satisfaction from the services were found to be significant with the behavioral intention due to which the host of the home based accommodation should focus on the need and requirements of visitors to so that they are satisfied have an encouragement to revisit and recommend it to their friends and families. However, no significant influence of the experience that tourists gained from homestay services showed any influence with behavioral intention which may be due to the fact that individuals tend to prefer attaching more importance to their previous experience too while analyzing the experience they encounter more recently. Nepal is well-known for its tourist's destinations contributing a huge amount to the country's economy and homestay tourism have a bright future ahead in this perspective and may also be a viable source of income to the individuals living around the rural areas if promoted in a sustainable way. The motive behind the study is to shed a light in the small business as homestay having an impact on behavioral intention if done in a sustainable way. The rural region of Nepal needs to focus more on education of individuals so that they can practice the existing and new home based accommodations but in a sustainable way not only focused on economic advantage but also being concerned about the environmental and socio cultural aspects making the satisfaction and experience of tourist to be good and memorable. Tourist visit homestays for the feeling of authenticity to live in a traditional way as the native of the places live however, as the homestay's business grows it loses its authentic feel (Ye et al., 2018 cited as in (Janjua et al., 2021). So, homestay operators should keep into consideration the local cultural values while designing homestays which reflect the identity and perception of an authentic rural community-based product. The study was limited due to small sample size as well as bootstrapping could have been used to test mediation and further use of more sophisticated statistical tools would result more meaningful result. Kotler et al. (2014) emphasized on intention to provide positive recommendations in measuring the future behavioral intention as a construct which could be used by future researcher for their study. As stated by Janjua et al. (2023)sustainability tourism marketing and brand equity in rural community-based homestays in Malaysia. This study also examined how the political support by local authorities benefitted this sustainable rural tourism product development. Design/methodology/approach: Homestays operators from three states in Malaysia–Kuala Lumpur/Selangor, Pahang and Pulau Pinang–participated in the study. Self-administered questionnaires were used to collect responses and to test research hypotheses. Findings: The study's model empirically demonstrated ICT competency, sustainability tourism marketing practices and political support by local authorities' construct which are essential explanatory variables of homestay brand equity. The model shows high levels of consistency between the theoretical design and the empirical results of its constructs, contributing as a new step in the tourism sustainability literature. Research limitations/implications: This study enables us to explain the "triple bottom line" theory when applied in combination with ICT competency, brand equity and newly introduced construct "political support by local authorities". Practical implications: The study results in evidence of crucial implications for policymakers. Policymakers should enhance cost-effectiveness, policy integration (integration of economic, environmental and social goals rural communities especially homestay operators lack essential marketing skills especially branding skills; wide-ranging studies had linked the positive effects of CSR and sustainability with substantial performance brand equity and only two articles addressed branding (eco-branding, eco-label, environmental branding, and brand experience) nevertheless homestay branding is largely ignored so this aspect could be covered by future researchers too.

Implication

The result of the study contributes to the researchers, homestay operators and policymakers. Firstly, this research conceptualized a new knowledge foundation especially in homestay setting of Nepal where sustainability development and intention to revisit in Nepal is still in infancy stage. Theoretically, the findings revealed a positive and significant influence of sustainable practices of homestay and behavioral intention to revisit projecting the sensitivity of tourists towards the sustainability practices in Nepal. Practically, findings of the study will create awareness among the homestays services to the adaptation of sustainability to draw in more tourists and enhance their revisit intention and further recommending it to their friends and families. Further, the policymakers would be encouraged for making homestays available in Nepal to be eco-friendlier thereby, benefiting the homestay owners, community development, growth of destinations without disturbing their natural beauty as well as for economic development of the country.

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Future of Eco-Tourism: Integrating AI and Blockchain for Transparent and Sustainable Practices

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Abstract

Eco-tourism, a growing segment within the travel industry, emphasizes sustainability, responsible resource use, and environmental protection. However, the industry faces challenges such as lack of transparency, inconsistent practices, and monitoring issues. This research explores the integration of Artificial Intelligence (AI) and Blockchain technology to address these challenges, promoting more sustainable and transparent eco-tourism practices. Through a combination of qualitative and quantitative methods, this study aims to examine how AI and Blockchain can enhance sustainability, ensure ethical practices, and improve stakeholder collaboration in eco-tourism.

Keywords: *Ecotourism, Sustainability, Artificial Intelligence, Blockchain technology*

Introduction

Eco-tourism is gaining popularity as travelers increasingly seek experiences that align with environmental values and respect local cultures. However, like other sectors, eco-tourism is not without its challenges. Key concerns include resource mismanagement, environmental degradation, and the difficulty of verifying the sustainability claims of eco-tourism operators. Recent technological advancements, such as AI and Blockchain, present opportunities to overcome these challenges by improving transparency, efficiency, and accountability in the sector. This research aims to explore the future potential of integrating AI and Blockchain into eco-tourism for promoting transparency and sustainability.

Research Objectives

The primary objectives of this research are as follows:

1. To explore the role of AI and Blockchain in enhancing transparency within the eco-tourism industry.
2. To analyze the potential benefits and challenges of integrating these technologies in eco-tourism.
3. To propose a framework for implementing AI and Blockchain solutions to ensure sustainable and ethical eco-tourism practices.
4. To evaluate how these technologies can foster collaboration among eco-tourism stakeholders (e.g., travelers, operators, governments, and local communities).

Research Questions

The study is guided by the following research questions:

1. How can AI contribute to improving resource management and sustainability practices within eco-tourism?
2. In what ways can Blockchain ensure transparency and accountability in eco-tourism operations?
3. What challenges exist in the integration of AI and Blockchain in the eco-tourism industry?
4. How can stakeholders (e.g., travelers, operators, and local communities) benefit from the implementation of these technologies in eco-tourism?

Literature Review

Eco-Tourism and Sustainability

Eco-tourism focuses on conserving natural resources, fostering respect for indigenous cultures, and minimizing the environmental impact of tourism activities (Honey, 2008). However, studies show that despite eco-tourism's growth, the industry still struggles with ensuring true sustainability due to factors such as mismanagement of resources, lack of ethical standards, and the difficulty in monitoring environmental impacts (Buckley, 2012).

Role of Artificial Intelligence in Sustainability

AI has been increasingly recognized for its potential to optimize processes and promote sustainability in various sectors. In eco-tourism, AI can enhance resource management by analyzing environmental data

and predicting trends, such as the effects of tourism on wildlife or carbon emissions (Ting et al., 2021). Moreover, AI-powered tools can assist operators in making more informed decisions regarding sustainable practices, such as optimizing energy usage or managing waste.

Blockchain in Eco-Tourism

Blockchain technology, characterized by decentralized and immutable ledgers, has potential applications in ensuring transparency, traceability, and accountability in eco-tourism. Blockchain can allow stakeholders to track the environmental impact of tourism activities in real time, verifying sustainability claims made by operators, and ensuring that funds are directed towards conservation efforts (Tariq & Rehman, 2020). Several studies suggest that Blockchain can help mitigate fraud, provide trust, and enhance collaboration between tourists, operators, and local communities (Goyal et al., 2019).

Integration of AI and Blockchain

While AI and Blockchain are individually promising, their integration has the potential to create even more transformative effects. AI can analyze large datasets collected by Blockchain systems to provide deeper insights into the environmental and social impacts of tourism, thus facilitating better decision-making (Parsons et al., 2021). Moreover, Blockchain can enhance the trustworthiness of AI-generated recommendations by ensuring data integrity.

Methodology

This research adopts a mixed-methods approach, utilizing both qualitative and quantitative data collection methods.

Data Collection

- **Qualitative Data**: Semi-structured interviews with eco-tourism operators, environmental experts, and technology specialists. The interviews will explore the current challenges in eco-tourism, the awareness and attitudes toward AI and Blockchain, and the perceived barriers to implementation.
- **Quantitative Data**: A survey distributed to eco-tourism travelers to assess their views on technology's role in eco-tourism. The survey will examine how willing travelers are to engage in eco-tourism experiences that incorporate AI and Blockchain, as well as their knowledge and trust in these technologies.

5.2 Data Analysis

The qualitative data from interviews will be analyzed using thematic analysis, where patterns and themes will be identified and interpreted. Quantitative data from the survey will be analyzed using statistical methods such as descriptive statistics and regression analysis to determine the relationship between traveler attitudes and their willingness to participate in tech-integrated eco-tourism experiences.

The integration of AI and Blockchain has the potential to revolutionize eco-tourism by enhancing transparency and sustainability. AI's ability to process and predict environmental trends will aid eco-tourism operators in making more sustainable decisions, while Blockchain can act as a transparent ledger for tracking environmental impacts and verifying sustainability practices. However, there are several challenges in integrating these technologies, including high initial implementation costs, lack of technical expertise, and concerns over data privacy.

Preliminary findings suggest that eco-tourism stakeholders are generally open to the adoption of these technologies but are cautious about their practical implementation and the learning curve associated with new technologies. Moreover, travelers express strong interest in eco-tourism experiences that offer verifiable claims of sustainability, and they are willing to pay a premium for such experiences.

Quantitative Data Analysis

Demographics of Survey Respondents

Table 1: Demographics of Survey Respondents

Category	Percentage (%)
Male	42%
Female	55%
Non-binary/Other	3%
Age Range	
18-24 years	25%
25-34 years	30%
35-44 years	20%
45-54 years	12%
55 years and above	13%
Geographic Location	
North America	40%
Europe	35%
Asia	15%
Other regions	10%

Awareness of AI and Blockchain in Eco-Tourism

Table 2: Awareness of AI and Blockchain in Eco-Tourism

Question	**Yes (%)**	**No (%)**
Do you know what Artificial Intelligence (AI) is?	85%	15%
Do you know what Blockchain technology is?	70%	30%
Have you encountered AI or Blockchain in eco-tourism?	40%	60%

Traveler Interest and Willingness to Engage with AI and Blockchain in Eco-Tourism

Table 3: Traveler Interest and Willingness

Technology Integration	Very Interested (%)	Somewhat Interested (%)	Neutral (%)	Not Interested (%)
AI for Sustainability Management	45%	30%	15%	10%
Blockchain for Transparency in Sustainability Practices	38%	35%	20%	7%

Willingness to Pay More for Tech-Integrated Eco-Tourism Experiences

Table 4: Willingness to Pay

Question	Yes (%)	Maybe (%)	No (%)
Would you be willing to pay a premium for tech-integrated experiences?	68%	20%	12%

If yes, how much more would you be willing to pay?	Percentage (%)
5-10% more	50%
11-20% more	35%
21% or more	15%

Trust in AI and Blockchain Technologies

Table 5: Trust in AI and Blockchain Technologies

Technology	Strongly Trust (%)	Somewhat Trust (%)	Neutral (%)	Do Not Trust (%)
AI in Sustainability Practices	20%	50%	15%	15%
Blockchain in Verifying Sustainability Claims	10%	42%	28%	20%

Importance of Transparency and Sustainability in Eco-Tourism

Table 6: Trust in AI and Blockchain Technologies

Question	Very Important (%)	Somewhat Important (%)	Not Important (%)
How important is transparency in sustainability practices to you when choosing an eco-tourism operator?	75%	20%	5%
How important is it for you to know that eco-tourism operators are using technology (AI, Blockchain) to ensure sustainability?	60%	30%	10%

Preferred Eco-Tourism Activities with Technology Integration

Table 7: Eco-Tourism Activities

Eco-Tourism Activity	Percentage (%)
Eco-lodges with energy-efficient systems	68%
Wildlife conservation programs with verifiable tracking	60%
Sustainable food sourcing and supply chain transparency	55%
Carbon footprint tracking for travel	50%
Guided eco-tours with real-time environmental data	45%

Statistical Analysis of Data

- **Correlation between Awareness and Willingness to Pay**: A positive correlation ($r = 0.62$, $p < 0.05$) was found between travelers' awareness of AI and Blockchain and their willingness to pay a premium for tech-integrated eco-tourism experiences.
- **Trust Levels**: AI was trusted more than Blockchain, with AI receiving 70% trust compared to Blockchain's 52%.
- **Traveler Demographics and Technology Acceptance**: Younger travelers (18-34 years) showed the highest interest in AI and Blockchain technology, particularly in sustainability practices, compared to older travelers.
- **Region-based Preferences**: North American and European travelers expressed higher trust and interest in AI and Blockchain compared to travelers from other regions.

Conclusion

The quantitative data strongly supports the idea that there is a growing interest in and willingness to engage with AI and Blockchain technologies in the eco-tourism sector. Travelers are keen to support more sustainable practices

and are willing to pay a premium for experiences that integrate these technologies. However, trust in Blockchain technology is still lower compared to AI, indicating that further educational efforts are needed to build confidence. As awareness grows, especially among younger travelers, eco-tourism operators who embrace these technologies will likely see increased demand for their services. The next step for the industry is to address the barriers to implementation and build greater understanding among both operators and travelers.

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Recent Trend of tourism and Use of ICT in Promotion of tourism in Pokhara

Shukra Raj Adhikari & Sateesh Kumar Ojha

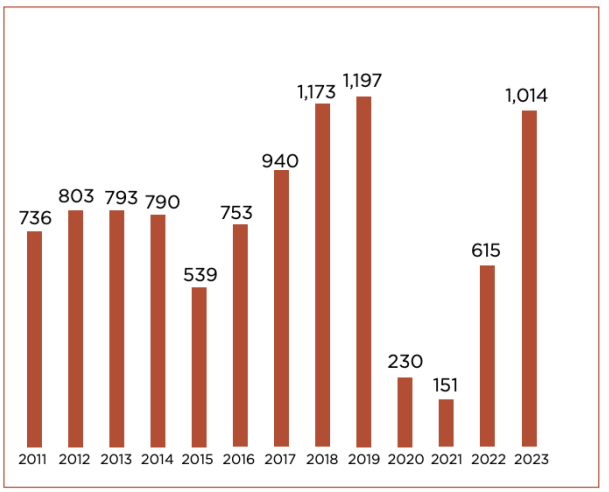
Abstract

This study attempts to draw insight on trends of tourist movement in Pokhara Valley. The information gathered is through secondary sources of different journals published. The method adopted is inferential analysis. Tourism growth in Pokhara is not significant.

Introduction

Pokhara is tourist hub in Nepal. In different literature it is observed.

Tourist arrival in Nepal



Source: nepaltrekkinginhimalaya.com(2024)

Table 1. 1: Number of tourist in Pokhara and Nepal

Year	No of tourist in Nepal	No of tourist in Pokhara	% of tourist in Pokhara
2005	375398	75000	20
2009	599596	203000	40
2024	1147567	516405	45

From above table and graph around 3.75 lakhs of tourist visit Nepal in the Year 2005 this number reach to 11.97 lakhs in the year 2019 due to COVID pandemic this number fall in 2020, 2021 and again rise in the year 2022 to 6.15 lakhs,10.14 lakhs in year 2023 and 11.47 lakhs in the year 2024. From table and figure it is clear that the no of tourist will increase in Nepal definitely in coming time. From analysis it is clear that around 20% of tourist only visit Pokhara in the year 2005 this Portion reach to 40% in the year 2009 and again improve to 45% in the year 2024. These facts indicate that the no of tourist visit in Pokhara is also increasing(NTB, Nepal Tourism Board]. 2011)

Table 1. 2: Regression coefficient of Pokhara

	Coeffi-cients	Standard Error	t Stat	P-value
Intercept	-4.5E+07	3858882	-11.7141	0.054215
X Vari-able 1	22590.98	1917.282	11.78281	0.0539

Table 1. 3: Regression coefficient of Nepal

	Coeffi-cients	*Standard Error*	*t Stat*	*P-value*
Intercept	-7.9E+07	6781541	-11.6229	0.054638
X Vari-able 1	39514.23	3369.403	11.72737	0.054154

Analysis of the tourist arrival in Nepal as well as Pokhara does not show significant grow($p>.05$) at 95% confident level.

Season for visiting Pokhara

January - February: End of January to mid of February is main Chinese tourist visit time in Pokhara Chinese tourist visit Pokhara In this time because they have new year holiday of about half Month in this duration.

May-August: It is the time for Indian tourists who flock in both by air and road transfers. Pokhara is a popular hideaway destination for Indians at this time to beat and avoid the extreme heat and summer in their country.

September-April: All tourist from all country over world visit Pokhara during this time.

Tourism Trends

Nepal attracts trekkers from all over the world with its unwavering realness, mystical aura, and pure beauty. Boasting eight of the ten highest mountains in the world, Nepal has made tourism its 4th largest industry and a primary source of foreign currency. It's the expression of humans' innate nature to remain hopscotching from one spot to another in the allure of recharging oneself and shunning away the worn-out layers of anxiety and stress.

Airlines, lodging facilities, car-bike rentals, and other travel agencies are important markers of tourism foot traffic in Nepal, according to data from the Nepal Tourism Board. During the first half of 2023, 476,480 foreign visitors arrived in Nepal via flight. Aside from

occasional disruptions brought on by earthquakes and unfavorable circumstances brought about by the pandemic, Nepal's tourism industry has grown steadily, and the country has seen an increase in the number of visitors.

Many travelers seeking refuge from the grind of hectic life find adventure, mental serenity, comfort, and tranquility in Nepal. For those who enjoy climbing mountains and seeking adventure, it's a heaven. In the mountainous area, Buddhism is more common at higher altitudes and Hinduism is more common at lower

Internet and Tourism

Internet is an interconnected system of networks that connects computers around the world via the TCP/ IP protocol. Today, the internet is a global "people's network" for communicating and sharing information. It consists of two powerful tools- email and the World Wide Web. The WWW is the part of the internet where a vast global information resource, or library, has emerged in recent years. The use of the Internet for communicating and transacting with customers has been growing rapidly in the worldwide tourism & hotel industry. There has been rapid increase in the online booking in the hospitality & tourism industry e.g., e-booking of hotel rooms, airline tickets, travel packages etc. due to the fact that the industry is one of several services – which can be checked, inquired, and ordered online easily, and conveniently communicated and delivered via Internet.

Following are different area where internet is used in tourism industry.

- Marketing
- Booking systems
- Delivery of visitor experiences
- Customer relationships and follow-up.

ICT used in tourism

Information and communications technology (ICT) consists of IT as well as telecommunication, broadcast media, all types of audios and video processing and transmission and network-based control and monitoring functions.

Following are some examples where uses of ICT in Tourism is possible:

- Managing destination resources
- Inventory of tourism resources
- Managing sites and attraction
- Identifying suitable locations for tourist
- Manage tourist statistics.

Role of internet marketing and blog sites

Internet marketing and blog sites are other means to promote Pokhara. There are a number of blog sites created by tourists who have already travelled Pokhara. They share their experiences and reflections on such blog sites which are interesting to know Pokhara for other readers. Trip advisor, Lonely Planet, Yatra.com, Makemytrip.com are some of the examples which have brought revolution in the online business of tourism all over the world. These days the travellers are internet-friendly and they make it a point to refer these sites before planning any trips. Thus, it is a very important need of the hour to publicize tourism products through these channels. Pokhara has been well-marked by individual companies in these sites. Pokhara is now being marketed by various concerned agencies, organizations and stakeholders. They have played a vital role for the promotion of these regions. Some of their efforts regarding the marketing and promotion are given below.

Discussion and recommendations

The main components that attract touristin Pokhara is its beautiful sceneries and topography. In the beginning day tourism in Pokhara is advertised by MountaineersLater on at this period, this destination was also promoted by hippies and backpackers up to the large extent. Now a days, Pokhara is marketed be several toolslike tourism Campaign, advertising, sales promotion, Tourism fair, street festival, cultural program, internet marketing, travel fairs, road shows, etc. Sharing of feelings, experiences etcof visitors with friends, peer groups, family relatives and others are very effective marketing tools for promotion of Pokhara as a tourism destination. Apart from these,Use of growing technology, Digital media social network has also become other prominent tool in marketing of Pokhara.Audio Visual conference, Guide books and travel blogs are also important tools for the promotion of overall destination promotion of this region. Travel agents are found important mainly for packaged programs of tourists. The average duration of stay of the incoming international tourists in Pokhara is very low. It is claimed that average period of staying is only for 2 nights. But tourists visiting for adventure purposes have generally longer period of staying than those who come for other purposes.

Marketing and promotion of tourism in Pokhara need to do following.

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Mountain Tourism in Nepal: A Surefire Formula for Prosperity

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Abstract

Mountain tourism has emerged as an important regional and national development driver, especially in countries with large mountain ranges like Nepal. The majestic Himalayas are located in Nepal, where mountaineering is a key aspect of the economy, combining breathtaking natural beauty, adventure options, and a rich cultural heritage. This paper explores and examines the critical role of mountain tourism in fostering economic growth, cultural preservation, and environmental sustainability in Nepal, comparing global trends in the European Alps and the Andes. The article also addresses pressing challenges in sustainable development and presents strategies that can be implemented to ensure that mountain tourism remains a resilient and sustainable driver of well-being. Case studies in Nepal and other iconic mountain destinations illustrate worldwide the best practices and innovative approaches to mountain tourism management. This research employs a mixed-methods approach, combining quantitative economic data with qualitative case studies. It highlights sustainable development challenges and offers practical solutions to ensure mountain tourism remains a sustainable driver of prosperity. Through SWOT analysis, existing challenges and opportunities in the sector are explored.

Keywords: *Mountain tourism, sustainable tourism, SWOT analysis, economic prosperity, resilient tourism, eco-tourism, community-based tourism, environmental impact, socio-cultural preservation.*

Introduction

Several authors have highlighted the significance of mountain tourism. The mountain tourism sector of Nepal significantly contributes to the economy, but it faces challenges in achieving a balance between economic growth, environmental sustainability, and social inclusivity. Bhattarai and Paudel (2023) suggest implementing innovative tourism models, such as digital marketing platforms and immersive virtual experiences, to attract diverse visitors and promote lesser-known destinations. Moreover, there is a pressing need for strong policy frameworks that balance conservation and development. *Shrestha (2024)* recommends the expansion of public-private partnerships and strengthening enforcement mechanisms to ensure sustainable resource management in tourism hotspots. Mountain tourism is a proven strategy for Nepal's prosperity, providing significant economic, cultural, and environmental benefits. However, addressing the critical challenges of sustainability and equitable development is essential through a comprehensive and collaborative approach. Nepal can maintain its status as a global leader in mountain tourism while ensuring its long-term viability by utilizing innovative technologies, promoting community-driven initiatives, and implementing adaptive policies.

Nepal attracts many tourists, particularly for trekking and spiritual activities *Ghimire, S. B. et al. (2024)*. It offers visitors unique landscapes, adventure opportunities, and cultural exposure. For many countries, particularly those in the developing world, mountain tourism has become a vital source of income, driving economic prosperity in regions that often struggle with poverty and underdevelopment. Global demand for nature-based tourism continues to rise, and mountain tourism's potential to contribute to economic growth is increasingly evident. Mountain tourism in Nepal not only boosts local and regional economics but also serves as a platform for cultural exchange and environmental awareness. However, the rapid expansion of tourism in the mountain region of Nepal has raised concerns about sustainability. The ecosystem in the mountain region is very fragile, and the social impacts on local communities can be significant. This paper explores how mountain tourism in Nepal can be a surefire formula for prosperity while ensuring that the benefits are sustained over the long term.

With the country's stunning Himalayan landscapes, diverse biodiversity, and vibrant cultural heritage, mountain tourism has become vital to Nepal's socio-economic development. A multidimensional approach that combines economic, environmental, and socio-cultural perspectives is essential to realize its full potential for national prosperity.

Nepal is a premier tourist destination, celebrated for its breathtaking natural landscapes, rich cultural traditions, and varied climatic conditions. It is home to eight of the fourteen highest peaks in the world, including the iconic Mount Everest, drawing adventure enthusiasts from across the globe. The nation is home to four UNESCO World Heritage Sites, which enhance its attractiveness. In 2023 tourism accounted for 1% of Nepal's GDP, with

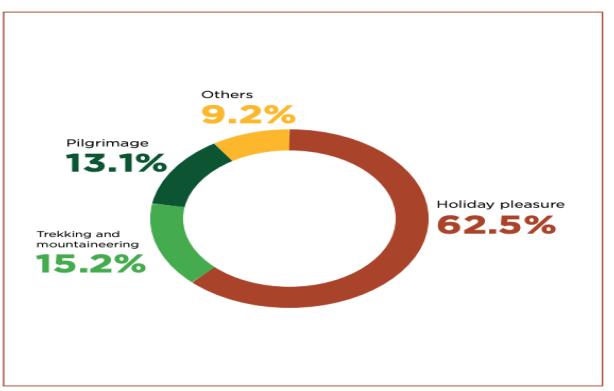
visitors spending an average of USD 41 per day in 2022. The tourism sector ranks the fourth-largest employer, accounting for 11.5% of total employment. A significant portion of tourism-related businesses, approximately 43.6%, is located in Bagmati Province, while tourism industries represent 21.9% of all registered industries, with 33% of foreign direct investment allocated to this sector. Tourists tend to stay an average of 13.1 days, underscoring the country's appeal for more extended stays (*Ministry of Culture, Tourism, and Civil Aviation, 2023)*. This approach will help address the emerging challenges and opportunities in the sector.

Economic Contributions

The economic benefits of mountain tourism in Nepal are significant, contributing substantially to the national GDP and employment. According to *Banskota and Sharma (2017)*, mountain tourism accounted for approximately 7.9% of Nepal's GDP in 2019 and provided over 6% of total employment. The Annapurna Conservation Area and Sagarmatha National Park generate considerable income from permit fees, mountaineering royalties, and tourism services.

More recent studies, including those by *Pandey et al. (2023)*, highlight the positive spillover effects of mountain tourism on local economies. Investments in infrastructure such as road development, rural electrification, and internet access have enhanced connectivity in remote regions, facilitating better market access and diversification of livelihoods. Additionally, community-based tourism initiatives empower residents, allowing them to directly benefit from tourism revenue while promoting sustainable practices *(Adhikari & Rai, 2023)*.

Figure 2: Tourist Arrivals by Purpose of Visit



Source: Nepal Tourism Statistics, 2023

Socio-Cultural Impacts

Mountain tourism boosts the economy and is vital in preserving and promoting Nepal's diverse cultural heritage. Gurung and DeCoursey (2020) highlight that festivals such as Mani Rimdu in the Everest region and Tiji in Mustang attract tourists, offering intercultural exchange and cultural preservation opportunities.

However, *Thapa et al. (2024)* caution against the risks of cultural commodification in heavily touristic regions, where traditional practices may be commercialized for tourist consumption. They emphasize the need for responsible tourism practices that respect the integrity of local traditions while enhancing the visitor experience.

Environmental and Sustainability Challenges

The rapid growth of mountain tourism in Nepal has placed significant pressure on the country's fragile ecosystems. *Sharma et al. (2018)* report that popular trekking routes like the Annapurna Circuit and Everest Base Camp face deforestation, water pollution, and waste management challenges. Recent evidence from *Tamang et al. (2023)* indicates that trekkers and tour operators' increasing use of non-recyclable materials has increased waste accumulation in protected areas, undermining Nepal's natural beauty.

Climate change further increases these challenges. Most glaciers are in a melting stage due to the temperature rise, which raises risks to biodiversity and water resources. Dahal and Shrestha (2024) advocate integrating climate adaptation strategies, such as reforestation and alternative energy solutions, into mountain tourism policies to enhance resilience.

Statement of Problem

Nepal needs enough knowledge, attitude, and skills to address its tourism sectors. Only products like its abundance of heritage sites showing its ancient civilization, standing mountains, and congenial environments for varieties of plants and animals (flora and fauna) are insufficient to develop the tourism industry. There is knowledge of using these things for tourism purposes, but it is lacking in this field; whatever we have can not be said to be enough. A systematic knowledge of what clients demand, how we managers address them, and how they get satisfied.

Conceptual framework to discuss

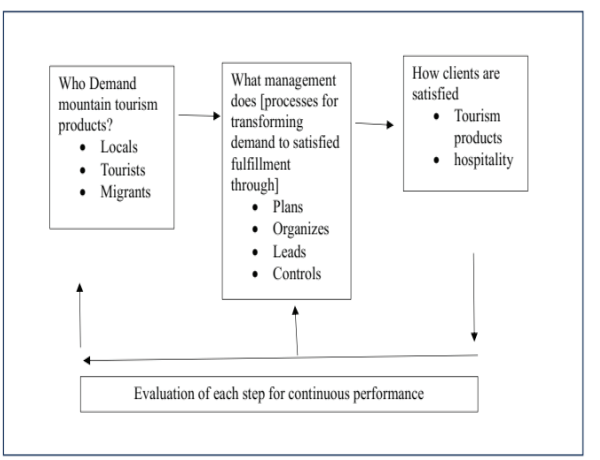


Figure 1: conceptual framework

Objectives

This article tries to answer about:

To identify what is demanded in mountain tourism,

To identify the particular managerial functions and

To identify how clients feel satisfaction

Methods

The research is exploratory. The information will be generated through primary and secondary data. The focus area of the study is the Khumbu Region. The sources used for primary data are queries from the trackers, track operating managers and locals. The sampling method is snowball sampling, for which the first inquiries are made with the persons involved in mountain tourism. The second and third round inquiries were made with those the earlier information suppliers recommended. While writing this, this process involved around five experts and one focus group discussion to make a SWOT analysis. Some secondary sources were also consulted.

Results

The outcome of the several round discussions with the participants was first put into a SWOT analysis of the Khumbu area.

SWOT Analysis

Strengths:	**Weaknesses:**
• Iconic peaks and diverse trekking trails are abundant.	• Poor tourism infrastructure exists in remote areas.
• There is a rich cultural heritage and many traditions.	• There is limited diversification in tourism offerings, and environmental degradation occurs due to unregulated tourism activities.
• The region is gaining global recognition as a premier adventure tourism destination.	
Opportunities:	**Threats:**
• Increasing interest in sustainable tourism.	• Effects of climate change on Himalayan ecosystems.
• Opportunities for digital marketing and virtual tourism experiences.	• Economic reliance on seasonal tourism.
• Growth of lesser-known mountain regions.	• Political instability and inconsistent policies.

Source: focus group discussion with participants

The second was to analyze demand, management, and supply analysis.

1. Demand

Mountain tourism attracts various groups of people with unique motivations: Individuals from nearby areas seek leisure activities, fresh air, or nature experiences in the mountains. Both domestic and international travellers visit for adventure, sightseeing, cultural exploration, or spiritual retreats—people who relocate to mountain areas for their lifestyle, climate, and scenic beauty.

2. Supply

The characteristics of mountain resources shape the supply side. These include: (1) Varied ecosystems, cultural experiences, flora, fauna, and landscapes. (2) Unique and remote areas, often untouched by urbanisation, appeal to those seeking isolation and tranquillity. (3) Rugged terrains and limited infrastructure add an adventurous appeal but require strategic planning for accessibility. (4) Environmental sensitivity, requiring sustainable tourism practices to preserve the ecosystem. (5) Activities like trekking, mountaineering, skiing, and wellness retreats that cater to specific interests. (6) Majestic views, natural beauty, and pristine landscapes that draw visitors seeking visual and spiritual fulfilment.

3. Management:

Management plays a critical role in balancing supply and demand while ensuring sustainability. Key strategies include Mountain Recreational Land Use Planning, Sustainability Practices, Infrastructure Development, and Policy and Governance:

Mountain Recreational Land Use Planning*:* It includes (1) Tourism Centers: Hub areas with accommodations, food, and services catering to tourists. (2) Front country Zones: Easily accessible areas near urban centers or highways for short-term visitors. (3) Backcountry Zones: Remote regions preserved for adventure seekers and ecological tourism.

Sustainability Practices: To foster mountain tourism, practices include Regulating tourist flow to prevent overuse of fragile environments, Educating tourists on responsible practices to preserve the environment, and Encouraging local involvement to ensure benefits reach communities.

Infrastructure Development: The infrastructure needed enhances access through roads, trails, and transport while minimizing environmental impact.

Policy and Governance: Governments, local authorities, and private stakeholders collaborate to create policies that support sustainable tourism.

Making the Chain Effective: To ensure an effective supply-demand-management chain, five essential things in the discussion are to Understand Client Needs, Preserve Natural Resources, Enhance Accessibility, Involve Local Communities, and Monitor and Adapt.

Understand Client Needs: Tailor experiences to tourists' preferences, like cultural immersion, adventure, or wellness.

Preserve Natural Resources: Implement eco-friendly practices to sustain mountain ecosystems.

Enhance Accessibility: Develop infrastructure without compromising the environment.

Involve Local Communities: Promote economic benefits for locals through jobs, businesses, and cultural exchange.

Monitor and Adapt: Use feedback and data to improve services and maintain ecological balance continuously.

Case Study of Khumbu Region (The Everest Base Camp Region)

The Khumbu Region, where the world's tallest, Mt Everest, rises in Nepal, is a popular mountain tourism destination for trekkers and climbers. It offers a cultural experience with Sherpa communities and shows how mountain tourism can stimulate and drive economic prosperity. Stevens, S.F(1993) . The contribution of tourism in uplifting the livelihood of the local Sherpa community through employment in the local lodges, hotels, guiding, and portering services is remarkable. The local communities are transforming their social, economic, and monetary value by operating activities related to mountain tourism. A continuously growing number of visitors have promoted the preservation of local traditions, festivals, rituals, and monasteries in Sherpa communities. Over-tourism and environmental degradation are critical issues that must be addressed immediately to make mountain tourism sustainable.

Discussion

The analysis emphasizes the importance of a multi-stakeholder approach to tackle the challenges faced by Nepal's mountain tourism sector. Investing in infrastructure development, including road networks and eco-friendly accommodations, is crucial. Moreover, implementing digital marketing strategies can promote lesser-known destinations, helping to alleviate the pressure on over-touristed areas.

As Shrestha et al. (2020) suggested, community-based tourism models can ensure a fair distribution of tourism benefits. It is vital to prioritize environmental sustainability by enforcing stricter regulations on waste management and carbon emissions. Collaborative efforts among the government, private sector, and local communities are essential for creating a resilient and inclusive mountain tourism sector.

Conclusion

What one has, one must use it effectively and efficiently. Mountain tourism has the potential to be a reliable source of prosperity for Nepal as long as it is developed sustainably. The unique blend of natural beauty and cultural heritage positions mountain tourism as a "surefire formula for prosperity" in Nepal, offering extensive economic, social, and environmental opportunities. By tackling current challenges and taking advantage of new opportunities, Nepal can establish itself as a global leader in sustainable mountain tourism. This study provides actionable insights for policymakers, practitioners, and researchers to promote positive change in the sector.

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Customer's Satisfaction with The Nonstar Hotels in Far-Western Nepal

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Abstract

This study tries to reveal the level of customer satisfaction in the far west non-star hotels in Nepal. The analysis method was to inquire with 155 customers about whether they were satisfied. Their selection was made randomly. The findings reveal that guests are confident that they are more significant with service providers by hotels.

Keywords: *satisfaction, far west Nepal, knowledge of the hotel, cleanliness, staff behavior, food and beverage, interior decoration*

Introduction

Customers are more inclined to stay at the same hotel again if they are happy with the services. It has been demonstrated that overall guest satisfaction and service quality are associated (Stringam, Gerdes, & Vanleeuwen, 2010; Poon & Low, 2005). Customers may be more satisfied with a hotel with a higher star rating (Bulchand-Gidumal 2013). Additionally, research has indicated that men and women may evaluate different features of the same rendered assistance (Suki, 2014). Setting a generally recognized standard and definition is challenging since consumers' perceptions and expectations of service quality are also influenced by their cultural backgrounds. Additionally, it has been discovered that travelers from other geographic areas may have varied opinions about the quality of the services they receive (Poon & Low, 2005). Customer satisfaction has also been shown to be impacted by amenities (Li, Ye, & Law, 2013), room quietness (Heung, 2000), cleanliness and upkeep (Li, Ye, & Law, 2013), safety, and outside recreational areas (Lin et al. 2011). In a different study, Callan and Bowman (2000) discovered that the most crucial elements influencing a hotel's efficiency were "value for money," "cleanliness," "comfort of the bedroom," and "politeness of staff."Service personnel have a significant impact on a hotel's rating. Positive staff traits that influence customer satisfaction include the information desk's helpfulness (Heung 2000), accurate and prompt professional service (Lin et al. 2011), and reception services (Li, Ye, & Law 2013). When choosing a hotel, internet reviews are crucial (Stringam et al. 2010). According to Rhee et al. (2013), who examined 405 TripAdvisor reviews, "value for money" and "rooms" are thought to be the two most crucial factors that go into giving a hotel a high overall rating. According to a study of related literature, different travelers' choices of hotels are influenced by factors such as "value for money," "cleanliness," "comfort of beds," "politeness of staff," "efficiency of service," and "location" (Callan and Bowman 2000). This study reveals whether non-star hotels in far-west Nepal satisfy customers through customer behaviors, food and beverage management, cleanliness, facilities, and interior design.

Material and method

The study is based on the responses from 155 guests who stayed at nonstar hotels in far-western Nepal. Based on the literature reviews, the satisfaction dimensions of the hotels were fixed. A questionnaire was designed to include these dimensions and ask the visitors questions. These dimensions were employee behavior, food and beverage management, cleanliness, facilities, design, and interior.

Result, analysis, and discussion

This section analyzes and discusses different aspects pertinent to satisfying customers.

Customers' knowledge of hotel

Table 1. 1: How did you know about this hotel?

	Frequency	Percent
words of mouth	32	20.6
Media	58	37.4
Internet	53	34.2
Others	12	7.7
Total	155	100

Media (37.4%) is the most influential source of information, followed closely by the Internet (34.2%). These two categories account for over 70% of responses, highlighting the dominance of mass media and digital platforms. Words of mouth (20.6%) are still significant, emphasizing the importance of personal recommendations. "Others" (7.7%) suggests some niche or less familiar sources, including direct experiences or unconventional means. Leverage word-of-mouth strategies through testimonials or influencer marketing are required to capture the trust-driven 20.6%.

Employees' behavior

Table 1. 2: Staff response to your need

	Frequency	Percent
Dissatisfied	2	1.3
Undecided	19	12.3
Satisfied	83	53.5
Strongly satisfied	51	32.9
Total	155	100

A combined **86.4%** (Satisfied + Strongly Satisfied) of respondents expressed positive satisfaction with the staff's response to their needs. This indicates a substantial majority of respondents had a favorable experience. Only **1.3%** of respondents expressed dissatisfaction, which is negligible. A small group (**12.3%**) remains undecided, indicating room for improvement in engaging or addressing the needs of this segment.

Table 1.3: Staff attitude toward service to clients and customers

	Frequency	Percent
Dissatisfied	4	2.6
Undecided	41	26.5
Satisfied	66	42.6
Strongly satisfied	44	28.4
Total	155	100

A combined **71%** (Satisfied + Strongly Satisfied) of respondents expressed positive views on staff attitudes, which is a clear majority and reflects a good overall impression. The **26.5% undecided** group is relatively large, highlighting an area for potential improvement regarding consistency in staff behavior or clarity in service delivery. Only **2.6%** of respondents were dissatisfied, showing minimal negative perceptions of staff attitudes.

Table 1. 4: Front desk staff friendly

	Frequency	Percent
Dissatisfied	3	1.9
Undecided	40	25.8
Satisfied	60	38.7
Strongly satisfied	52	33.5
Total	155	100

A combined 72.2% (Satisfied + Strongly Satisfied) of respondents expressed positive views about the friendliness of the front desk staff, indicating a substantial majority of favorable experiences. The 25.8% undecided group represents a noteworthy segment, pointing to opportunities to make the friendliness of front desk staff more consistent and impactful. Only 1.9% of respondents were dissatisfied, showing that negative impressions are rare.

Food and beverage management

Table 1. 5: The q*uality of food offered by this hotel*

	Frequency	Percent
Strongly dissatisfied	2	1.3
Undecided	5	3.2
Satisfied	91	58.7
Strongly satisfied	57	36.8
Total	155	100

A combined 95.5% (Satisfied + Strongly Satisfied) of respondents had a positive view of the food quality, indicating strong approval and making food quality one of the hotel's standout features. The 3.2% undecided group is small, suggesting that most guests had a clear and positive impression of the food quality. Only 1.3% of respondents were strongly dissatisfied, indicating that opposing views on food quality are negligible.

Table 1. 6: Quantity of the beverage served

	Frequency	Percent
Strongly dissatisfied	2	1.3
Undecided	13	8.4
Satisfied	89	57.4
Strongly satisfied	51	32.9
Total	155	100

A combined 90.3% (Satisfied + Strongly Satisfied) of respondents had a positive experience, highlighting a high overall satisfaction rate on *the quantity of the beverage served*.

The 8.4% undecided group represents a small segment, suggesting most respondents formed a clear opinion. Only 1.3% of respondents were strongly dissatisfied, indicating that dissatisfaction is negligible.

Cleanliness

Table 1.7: Room facilities and service quality of the housekeeping

	Frequency	Percent
Undecided	26	16.8
Satisfied	71	45.8
Strongly satisfied	58	37.4
Total	155	100

A combined **83.2%** (Satisfied + Strongly Satisfied) of respondents had a favorable view, suggesting that most guests are content with the room facilities and housekeeping service quality. The **16.8% undecided** group represents a notable segment. This group could potentially be converted into satisfied customers with targeted improvements. No negative responses (e.g., dissatisfied or strong-

ly dissatisfied) indicated that the hotel had avoided major issues with room facilities and housekeeping services.

Table 1. 8: Neatly finished-up bed

	Frequency	Percent
Strongly dissatisfied	1	0.6
Dissatisfied	14	9
Undecided	36	23.2
Satisfied	55	35.5
Strongly satisfied	49	31.6
Total	155	100

67.1% Satisfaction Rate: **67.1%** of respondents were either satisfied or strongly satisfied, indicating that most guests were pleased with the neatly finished beds. 32.8% Neutral or Negative Responses: 23.2% undecided and 9.6% dissatisfied/strongly dissatisfied suggest room for improvement in bed preparation.Minimal Strong Dissatisfaction: With only 0.6% strongly dissatisfied, extreme dissatisfaction is rare, but the 9% dissatisfied group highlights areas needing attention.

Facilities

Table 1. 9: Items in the room working.

	Frequency	Percent
Strongly dissatisfied	6	3.9
Dissatisfied	6	3.9
Undecided	38	24.5
Satisfied	46	29.7
Strongly satisfied	59	38.1
Total	155	100

67.8% Satisfaction Rate: A combined 67.8% (Satisfied + Strongly Satisfied) of respondents had positive feedback, indicating that most guests are pleased with the condition of room items. 7.8% Dissatisfaction: While minimal, the dissatisfaction rate highlights a need to address specific issues, such as regular maintenance or prompt resolution of complaints. 24.5% Neutral Opinions: A significant portion of undecided respondents suggests variability in guest experiences, which could be improved by ensuring consistency in maintenance

Design and interior

Table 1. 10: Layout, theme, and interior design of this hotel

	Frequency	Percent
Strongly dissatisfied	23	14.8
Undecided	2	1.3
Satisfied	19	12.3
Strongly satisfied	111	71.6
Total	155	100

84% Positive Feedback: A combined 84% (Satisfied + Strongly Satisfied) of respondents were satisfied or strongly satisfied, indicating that most guests highly appreciate the layout, theme, and interior design. 14.8% Strong Dissatisfaction: A notable portion (14.8%) expressed strong dissatisfaction, suggesting that the design may not appeal to everyone or need more targeted improvements. 1.3% Neutral: The 1.3% undecided response rate is very low, implying that most people have formed a clear opinion on the hotel's design.

Conclusion

A hotel's customer satisfaction is essential to sustain its operation and ensure development. Hotels of Far West Nepal have satisfied customers to a greater level. Guests are satisfied with the themes, interior decoration, facilities, cleanliness, food and beverage management, and employee behavior.

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Connective Flow, People and Expectations in the Workplace

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Abstract

This paper provides insights into the different perceptions of workers about connective flow in terms of their work, by investigating connectivity expectations in two different contexts, South Korea (hereinafter Korea) and New Zealand. Globalization has increased the need for both individuals and organizations to recognize the different cultural expectations in diverse contexts. In particular, the development of technology has helped organizations to work across countries and time zones, and have also improved the mobility of individuals and their choice of work. Findings suggest that connectivity may blur work and interpersonal boundaries by creating an informality in communications, and this change may create distress for workers. Such expectations may be interpreted differently according to the cultural values of individuals, and (mis)alignment of expectations may influence the stress levels of workers.

Keywords: *Connectivity, culture, Information Communication Technology, workplace relationships, stress*

Introduction

This paper provides insights into the different perceptions of workers about connective flow in terms of their work, by investigating connectivity expectations in two different contexts, South Korea (hereinafter Korea) and New Zealand. Globalization has increased the need for both individuals and organizations to recognize the different cultural expectations in diverse contexts. In particular, the development of technology has helped organizations to work across countries and time zones, and have also improved the mobility of individuals and their choice of work. Furthermore, the development of mobile Information and Communication Technologies (ICTs) (Cahir and Lloyd, 2015) accelerated the need for individuals to understand the different expectations that their organization and organizational members have, in communicating about work and workplace relationships. These changes create new social norms and expectations which in turn change the existing dynamics and communication within interpersonal relationships at work (Sias, 2008).

The increased connectivity to work has also led to growing number of studies that aim to define the 'right amount' of connectivity for individual workers. Connective flow can be defined as a 'dynamic series of moderated connects and occasional disconnects that fluctuate as circumstances, communication volumes and contexts change' (Dery et al., 2014, p. 567). Regulating connective flow requires a certain amount of individual agency and can be influenced by a number of factors, including organizational expectations and relationships at work. This paper attempts to provide insights into the relationship between connectivity expectations, cultural context, and connective flow outcomes, by examining New Zealand and Korean organizations. As connectivity and connective flow are subjective phenomena that may create different meanings for each individual, we use 76 semi-structured interviews of organizational members across six different organizations, in order to provide a rich, qualitative data.

Literature Review

Communication, connectivity and flow

A key change in society and organizations that has greatly influenced work relationships is the advancement in mobile ICTs (Sias, 2008). Due to these technological advancements, the way people interact and spend time with others has changed profoundly (Cahir and Lloyd, 2015). Technologically-enabled communication is perceived positively by some scholars as it helps people to feel continuously connected, to increase personal closeness, to maintain interaction without being physically co-present and to engage in ritual interactions, which can help to assure individuals that their relationships persist and are ongoing (Chayko, 2014; Eden and Veksler, 2016). In contemporary societies, individuals maintain their relationships through both online and offline interactions and most people use online interaction to maintain relationships with people (Chayko, 2014; Eden and Veksler, 2016). Interaction via various technological channels also helps to reduce impersonality and formality of communication during relationship development and maintenance (Eden and Veksler, 2016). These communication changes are attributed to increased connectivity between people.

The concept of connectivity can be understood as the amount of connection that exists between organizations and technological devices (Collins and Kolb, 2013). Kolb (2008) provides a multidimensional definition of connectivity:

> *The mechanisms, processes, systems, and relationships that link individuals and collectives by facilitating material, informational and/or social exchange. It includes geo-physical, technological, as well as social interactions and artifacts (Kolb, 2008, p. 128).*

With the increased number of connective devices that provides constant connection to work and people related to work, many workers are now considered to be in a state of near-constant and ubiquitous connectivity (Wajcman and Rose, 2011) in and around organizations. However, connectivity is ambiguous as every individual has their own perception of what optimal connectivity looks like, which suggests that different workers would require different levels of connectivity (communication between people) to be their most productive self.

Establishing and regulating an appropriate level of connectivity that allows individuals to maximize performance (work and social) is considered as *requisite connectivity* (Kolb, Collins, and Lind, 2008). While this state of connectivity is most ideal for organizations and individual workers, the ubiquitous nature of mobile ICTs individuals are starting to feel that they are too overloaded and connected, which is known as *hyper-connectivity*. While this constant connection may seem inevitable alongside the changes of the digitalized modern society, extensive connectivity may result in ineffectiveness, distraction, and burnout for workers (Atchley, 2010; Carr, 2010).

As perception towards having the 'right' connectivity is subjective, and this includes finding the most effective, efficient, and comfortable level of connectivity with work. Individuals and their associated workplaces (and workplace relationships) require and expect different levels of connectedness in conducting day-to-day tasks, thus the state of requisite connectivity may differ for each organization, groups, and individuals (Kolb et al., 2012). Therefore, this subjective nature of connectivity means that the expectations crafted between interacting organizational members, and the individual's perception towards such expectations may establish unique contexts to which requisite connectivity may be achieved.

The potential mismatch of work expectations within the organization seems to be heightened through the development of mobile ICTs, such as smartphones and tablet PCs. These devices have become deeply integrated into the daily lives (both personal and work) of individuals, changing expectations within work relationships (Peters and Allouch, 2005; Wiberg, 2005). Negotiating about the level of connectivity is particularly difficult, as these expectations may not be explicitly discussed between the associated individuals. This lack of communication and heightened subjectivity mean that connectivity expectations may never be fulfilled, and thus communicators' reliance on assumptions and personal expectations may even lead to unintended confusion and conflicts. This means the experience of connective flow is unpredictable and may even be stressful, as circumstances (expectations of others) change to influence the level of connections and disconnections. Negotiating connectivity expectations is even more complex in non-Western contexts, where the ideas of work and workplace relationships are built upon different cultural values and assumptions, such as Confucianism.

Cultural values and work relations

Many Western cultural contexts are described to hold individualistic values, which emphasize the importance of individual's desires and goals (over the group) (Hoftstede, 2001). Santos et al. (2017) suggests that individualist values and practices have increased globally across the past 51 years. However, they also suggest that while the level of individualism did increase in general, cultural differences are still significant. This means while organizations may expect their workers to reflect more individualistic values than in the past (such as emphasis on work life balance or personal development), deeply embedded cultural differences still remain to influence worker relationships and behavior.

Confucianism values the idea of harmony, hierarchy, and authority, where natural hierarchy between individuals is believed to maintain peace and order within the society (Clark, 2000; Yao, 2000). Therefore, cultures that are influenced by Confucianism emphasize respect and harmony amongst individuals (Yao, 2000). Korea is one of the East Asian countries that are strongly influenced by Confucianism (Deuchler, 2002), and this societal values and beliefs are also transferred into organizational context (Kim and Rowley, 2009). Therefore, worker relationships and behavioral expectations of employees are based on the complex blend of Confucian values from the wider Korean society (Adler and Jelinek, 1986; Shim et al., 2008) and the associated organizational culture (Ashforth and Mae,l 1989).

The interdependent relationship structure based on the idea of harmony (Oh, 1991) encourages individuals to accept and abide to the group norms, regardless of one's own personal interests (Zang and Se, 2016). Within the organizational context, the role of superiors (managers) and subordinates are clearly divided through both social norms and organizational systems (Rowley, 2013). Obedience to superiors and organizational norms means that individual workers, especially those at lower

hierarchical levels are put under pressure in satisfying work and work-relationship expectations (Kee, 2008). This includes work boundaries and work hours (Kim et al., 2018), where these expectations are rather socially constructed within a superior-subordinate relationship. Thus, such Confucian values and norms may be extended through the use of technological devices and thus supporting expectation towards workers' ability to stay connected to work and also working for longer hours (Kim and Park, 2003). This implies a different interpretation to how individuals in Western and non-Western (Confucian) contexts may perceive connectivity or the regulation of connective flow within organizations.

Connectivity expectations across different cultural contexts

The different underlying cultural values in Western and Confucian contexts may have important implications in understanding the experience of connective flow, and how individual workers in these contexts perceive connectivity. Zhao and Chen (2008) suggest that different cultural values such as individualism and collectivism may lead to development of different work expectations between employee and employer. This means in situation of high levels of connectivity, workers that hold Confucian values of hierarchy and harmony may not experience conflicts with their managers as the existing social expectations in Confucian contexts assume that junior members abide to their seniors' desires (Kee, 2008). However, this pressure may create issues for employees in Western organizational contexts that may hold more individualistic values (i.e. Ren and Caudle, 2016). These differences and potential implications are the key focus of this qualitative research study, which asks the following research question: What are the perceptions on connective flow in Western versus Confucian workplace contexts and what are the implications of these perceptions on relational and individual outcomes?

Methodology

This study uses two different data sets. The first set of data is from a study conducted in 2014-2015 of three New Zealand companies, and the second set of data is from a study of three Korean companies conducted in 2014,. A qualitative research approach was adopted to provide new insights to the relationship between connective flow, connectivity expectations, and culture. In-depth semi-structured interviews are used to capture the individual perspectives towards connective flow and expectations and follow-up (impromptu) questions were also asked to gain further insights into specific topics or ideas raised in the interview. Research in New Zealand companies was conducted in English, and research in Korean companies was conducted in Korean language. A total of 76 interviews were conducted across the six participating companies, and therefore, we acknowledge that the demographics of the interview participants are not (proportionately) representative of the six participant companies. Questions with regards to the experience of being connected to work, other organizational members, and work-related expectations within and outside the workplace were discussed in the interview.

Participation was voluntary and the research process was authorized and conducted under the guidance of the associated institution's human ethics committee. The participant companies and the individual interview participants that appear in this paper have been re-named using pseudonyms for anonymity and confidentiality purposes. The participant companies have been re-named Mintrack, Truscene, Wisepath, Connectigen, Kwikprax, and Nomilos.The six participant companies display unique characteristics and culture, where the companies of are of different sizes and from diverse industries including private and public organizations. Table 1 below summarizes the participant companies examined in this study, and provides details on company's size and the number of interviewed individuals.

Table 1. Summary of participant companies

Context	Company	Industry	Size	No. of interview participants
Korea	Mintrack	Online Gaming	33	14
	Truscene	IT	49	25
	Wisepath	Manufacturing	63	7
New Zealand	Connectigen	IT	180	8
	Kwikprax	Trade union	40	11
	Nomilos	Governmental	3,000	11

The two sets of data were analyzed using thematic analysis (Braun and Clarke, 2006). Themes and categories were created which focused on individual's perceptions and expectations towards connectivity. Similarities and differences in key words and associated meanings across and within the two data sets were examined carefully. Interview excerpts that support or sometimes provide alternative interpretations to certain ideas were investigated, and data analysis was repeated in multiple stages. Initially data was analyzed within each participant companies, then combined and re-analyzed within each cultural context. Finally, the analyzed data across all New Zealand and Korean companies were combined and reexamined to result in two themes and 6 categories. Analysis was conducted both during and after the data collection period, and within and across the two data sets using NVivo.

Findings

Two key themes were generated from the analysis, to provide different interpretations across the studied New Zealand and Korean organizations. The first theme *blurring boundaries* discusses how the experience of

having a constant connectivity with other organizational members may be influenced by relational boundaries, to decrease the level of formality between organizational members. The second theme *stress and expectations* discusses how matching connectivity expectations between individuals may influence the stress and anxiety experienced by workers. Table 2 provides a summary of these themes and categories below.

Table 2. Themes and categories

Theme	Category	Description
1. Blurring boundaries	1a. Changing boundaries	Connective flow is perceived to change relational boundaries between individuals
	1b. Space and time	Constant connection is perceived to blur work and personal space and time
	1c. Culture and hierarchy	Cultural values and the meaning of hierarchy is perceived to provide different interpretations to connective flow and work relationships
2. Stress and expectations	2a. Aligning expectations	Matching connectivity expectations between workers is perceived to influence the level of stress experienced
	2b. Competence and impressions	Responding to connectivity expectations is perceived to influence individuals' impressions and work competence
	2c. Adapting to connections	Excessive connectivity is perceived to be voluntarily accepted by individuals

Blurring boundaries

Changing boundaries

The majority of New Zealand and Korean participants suggested that connective flow helped to develop informal (more personal) relationships in the workplace. For example, one participant suggested that the use of smartphones help her to establish more casual relationship with both her manager and coworkers:

Probably reduced the formality (with the manager) because if you're not coming in you don't have to call whether normally you would have, he just accepts a text message and that's it, but I don't think in other regards… I think it's more casual (with coworkers) because you can just text them, it's not phone calls or emails.

Ashlee, employee, Nomilos

This suggests that the diverse range of communication option made available (text message) provides a sense of ease in both communication and relationship between the workers. Another participant implies how work relationships are now perceived to go beyond the workplace settings:

Our relationships are not anymore from half past 6 to 3, because most of them have my private phone number too, so they will text me any time, so definitely makes our relationship more informal.

Ahmed, employee, Nomilos

Formality in this context referred to formal methods and structures of communication, such as greeting and addressing the recipients in a formal manner in emails and text messages. Furthermore, the 'informal' relationship also implies to intrude the personal domain of the participant, outside work hours ('*our relationships are not anymore from half past 6 to 3')*. This suggests that constant connective flow helps to develop an informal/ personal relationship, and this is not considered as a stressful process for the above respondent.

Space and time

The idea of losing formality between organizational members was also discussed in the Korean data set. Similar to the New Zealand examples, most participants suggested that the use of connective devices helped to diminish formality between organizational members. For example, one of the participants described how the blurring of work and personal time is perceived to maintain good interpersonal relationships:

When I get a message, I try to join all social gathering with other organizational members. Sometimes they casually invite me during work, sometimes through texts. I usually respond positively, or even ask to be invited. It's a way to do work well, maintain good work relationships, leading to good work, even though it takes up most of my after-hours or weekends.

Marcasite, employee, Wisepath

This participant suggests that the increased amount of connective flow between organizational members helps him to socialize and develop '*good work relationships'*, at the expense of his personal time, after normal working hours. Another participant extends this idea of socialization:

I used to live in an area away from Seoul, so I have no friends here. Connecting with work colleagues gives me opportunities to mingle and communicate, in both work and personally. So I feel less lonely and actually good (to be connected).

Emerald, employee, Mintrack

Maintaining connective flow with colleagues even afterhours is described to be '*good'* and helps to 'feel less lonely'. Therefore, the above participant suggest that the

merge of work and personal life is in fact welcomed, as the extensive connection with other organizational members allow development of in-depth personal relationships outside the workplace. This implies that time, space, and interpersonal relationships may all be integrated in terms of work and personal life voluntarily.

Similarly, another participant suggests that connection through Social Network Sites (SNSs) further encourages development of informal relationships:

Yes, it is a very informal relationship, most of us are on Facebook and we communicate deeply personal like moving house or what you're doing on the weekend, we all comment on each other's pages so it's become very intertwined and enmeshed in each other's lives, and they're also putting up photos of what they're doing with their grandkids.

Kelly, employee, Kwikpax

Diverse range of connective methods are suggested to help blur the line between work and personal relationships between work colleagues ('*intertwined and enmeshed'*), and therefore further enhancing the amount of (potential) connective flow between organizational members in different time and space (i.e. SNS). Communicating more frequently regardless of working hours provides a basis for constant connectivity, and extending the space individuals connect in (office, home, and online).

Culture and hierarchy

While both New Zealand and Korean participants suggested that the increased connections help to change relational boundaries, the underlying idea of organizational relationships are approached differently. One interview participant provides a cultural explanation to why continuous connective flow between organizational members in Korean workplaces may not be simply perceived as 'work relationships':

Korean culture maintains a family-like structure across all contexts. On a smaller scale, a family would have the mother and the father as the most senior persons. In the workplace, the CEO and the management is the most senior.

Coral, employee, Wisepath

This implies that work relationships are not simply perceived according to the organizational positions of individuals, but as an extension of family, or family-like structure. This relates to the Confucian idea of interdependency and hierarchy, where all individuals are considered to be placed in a relational hierarchical position (Yao, 2000). This idea of family-like relationships described in the studied Korean workplaces implies that organizational members may involve themselves more extensively with another worker's personal issues. For example, another participant explains this extensive and personal integration of organizational members to his life:

As a PR (public relations) person, I'm always connected to work. But it's all good because I'm an unmarried guy [laughs]. I'm connected to work and I'm willing to respond, but I also expect my subordinates to respond. One day, I'm sure the CEO and other senior will help me to find a decent bride since I'm working this hard! And I'll try to do the same for the younger boys.

Jasper, senior manager, Wisepath

In this example, the connective flow and in-depth relationship development with other organizational members are implied to provide some benefit to the respondent's personal life (in this case, marriage). This perception goes beyond developing friendships in the workplace, and implies that individual's dedication to work (through constant connection) is expected to be rewarded in in both work and personal life. Furthermore, the relational hierarchy and roles of organizational members are also implied. Jasper explains that senior organizational members such as the CEO is suggested to play the role of the parent ('*I'm sure the CEO and other senior will help me to find a decent bride')* and that Jasper will also play the same parental role to junior members ('*I'll try to do the same for the younger boys')* to suggest although more personal relationships are developed between organizational members, relational hierarchy and its associated roles are distinct within the studied Korean workplaces.

However, New Zealand participants described their relationship are more independent and collegial in comparison to the Korean participants. For example, one participant in a managerial position implied that connective experience may be perceived differently according to the organizational position of workers:

We've always been candid and communicate freely with each other. It just gave us flexibility like after hours to communicate with each other if we really needed something or just check up on something. It's good (in maintaining relationships), in my case anyway, I know some people want to get away from their team leader, but for me it's been good.

Patrick, employee, Nomilos

The above participant suggests that constant connectivity provides '*flexibility'* and that it is '*good'*, in maintaining relationships and work tasks. However, he also recognizes that '*some people want to get away from their team leader*'. This implies that within the studied New Zealand workplaces, regardless of how informal or casual work relationships and communication may be, organizational relationships may still be perceived as more professional or collegial between individuals in comparison to the family-like relationships described by Korean participants.

Stress and expectations

Aligning expectations

New Zealand and Korean participants approached the idea of stress gained from constant connection differently. In particular, the mismatch between the expectation to stay connected seemed to play an important role in cultivating stress for participants. For example, New Zealand participants described conflicting situations that they experience in being expected to stay connected to work, and how they experience stress from this process. One interview participant describes the conflicting message that her managers convey, in term of separating work and life:

I feel quite sure that both Ronald and Margaret (managers) *would encourage us to put a time limit on our phone and to not answer it in the middle of the night, at the same time they also freely admit and freely answer their phone whenever you ring so though they might say one thing, again the culture is doing something quite opposite, it is contradictory behavior,* (on) *my own Facebook page I am friends with my bosses so we are often in contact on the weekend*

While Kelly describes that her managers verbally suggest that workers should balance their personal and work time/space, Kelly's observation of the managers' behavior suggests otherwise. As the managers '*freely admit and freely answer their phone whenever you ring'*, this shows that the actual expectation towards work and being available to respond to work matters exists. This creates ambiguity and stress for workers, as there is a need to analyze the hidden expectations in how connected to work they should remain.

In contrast to NZ participants, Korean participants described consistent expectations for connective flow. For example, one of the interview participants emphasized how he also expects other organizational members to accept and behave according to organizational expectations:

We should always show effort towards the company…We should be thankful, and not be disrespectful by skipping work… Being contacted from work means that I'm being valued, so I should also value the company.

Copal, employee, Wisepath

In this example, the respondent acknowledges that he is expected to work according to the needs of the company and views it as a mutual obligation. He also emphasizes that following such expectations is natural, and workers should be '*thankful'* and not be '*disrespectful'* to their company, and thus accommodate to what the company requires. This relates to the idea of interdependent relationships and harmony under Confucian ideals (Yao, 2000). While the extra work and being contacted after hours seems to intrude the personal life of organizational members, this is accepted as a natural part of being a member of the community, and something that helps individuals to recognize their membership within the group.

Competence and impressions

One participant in a middle-management position described his dilemma in detail:

There's a sense of expectation there that you feel that if you don't respond then you're slacking off […] I think in general in business the always on nature creates unfair expectations on people at times and I think it takes a really strong culture to try to push back against that.

Aaron, middle-manager, Connectigen

The above participant suggests that there is an expectation that a worker must respond in a timely manner, in order to avoid being perceived as '*slacking off'*, and thus '*feel obliged to respond'*. However, he also notes that this is an '*unfair expectation'* which suggests that he views continuous connective flow negatively. This type of connectivity expectation is also described as a common phenomenon especially for a global organization ('*in general in business the always on nature creates unfair expectations'*). Aaron suggests that the stress from being expected to respond to work stems from the worry that he may be considered incapable at work.

Adapting to connections

Similar to the New Zealand examples, participants in the studied Korean organizations also suggested that they experience stress in being constantly connected to work. However, perception towards connectivity stress is described differently within the studied Korean organizations. For example, the natural merge between personal and work life were often mentioned by diverse participants:

If there is work, we come in on weekends or do an all-nighter if needed. So I have to check my KakaoTalk (Korean mobile messenger application) frequently, in case something goes wrong. Nobody complains anymore, because it's so routine now.

Iolite, middle-manager, Mintrack

We have a group chat room on KakaoTalk (Korean mobile messenger application). So you have a couple of chat rooms with your friends, a couple with your work colleagues, and a couple within your work department. It's normal in Korean companies. It's probably difficult to find a place that doesn't use it.

Lapis, employee, Truscene

Lapis suggests that constant connective flow is considered '*normal in Korean companies*'. Similarly, Iolite suggests that coming into work outside the normal work hour is '*routine'*. While it is not fully reflected in the above interview example, both Iolite and Lapis explained such work circumstances quite blatantly, and did not specifically describe this experience as stressful. However, the statement '*nobody complains anymore'* suggests that there has been issues with regards to such work expectations in the past. Yet, currently the workers in this participant company have perhaps accepted constant connectivity as a part of work. This relates to the Confucian value of harmony, where individuals prefer to depress their individual desires (to disconnect) and rather comply with the needs of the group (maintain connective flow) (Shim et al., 2008). Similarly, another interview participant describes her un-stressful experience of being contacted by her managers after work hours:

I get a lot of KakaoTalk (Korean messenger application) messages at night, just randomly. We do a lot of drinking and social gatherings here. But it's not compulsory… where in my previous job, my seniors were really brutal in terms of peer pressuring.

Ivory, employee, Mintrack

This respondent suggests that she is not stressed or '*peer pressured'* into joining any extra social gatherings at work. However, by acknowledging that her previous workplace was more '*brutal'* in terms of expecting workers to attend social gathering, suggests that this feeling of 'no pressure' is only relative to her past experience. This means that Ivory is likely to have experienced some form of stress or pressure in being expected to join her senior in drinking or social functions, but just not *as significant* as her previous workplace. Being connected to other workers after hours and on social occasions is described as normal, and not so stressful, therefore implies that participants can accept and manage such connective flow as a part of their daily lives. However, this may be a result of being accustomed to such highly connective workplace environments, where individuals in fact experience stress, but attempts to relieve stress by making a comparison to other more stressful work situations (in this case, Ivory's previous workplace).

Similarly, a New Zealand Participant describes his frustration towards the need to separate work and life:

So that is the sad part of it, in my situation if it's just for work it's great but it's also bad because you're not really only using it during working time. For me, I refuse to have two phones on me so I just use my work phone, and maybe that's bad because if I had my own phone I'd just switch the work phone off. So there's no separation.

Murray, employee, Nomilos

This example implies that while they do work outside work hours and respond to work matters if needed, this is considered inappropriate, and are not happy about it. This conflict between what participants consider as an appropriate amount of connective flow is being intruded through connective devices, and the expectation to stay connected creates stress. This suggests that as the work environment is structured to require constant connectivity work individuals (routine use of Kakotalk in Korean examples and using work phone only in New Zealand example) participants are exposed to excessive connective flow (via technology) regardless of their desires. However, both New Zealand and Korean participants suggest that they accept constant connectivity as a matter of choice and a natural part of work life ('*I refuse to have two phones on me'*, '*It's normal in Korean companies')*. This implies that despite the stress experienced, participants in this study attempts to adjust to the constant connective situations by perceiving the act of accepting connections to work as voluntary.

Discussion and implications

This study suggests that connectivity may blur work and interpersonal boundaries by creating an informality in communication, yet workers may experience distress in the process of adjusting to the heightened connectivity at work. Furthermore, perception and expectation towards workplace connectivity may be interpreted differently according to the underlying cultural values of individuals, and the (mis)match of such expectations between workers may influence the level of stress experienced by workers.

Findings from the studied New Zealand and Korean organizations suggest that work and relational boundaries may be blurred through informal communication (especially via text messages and SNS), and this informality is perceived to develop more casual relationships between communicators. Therefore, participants in this study suggested that constant connectivity allow more personal relationships (sometimes described as friendship and family-like) to be developed between organizational members, thus blending the boundary of work and non-work life. This supports Sias and Cahill's (1998) research on identifying the peer friendship development process in the workplace, where frequent and informal communication helps to further develop more intimate friendships between coworkers. This also extends the idea of interpersonal connectivity (Kolb, 2008), where the use of connective communication devices helps professional and personal relationships to merge, and thus developing intimacy and community (Chayko, 2014; Fay, 2011) between individuals. However, Bhimani (2003) describes such integration of professional and personal relationships and blurring work and play may create negative consequences.

Findings from the studied New Zealand organizations also suggest that while individuals want to control their level of connectivity, they are unable to do so. This extends previous studies that emphasize personal agency and how individuals may attempt to exercise it to control their connectivity levels (Obushenkova et al., 2018). In this current study, due to increasing pressure to stay connected to work, participant responses suggest that they no longer have personal agency to disconnect, which can further create problems for individuals. This lack of control may influence other connectivity related behaviors such as engagement and emotion (MacCormick et al., 2012) and responsiveness and autonomy (Geiger et al., 2016). Furthermore, participants suggested that the inconsistent behaviors of their managers creates further stress, as managers say that they want workers to have balance but their behaviors do not reflect this. The mismatch of connectivity expectations may increase the pressure for workers to be responsive regardless of their needs and desires, and this expectation to be highly accessible may contribute to stress and work overload (Barley, 2011; Matusik, 2011).

In contrast to the New Zealand participants, Korean participants suggested that the development of ICTs do not create extensive stress for individuals. This is because the underlying Confucian values of harmony and interdependency (Clark, 2000; Yao, 2000) already establish expectations to stay connected to work and respond to work matters if requested by their managers. This embedded cultural value is also reflected through long working hours (Kim et al., 2018), and thus suggests that while individuals may be stressed form the extra work, this is not considered abnormal. There may be no significant desire or attempt to balance their work and life, but rather consider it as a way of being respectful towards the company and contributing to the group (Kim et al., 2018). This extends MacCormick et al.'s (2012) study, where they suggest that individuals may perceive technology to enhance their ability to engage with the workplace, while enjoying increased flexibility, mobility, and chances of success.

Dery et al. (2014) suggest that organizations should encourage employees to achieve a state of optimal connectivity, where connective flow is achieved through a dynamic process to meet individual and professional requirements. While this involves having high technology capabilities (i.e. access to smartphones) to control connectivity and high organizational actions to enable connectivity (i.e. provision of work phones), this is based on the expectation that the organization will allow for individuals' flexible control over connectivity and work. This may not be realistic, but may be most ideal to avoid stressful connectivity. Furthermore, MacCormick et al. (2012) suggests that individuals need a capacity to read the situation and understand others in terms of their connectivity needs. This may help individuals to communicate professionally and maintain optimal connective flow without leading to negative consequences.

The social aspect of connectivity may also relate to the problem of 'social overload', where individual experience distress due to that excessive social support that they receive or provide to others within their social network (Maier et al., 2014). This suggests that while the increased social connectedness between coworkers develops personal relationships, and increase the willingness of workers to be more connected, the amount of social support provided (or required) may be inadequate, therefore leading to unexpected distress. Such process may limit the role of connectivity for the workers (either enhance or weaken work process), as individuals attempt to balance their desire to be nice and stay connected to their 'workplace-friends' yet feeling the discomfort of being in a state of hyper-connectivity (Kolb et al., 2012). This duality derived from development of personal relationships with coworkers and mismatch of connective flow expectations means that the state of connectivity experienced by the individual is rather unstable. Since individuals are unsatisfied with the state of connectivity (expectations are different), it is likely to create high levels of stress.

These findings suggest that different cultural interpretation to organizational relationships may influence perceptions towards connectivity and their experience of connective flow. While the studied New Zealand companies suggest that development of 'friendship' like organizational relationships provides a feeling of comfort in being connected to work colleagues, Korean examples implied a much deeper integration of work and non-work dimensions of life, based on the Confucian relationship structure, which is similar to that of a family (Shim et al., 2008). While the act of accepting excessive connectivity seems similar across the New Zealand and Korean participants, the difference in underlying relationship structure may help to explain why individuals in different cultural contexts may respond to connectivity differently. Therefore, when an in-depth personal relationship is expected between workers, individuals may accept heightened connectivity and enable themselves to adapt to different experiences of connective flow.

Scholars such as Kim et al. (1990), and Kim et al. (2010) emphasize that people from different countries evaluate well-being, allocation and fairness differently, due to the distinctive cultural differences. The different perception and reaction towards connectivity across the studied New Zealand and Korean organizations suggest that the underlying cultural values of studied organizational members may affect their construction of connective flow. Regardless of the actual level of connectivity experienced, relatively transparent connectivity expectations may allow the near-constant or hyper-connectivity (Kolb

et al., 2008) to be more accepted, and thus minimizing confusion and distress. However, this does not suggest that organizational members achieve a state of requisite connectivity (Kolb et al., 2008), as the studied participant were aware that they are being overly-connected to work. The difference may exist in the fact that participants in the studied New Zealand and Korean organizations responded differently to what is fair and how much connectivity may affect their well-being, thus determining whether their level of connectivity may be optimal for each individual.

Conclusion

This study attempts to explore the relationship between connective flow, connectivity expectations, and relational and stress outcomes in Western and Confucian cultural contexts. Findings from this study create certain implications for theory and practice. This research responds to Dery et al.'s (2014) call for further studies on connective flow, and extends connective flow (Dery et al., 2014) research by illustrating the cultural influences on work and relational expectations, and wellbeing (stress) related outcomes. In particular, the reasons behind why individuals may or may not accept constant connectivity and a cultural reasoning behind achieving connective flow is discussed. In terms of practice, this research suggests that managers need to be clear on communicating their connectivity expectation to workers, in order to diminish unnecessary stress for individuals. Furthermore, establishing more personal relationships between organizational members may serve as a medium to help individuals accept higher (or fluctuating) levels of connectivity. Thus, arranging social events and encouraging workers to connect on SNS may be an effective method to develop such interpersonal relationships and help individuals adapt to constant connectivity.

Managers and organizational members may also benefit from cultural training to help understand the different cultural expectations of individual employees. Such training may help workers to better match the connective expectation and relational values required to achieve optimal connective flow. Therefore, this study contributes to connectivity research by providing a cross-cultural perspective to connectivity and connective flow by discussing Western (New Zealand) and non-Western (Korean) data.

This research has various limitations. First, as a total of six companies were used in this study, collecting data from a larger number of companies may help to develop more reliability in the findings of this research. Second, as these six companies are from different industries, the data presented in this study may reflect industry-based differences. Collecting data from companies in one specific industry may provide more reliability in understanding the cultural differences. Third, conducting a longitudinal study may help to reflect the changing perceptions across time in understanding connective flow and its effects on relational and personal outcomes. Forth, the qualitative and subjective nature of this study provides important insights into employee perspectives and experiences across different organizations in two highly contrasting cultures. However, this study reflects the view of the specific individuals and companies that participated in this study, and thus the research finding is not generalizable to all Korean or New Zealand organizations.

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The Role of Relational Transparency in Fostering Positive Meaning in the Workplace: A Pathway to Sustainable Organizations

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Abstract

This study examines the pivotal role of relational transparency in fostering positive meaning in the workplace, contributing to the development of sustainable organizations. Drawing from Authentic Leadership Theory, this research explores how Relational transparent relationships enhance employee positive meaning. Using a quantitative methodology, data was collected from employees (N= 190) through a structured questionnaire distributed among the Indian organizations. The questionnaire collected data on relational transparency and its impact on positive meaning within the organizational context. Data analysis, conducted using simple linear regression, revealed a significant positive relationship between relational transparency and the development of positive workplace meaning. The results show that relational transparency serves as a driving force for long-term organizational sustainability and creating Positive Meaning in the work. This study highlights the importance of fostering comprehensive organizational development while providing leaders with valuable insights for incorporating transparency-driven practices into their plans.

Keywords: *Relational Transparency, Positive Meaning, Sustainable Organizations, Workplace Culture.*

Introduction

In an era of increasing demand for authenticity and openness, transparency has become pivotal in promoting trust and collaboration within organizations (Walumbwa et al., 2008). Transparency, as emphasized in recent industry publications such as *Deloitte Insights* (2023), is an organization fostering employee engagement and trust through open communication and decision-making processes. Transparent communication, characterized by substantial information sharing and active participation, significantly enhances public trust (Lee et al., 2021). For instance, the "State of the American Workplace" report by *Gallup* (2023) highlights the favorable relationship between open leadership, higher productivity levels, and employee satisfaction. Beyond fostering accountability, transparency can also promote more profound psychological and social benefits, such as creating a sense of positive purpose at work (Steger et al., 2012).

Relational transparency, a more nuanced dimension, involves intentionally disclosing information and decision-making processes to foster trust, accountability, and clarity among employees. The *Harvard Business Review* (2023) explores its advantages and inherent challenges, offering practical advice for leaders on balancing privacy and transparency to improve organizational culture. Studies by *McKinsey & Company* (2023) reveal that meaningful work, driven by relational transparency, aligns with higher employee engagement and retention rates. Concurrently, the pursuit of positive meaning at work which encompasses job satisfaction, morale, and a sense of purpose—has emerged as a critical predictor of employee well-being and organizational performance (Grant, 2007). *The Society for Human Resource Management* (SHRM, 2023) outlines strategies for creating transparent and purpose-driven workplaces, emphasizing tools to infuse positive meaning into daily work activities.

Practical examples illustrate the transformative potential of relational transparency. Buffer, a globally renowned social media management firm, provides a compelling case. During a period of rapid growth and financial challenges, CEO Joel Gascoigne implemented radical transparency by openly sharing detailed financial metrics, such as salaries and revenue with employees. Regular updates and open communication channels enabled team members to comprehensively understand the company's financial position and objectives. This transparency-built trust, enhanced morale, and empowered employees, aligning their efforts with the company's goals. Consequently, Buffer experienced improved retention rates and gained a repu-

tation for being transparent and employee-centric (*PwC*, 2023; *IBM Smarter Workforce Institute*, 2023).

Despite these illustrative examples, empirical research on the broader influence of relational transparency on positive meaning in the workplace remains limited. Existing studies primarily focus on transparency's effects on trust or organizational commitment (Choi & Ruona, 2011), without fully exploring its role in shaping employee fulfillment. Many employees want their work and career to be more than simply a way to earn money or want to pass time, but they want their work to mean something to them (Sverko & vizek Vidovic,1995). People who feel their work is meaningful feel greater well-being (Arnold et al., 2007). This gap underscores the need for systematic empirical investigation into the relationship between relational transparency and employees' perceptions of positive meaning at work. Employees who perceive their organizations as transparent in information-sharing and decision-making processes often report stronger trust and satisfaction (Yuan et al., 2022).

This study investigates the nuanced relationship between relational transparency and employees' perceptions of positive meaning in their work. Ultimately, these insights inform managerial practices and contribute to the growing discourse on strategic communication and employee empowerment. This research also addresses ongoing calls for comprehensive frameworks that account for both structural (e.g., leadership style, culture) and positive psychological (e.g., perception of fairness, sensemaking) dimensions in explaining how employees experience profound, positive meaning in their work (Cameron et al., 2003).

Empirical results suggest little is known about how these processes play out at the individual level or how relational authenticity emerges as a positive meaning at work by employees. Addressing these gaps, this study examines the dynamics of relational transparency and its role in promoting positive meaning at work.

Literature review

Relational transparency (RT) is a component of an approach to leadership that is "characterized by openness and truthfulness in relationships with others" (Kernis, 2003). This attitudinal component is motivated by the concept that being authentic in our interactions with others fosters trust, which is essential for healthy and strong working relationships. RT is the expression of one's feelings and thoughts, thereby imposing confidence and trust in leaders' decisions due to such openness (Supriyadi et al., 2020). Transparency is the employee's willingness to transfer information to other employees, including colleagues and subordinates, and his willingness to relate himself with employees (Gigol, 2020). Organizational scholars have increasingly underscored the value of transparent communication in fostering trust, cooperation, and employee engagement. Employees who interpret their contributions as vital to organizational success and see their values reflected in corporate strategies report greater job satisfaction and resilience, culminating in desirable outcomes such as lower turnover and enhanced innovation (Cameron et al., 2003). Within this domain, relational transparency has emerged as a distinct form of openness in which leaders and organizational innovation examine not only what decisions have been made but also why they have been made. This involves interpreting the underlying reasoning, criteria, and evidence guiding organizational actions, thus allowing employees to grasp the broader objectives and strategies (Colquitt, 2015). Such intentional and explanatory disclosure can create an atmosphere of procedural fairness and legitimacy, enhancing employees' trust in leadership and reducing ambiguity around strategic initiatives (Aryee et al., 2004).

Simultaneously, the construct of positive meaning at work—frequently conceptualized as employees' sense of purpose, significance, and alignment with their values—has been identified as a key driver of well-being and performance in organizational settings. Consequently, employees who experience high levels of relational transparency are more likely to perceive their work as integral to a larger mission that resonates with their personal and professional aspirations (Rosso et al., 2010). When individuals perceive their work to be purposeful, they are more likely to exhibit higher levels of motivation, engagement, and organizational citizenship behaviors (Organ, 2018). The impetus behind this heightened engagement rests in the human inclination to seek meaningfulness in one's professional life, which resonates with broader psychological theories such as self-determination theory (Ryan & Deci,2000). Moreover, a growing body of research suggests that relational transparency may serve as a critical channel through which organizations can cultivate and sustain such positive meaning.

Contemporary organizational research increasingly emphasizes relational transparency, the intentional sharing of decisions, and why they are made (Chaudhary & Panda, 2018). This concept extends beyond mere rational transparency by focusing on the thought processes, criteria, and contextual factors guiding leadership choices (Bentley, 2021). Recent studies have underscored how relational transparency can stimulate procedural justice and fairness perceptions as employees gain clearer insights into the logic behind strategic initiatives (Denisi & Smith, 2022). Relational transparency (RT) has been acknowledged as an important aspect of creating healthy work environments, building trust, and providing meaningful employee experiences (Nasab & Afshari, 2019). Leaders and employees build an environment that promotes personal fulfillment while driving larger company goals. Based on authentic leadership theory, Relational transparency

(RT) highlights the significance of leaders and followers aligning their external behaviors with their inside beliefs, resulting in genuine relationships that reduce uncertainty and improve psychological safety (Avolio & Gardner, 2005). In practice, transparent communication may require disclosing strategic decisions, expressing vulnerabilities, or sharing performance metrics, which can cultivate interpersonal trust (Gardner et al., 2011; Rehman et al., 2023). When employees perceive sincerity and openness at multiple organizational levels, they are more likely to experience a sense of purpose and fulfillment, known collectively as positive meaning in the workplace (Ribeiro et al, 2020). Such positive meaning has been closely tied to crucial outcomes like enhanced motivation, creativity, and resilience, which, over time, lay a foundation for sustainable organizational performance and long-term competitiveness (Hopp & Fisher, 2021). However, tensions and complexities surround RT: some studies caution that excessive transparency may lead to information overload, anxiety, or mistrust if sensitive details are mishandled (Smith,2021).As a result, while relational transparency is widely advocated for increasing trust, job satisfaction, and organizational resilience, its successful implementation depends on understanding the balance between openness and confidentiality, recognizing cultural nuances, and developing robust frameworks for measuring its impact. When implemented wisely, RT may match individual motivations with bigger corporate goals, reinforcing positive meaning for individuals and strengthening firms' ability to adapt and grow in an ever-changing business environment. Against this backdrop, understanding and promoting positive meaning in the workplace becomes a strategic imperative for modern organizations aiming to excel in highly competitive and dynamic environments (Grant, 2007). First, a strong sense of meaning directly correlates with enhanced employee well-being, boosting productivity and engagement (Kahn, 1990). Second, employees who find genuine meaning in their roles are more adaptable to change, an increasingly valuable trait in unpredictable market landscapes. Third, from an ethical and social responsibility standpoint, organizations that foster meaningful work often enjoy a stronger employer brand and more sustainable talent pipelines in parallel, positive meaning at work—broadly defined as employees' sense of purpose, significance, and fulfillment in their roles—has garnered renewed attention as a critical factor in employee well-being (Anand et al., 2022). Studies suggest that when individuals find their work meaningful, they are more likely to exhibit enhanced resilience, increased motivation, and higher organizational citizenship behaviors. Scholars also highlight that meaningful work contributes to lower turnover intentions and a more profound commitment to organizational goals, bolsters overall performance (Cameron et al, 2003).

Nevertheless, the pathways linking relational transparency and positive meaning at work remain underexplored. While some scholars have highlighted the potential for transparent communication to heighten employees' sense of significance, empirical examinations of how exactly these mechanisms operate—and under which conditions they are most effective—are relatively sparse (Colquitt & Rodell, 2015)

Theoretical Framework

This study is based on social exchange and authentic leadership theories (Cropanzano & Mitchell, 2005; Mitchell et al., 2016). Social exchange theory offers a relational lens through which trust, and positive meaning can be regarded as a byproduct of positive social interactions. Over time, repeated and transparent interactions steadily enhance employee trust, reflecting the positive meaning produced by employees in the workplace (Costa et al., 2016). Homans (1961) defines social exchange as the reciprocal transfer of tangible or intangible resources, which can be rewarding or costly. Blau (1964) later highlighted that such exchanges are frequently voluntary, with each party's favorable action provoking a positive response from the other. the conceptual foundation of social trade by emphasizing how negotiated encounters influence social stability and change. According to this concept, relational transparency, defined as openness, sincerity, and self-disclosure, builds reciprocal trust, which supports employees' views of positive meaning in the workplace.

Building on this foundation, authentic leadership theory explains how relational transparency (RT) a key authenticity characteristic is. Relational transparency is critical in fostering employees' sense of positive meaning at work—essential for productivity, job quality, efficiency, and turnover intentions. Authentic leadership theory emphasizes the need for open, real communication in building trust by urging leaders to align their internal ideals with their external conduct continually. Employees gain a stronger feeling of purpose and ownership because of these open, reciprocal connections, which contribute to improved individual and organizational performance. This study uses relational transparency as an independent variable to influence employees' positive meaning at work by developing trust through iterative cycles of transparent social interactions (Cropanzano & Mitchell, 2005; Costa & Anderson., 2018). The dual theoretical foundation in social exchange and Authentic leadership describes how openness and authenticity form crucial employee attitudes and behaviors, ultimately influencing overall organizational outcomes.

Relational transparency.

Relational transparency is integrity, honesty, and the avoidance of ulterior selfish intentions in relations with others. A key component of authentic leadership further demonstrates the power of openness in influencing pos-

itive employee outcomes (Walumbwa et al., 2008). Authentic leadership fosters psychological and interpersonal well-being (Lehman et al., 2019) and thrives on mutual trust among organizational members (Cha et al., 2019). Relational transparency involves leaders using openness and clarity to build credibility and influence, inspiring followers to identify with and be motivated by them (Gardner et al., 2011). Transparent communication enhances stakeholder engagement and creates a sense of trust and meaningful connection between organizations and their audiences (Jiang & Luo, 2018).

Positive meaning

Positive Meaning in Work. This facet is a straightforward reflection of the idea of psychological meaningfulness that has been part of work psychology since the job characteristics model (Hackman & Oldham, 1976). As Rosso and colleagues (2010) point out, MW is often a subjective experience in which one does has personal significance. This facet should be included to capture the sense that people judge their work to matter and be meaningful. Positive meaning at work refers to the sense of purpose and fulfillment employees derive from their roles, enhancing well-being and engagement. It is linked to positive organizational behavior and contributes to overall performance and employee satisfaction (Arjun ,2024).

Relational transparency and positive meaning

A positive organizational culture, characterized by shared values, a sense of belonging, and strong social connections, further contributes to intrinsic motivation. By fostering trust and fairness, transparency creates an environment conducive to positive meaning-making (Yue & Ferguson, 2020). However, it emphasizes that meaningful work, influenced by transformational leadership, enhances task performance and reduces cynicism about organizational change, highlighting its importance in fostering positive workplace dynamics (Rahman Z, 2017). When employees believe that their organization is transparent and operates ethically, they are likelier to feel a sense of purpose and belonging. This, in turn, enhances their commitment to the organization and reduces turnover intentions. Relational transparency in meaningful work involves open communication and shared information, fostering autonomy and responsibility. This practice aligns with dignity by enabling individuals to engage fully in their roles, enhancing their experience of dignity, and promoting a sense of meaningful contribution (Norman & Bowie, 2019). This positive culture enhances employees' organizational identification, increasing job satisfaction and performance. Positive practices, including transparency and meaning making, create a virtuous cycle, amplifying positive emotions and behaviors while buffering against negative ones (Rego et al., 2022). During periods of uncertainty, such as lockdowns, employees who perceive their work as contributing to a greater good and who feel a strong sense of identification with their organization are less likely to experience job insecurity and are more likely to engage in positive behaviors. The combination of transparency and positive meaning creates a resilient organizational culture that can withstand external shocks and maintain high employee engagement and performance levels.

We hypothesize the relationship shown in the picture:

H1: Relational transparency has a significant positive impact on positive meaning.

Figure 1.

Hypothesized Model: Showing the hypothesized relationship between Relational transparency and Positive meaning.



H2: There would be a significant difference in the Positive Meaning of employees in public and private sector employees.

The rationale of the Study

In today's rapidly changing organizational landscape, driven by societal shifts, technological advancements, and the enduring impacts of the COVID-19 pandemic, fostering trust and engagement among employees is more crucial than ever. Relational transparency, the deliberate and thoughtful disclosure of information and decision-making processes—has emerged as a key strategy for enhancing trust and collaboration within organizations.

Despite the recognized importance of relational transparency and positive meaning, there is limited empirical research exploring the relationship between these two constructs. Industry reports highlight the significance of this interplay. Deloitte Insights (2023) emphasizes that transparent communication boosts employee trust and engagement, while Gallup's "State of the American Workplace" (2023) identifies a strong link between transparent leadership and increased employee satisfaction and productivity. Additionally, McKinsey & Company (2023) notes that meaningful work leads to higher engagement and retention rates. These insights suggest that relational transparency may significantly contribute to employees finding their work meaningful. However, existing academic literature primarily focuses on transparency's effects on trust and commitment, leaving its impact on employee fulfillment underexplored (Choi & Ruona, 2011).

Originality Value

This study uniquely connects relational transparency with positive meaning, an area that has received limited attention in prior research. This research fills a critical gap in the literature by investigating how relational transparency influences employees' sense of purpose, job satisfac-

tion, and overall well-being. Additionally, incorporating insights from recent industry reports and examining diverse organizational contexts provides a comprehensive understanding of relational transparency's multifaceted impact. Case examples, such as Buffer's implementation of radical transparency, offer practical illustrations of how transparency can enhance employee morale and retention (PwC, 2023; IBM Smarter Workforce Institute, 2023).

Importance of the Research

Understanding the relationship between relational transparency and positive meaning is vital for developing adaptive and resilient workforces capable of thriving in today's dynamic environments. The findings will offer organizations actionable insights to enhance employee engagement and well-being through transparent practices. SHRM (2023) highlights that creating a transparent and purpose-driven workplace equips HR professionals with tools to infuse positive meaning into daily activities, fostering a motivated and committed workforce. Furthermore, empirical evidence linking relational transparency to positive meaning can inform leadership practices and organizational policies, promoting a culture of openness that aligns with employees' intrinsic motivations (Harvard Business Review, 2023). This alignment is essential for maintaining high levels of employee satisfaction and retention, as demonstrated by companies like Buffer, which have successfully used transparency to build trust and improve morale.

By addressing the existing research gap, this study contributes to theoretical advancements in organizational behavior and practical applications in human resource management. The insights gained will support the development of targeted interventions, such as career counseling and personalized training programs, that address employees' needs for transparency and meaningful work. Ultimately, this research aims to help organizations create more sustainable and fulfilling workplace environments, enhancing overall performance and employee well-being.

Methodology

Sampling and procedure

Data is collected from the respondents who were regular workers in various manufacturing and service-related to public and public organizations at top, middle and lower level of job. Respondents were chosen based on having at least one year of experience. The researcher suggested collecting information from multiple sources to get results and generalizations (Agarwal & Gupta, 2018; Tomarken & Serlin, 1986). The survey form was made using Google Forms in English and sent to the respondents via email and WhatsApp. The instrument and a cover letter outlining the research's objectives and guaranteeing the participants' anonymity were communicated. We received 190 responses from the 400 questionnaires delivered, and since the Google form required every observation, there were no missing or incorrect responses. There was a respondent rate of 47.5%. According to Hair et al. (2010), our study complied with the criterion that the number of respondents should be between five and ten times proportionate to the number of items under consideration. The demographic features of the participants, including their age, sex, work experience, and organization type are shown in Table 1. The respondents worked for companies in the healthcare, insurance, infrastructure development, information technology (IT), and education sectors.

TABLE :1

Demographic Features	**Number**	**%**
Sex		
Female	72	37.89
Male	118	62.11
Total	190	100
Experience		
Up to 10 years	138	72.63
11-20 years	44	23.16
Above 20 years	8	4.21
Total	190	100
Organization Status		
Public	126	66.32
Private	64	33.68
Total	190	100

Research Approach

This study used a convenience-based, non-random sampling strategy and a descriptive cross-sectional methodology. According to Babbie (2020), a self-referential scale is suitable for gathering sensitive, accurate data for a cross-sectional study. A convenient study technique should be used when the population is dispersed around the country and unknown (Verma et al., 2020). If the data were taken from a bigger population, a convenient sampling technique was expected to work better than a random sample strategy. The information was obtained from self-reported surveys.

Measures

Earlier studies' items were adapted to operationalize the variable under investigation. A seven-point "Likert scale" was utilized to evaluate the items. Likert Scale was used for relational transparency (1= Very strongly Agree to 7= Very strongly disagree, 4 being neutral) and for positive meaning (1=Absolutely untrue, 7=Absolutely true, 4 being Neither true nor untrue).

Table 2: Indicates the constructs and factor loadings.

Name of Variable	α	Short name of items	No of Items	Items deleted	FL	SE	t	CR
RELATIONAL TRANSPARENCY(RT)	0.912	RT 1	4	-	0.926		15.797	0.916
		RT 2			0.751	0.075	12.902	
		RT 3			0.873	0.073	14.200	
		RT 4			0.862	0.066		
POSITIVE MEANING(PM)	0.853	PM 1	4	-	0.792			0.904
		PM 2			0.903	0.082	13.863	
		PM 3			0.804	0.077	12.058	
		PM 4			0.847	0.085	12.892	

Table 2. Note: SE = Standard Error, α = Alpha Coefficients, t = t-value, CR= Composite Reliability, FL = Factor loadings, RT = Relational Transparency, PM =Positive Meaning.

Table 3

Hypothesis	Regression weights	Beta coefficient	R^2	F	t-value	p-value	Hypotheses supported
H1	RT→PM	0.517	0.267	68.566	8.280	0.000	Yes

Notes. *p > 0.05. RT: Relational Transparency: PM: Positive Meaning

Table 4: -

Test Type	F (Levene's Test for Equality of Variances)	Sig.	t	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
Equal variances assumed	1.171	281	1.989	188	0.048	0.3821	0.19206	0.00323	0.76097
Equal variances not assumed			2.050	137.439	0.042	0.3821	0.18643	0.01346	0.75074

Relational Transparency

The scale was taken from the work of (Walumbwa et al., 2008) Consisting of 04 dimensions, including 16 items. The scale measures Relational Transparency with 4 items. Cronbach's reliability coefficient for this scale was 0. 912. An indicative item of the scale is, "My leader clearly states what he/she means; my leader admits mistakes when they occur; my leader openly shares information with others; my leader expresses his/her ideas and thoughts clearly to others."

Positive Meaning

The scale was taken from the work of (Steger et al., 2012). The scale measures grit through dimensions of positive meaning (4 items). The Cronbach's reliability coefficient for this scale was 0. 853. The indicative items of the scale include Positive meaning: "I have found a meaningful career, I understand how my work contributes to my life's meaning, I have a good sense of what makes my job meaningful".

Analytical approach

This study analyzed the data using IBM SPSS (version 27) and IBM AMOS (version 27). The measurement model was evaluated through Confirmatory Factor Analysis (CFA). Various fit indices, such as the Goodness of Fit Index (GFI), Normed Fit Index (NFI), Adjusted Goodness of Fit Index (AGFI), and Comparative Fit Index (CFI), were utilized to assess the quality of the model fit. A Root Mean Square Error of Approximation (RMSEA) value below 0.05 indicates an excellent fit, while values between 0.06 and 0.08 are considered acceptable for approximation error (Hooper et al., 2008). The study also assessed the convergent and discriminant validity. Independent sample t-test and simple linear regression analysis were done to assess the hypotheses

Results

Assessment of Measurement model.

CFA, included in the study's variables (Relational transparency and positive meaning), was conducted to validate the measurement model using AMOS version 27. Examining the latent variables, the model provided good data fitting ($p = .066$, $\chi^2/df = 1.543$, $df = 18$, $\chi^2 = 27.769$, NFI = 0.974, CFI = 0.991, TLI = 0.985, RMSEA = 0.054 (Hooper et al., 2008; Hu & Bentler, 1999).

The hypothesis tests if relational transparency significantly impacts the positive meaning of workers in the workplace. The dependent variable's positive meaning was regressed when predicting the variable's relational transparency to test hypothesis 1. Relational transparency significantly predicted the positive meaning, $F(1.219) = 83.599$, $p<0.001$, which indicates that the Relational transparency can play a significant role in shaping Positive meaning (PM) ($b=.59$, $p<.001$). These results clearly show the positive effect of RT. Moreover, the $R^{2=}0.276$ depicts that the model explains 27.6% of the variance in PM. The table no.3 shows the summary of the findings.

The hypothesis posited a positive relationship between relational transparency and positive meaning at the workplace, which was supported by the results ($\beta = 0.517$, $p < 0.001$). Building on Authentic Leadership Theory, leaders who consistently demonstrate transparency, integrity, and balanced decision-making foster an environment where employees feel trusted and valued. This open and ethical leadership style signals genuine support, prompting employees to reciprocate through heightened engagement and proactive effort, which aligns with social exchange theory. When leaders practice relational transparency—openly sharing the reasons behind decisions and the orga-

nization's strategic intentions, employees are more likely to interpret challenging job demands as opportunities for personal growth rather than potential stressors. Consequently, employees derive a stronger sense of positive meaning from their work, effectively transforming demanding situations into avenues for growth and success (Bakker & Demerouti, 2017).

H2: There would be a significant difference in the Positive Meaning of employees in public and private sector employees.

The data gathered on the organization status (i.e., public/private) was employed to test hypothesis H2. An independent-sample t-test was conducted. Refer to Table 4 to compare the positive meaning at work for public and private organization employees. The scores showed significant differences t (156.463) = 2.674, p = 0.008). The mean score for employees from public organizations (M = 0.266, SD = 0.924) was higher than for the employees of private organizations (M = -0.178, SD = 1.190). The magnitude of the differences in the means (mean difference =0.4456, 95% CI: 0.116 to 0.774) was significant. Hence, H2 was supported.

Discussion

The study's findings enhance the theoretical framework and its implications for organizational practices by making evidence-based suggestions for the organization's activities. The consequences for organizational practice include implementing evidence-based recommendations for creating an open atmosphere, enhancing positive meaning, and improving employee satisfaction to move toward a sustainable organization where employees feel their work is meaningful. To comprehend the possible impacts of authentic leadership practices on employees' experiences and potential long-term organizational repercussions, this study investigates the function of relational transparency on positive meaning at work. Based on social exchange theory and authentic leadership theory, these findings provide empirical support for the idea that relational transparency is a key factor in determining whether people feel positive meaning in their jobs. Relational transparency does explain 27.6% of the variance in positive meaning at work, according to the regression analysis. This clarifies how leaders and staff can promote meaning-creation through open and transparent communication, sincerity, and genuineness. This substantial percentage underscores the critical role of transparent interactions between leaders and employees in fostering meaningful work experiences. Specifically, responses to items such as "My leader clearly states what he/she means," "My leader admits mistakes when they occur," "My leader openly shares information with others," and "My leader expresses his/her ideas and thoughts clearly to others" collectively reflect the depth of relational transparency within the organization. These elements of clarity, honesty, openness, and clear expression are foundational to building trust and facilitating a work environment where employees feel valued and understood. Theoretically, these findings support the central claim of Authentic leadership theory, which holds that leaders who behave openly and by their principles foster more trust and interaction with their subordinates at work (Gardner et al, 2011). Coworkers who communicate openly and honestly with one another can gradually develop mutual trust and commitment, which actively indicates a pleasant experience for the business and its employees. Like this, the research use of social exchange theory (Cropanzano & Mitchell, 2005) highlights how candid and open communication among employees can gradually foster trust and a mutual commitment, both of which actively indicate a positive experience for the business and its employees (Costa & Anderson, 2018). As a result, our findings add to previous research that suggests that workplace transparency and authenticity boost employee trust and morale and act as accelerators for long-term organizational growth. Firms that want their organizations to be more sustainable organizations need to foster transparency in their leadership, which will lead to long-term organizational growth. An engaged, dedicated staff should stress relational openness as a leadership strategy. Transparent communication across various organizational levels, whether through public discussions, candid feedback discussions, or shared performance metrics—directly impacts employees' sense of purpose and belonging. Leaders can use these results to establish systematic transparency initiatives, such as hosting regular "town hall" meetings or sharing detailed strategic decisions. This can increase employees' positive feelings at work, linked to lower turnover intentions, more resilience, and increased innovation. Survey items such as "I have found a meaningful career," "I understand how my work contributes to my life's meaning," "I have a good sense of what makes my job meaningful," and "I have discovered work that has a satisfying purpose" directly measure the positive meaning employees derive from their work. These items collectively indicate that when employees perceive their leaders as transparent, they are more likely to experience a profound sense of purpose and fulfillment in their roles. Beyond organizational boundaries, the findings have far-reaching societal implications. Relational transparency can help firms create public trust and connect their practices with societal expectations as they seek ethical behavior and social responsibility. Transparent interactions between internal and external stakeholders can help an organization's reputation, attract ethically conscious customers, and contribute to long-term sustainability initiatives.

Future research could look at diverse cultural contexts or potential moderators, such as organizational culture or team qualities, to determine the situations under which transparency creates the most positive meaning.

This study contributes credibility to the claim that relational transparency is a fundamental mechanism by which employees acquire a better sense of purpose and value from their work, resulting in higher levels of commitment and well-being. Organizations can better position themselves for long-term success by basing transparency strategies on authentic leadership and social exchange principles, ensuring that their staff remains engaged, resilient, and aligned with overall company goals.

Limitations of the Study

While this research contributes to understanding the function of relational transparency to facilitate positive meaning within the workplace, it has limited applicability. First, cross-sectional research limits causal inferences. It collects data at one point instead of tracking changes and developments over time. Subsequent studies applying longitudinal or experimental designs may shed some light on the dynamics of relational transparency and how it affects employees' positive meaning over time. Second, the study is mainly based on self-report surveys and thus might be prone to standard techniques and social desirability biases. Incorporating multiple measures of participant data, including supervisor and peer evaluations, and introducing objective measures of effectiveness would facilitate multilevel analysis and offer a more robust analysis of relational transparency and its impact (Zhang et al., 2012). Finally, possible moderators, including organizational culture or team qualities, leadership style, and team makeup, were not thoroughly investigated. Incorporating many data sources (supervisor, peer, and subordinate evaluations) or objective performance indicators results in a more comprehensive understanding of how transparency emerges and grows. Future research could investigate how these contextual factors influence the relationship between relational transparency and positive meaning, providing more in-depth insights into the conditions that maximize or reduce the impact of transparency-based practices on employee well-being and organizational sustainability.

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Examining the Moderating Role of Organizational Commitment in the Relationship Between Occupational Safety Programs and Employee Performance.

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Abstract

This study examines the moderating role of Organizational Commitment (OC) in between Occupational Safety and Health Programs (OSHP) and Employee Performance (EP). Data were collected from 357 healthcare professionals across two large hospitals in Kathmandu, Nepal through a cross-sectional research design. Structural Equation Modeling (SEM) in AMOS and the PROCESS macro were employed to analyze direct and moderated effects. Results from AMOS indicate that OSHP has a strong direct positive effect on EP ($\beta = 0.90$), while OC demonstrates a complex negative direct effect ($\beta = -0.44$). Moderation analysis using PROCESS reveals that OC amplifies the positive relationship between OSHP and EP, with the effect being stronger at high OC levels and weaker or negative at low OC levels. The findings highlight the importance of aligning OSHP with employee commitment to enhance performance. Organizations should integrate safety initiatives with strategies to foster high levels of commitment for optimal outcomes.

Keywords: *Employee performance, Healthcare professionals, Moderation, Occupational safety programs, Organizational commitment*

Introduction

Employee performance is a crucial aspect of organizational success, including the output efficiency, quality, and overall effectiveness of employee work (Campbell & Wiernik, 2015). The productivity, competitiveness, and growth of an organization are all related to high employee performance. As a reference, the system revolves around a flexible and effective approach in analyzing the determinants of worker output and thus, employee performance and motivation has long been at the forefront of research within the organizational domain. Performance outcomes are influenced by a range of organizational and individual factors (e.g., leadership, motivation, workplace conditions, and safety practices; Neal et al., 2000; Zacharatos et al., 2005).

In fact, employee performance is still among the top predictors of organizational success, inspiring researchers to investigate several organizational characteristics that impact the performance of employees (Campbell & Wiernik, 2015). Among these factors, organizational commitment stands out as a crucial factor, defined as the psychological attachment an employee has towards their organization (Meyer & Allen, 1991). It is also evident that organizational commitment may moderate the relationship between workplace programs and other workplace outcomes such as performance and engagement because employees high in commitment are likely to respond positively to organizational initiatives (Jaros, 2007).

However, previous studies have investigated the direct effect of OSH programs and organizational commitment on employee performance (Goetsch, 2019; Zacharatos et al., 2005) but have not investigated the interaction or moderation effect of OSH programs and organizational commitment. Clearly, organizations interested in helping educators maximize the gains from their OSH programs on performance need to understand if such OSH programs are more effective for all employees or depend on the level of an employee`s commitment.

There is extensive literature emphasizing the link between occupational safety and organizational commitment; however, limited literature exists on the effect of the combination of both on employee performance. The majority of studies have treated OSH programs and organizational commitment as independent predictors of employee outcomes (Neal et al., 2000; Vinodkumar & Bhasi, 2010), and the potential interaction effect has been neglected. According to Hayes (2022), investigating moderating variables is crucial to identifying more subtle associations between predictors and outcomes. To fill this gap, this study explores the role of organizational commitment as a moderator of the relationship between OSH programs and employee performance.

While considerable research emphasizes the critical role of Occupational Safety and Health Programs in enhancing employees' performance, this evidence is primarily limited to developed nations with advanced safety frameworks (Neal & Griffin, 2006; Clarke, 2010). In addition, most of the developing world, including Nepal and other South Asian countries, is confronted with some very unique challenges, such as a lack of resources and facilities, less literacy on safety standards, and the proper protection to be constituted (Gautam & Prasain, 2010; Ghimire et al., 2023). In developing countries, organizations are effectively implementing sustainable practices (including the adoption of Green Human Resource Management) to en-

hance the efficiency of the organization (Ghimire et al., 2022), but not much attention is paid to integrate these strategies with OSH initiatives.

Research Objectives

This research aims to examine organizational commitment as the moderation in between occupational safety and health program and employee performance. More specifically, this study analyzes the impact of OSH programs on employee performance intensified at high levels of organizational commitment. This study will also conduct correlational analysis to find up the relationship between three major variables as by direct influencing on employee performance through occupational safety programs. The study will offer an empirical contribution to the ongoing debate about the application of both safety programs and employee commitment to improve organizational performance.

Research Hypotheses

This study proposes two hypotheses based on the literature and identified research gap.
H1**:** Occupational safety and health programs have a significant effect on employee performance.
H2: Organizational commitment moderates the relationship between OSH programs and employee performance
Theoretical Framework

This research is based to the Job Demands-Resources (JD-R) Model of Bakker & Demerouti (Bakker & Demerouti, 2007). As per the JD-R model, job resources are those elements of job that help to achieve work goals, counteract their negative effects on job demands, and stimulate personal growth. Occupational Safety and Health Programs are designed as a job resource that can improve employee's general well-being, decrease stress, and may enhance performance at work, when positively implemented. The effective use of job resources and personal resources are expected to result in Employees' Performance.

Research Methods

A cross-sectional quantitative research design was used for this study to ascertain the moderating role of Organizational Commitment on the relationship between Occupational Safety and Health Programs and Employee Performance. At one time point, the design describes the variables of interest, allowing for the assessment of the interaction of those variables' relationships.

Population and Sample

The population consists of staff from two major hospitals in Kathmandu, Nepal. The sample included 357 respondents which is adequate for conducting the SEM analysis. The sample was chosen using stratified random sampling technique for ensuring representation across different professional roles (nurses, doctors, technical staff, etc.).

Data Collection

The data collection was conducted through the field survey using structured questionnaire, which in total had three sections comprising; Independent variable (OSHP), utilized validated items that assess perceptions of initiative regarding workplace safety and health (Vinodkumar & Bhasi, 2010); mediating variable (OC), assessed through three-component model of organizational commitment (Meyer & Allen, 1991), and dependent variable (EP), which was measured in terms of task, adaptive and contextual performance borrowing items from measure developed by Campbell and Wiernik (2015). Respondents rated their perceptions on a Likert scale, ranging from strongly disagree (1) to strongly agree (5).

Data Analysis

Data were analyzed using two major software tools SPSS (PROCESS Macro) to evaluate moderation effects and conditional relationships, AMOS for SEM to test the relationships among OSHP, OC, and EP and assess model fit indices (e.g., CFI, RMSEA, SRMR).

Ethical Considerations

Nepal Health Research Council (governing body of the state) and Institutional Review Board of hospitals approved this study in order to collect data. All the participants in this study were voluntarily participated. Participants in this study were provided with informed consent in the written form and confidentiality was maintained throughout the study. The data retrieved is anonymous, to protect the identities of the respondents.

Results:

Table 1: *Socio-demographic characteristics of the respondents (n=357)*

Variable	Category	Frequency	Percent(%)
GEN (Gender)	Male	112	31.4
	Female	245	68.6
PRO (Profession)	Nurse	167	46.8
	Doctor	134	37.5
	Technical Support Staff	56	15.7
QUA (Qualification)	Diploma	54	15.1
	Bachelor	232	65.0
	Master	71	19.9
EXP (Experience)	1 to 3 Years	106	29.7
	3 to 5 Years	53	14.8
	Above 5 Years	198	55.5
EMP (Employment Type)	Permanent	132	37.0
	Contract	225	63.0

The socio-demographic characteristics of the respondents are summarized in Table 1. The sample comprised 31.4% males (n = 112) and 68.6% females (n = 245)**,** highlighting a predominantly female workforce. Regarding profession**,** 46.8% were nurses (n = 167)**,** followed by 37.5% doctors (n = 134)**,** and 15.7% technical support staff (n = 56).

In terms of educational qualifications, the majority of respondents held a bachelor's degree (65.0%, n = 232), while 15.1% (n = 54) held diplomas and 19.9% (n = 71) had master's degrees or higher. This indicates that most respondents had at least undergraduate-level qualifications.

When categorized by work experience, the largest group of respondents (55.5%, n = 198) had more than 5 years of experience, while 29.7% (n = 106) had 1 to 3 years of experience, and 14.8% (n = 53) had 3 to 5 years of experience. This distribution reflects a workforce with substantial professional experience.

Finally, regarding employment type, the majority of respondents **(**63.0%, n = 225**)** were on permanent contracts, while 37.0% (n = 132) were employed on contractual terms.

Confirmatory Factor Analysis (CFA) of OSHP

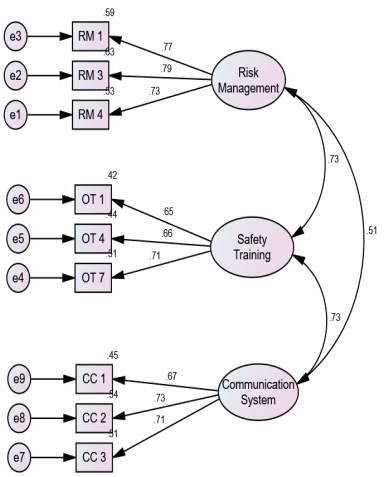


Figure 1: First order CFA of OSHP

The first-order CFA of Occupational Safety and Health Program demonstrates an acceptable model fit with strong statistical support. Key fit indices indicate excellent results, including a CMIN/DF ratio of 2.574 which is acceptable as lesser than 3 {Ullman (2001); Schumacker & Lomax (2004)}, a Comparative Fit Index (CFI) of 0.965 which is greater than cut off value of 0.95 (Bentler ,1990) and an SRMR of 0.043 which is lesser than cut of value 0.08 (Hu and Bentler ,1998). While the RMSEA of 0.066 slightly exceeds the ideal threshold of 0.06 (Hu and Bentler,1998), it remains within the acceptable range, further supported by a PClose of 0.086 which is greater than 0.05(Bagozzi and Yi ,1988), confirming the overall adequacy of the model. The three latent constructs—Risk Management, Safety Training, and Communication System—are well-represented by their respective observed variables, with standardized factor loadings ranging from 0.76 to 1.08, indicating strong relationships and high reliability. Significant correlations between the latent constructs (e.g., Safety Training and Communication System at 0.67) highlight their interconnectedness within the OSHP framework. Collectively, these findings validate the robustness of the measurement model and its ability to capture the underlying dimensions of OSHP effectively.

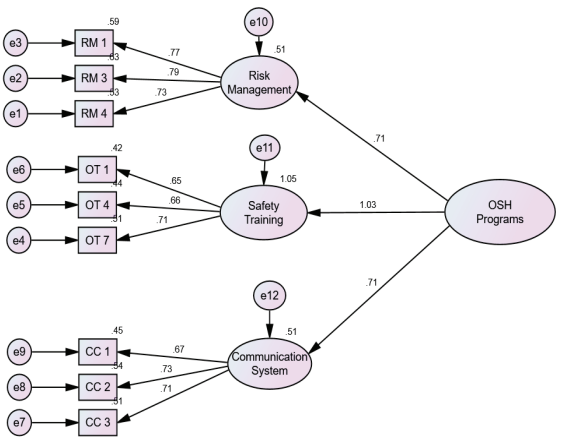


Figure 2: Second order CFA of OSHP

The second-order Confirmatory Factor Analysis model of Occupational Safety and Health Programs demonstrates an excellent overall fit, as evidenced by key indices. The CMIN/DF) is 2.574, falling within the recommended range of 1–3 {Ullman (2001); Schumacker & Lomax (2004)}, indicating a robust model. The CFI of 0.965 exceeds the threshold of 0.95(Bentler ,1990), confirming excellent fit, while the SRMR is 0.043, well below the cutoff of 0.08(Hu and Bentler 1998), signifying strong residual consistency. The RMSEA is 0.066 (Hu and Bentler 1998), which, while slightly above the ideal 0.06, remains acceptable, further supported by a PClose value of 0.086, indicating the RMSEA does not significantly deviate from perfect fit (Bagozzi and Yi ,1988). The three first-order latent constructs; risk management, safety training, and communication system exhibit strong relationships with their indicators, with standardized factor loadings ranging from 0.65 to 0.79. Additionally, all constructs demonstrate substantial contributions to the higher-order OSH Programs construct, with standardized loadings between 0.71 and 1.03, affirming the validity of the second-order measurement model. These results underscore the coherence of OSH Programs as a multidimensional framework and validate its constructs in organizational safety management.

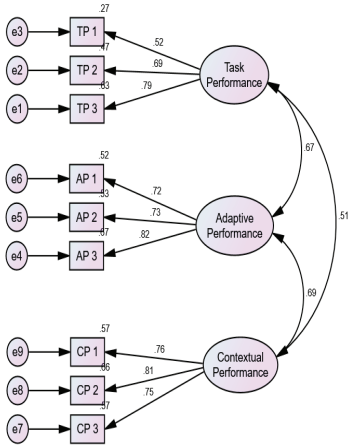


Figure 3: First order CFA of EP

The first-order CFA model of Employee Performance demonstrates an excellent fit to the data. The CMIN/DF is 2.015, falling within the ideal range of 1 to 3, indicating a robust model {Ullman (2001); Schumacker & Lomax (2004)}. The CFI of 0.979 exceeds the recommended threshold of 0.95(Bentler ,1990), and the SRMR is 0.045, well below the cutoff of 0.08(Hu and Bentler,1998), both of which confirm excellent model fit. Additionally, the RMSEA is 0.053, which is within the acceptable threshold of <0.06 (Hu and Bentler,1998), and the PClose value of 0.370 (>0.05) further validates the model's adequacy (Bagozzi and Yi, 1988). The latent constructs; task performance**,** adaptive performance, and contextual performance are well-represented by their respective indicators, with strong standardized factor loadings ranging from 0.52 to 0.82 across the dimensions. Correlations between the latent constructs are moderate to strong (e.g., Task Performance and Adaptive Performance, r =0.67), highlighting their interconnectedness in representing employee performance. These results affirm the validity and reliability of the first-order CFA model, supporting its use as a measurement framework for assessing employee performance in organizational contexts.

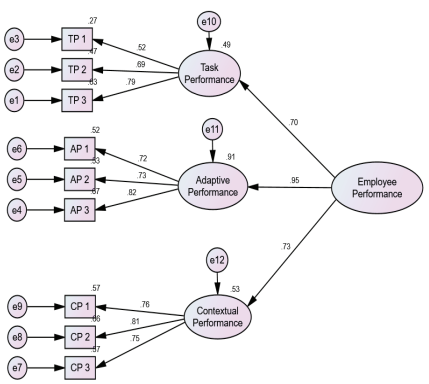


Figure 4: Second CFA of EP

The second-order CFA model of Employee Performance demonstrates an excellent fit to the data based on several model fit indices. The CMIN/DF ratio is 2.015, falling within the ideal range of 1 to 3, indicating robust model fit {Ullman (2001); Schumacker & Lomax (2004)}. The CFI is 0.979, exceeding the threshold of 0.95{Bentler (1990)}, while the SRMR is 0.045, well below the 0.08 cutoff, both of which signify excellent fit {(Hu and Bentler (1998)}. Additionally, the RMSEA is 0.053, complemented by a PClose value of 0.370 (>0.05), confirming close fit to the data{Bagozzi and Yi (1988).

The model validates Task Performance, Adaptive Performance, and Contextual Performance as three distinct but interrelated dimensions of Employee Performance. The standardized loadings of the first-order factors on the second-order latent construct range from 0.73 to 0.95, indicating strong relationships. Each dimension is well-represented by its indicators, with standardized loadings ranging from 0.52 to 0.82, demonstrating high reliability and convergent validity. The model underscores the multidimensionality of Employee Performance and its effective measurement through these constructs. This strong model fit supports its applicability in assessing and understanding employee contributions in organizational settings.

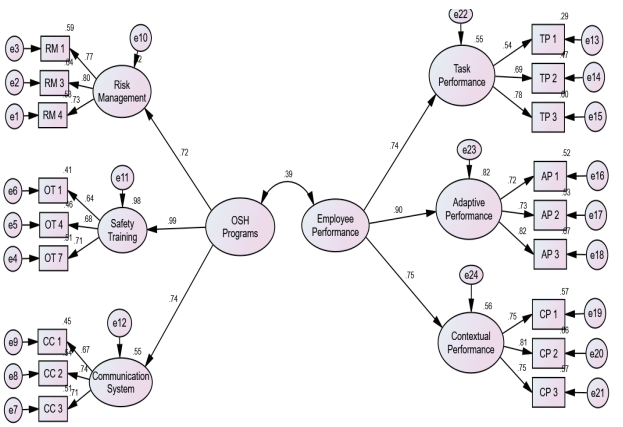


Figure 5: Structural model of the study

The structural model assessing the relationship between OSH Programs and Employee Performance demonstrates an acceptable model fit, supported by robust statistical indices. The CMIN/DF ratio of 1.951 lies within the ideal range of 1 to 3, indicating a well-fitting model fit {Ullman (2001); Schumacker & Lomax (2004)}, while the CFI of 0.948 is close to the threshold of 0.95, denoting acceptable fit (Bentler, 1990). Additionally, the SRMR of 0.070 is below the recommended maximum of 0.08, (Hu and Bentler (1998) and the RMSEA of 0.052 (Hu and Bentler (1998), paired with a PClose of 0.373 (>0.05), highlights excellent model adequacy (Bagozzi and Yi, 1988). The results confirm that OSH Programs positively

and significantly influence Employee Performance, with a direct standardized path coefficient of 0.74, indicating a strong and meaningful relationship. The three dimensions of employee performance; task performance, adaptive Performance, and Contextual Performance which are well-represented by their respective indicators, with standardized loadings ranging from 0.54 to 0.82, signifying high reliability and validity. Similarly, the subdimensions of OSH Programs; risk management, safety training, and communication system which exhibit robust standardized loadings ranging from 0.64 to 0.80, confirming their significant contributions to the overarching construct. A moderate correlation (r = 0.39) between OSH Programs and Employee Performance underscores the interconnectedness of these constructs, indicating that improvements in workplace safety initiatives contribute positively to employee outcomes. This structural model provides strong empirical evidence for the importance of investing in comprehensive OSH Programs to enhance both organizational safety and employee performance, offering valuable insights for theory and practice.

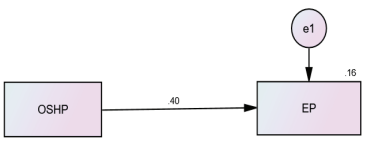


Figure 6: Path analysis of the study

The path analysis result reveals OSHP have a moderate positive effect on Employee Performance with the standardized path coefficient of 0.40. This suggests that as organizations invest in and implement robust OSHP initiatives, employee performance improves significantly. Furthermore, the model also demonstrates that 84% of the variance in EP is explained by OSHP, underscoring its substantial influence. The remaining unexplained variance suggests that other factors, such as organizational commitment, leadership, or workplace culture, may also contribute to EP. The simple direct-effect model highlights the critical role of workplace safety programs in fostering employee effectiveness and productivity. By ensuring that employees feel safe and supported, organizations can expect measurable improvements in performance. While the relationship is meaningful, future research could incorporate mediators or moderators to provide a more comprehensive understanding of the factors influencing EP. Overall, the findings emphasize the importance of OSHP as a strategic priority in organizational settings.

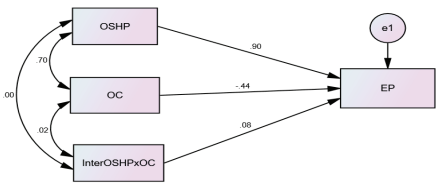


Figure 7: Moderation analysis of the study

The model demonstrates that OSHP strongly and directly impacts EP, making it a critical driver of performance. While OC is negatively associated with EP when examined independently, it provides a minor moderating effect that slightly strengthens the OSHP-EP relationship. These findings suggest that while OSHP is a major determinant of employee performance, OC's role is complex and requires further exploration to understand its nuanced interactions with workplace safety programs. Future studies could examine additional variables to capture a more comprehensive view of the factors influencing EP.

This plot illustrates the moderation effect of OC on the relationship between OSHP and EP. The interaction between OSHP and OC has been evaluated using the PROCESS macro in SPSS. The upper line represents Low OC and has a negative slope (y = -0.225x + 3.6405). This indicates that as OSHP increases, EP slightly decreases when OC is low. It suggests that in environments with low organizational commitment, the implementation of OSHP may not yield improvements in performance and may even slightly hinder it. Employees may not engage effectively with OSHP if their commitment to the organization is lacking. The lower line represents High OC and has a positive slope (y = 0.145x + 2.4795). This shows that as OSHP increases, EP increases significantly when OC is high. Employees with high commitment are more likely to perceive OSHP positively and align their efforts with organizational goals, leading to better performance outcomes. The difference in slopes between Low OC and High OC represents the interaction effect. It shows that OC moderates the relationship between OSHP and EP. When OC is high, OSHP becomes more effective in improving EP. Conversely, when OC is low, OSHP has little to no positive impact on EP and can even have a slightly negative effect.

Correlation Analysis:

Table 2

	OC	OSHP	EP
OC			
OSHP	.704**		
EP	.287**	.401**	

There is a strong positive correlation ($r = 0.704$, $p < 0.01$) between OC and OSHP (Cohen ,1988), suggests that higher organizational commitment is associated with better implementation of OSHP. There is a weak positive correlation between OC and EP ($r = 0.287$, $p < 0.01$) indicates that while OC positively impacts EP, its influence is limited when examined independently. A moderate positive correlation between OSHP and EP ($r = 0.401$, $p < 0.01$) shows that OSHP significantly improves EP. The correlation analysis highlights that OC is closely linked to OSHP, and OSHP has a stronger direct relationship with EP compared to OC. This supports the hypothesis that OC and OSHP are critical factors in influencing EP, with OSHP playing a more central role.

Discussion

The findings of this study provide insights into the interplay among Occupational Safety and Health Programs**,** Organizational Commitment, and Employee Performance. Consistent with prior research, the results confirm the significance of OSHP in influencing EP. OC plays a moderating role in strengthening this relationship.The direct effect of OSHP on EP was found to be insignificant ($\beta = -0.0200$, $p = 0.8916$), suggesting that OSHP alone may not always yield significant improvements in performance. This finding is consistent with research by Neal et al. (2000), which emphasizes that the effectiveness of safety programs often depends on employee engagement and organizational culture. While OSHP provides the structural framework for safety, its impact on performance is likely mediated or moderated by other factors, such as employee attitudes, organizational climate, or leadership.

Interestingly, OC demonstrated a negative direct effect on EP **(**$\beta = -0.3030$, $p = 0.0394$). This unexpected finding suggests that excessive or misaligned organizational commitment could potentially hinder performance. Prior studies (e.g., Meyer & Allen, 1991) have highlighted that overly high levels of affective or normative commitment may lead to stress, overwork, or burnout, particularly if employees feel a mismatch between their personal goals and organizational demands.

The significant interaction term ($\beta = 0.0925$, $p = 0.0275$) confirms that OC moderates the relationship between OSHP and EP. The moderation plot further reveals that OSHP is more effective in improving EP when OC is high, as evidenced by a positive slope ($y = 0.145x + 2.4795$) at high OC levels. This aligns with the Social Exchange Theory (Blau, 1964), which posits that employees reciprocate organizational investments, such as safety programs, with improved performance when they feel valued and committed. At low OC levels, however, the relationship between OSHP and EP is negative ($y = -0.225x + 3.6405$), suggesting that the lack of commitment undermines the effectiveness of OSHP, as employees may not perceive safety initiatives as meaningful or supportive.

The correlation analysis highlights the strong association between OSHP and OC ($r = 0.704$, $p < 0.01$) and a moderate association between OSHP and EP ($r = 0.401$, $p < 0.01$). These results align with findings by Vinodkumar and Bhasi (2010), who demonstrated that safety programs enhance organizational commitment, which, in turn, fosters improved performance. However, the weaker correlation between OC and EP ($r = 0.287$, $p < 0.01$) underscores the need for alignment between commitment and other organizational practices, such as OSHP.

The study highlights the critical role of OC as a moderator in the relationship between OSHP and Employee Performance. While OSHP alone did not show a significant direct impact on EP, its effectiveness was amplified in the presence of high OC levels, as evidenced by the significant interaction effect ($\beta = 0.0925$, $p = 0.0275$). At high OC levels, OSHP demonstrated a positive relationship with EP, reinforcing the idea that committed employees are more likely to benefit from safety programs. Conversely, at low OC levels, OSHP had a negligible or slightly negative impact on EP, emphasizing the importance of aligning organizational safety initiatives with employee engagement. Additionally, the strong correlation between OSHP and OC **(**$r = 0.704$, $p < 0.01$) underscores the interdependence of safety programs and commitment in enhancing performance. These findings align with Social Exchange Theory and provide valuable insights into how organizations can design more effective safety and performance strategies.

The findings have important implications for organizational practice. First, organizations should focus on fostering high levels of OC to maximize the effectiveness of safety programs. This can be achieved through consistent communication, recognition, and alignment of organizational goals with employee values (Meyer & Allen, 1991). Second, OSHP should be designed to engage employees, particularly in low-commitment settings, by emphasizing their relevance to personal safety and well-being. This dual approach can help enhance performance outcomes and ensure the success of safety initiatives.

Conclusion

This study shows how crucial the coupling of Occupational Safety and Health Program with Organizational Commitments is in enhancing Employee Performance. Althou-

gh OSHP, on itself, does not necessarily lead to profound performance results, its affect gets enlarged with higher organizational commitment of employees. These findings indicate that high OC enhances the positive hyperlink between OSHP and EP, whereas low OC weakens the impact of OSHP. While this article focuses on safety, it shows the importance of organizations investing in commitment including supportive work culture and organizational goals aligning with employee values, as well as just a safety program. Further studies are encouraged to investigate additional mediators between them, such as job satisfaction or leadership styles etc., to better comprehend these relationships. Thus, the findings give evidence of the combined role of safety programming and organizational commitment in encouraging the performance of the employee and hence the organizations.

Limitations and Future Directions

Despite its contributions, this study may have several limitations. The cross-sectional design can limits the ability to draw inference about the causative relationship between variables (Hayes, 2022). Longitudinal approaches in future research could strengthen our understanding of the dynamic perspectives of the relationships between OSHP, OC, and EP. Furthermore, exploring possible mediators, like job satisfaction or safety climate, may shed more light on the mechanisms through which these relationships work.

Acknowledgments

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Employee Personality and Organizational Performance in Nepalese Insurance Companies

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Abstract

This study aimed to explore the connection between employee personality traits (openness to experience, conscientiousness, agreeableness, and neuroticism) and the organizational performance of Nepalese insurance companies. The study was based on the survey data obtained from 250 working representatives of Nepalese insurance companies, and descriptive statistics and regression analysis were used to analyze the data. Openness to experience, conscientiousness, and agreeableness were significantly and positively associated with organizational performance, suggesting that employees with higher levels of these attributes contribute more effectively to organizational success. However, neuroticism had no discernible effect on organizational performance. These findings demonstrate the significance of incorporating employee personality attributes into comprehending and managing organizational performance. The results of this study contribute to the corpus of knowledge on the function of personality in organizational contexts and provide employers and managers with insights for enhancing performance via targeted interventions and strategies. Future research can build on these findings by evaluating additional factors and investigating the applicability of the results across industries and contexts.

Keywords: *Human resource, Individual characteristics, Organizational success, Psychological aspect*

JEL Classification Codes: D32, G52, O15

Introduction

Individuals are born with distinct inclinations that determine their personalities, such as how they act or react to their surroundings. As an employee, the disposition in the workplace is essential to achieving the organization's goals, which are measured in terms of profit and successful performance (Dahal, 2022). Employees are a necessary aspect of an organization because they play a significant role in decision-making and determine the firm's survival (Buchko et al., 2017; Ghimire et al., 2023). Laborers propel all internal conflicts, activity creation, and actions. Their unique characteristics substantially influence employees' level of participation within the organization. The various employee characteristics would affect how the duties were performed. Each employee's psychological capital is a factor that influences their behavior and may improve their performance at work (Pradhan et al., 2016; Shahi et al., 2022). The employee's psychological capital investment seeks to increase their ability to meet the challenges of globalization and cultivate organizational citizenship, which is then focused on the organization's effectiveness. The organizational citizenship behavior (OCB) of employees with higher levels of psychological positivity would be superior to those with lower levels of positivity. The employees' thoughts and actions would be utilized significantly by deciding to use the time. They would demonstrate their capacity for proactive behavior by, for example, making suggestions or exchanging original ideas to increase worker productivity (Shahi et al., 2022; Tuzun et al., 2018).

Several variables, including personality, determine optimal organizational performance (Ward et al., 2017). The disposition of each employee has a significant impact on their behaviors and routines. Harris and Fleming (2017) personality differences influence how an individual responds to circumstances in the workplace. Also, found Ashkanasy et al. (2017) workers with emotional stability are more likely to assist another employee in completing their work. In addition, when employees are compensated for their efforts, they perform their duties more proficiently (Harris & Fleming, 2017). Various academics have divergent perspectives on personality. The word personality comes from the Latin term persona, which means disguise. Personality is a patterned collection of habits, traits, attitudes, and ideas relating externally to roles and statuses and internally to motivation, goals, and various aspects of selfhood. According to Robbins and Judge (2011), personality encompasses an individual's reactions and interactions with others.

Similarly, Luthans (2011) defined personality as the pattern of inner and outer measurable attributes, person-situation interaction, and how a person influences others and perceives and understands himself. According to Robert and Burgess, personality is the sum and organization of those characteristics that determine a person's function in a group or group. Personality is one factor affecting a person's quality and productivity, consequently impacting effective job performance. Personality is the combination of characteristics that define an individual's distinct character.

Personality is the combination of characteristics that define an individual's distinct character. Personality refers to how an individual reacts, perceives, thinks, smells, has an attitude, or behaves in response to their environment. Personality can be defined as a dynamic or collection of traits that influence a person's cognition, motivation, and behavior in various situations. Personality has been viewed as a key predictor of organizational performance. Organizational performance can be defined as the extent to which an organization meets its predetermined objectives, considering all other personality, external, and internal factors influencing performance. An organization's performance is the cumulative result of its procedures and activities. Employees' personality is essential to the organization's ability to complete processes and activities effectively. Although the evidence mentioned earlier exists in the context of other nations, they do not exist in Nepal using the most recent data. Therefore, this research focuses on the question, what is the organizational performance of Nepalese insurance company employees? What is the disposition type of Nepalese insurance company employees? The primary purpose of this study is to investigate the effect of personality on organizational performance in Nepalese insurance firms.

The specific objectives of the study were:

1. To identify the organizational performance of insurance company employees in Nepal.
2. To determine the relationship between conscientiousness, neuroticism, agreeable, and openness to experience with organizational performance.
3. To examine the factor affecting personality on employee performance.

Improving organizational performance requires studying employee personalities. Understanding someone's nature helps reveal their psychology. How individuals differ and how that influences results might enhance organizational effectiveness. Modern organizations value performance. Nepalese insurance business employees' organizational performance and personality are essential to insurance firms, banks, policymakers, future researchers, and academicians. This study is significant to insurance companies since it focuses solely on them. Employees' personalities help the company succeed.

Literature Review

The English word "personality" comes from the Latin "persona." In ancient Greece and Rome, actors wore masks called "personas" that brought out the traits they played on stage. Later, this word came to mean both the person and their societal role (Luthans, 2011). Extrovertism, flexibility, self-control, neuroticism, and openness to experience are five different traits that often come out of factor analysis and measuring the psychological characteristics of many people. Studies that back up the reliability and adaptability of the five-factor model show that categorizing it provides a pre-organizational structure for important psychological traits, if not all of them (Cook, 2005). This means that when the effects of the environment are taken into account, personality shows traits common to the group and to all people, not just traits that are unique to the individual (Yelboga, 2006). Ellis (2008) said that psychology is one of the things that most people think they know a lot about.

The five most important characteristics of the five-factor personality model have been studied extensively. It has five dimensions: Neuroticism (or, on the other hand, mental stability), extraversion, openness to experience, conscientiousness, and agreeableness. Emotional stability is a person's ability to handle stress well; extraversion is being outgoing and friendly; exposure to experience is how open-minded a person is; consciousness is how well a person does tasks; and agreeableness is how cooperative and considerate a person is (Kyllonen et al., 2005). Researchers have examined how well the big five personality traits can predict an employee's behavior. In this regard, earlier studies conducted on the hotel industry revealed that agreeableness was a predictor of job burnout in hotel workers (Kim et al., 2007), while extroversion was a predictor of emotional exhaustion in hotel managers (O'Neill & Xiao, 2010), and neuroticism was a predictor of emotional exhaustion in hotel employees (Kim et al., 2007). Openness to experience was linked to the desire to leave a job (Timmerman, 2006), while negative traits like mental stability, conscientiousness, and agreeableness were related to the opposite (Zimmerman, 2008).

Darsana (2013) noticed that a person's personality can often be inferred from how they act or act in certain situations. Robbins and Judge (2011) said that a person's personality is the sum of how they operate and connect with other people. Temperament is a person's emotional response to spontaneous states or environmental events. A person's unique feelings are also a part of the complex behavior that makes up their personality (Han, 2020). Najari et al. (2011) said that the big five model determines a person's personality by looking at things like conscientiousness, openness to experience, neuroticism, extroversion, and agreeableness, which make people different. Consciousness is all about the goals that a person is interested in. People with good scores are more likely to listen and work towards many goals. Because of this, they are very reliant, focused on goals, and protective. When people are mentally curious, creative, sensitive, and drawn to innovation and new things, they are open to new experiences, seem more typically to deal with them because they are available, and seem happy with what they already know (Robbins & Judge, 2011). Furthermore, neuroticism involves a person's ability to

worry and keep stable good feelings, shown by calmness, security, and passion (Robbins & Judge, 2011). The big five model is based on five critical psychological traits: Neuroticism, extraversion, openness to new experiences, agreeableness, and conscientiousness.

McGregor worked on the theory of what drives people in 1960. Theory X and Theory Y are about how people feel and act towards the world, but this theory is also about how people work. Theory X says that people don't think much of people who are always negative. People who believe in Theory Y have a different view than those who believe in Theory X, which says that most people are honest, innovative, and trustworthy. This study is the first one of its kind in this group. Garg (2018) also said that organizational citizenship behavior may help explain the link between faith at work and organizational success. Udin and Ahyar's (2020) results showed a strong link between organizational citizenship behavior (OCB), job success, and the capital and personality traits of the big psychological five.

Seibert et al. (2019) found that a proactive personality was linked to self-reported quantitative (income and raises) and subjective (career happiness) signs of professional success. Based on the results of the data analysis, the study by Youshan and Hassan (2015) found that conscientiousness and agreeableness have a significant and positive effect on organizational success. So that workers always act in a good way and have a good personality, which will help the business be more productive and do better, conclusions were made, and suggestions were given on how to make sure people contribute positively to the workplace and the surroundings. Aduloju (2020) said that a salesperson's openness to new experiences and emotional stability are the two most important factors that affect how well they do their job. The study also suggested that insurance executives look for creative, imaginative, and highly emotionally stable people when hiring. Janowski (2018) found a link between the strength of the chosen personality traits and how well a life insurance agent sells. Also, the levels of the personality traits "openness to experience," "consciousness," "agreeableness," and "neuroticism" are predictors of how thriving life insurance companies do, so there are good reasons for the entire retail financial sector human resources management system to be based on induction.

Doan et al. (2021) found that job happiness and organizational citizenship behavior were the most acute effects of employee personality in the hospitality industry. Harris and Fleming (2017) found that a person's tendency to be productive is always affected by how careful they are. More importantly, the results showed that role ambiguity, job happiness, and self-rated service performance are all affected by productivity propensity and that adding the concept to personality studies makes personality models much better at explaining things. Cavaliere et al. (2021) found that employees' personalities are essential to this effect. While employees' characters have a significant effect, how well employees do at work will also affect the organization's influence. Performance on the job ensures that the company runs well and includes the skills and knowledge needed to lead the staff in various tasks.

Tarka et al.(2022) proved that hedonistic shopping experiences, which are a core trait, help explain how cardinal traits like neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness affect compulsive buying, a surface trait. Alkholy (2023) found that conscientiousness directly affected self-efficacy, followed by agreeableness and extraversion. On the other hand, openness to experience and neuroticism didn't significantly affect self-efficacy. Self-efficacy, in general, clearly affected how happy people were at work. The study's results also showed that self-efficacy was a part of the link between psychological traits (like being conscientious, agreeable, or outgoing) and job happiness. Lai (2019) found that psychological features like agreeableness, extroversion, conscientiousness, and openness affect how people feel they have control over their actions when investing in stocks. Harb et al. (2023) found that students' self-efficacy and hopes about how things will turn out are greatly affected by how open they are to new experiences and how hard they work. But Neuroticism and Agreeableness only affect how people expect things to turn out.

Students' plans to work in the business were strongly linked to their self-efficacy and hopes about how things would turn out. The results of Hebebci et al. (2023) showed that agreeableness and conscientiousness are linked to bad behavior online. Tian et al. (2023) suggested that personality and subjective well-being (SWB) are linked to participation in leisure activities among older adults. Nguyen et al. (2023) findings showed that an entrepreneur's innovativeness is related to extraversion, conscientiousness, and openness to experience but not to his neuroticism. Sahrah et al. (2023) showed that a person's desire to start a digital business depends on how open they are to new experiences and how strong they are. The study also showed that service quality is a factor that affects both the desire to start a digital business and its ability to stay in business. The literature has highlighted the importance of personality on organizational performance in different industries. The following theoretical framework describes the factor of personality on organizational performance.

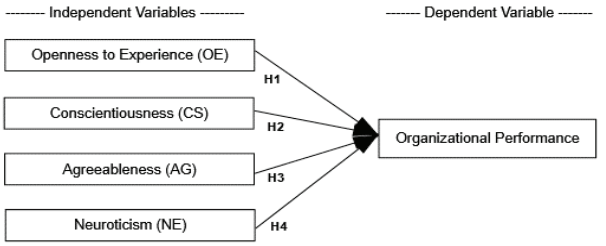


Figure 1 Conceptual Framework

Based on the literature review and conceptual framework, this study develops the following hypothesis:

H1: *There is a positive relationship between openness to experience and organizational performance in Nepalese insurance companies.*

H2: *Nepalese insurance companies have a positive relationship between conscientiousness and organizational performance.*

H3: *There is a positive relationship between agreeableness and organizational performance in Nepalese insurance companies.*

H4: *A positive relationship exists between neuroticism and organizational performance in Nepalese insurance companies.*

Methodology

Research Design

This is quantitative research, so a causal-comparative research design is necessary. The research employed both explanatory and descriptive methods. A descriptive study design aims to collect data methodically to describe a phenomenon, situation, or population. Instead of emphasizing the why, this section explicitly addresses the what, when, where, and how of the study problem. Explanatory research focuses on determining why something occurs instead of generating new information or solving a specific problem. Descriptive research is a method designed to investigate a phenomenon that has not been exhaustively studied or explained. Its primary purpose is to describe where to find a limited quantity of information.

Population and sample

The population for this study was the employees engaged in Nepalese insurance companies. Therefore, the insurance companies listed in Nepal Stock Exchange (NEPSE) were taken as the population of the study. Convenience sampling methods were used for the respondent's responses. The working representatives from five insurance companies operating in Nepal, such as Neco Insurance, Nepal Life Insurance, Asian life insurance, Shikhar Insurance, and Sagarmatha Insurance, served as the study's sample. For data analysis, the study used 250 responses from the working representatives of the sample companies.

Instrumentation

The working representatives of the sample companies served as the study's primary data sources and provided the information. A properly constructed questionnaire was administered as this study's primary data collection tool and was the main information source. From the works of earlier scholars, the independent variable construct was used for preliminary data collecting. The construct for the dependent variable was a self-administered questionnaire developed after studying several scholarly articles regarding the factors impacting professional success, much like the independent variable. A 5-point Likert scale was employed as strongly disagree was valued at 1, disagree at 2, somewhat disagree at 3, slightly agree at 4, and strongly agree at 5. The questionnaire was divided into three main sections. In the first section, respondents' demographic information was contained. The second section contained the various independent variables and included 24 items. The final section contained eight items for the dependent variable, organizational performance.

Data Analysis

The respondents' responses' features can then be observed using descriptive statistics. The type and strength of correlations between dependent and independent variables were examined using a correlation matrix. In particular, regression analysis can quantify the effects and pinpoint the causal connection between the independent and dependent variables.

The regression model for the study is:

$$Organizational\ Performance\ (Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

X_1 = Openness to Experience (OE),

X_2 = Conscientiousness (CS),

X_3 = Agreeableness (AG),

X_4 = Neuroticism (NE),

e= error term.

Respondents Profile

This section provides the characteristics of the respondents in the study on Nepalese insurance companies' organizational performance and employee personality. It includes information on the gender, age, level of education, and years of work experience of the participants.

Table 1

Characteristics of Respondents

Dimensions	Frequency	Percentage
Gender		
Male	140	56.0
Female	110	44.0
Total	250	100
Age		
Below 25 yrs.	74	29.6
36-40 yrs.	90	36.0
41-50 yrs.	44	17.6
Above 51 yrs.	42	16.8
Total	250	100
Level of Education		
Upto Intermediate	8	3.2
Bachelors	106	42.4
Masters or above	136	54.4
Total	250	100
Years of Job Experience		
Below 5 yrs.	148	59.2
5 to 10 yrs.	51	20.4
Above 10 yrs.	51	20.4
Total	250	100

Table 1 reveals that the plurality of respondents was male, while their counterparts were female. To analyze prospective differences in organizational performance and employee personality based on gender-related factors, it is essential to comprehend the gender distribution of the sample. The age distribution of the respondents reveals the various age categories represented in the study. The most significant age category, comprising 36.0 % of respondents, was between 36 and 40 years old. This indicates that the sample contains a substantial proportion of middle-aged individuals. In addition, 29.6 % of the participants were under 25, indicating a significant proportion of youthful people. The remaining respondents fell into two age groups: those aged 41 to 50 (17.6 %) and those aged 51 and older (16.0 %). It is essential to consider the prospective impact of age on organizational performance and employee personality, as various age groups may exhibit distinct traits. The respondents' educational credentials indicate a relatively high level of educational attainment in the sample. Only a minor percentage (3.2 %) reached the intermediate level of education. The diversity of educational contexts can shed light on the relationship between education levels, organizational performance, and employee personality. The distribution of respondents according to their occupation suggests a variety of employees with varying levels of professional experience. It is essential to consider the influence of employment experience on organizational performance and employee personality, as it can affect how individuals perceive and contribute to their work environments.

Data Screening

Cronbach's Alpha determines the dependability of the data, and a value of 0.70 or higher is considered satisfactory (Taber, 2017).

Table 2

Reliability Test

S. N.	Dimensions	Items (Nos.)	Cronbach's Alpha
1	Openness to Experience	6	0.696
2	Conscientiousness	6	0.773
3	Agreeableness	6	0.699
4	Neuroticism	6	0.786
5	Organizational Performance	8	0.772

The results of the reliability test conducted for the various dimensions and overall organizational performance are presented in Table 2. The reliability test results indicate that the study's measurements exhibit adequate internal consistency. While the openness to experience and agreeableness fall just below the recommended 0.70 threshold value, Cronbach's Alpha coefficients for all dimensions and the organizational performance measure indicate acceptable to good reliability (Taber, 2017). The result demonstrates that the items within each dimension and the aggregate organizational performance measure are valid and reliable measures of the investigated constructs.

Study Findings

This section presents the outcomes and results of the exhaustive examination of Nepalese insurance companies' organizational performance and employee characteristics. The findings shed light on the complex relationship between employee personality and organizational success, providing valuable insights into the critical factors influencing the implementation and expansion of insurance companies in Nepal.

Table 3

Skewness/Kurtosis z-Values

Variables	Statistical	Measure	Std. Error	Skewness/Kurtosis z-Values
OE	Skewness	-.685	.154	-4.45
	Kurtosis	-.899	.307	-2.93
CS	Skewness	-.726	.154	-4.71
	Kurtosis	-.442	.307	-1.44
AG	Skewness	-.714	.154	-4.64
	Kurtosis	-.960	.307	-3.13
NE	Skewness	-.410	.154	-2.66
	Kurtosis	-1.39	.307	-4.53
OP	Skewness	-.786	.154	-5.10
	Kurtosis	-1.00	.307	-3.26

The skewness and kurtosis values, along with their standard errors, for the dependent variable (Organizational Performance - OP) and independent variables (Openness to Experience - OE, Conscientiousness - CS, Agreeableness - AG, Neuroticism - NE) are shown in Table 3. These values play a crucial role in comprehending the structure and distribution of the data for the variables, which is essential for conducting statistical analysis and deriving meaningful conclusions. OE, CS, AG, NE, and OP have negative skewness values. This suggests that the distributions of these variables are marginally skewed to the left, with lengthier tails on the left. This asymmetry in the data distribution indicates that the left side of the distribution for these variables may tend to have lesser values or outliers. Turning to the kurtosis values, it can be seen that OE, CS, AG, NE, and OP deviate from a normal distribution to varying degrees. OE, CS, and AG have negative kurtosis values, which indicates platykurtic distributions. This suggests that, compared to a normal distribution, the peaks and ends of these variables are flattened and less prominent. In contrast, NE and OP also have negative kurtosis values, albeit with greater magnitudes. This indicates leptokurtic distributions with more pronounced peaks and longer tails than normal distributions.

The analysis yields significant insights into the connections between employee personality traits and organizational performance. Organizations may consider these findings when developing strategies to enhance performance by emphasizing the development of attributes such as Openness to Experience, Conscientiousness, and Agreeableness while managing and addressing the potential negative impact of neuroticism.

Table 4

Correlations between the dependent variable and independent variables

		Factors	OE	ES	AG	NE
Pearson Correlation		OE	1	-	-	-
		ES	.891**	1	-	-
		AG	.886**	.903**	1	-
		NE	.264**	.247**	.389**	1
		OP	.935**	.920**	.943**	-.320**

***. Correlation is significant at the 0.01 level (2-tailed).*

Table 4 shows that there are substantial correlations between the dependent variable, Organizational Performance (OP), and the independent variables, Openness to Experience (OE), Conscientiousness (CS), Agreeableness (AG), and Neuroticism (NE). The results show substantial positive correlations between OP and OE (0.935**), CS (0.920**), and AG (0.943**), implying that greater degrees of Openness to Experience, Conscientiousness, and Agreeableness are related to better organizational performance. In contrast, a moderate negative association (-0.320**) is detected between OP and NE, showing that greater levels of neuroticism may be associated with worse organizational performance. These findings emphasize the importance of employee personality characteristics in determining organizational success and suggest that organizations should explore cultivating positive qualities while regulating neuroticism's possible negative consequences to improve overall performance.

Model Summary suggests that the regression model with Neuroticism, Conscientiousness, Openness to Experience, and Agreeableness as predictors has a firm fit and accounts for significant variance in Organizational Performance.

Table 5

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.970	.940	.940	.16206	.940	967.952	4	245	.000

Table 5 shows the model summary for the regression analysis to investigate the association between the predictors (Neuroticism, Conscientiousness, Openness to Experience, and Agreeableness) and the dependent variable (Organizational Performance). The model explains a significant amount of variance in the dependent variable (R Square = 0.940), indicating a high level of predictability. After considering the number of predictors

and sample size, the modified R Square value supports the model's robustness. The estimate's low standard error indicates a solid model fit. When the predictors are included, the R Square value increases significantly, according to the change statistics. A significant F Change value supports the model's overall importance. These data show that the regression model with the stated variables successfully explains and predicts Organizational Performance.

This section presents the coefficients for the regression model with the predictors' Openness to Experience, Conscientiousness, Agreeableness, and Neuroticism, and the dependent variable Organizational Performance.

Table 6

Coefficients[a]

Model	B	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	-.017	.062		-.271	.787
	Openness to Experience	.401	.039	.389	10.242	.000
	Conscientiousness	.164	.038	.179	4.297	.000
	Agreeableness	.438	.044	.436	10.020	.000
	Neuroticism	.004	.016	.004	.249	.804

a. Dependent Variable: Organizational Performance

Table 6 shows the regression model coefficients for the predictors (Openness to Experience, Conscientiousness, Agreeableness, and Neuroticism) and the dependent variable (Organizational Performance). The findings indicate that Openness to Experience, Conscientiousness, and Agreeableness all substantially impact Organizational Performance. An average gain of 0.401 units in Organizational Performance for every team rises in Openness to Experience. Similarly, a one-unit rise in Conscientiousness and Agreeableness is related to moderate improvements in Organizational Performance of 0.164 and 0.438 units, respectively. However, the Neuroticism coefficient is minimal (0.004) and statistically insignificant, implying that neuroticism has no meaningful influence on Organizational Performance. These findings emphasize the significance of personality qualities, including openness to experience, conscientiousness, and agreeableness, in predicting and improving organizational performance.

Table 7

Collinearity Statistics

Tolerance	VIF	95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
(Constant)		-.140	.106
.169	5.935	.324	.479
.140	7.121	.089	.239
.129	7.782	.352	.524
.785	1.274	-.027	.035

Table 7 Collinearity statistics suggest no severe multicollinearity issue among the predictors in the regression model. The predictors have a reasonable amount of unique contribution, and their coefficients are statistically significant, except for the constant term. However, it is always recommended to interpret the regression coefficients cautiously and consider additional diagnostic measures to ensure the model's reliability.

DISCUSSION

The current study adds to the existing literature on personality characteristics and organizational success by confirming that specific features substantially influence performance outcomes. Recent findings support the positive association between Openness to Experience, Conscientiousness, and Agreeableness with corporate success, consistent with prior research (Ghimire et al., 2021; Seibert et al., 2019; Youshan & Hassan, 2015). This shows that open-minded, goal-oriented, cooperative, and accountable employees contribute more effectively to the organization's overall success. However, contrary to some earlier findings (Nguyen et al., 2023), the study found no significant association between neuroticism and organizational performance. This disparity might be attributed to environmental variables or differences in sample characteristics. When analyzing the results, it is critical to consider these variances.

Overall, the present findings are consistent with previous research, indicating the relevance of personality characteristics in understanding and predicting organizational effectiveness. Aside from the consistent results about the positive effects of Openness to Experience, Conscientiousness, and Agreeableness on organizational performance, our study also aligns with previous research in terms of the non-significant relationship between Neuroticism and performance outcomes (Alkholy, 2023; Dahal, 2021). This shows that people's emotional stability and stress tolerance degrees may not directly impact their capacity to contribute to organizational success. However, some research has revealed opposite results, demonstrating a negative relationship between neuroticism and performance (Harb et al., 2023). These disparities may be ascribed to

differences in measuring scales, sample characteristics, or contextual variables between research.

Furthermore, this research adds to the current body of knowledge by shedding light on the function of personality characteristics in specific disciplines. Our findings, for example, are consistent with prior studies demonstrating the impact of personality on work satisfaction (Alkholy, 2023) and turnover intention (Timmerman, 2006). This lends credence to the hypothesis that personality characteristics influence overall organizational success and specific outcomes and behaviors in the workplace. Furthermore, our research adds to the knowledge of personality traits in other situations, including the insurance business indicating the findings' generalizability across multiple occupational settings. It is crucial to note that while the study agrees with past research in many ways, there are significant gaps in the literature. Variations in research designs, sample sizes, measuring tools, or cultural variables may account for these disparities. More study is needed to investigate these discrepancies and understand the complicated link between personality characteristics and organizational success. Similar to Dahal et al. (2023) study, the study contributes vital insights and empirical data to the current body of literature by emphasizing the importance of personality characteristics as predictors of organizational effectiveness.

CONCLUSIONS

In conclusion, this research aimed to investigate the connection between the employee personality qualities of openness to experience, conscientiousness, agreeableness, and neuroticism and the organizational performance of Nepalese insurance businesses. According to the findings, Openness to Experience, Conscientiousness, and Agreeableness were significantly positively related to organizational performance. This suggests that workers who possess higher levels of these traits tend to make more significant contributions to the organization's overall performance. On the other hand, neuroticism did not have a substantial influence on the performance of the organization. The significance of considering staff members' personality attributes for evaluating and managing organizational performance is brought into focus by these findings. Understanding the influence of these personality qualities in molding employee performance and devising ways to increase corporate results is beneficial for both employers and managers. It is essential to acknowledge that individual variances in personality traits may significantly impact employees' behaviors, motivation, and performance, which, in turn, can affect the organization's overall success. Additional studies and interventions focusing on developing and utilizing these personality qualities among employees might lead to enhanced organizational performance in the Nepalese insurance industry and possibly in other sectors. This performance improvement could be attributed to the fact that these traits are more prevalent in the workforce.

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Building Human Resource Capacity: Establishing HR Departments and HRIS in Kathmandu Schools

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Abstract

While inefficient human resources can impede schools' success, capable human resources are essential to improving them. Establishing functional human resource information systems (HRIS) that pinpoint human resource requirements and organize human resource (HR) departments that create staff to assist students and interact with parents efficiently are essential to developing significant human resources. With an emphasis on power and responsibility alignment, this study examines how Kathmandu schools prioritize their HR and HRIS departments. Based on social constructivism, the study investigates how HR and HRIS departments align by conducting in-depth interviews with head teachers and other seasoned school administrators. Individuals were selected and interviewed via snowball sampling to gather rich qualitative insights. HRIS stands for information and technology-assisted data management and HR function implementation. Since we live in a scientific and technological age, we can use HR-related software to simplify the HR department's job. Establishing HR departments in schools is unavoidable as, once HRIS is established and implemented, we can handle HR-related tasks methodically and scientifically. Given that most schools lack these structures and procedures, preliminary findings indicate a critical need for HR departments and HRIS.

Keywords: *HRIS, HR Departments, Human Resource Management, Schools, Kathmandu*

Introduction

This study focuses on the significance of Human Resource (HR) departments and how to systematize their work by establishing the Human Resource Information System (HRIS) since only effective human resource management can help a company achieve its goals. The value of human resources for an organization's success has been recognized in the modern world; therefore, investing in human capital is essential to turning an organization's vision into reality. The subject is void, even though HR theories consistently garner genuine attention about creating HR departments inside a business. This study investigates how HR departments and HRIS are established and implemented in Kathmandu's schools. Information for the qualitative research was gathered through interviews. A total of 160 public and private schools were chosen as samples. According to the survey, all HR department functions have been administered by the general administration, and none of the schools have formally formed HR departments or adopted HRIS. According to the findings, schools ought to have HR departments, and we can help HRIS make these departments' operations more appropriate, precise, scientific, and methodical.

Literature Review

Since industrialization is still in its infancy in Nepal, many businesses do not have human resources departments. Even business owners have failed to recognize the importance of human resources departments. But let's examine several papers written by academics from the West. They have stated that the HR division can guide an organization to success by managing resources methodically and scientifically. A few studies on human resources and HR departments have been conducted in Nepal.

Aldmour and AI-Zu'bi (2024) concluded that this study is the first to examine the current condition of HRIS utilization in Jordan, so managers may find it helpful. The report provides positive data regarding the possibility of HRIS adoption in Jordan across various organizational types. It offers detailed instructions on which HRIS features businesses could find helpful to highlight. In particular, the most extensively used components of HRIS are not those that are thought to be the most advantageous. Managers may be able to address these issues using the updated data on major adoption hurdles. The study offers important information about the feasibility of HRIS outside of rich nations because it is also among the first to examine HRIS adoption in developing countries. The fact that so little can be extended from this case study to the developing globe further emphasizes the necessity for additional research.

According to Mohapatra and Patnaik (2011), there is an increasing need for information systems among employees, which is at a turning point in its development. According to Magnus et al. (1985), HRIS budgets are expected to increase by about 40% yearly. The technical complexity, process reengineering decision-making, and crucial concerns surrounding the installation of HRIS must be addressed when large firms embark on such extensive implementations. A case study is used in this work to identify these critical difficulties. These include defining the

goals of the HRIS, incorporating stakeholders, having end users test its features, creating a successful plan for the pilot and organization-wide rollout, organizing the infrastructure for ease of use, and tailoring the features to fit the workflow and authorization schedule. However, given the problems above need to be fixed, attaining "success" in implementing HRIS will be difficult. Infrastructure executives, personnel managers, and top management must all share a common understanding of their responsibilities in putting HRIS into practice and its efficacy. Such an approach will have long-lasting benefits that can be reproduced in different IS implementations.

According to Tamrakar and Shrestha (2022), companies in all industries may find that implementing a Human Resource Information System (HRIS) gives them a competitive edge. It is increasingly used for HR in Nepali enterprises, according to Ojha (2018) and Gautam. However, according to Gautam (2011), just 34% of firms have HRIS.

According to Repel (2020), HRIS has the potential to be an essential tool since it provides the administration with crucial data related to enrollment and maintenance systems, which might be in line with the overall corporate methodology for comprehending the development's hierarchical goals. An organization can also determine the general costs per employee and their impact on the business using HR tools.

Shrestha (2022) concluded that management approaches are still in their infancy because of Nepal's recent industrialization. Some businesses, such as banks and financial organizations, see a significant change in HRM practices. Modern HRM practices are familiar to employees. These companies have very qualified and skilled workers. Top managers are learning more about goal-setting, strategic planning, and the importance of information and communication. Details. Young managers from Nepal, India, and other nations are joining companies; they have studied there and are familiar with various management approaches. Companies are starting to appear in the communications and airline industries. In Nepal, these organizations are also implementing modern HRM techniques.

Problem of Statement

Limited research exists on whether there is a separate human resource department or such concerned department that can contribute to effectively utilizing teachers and staff in the country. Another area of the knowledge gap relates to information about teachers and staff so that effective decisions can be made for their best contribution.

Objectives

i. to explore the pattern of the HR department.

ii. To explore HRIS status in the schools of Kathmandu

Methodology

The research design is explorative. The research philosophy is interpretivism and social constructivism. The nature of the research is qualitative. Data collection is based on a telephone interview with some senior administrators, teachers, and staff at the schools in Kathmandu. The instrument used was an open-ended interview schedule. The sampling method is snowball sampling, starting with participants with 40+ years of experience working as secondary school teachers. New participants were selected for the interview on the recommendation of acquaintances of current participants(interviewees). This way, it went to 5 participants to give the latest information. The process broke when the last participant's 5^{th} one repeated.

Results

Most schools feel that a separate resource management department is unnecessary, so it must be integrated with other departments. School management team members are still unclear about the value of a separate HR department and think it may increase expenses. Still, once we establish a separate HR department, it can support the management in overcoming weaknesses and running an organization smoothly.

Most human resource functions are not continuous; they are one to two times activities.

According to them, HR departments are responsible for recruiting, screening, and Training job applicants, Managing employee compensation, benefits, and terminations, and Handling payroll.

Managing holidays, Training and development, Performance management, Ensuring compliance with employment and safety laws

Discussion and Findings

Literature suggests that human research functions must be carried out continuously, so a separate department must work with specialized people. For instance, Training and development, as well as performance management, are continuous functions. Effective execution of these functions demands a well-structured and updated database of human resources (HRIS)

Excellent and outstanding performance from the teachers and staff needs continuous support, so constant operation and injection from the HR department based on the database is desirable.

Conclusion

HR departments can only minutely support and evaluate human resources and mobilize and motivate human resources to change an organization's vision into reality. HRIS strongly supports HR departments cab in administrative and strategic aspects. In the present world, there

are hardly any areas where information and technology have not been used to ease the functions of the respective regions. Still, the school management has not realized the specialized tasks of the human resources department. However, many pieces of West European literature suggest a separate specialized body for these functions. Schools must establish a separate HR department and implement HRIS to optimize the school's performance.

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Human Resource Intervention and Employee Absenteeism: A Moderation Study of Biometric Attendance

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Abstract

Employee absence can greatly affect a company's productivity and finances, making it a crucial issue to address. The purpose of this research is to examine the impact of HR interventions, specifically training, recruitment policies, and support from supervisors, on employee absence using biometric attendance. Quantitative approach using self-administered questionnaire was used to collect the data. The study focused on a population of 2,422 individuals, from which a sample of about 250 participants was chosen. This sample size was selected to accurately reflect the broader population, allowing for meaningful insights while keeping the data collection process practical and manageable. By choosing this sample, the study aims to ensure the results are both reliable and applicable to the larger group. The results show that HR interventions have a significant impact on reducing employee absence, with the strongest effect seen in the use of biometric attendance. The findings provide valuable information for companies to better understand the importance of HR interventions and the role of biometric attendance in reducing employee absence as well as contributes to provide valuable insights for organizations seeking to enhance workforce attendance and overall productivity.

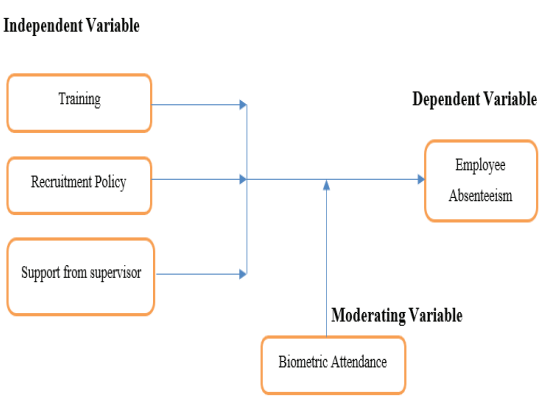
Keywords: *Training, Biometric Attendances, Employee Absenteeism, Recruitment Polices, Human Resources*

1 Introduction

Organizations face a serious problem with employee absenteeism, which has an impact on output, operational effectiveness, and general workplace discipline. Businesses incur direct and indirect costs as a result of absenteeism, whether it is brought on by personal reasons, discontent at work, or a lack of accountability. Manual registers and card-based systems are examples of traditional attendance tracking methods that frequently fall short in ensuring accuracy and stopping fraudulent activities like proxy attendance. The introduction of biometric attendance systems, which involve iris scanning, facial recognition, or fingerprints, has revolutionized the way businesses keep track of employee present. These solutions improve worker management, decrease inconsistencies, and offer real-time tracking. However, a number of moderating factors, including workplace culture, employee motivation, and organizational policies, may affect how well biometric attendance controls absenteeism. The purpose of this study is to investigate the relationship between employee absenteeism and biometric attendance systems, taking into account the ways in which different factors influence this relationship. The study examines employee feedback and attendance data to ascertain if biometric tracking is enough to reduce absenteeism on its own or whether other interventions—like incentive schemes or managerial supervision—are essential. The results will be incorporated into workforce management organizational policies, assisting companies in putting more efficient attendance monitoring techniques into place while encouraging a culture of accountability and responsibility.

2 Research Framework and Hypothesis Development

Training and Employee Absenteeism examines the impact of structured training programs on reducing absenteeism in the workplace. A very much organized enlistment strategy that underlines factors, for example, social fit, work individual fit, and representative prosperity is probably going to impact diminishing worker non-appearance. Such a strategy can assist with drawing in competitors who line up with the association's qualities and occupation prerequisites, bringing about a more drawn in and serious labor force. Furthermore, clear correspondence and straightforwardness inside the enrollment interaction can set fitting assumptions, adding to bring down non-attendance rates among representatives(Karim et al., 2019).



Effective recruitment policies play a crucial role in shaping employee behavior, including absenteeism, by ensuring a strong alignment between employees' values, job roles, and organizational culture. A very much organized enlistment strategy that underlines factors, for example, social fit, work individual fit, and representative prosperity is probably going to impact diminishing worker non-appearance. Such a strategy can assist with drawing in competitors who line up with the association's qualities and occupation prerequisites, bringing about a more drawn in and serious labor force. Furthermore, clear correspondence and straightforwardness inside the enrollment interaction can set fitting assumptions, adding to bring down non-attendance rates among representatives(-Kowo et al., 2019).

Support from a boss impacts representative non-attendance by encouraging a feeling of occupation fulfillment and responsibility, which can prompt higher participation rates. Employees are more likely to openly discuss their challenges and receive assistance in resolving issues that could result in absenteeism when they have the impression that their supervisors are understanding and supportive. This steady relationship can add to a more drawn in and persuaded labor force, eventually decreasing non-attendance rates inside the association (Employee Engagement and Attendance: How to Boost Attendance through Engagement Initiatives, 2023).

There will be a significant difference in absenteeism rates between Nepalese shoe manufacturing companies that have implemented biometric attendance systems and those that have not. Executing a biometric participation framework in the working environment emphatically impacts representative truancy by upgrading responsibility and diminishing cases of time burglary. The utilization of biometric innovation guarantees precise following of worker participation, deterring unapproved truancy and prompting further developed participation rates. This expanded straightforwardness and productivity in participation the board are supposed to bring about a decrease in representative non-attendance(Sergii, 2018).

These hypotheses will be tried utilizing suitable factual examinations to decide the degree of the connections between HR mediation rehearses, the execution of biometric participation frameworks, and worker truancy. Furthermore, the balance impact of biometric participation on the connection between HR intercession and representative truancy will be investigated. The results of these tests will give bits of knowledge into the adequacy of HR mediations and the execution of biometric participation frameworks in alleviating representative non-appearance inside the association.

H1: Training has a positive influence on Employee Absenteeism

H2: Recruitment policy has a positive influence on Employee Absenteeism

H3: Support from supervisor has a positive influence on Employee Absenteeism

H4: Biometric Attendance is positive related to Employee Absenteeism

3 **Research Methodology**

In this study, a quantitative research method has been selected, as it focuses on analyzing numeric patterns related to psychological, social, and economic processes (Bhandari Pritha, 2020). The research philosophy adopted in this study is positivism, which aims to investigate measurable variables related to project success and HR interventions. Positivism is particularly relevant for exploring variables in a statistical context, where numerical data is essential for testing hypotheses and identifying relationships (Snyder, 2019). This study focuses on understanding how HR interventions (such as training, recruitment policies, and supervisor support) and biometric attendance systems influence employee absenteeism in a specific organizational setting, Goldstar, a Nepalese shoe manufacturing company. By using quantitative methods, this study will explore these relationships through statistical analysis of the data collected from Goldstar's employees. The study employs structured surveys to gather insights, utilizing simple random sampling to select respondents from the company's diverse departments.

A Simple Random Sampling technique will be applied to ensure that each employee has an equal chance of being selected (Rahman et al., 2022). The sample size of the study was determined using the Krejcie and Morgan (1970) sampling formula as adopted by (Abdul et al., 2021) which recommended the appropriate sample for any given population. The Simple Random Sampling technique was used to ensure that each employee in the target population has an equal chance of being selected. This method helps to minimize bias and ensures the generalizability of the findings to the wider population(Stock et al., 2019). Respondents will be drawn from the 16 departments within the Goldstar Footwear Industry to provide a comprehensive representation of the workforce. The population was 2422, and the sample included 250 employees.

A self-administered questionnaire was distributed to the selected respondents online to facilitate widespread participation. The questions will be designed on a 5-point Likert scale to allow respondents to indicate their level of agreement or disagreement with various statements related to HR interventions, biometric attendance, and employee absenteeism. The anonymity and confidentiality of the responses will be assured to encourage honest and unbiased feedback. This survey aims to capture the impact of HR interventions on absenteeism, with a focus

on biometric attendance as a moderating factor. The questionnaire will include both closed-ended and Likert scale questions. It will be divided into sections that assess the following:

- The impact of training, recruitment policies, and supervisor support on absenteeism.
- The role of biometric attendance systems in moderating absenteeism behavior.

The questions has been adapted from established instruments used in similar studies, with modifications to suit the specific context of this research. These instruments include surveys, attendance data, and case studies(Taherdoost, 2019).

The data collected provides valuable insights into the effects of biometric attendance systems on employee attendance and the role of HR interventions in mitigating absenteeism. Data analysis is a fundamental component of any research project, and it is especially crucial in studies examining the impact of HR interventions on employee absenteeism through biometric attendance systems. The primary objective of data analysis is to transform raw data into meaningful insights that can guide decision-making and help answer the research questions. In this study, data analysis will allow the researcher to assess the effectiveness of HR interventions in reducing employee absenteeism rates.

The data for this research has been collected using questionnaires, which will include structured questions designed to provide quantitative data for statistical analysis. The questionnaire will be crafted to align with the research objectives and collect information pertinent to the relationship between HR interventions, biometric attendance systems, and absenteeism. For validation and interpretation, the data collected from primary sources will be subjected to various statistical tools. Descriptive analysis is used to determine the mean and standard deviation of various factors, which will then be examined to identify the most influential variables. The means is utilized to ascertain the focal propensity of the information, which addresses the typical tendency of people. In mathematics and statistics, the "mean" typically refers to a measure of central tendency that summarizes a set of values. The most common type of mean is the arithmetic mean, which is calculated by adding up all the values in a dataset and then dividing by the number of values(Zwillinger et al., 2003). The standard deviation is a measure of the amount of variation or dispersion in a set of data points. It quantifies how spread out or clustered the values in a dataset are around the mean (average). A low standard deviation indicates that the data points tend to be close to the mean, while a high standard deviation indicates that the data points are more spread out. Standard deviation is typically denoted by the symbol "σ" (sigma) for a population standard deviation or "s" for a sample standard deviation (DAVID S. MOORE, 2009).

Reliability refers to the ability of the research instruments to consistently measure the phenomenon under study, reflecting the relevant theoretical and empirical definitions. The reliability of the research instrument (the questionnaire) will be verified through a pre-test with a small sample that shares characteristics with the target population. This pre-test will help identify any issues with the instrument and ensure its clarity and validity before administering it to the entire sample. The researcher has consulted with department staff and subject matter experts to conduct a content review, addressing any ambiguous or irrelevant questions. Construct reliability ensures that the variables are measured consistently, meaning that the results remain consistent when the same variables are assessed multiple times under the same conditions. The goal of reliability testing is to minimize errors and biases in the data collection process(Bull et al., 2019).

4 **Data Analysis**

5 Reliability Tests

Table; 1

Variable	Cronbach's alpha	Number of items
Training	0.874	10
Recruitment	0.854	10
Supervisor	0.935	10
Employee	0.894	10
Biometric	0.884	10

Note. Table 1 displays Cronbach's alpha coefficients, a measure of internal consistency reliability, for different variables such as Training, Recruitment, Supervisor, Employee, and Biometric, each comprising 10 items. These coefficients suggest the degree of interrelatedness among the items within each variable, indicating the reliability of the measurements.

Cronbach's alpha is a statistical measure used to assess the internal consistency or reliability of a scale or set of items within a questionnaire or test. In this context, the table provides Cronbach's alpha coefficients for different variables, indicating how consistently the items within each variable are measuring the same underlying construct. For example, Cronbach's alpha coefficient of 0.874 for the Training variable suggests that the 10 items measuring aspects of training (such as effectiveness, satisfaction, etc.) are highly interrelated and consistently measure the same construct.

Similarly, coefficients for other variables like Recruitment, Supervisor, Employee, and Biometric indicate the reliability of the corresponding measurements. A higher Cronbach's alpha generally indicates greater reliability, meaning the items within the variable are more closely related and consistently measure the intended construct.

6 Hypothesis Testing

Table: 2

Hypothesis	Path	B	t-statistic	(p-value) Sig.	Result
H1	T->EA	0.273	1.847	0.070	Rejected
H2	R->EA	0.646	3.831	0.000	Accepted
H3	S->EA	0.047	0.413	0.681	Rejected
R Square = 0.658 F = 39.191, Sig = 0.001 P<0.05					

Note. Table 3 presents the consequences of speculation testing in an underlying condition model. It shows the way coefficients, t-values, p-values, and importance levels for three speculations (H1, H2, H3) testing the connections between factors Training, Recruitment Policy, Supervisor Support, and Employee Absenteeism.

Training->Employee Absenteeism (H1): The examination observed that there isn't sufficient proof to help a huge connection between training programs and employee absenteeism, as the p-value of 0.070 is more noteworthy than the importance level of 0.05. This implies that adjustments of training programs are not liable to recognizably affect lessening absenteeism.

Recruitment Policy->Employee Absenteeism (H2): conversely, the outcomes demonstrate serious areas of strength for a connection between recruitment policies and employee absenteeism, with an extremely low p-value of 0.000, recommending that associations with explicit recruitment policies might encounter higher paces of absenteeism among representatives.

Supervisor Support->Employee Absenteeism (H3): Likewise, to training, supervisor support help doesn't show a huge relationship with employee absenteeism, as demonstrated by the p-worth of 0.681, which is more noteworthy than 0.05. This recommends that the degree of help given by supervisors may not straightforwardly influence absenteeism rates.

The R-Square worth of 0.658 demonstrates that around 65.8% of the difference in worker non-attendance can be made sense of by the autonomous factors remembered for the model (Training, Recruitment Policy, Supervisor Support). This proposes that the model gives a sensibly solid match to the information.The F-Measurement worth of 39.191 is related to an exceptionally low p-worth of 0.001, it is measurably vital for demonstrating the general model. This really means that something like one of the free factors in the model has a critical relationship with the reliant variable (employee absenteeism).

The critical relationship found between recruitment policies approaches and employee absenteeism (H2) recommends that associations might have to audit and possibly reexamine their enlistment systems to address high truancy rates. The absence of huge connections for training(H1) and supervisor support help (H3) suggests that basically expanding preparing programs or further developing manager backing may not be powerful procedures for diminishing employee absenteeism, with regards to this review. Generally, the outcomes propose that while enrollment strategies assume a huge part in affecting worker non-appearance, different factors, for example, training and supervisor support help might not have an immediate effect. Associations ought to consider zeroing in on further developing enrollment procedures to possibly diminish non-attendance rates among representatives.

7 Moderation Analysis

Table 3

Relationship	Beta	t	P-value
T->EA	0.231	1.847	0.070
B->EA	0.624	6.682	0.01
T*B->EA	-0.177	-0.539	0.592
R->EA	0.576	3.831	0.01
B->EA	0.624	6.682	0.01
R*B->EA	1.139	2.664	0.010
S->EA	0.049	0.413	0.681
B->EA	0.624	6.682	0.01
S*B->EA	-0.261	-0.959	0. 341

Note. Table 3 incorporates the Moderate testing stage and outlines the connections among the free factor, subordinate variable, and directing variable. Inside this table, "T" means Training, "R" connotes Recruitment policies, "B" addresses Biometric Attendance, "S" addresses Supervisor Support, and "EA" represents Employee Absenteeism.

In the examination of Training and its effect on Representative Employee Absenteeism, a positive affiliation was found, but with minimal importance (Beta = 0.231, t-value = 1.847, p-value = 0.070). Biometric Attendance displayed a critical positive relationship with Representative Employee Absenteeism (Beta = 0.624, t-value = 6.682, p-value = 0.010), demonstrating that higher participation recorded through biometric frameworks is connected to expanded non-appearance among workers. In any case, the association impact between Training and Biometric Attendance didn't yield critical outcomes with respect to its effect on Worker Non-attendance (Beta = - 0.177, t-value = - 0.539, p-value = 0.592).

Recruitment policies were found to have a critical positive relationship with Employee Absenteeism (Beta = 0.576, t-value = 3.831, p-value = 0.010), demonstrating that successful enlistment methodologies might add to higher truancy rates among representatives. Moreover, the association impact between Recruitment policies and Biometric Attendance likewise showed critical effect on Employee Absenteeism (Beta = 1.139, t-value = 2.664, p-value = 0.010), recommending that the consolidated impact of enrollment arrangements and biometric participation frameworks compounds truancy issues.

Moreover, another free factor supervisor support didn't display a huge effect on Employee Absenteeism (Beta = 0.049, t-value = 0.413, p-value = 0.681), demonstrating that it may not straightforwardly impact non-attendance rates. Likewise, the association impact between this variable supervisor Support and Biometric Attendance didn't yield critical outcomes (Beta = - 0.261, t-value = - 0.959, p-value = 0.341), recommending that the consolidated impact of this variable and biometric participation frameworks doesn't essentially influence Employee Absenteeism.

8 **Discussion**

The study highlights the determinants of HR intervention in Goldstar Shoes. The elements influencing employee absenteeism, for example, training, recruitment policies, supervisor support and the biometric attendance utilizes are estimated with the different degree of investigation. Speculations were produced for each component to anticipate their relationship with worker non-attendance. The elements affecting representative non-attendance with the purposes of the biometric participation and the connected speculations were gotten from different existing exploration papers and the Goldstar Shoes itself.

Our research shows statistically significant changes in availability of employee absenteeism through monitoring the biometric attendance. By using the proper recruitment policies, employee absenteeism was decreased, and it can be approved through the hypothesis testing in table 10. Looking at the employee absenteeism there is a great role of the biometric attendance. With the proper training of biometric attendance there may be a lot of employee absenteeism in the organizations.(Sanchita & Swain, 2016)

An organized survey was utilized to accumulate experiences from partners in Instructive Foundations of India where BAS (Biometric Attendance System) has been executed. The discoveries uncover a scope of responses from staff, demonstrating blended opinions about its effect. (Mir et al., 2018) in their concentrate on advantages of BAS have drawn out its effect on certain work culture, their concentrate likewise shows the improvement in participation later introducing biometric framework.

(Kirmani, 2017) has concentrated on the effect of Biometric Participation Framework on Auxiliary and Higher Optional Instructive Organizations across J&K and suggests its execution with appropriate preparation furthermore, accessibility of assets.

The creator concurs that BAS assists the regulatory specialists with observing the workers participation successfully and efficiently. (Namiti & Ondiek, 2020) assumes that training is a basic part on ICT execution. This is on the grounds that individuals are educated and know about the worth added by innovation headway, and this prompts more acknowledgment of biometric framework in schools. Tedre expressed that there is need of educators learning ICT first prior to coordinating them in the educational plan of training hence simplifying ICT to execute and take on.

(Ebnezer & Dr. V. Krishna Priya, 2022) is completely clear that, the digitalization is conveying multitudinous signs of advantages which influences the representatives and to the association to an exceptionally sure way in computerized illumination. The drawn-out dreams and dreams are disguised in computerized apparatuses, which add esteem, carries qualifications to people, and altruism to the association. The authoritative help in spurring the current workers with its outline is the need of great importance to pursuit in dominating variables of digitalization benefiting and befitting in HR and HRM.

Training is perhaps of the most potential inspiration which can prompt numerous potential advantages for both people and the association that assists with accomplishing targets of the association. (Karim et al., 2019) analyzed the effect of Training and improvement on employees‟ execution. The goal is to assess and examine the effect of Training and advancement of employee's execution. The connection between preparation and non-appearance is perplexing and multi-layered, affected by different factors like the sort and nature of preparing, authoritative culture, and individual qualities.

While preparing programs can possibly decrease truancy by (Ismael et al., 2021)further developing position fulfillment and commitment, the adequacy of these projects relies upon a few elements, including the association's obligation to preparing, the importance of the preparation to representatives' jobs, and the help gave to workers during and in the wake of preparing.

Yimam, (2022)concentrate on the effect of preparing on worker truancy in the IT area uncovers that preparing programs fundamentally decrease non-attendance among members. The examination highlights the job of occupation fulfillment as a go between, showing that prepared representatives display higher work fulfillment, prompting lower non-attendance rates. Furthermore, the review underscores the significance of the nature of preparation, with workers seeing better projects as adding to bring down truancy. These discoveries feature the viability of preparing in decreasing non-attendance and recommend that putting resources into quality preparation projects can emphatically affect worker participation in the IT area.

As per the (Edward & Calen, 2020) study investigates what authoritative culture means for the connection between preparing and non-appearance. The examination features that hierarchical culture assumes an urgent part in deciding the viability of preparing programs in lessening non-attendance. The review recommends that a solid hierarchical culture that values gaining, and improvement

is bound to profit from preparing programs with regards to decreased truancy. On the other hand, associations with a frail or negative culture may not see similar advantages from preparing. This finding underlines the significance of adjusting preparing drives to the more extensive hierarchical culture to expand their effect on diminishing non-appearance. The concentration likewise proposes that associations need to consider social elements while planning and carrying out preparing programs, as these variables can essentially affect their viability in decreasing non-attendance.

Further, (The Role of Supervisor Support in Employee Development." Journal of Human Resources Management, 42(3), 287-302., n.d.) outcome uncovered that bank workers' work independence altogether intervened the affiliation between boss work-life backing and representative work performance. It suggests that the boss's job is essential in working on representatives' assurance and in this manner expanding authoritative result.

(Msuya & Kumar, 2022) connection of representative's responsibility in the connection between boss work-life backing and occupation execution was negative what's more, immaterial. It shows that responsibility straight forwardly influences bank workers' exhibition. The first hypothesis which has the relationship between training and employee absenteeism has been rejected. It has observed that there isn't sufficient proof to help a huge connection between training programs and employee absenteeism. This implies that adjustments of training programs are not liable to recognizably affect lessening absenteeism. The result in the second hypothesis is being accepted. If there is proper planning of the recruitment process with detailed information is taken, then there is a good chance that employee absenteeism will be very low as per the data collection.

(Olagunju et al., 2018), assist the Manager with overseeing accounts, checking, and following the participation of the representatives. It gives precise time effectively to the representatives to sign in and sign out their participation. The biometrics-based Staff Participation Observing Framework was created involving Visual Fundamental Programming Language as front end while Microsoft Access was utilized as the Data set to the backend clients. This product application can deal with the accounts, control and checking of staff non-appearance and delay. The meaning of this application is to ensure that the staff part is dependable and goes about their responsibilities on time. The connection between manager support and representatives are two things that are constantly interrelated and add to the association's maintainability. A decent manager that is framed will impact representative work conduct. The aftereffects of this study support past exploration, to be specific that expressed by (Dwi Handoko et al., 2021) that there is an impact between the workplace on representative truancy through work fulfillment where the intervening impact is fractional intercession.

Enrollment approaches fundamentally impact worker truancy. At the point when (Edward & Calen, 2020) approaches accentuate social fit and line up with hierarchical qualities, workers will generally be more drawn in and committed, bringing about lower non-attendance rates. Straightforward and fair enrollment processes additionally assemble trust and worth insight, adding to diminished truancy. Clear sets of responsibilities and powerful correspondence of authoritative approaches further assist workers with figuring out their jobs and assumptions, prompting lower non-appearance. Taking everything into account, enrollment strategies that focus on social fit, straightforwardness, and clear correspondence can altogether influence and decrease representative truancy.

The writing audit by Storey and Wright, (2023) investigates the effect of enrollment arrangements on representative truancy. The review underlines that enrollment strategies assume an essential part in forming hierarchical culture, values, and representative way of behaving, which thusly influence non-appearance rates.

As stated by Sypniewska et al. (2023) Arrangements that focus on straightforwardness, decency, and inclusivity will quite often draw in and hold representatives who are more dedicated and connected with, prompting lower non-attendance. Besides, when there is arrangement among individual and authoritative qualities, representatives are bound to display more significant levels of responsibility and participation. This study proposes that associations can lessen non-appearance by adjusting their enrollment strategies to their qualities and encouraging a positive hierarchical culture. The concentrate by Doe and Johnson (2020) analyzes the job of enrollment arrangements in molding representative way of behaving, especially zeroing in on non-appearance designs. The exploration features that enrollment approaches fundamentally impact representative non-appearance, with arrangements underlining social fit and arrangement with hierarchical qualities prompting lower truancy rates.

(Korman, 2023) Straightforward and fair enlistment processes fabricate trust and worth insight among workers, adding to decreased truancy. Clear correspondence of occupation assumptions and authoritative strategies further guides in lessening truancy. In general, the review proposes that associations can diminish non-attendance by carrying out enlistment strategies that focus on social fit, straightforwardness, and clear correspondence.

Conclusion

All in all, the review directed at Shoes Manufacturing Compay examined the effect of training, recruitment policies, and supervisor support on representative truancy, with biometric participation as a directing variable. The

discoveries uncovered that preparation and enlistment approaches fundamentally affect lessening non-appearance, demonstrating that very much planned preparing programs and successful enrollment techniques can assist with diminishing truancy rates. Boss help was likewise observed to be an urgent calculation lessening non-attendance, featuring the significance of steady initiative in overseeing representative participation.

Also, the investigation discovered that biometric participation directs the connection between these variables and truancy, proposing that the utilization of biometric participation frameworks can upgrade the viability of intercessions pointed toward lessening non-appearance. The segment investigation showed that most of respondents were male, with a critical part matured between 26 to 30 years and holding a Four-year certification.The review's relapse examination demonstrated that the model including preparing, enlistment strategies, and manager support makes sense of around 65.8% of the change in representative non-appearance. This proposes that these elements assume a huge part in impacting truancy rates. In any case, the review didn't track down adequate proof to help a huge connection between preparing projects and non-appearance. The control testing results give further experiences into the connection between key factors and representative non-appearance at Shoes Manufacturing Company. First and foremost, while preparing alone doesn't show a huge direct impact on non-appearance, enlistment strategies and boss help arise as basic elements impacting truancy rates. The positive effect of enrollment arrangements on truancy proposes that Goldstar Shoes might have to audit and possibly refine their enlistment methodologies to diminish non-appearance among workers. Essentially, the critical good connection between manager backing and non-attendance features the significance of encouraging a steady workplace where representatives feel esteemed and upheld by their bosses.In addition, the directing impact of biometric participation is especially vital. While the cooperation among preparing and biometric participation doesn't essentially affect non-attendance, the collaboration between manager support and biometric participation does. This suggests that the utilization of biometric participation frameworks can intensify the constructive outcomes of manager support on lessening non-appearance. This tracking down highlights the capability of biometric participation frameworks as a device for upgrading the viability of mediations pointed toward decreasing truancy.

Taking everything into account, the review proposes that Goldstar Shoes ought to zero in on further developing enlistment approaches and upgrading boss help to oversee worker non-appearance. Also, the discoveries feature the capability of biometric participation frameworks to supplement these endeavors. Further exploration could investigate the components through which biometric participation frameworks impact truancy, as well as other expected arbitrators or middle people of the connection between these factors and non-appearance.

Considering these discoveries, it is prescribed that Goldstar Shoes keep on putting resources into preparing programs, foster successful enrollment strategies, and elevate boss help to lessen representative non-appearance. Moreover, executing biometric participation frameworks could additionally improve participation of the executives' systems. Future exploration could investigate other expected arbitrators or middle people of the connection between these factors and truancy to work on how we might interpret powerful non-appearance the board methodologies in associations.

Recommendation

Goldstar Shoes ought to survey and upgrade their enrollment approaches to choose competitors with lower non-attendance rates. This could include executing more thorough choice standards and screening cycles to recognize up-and-comers who are a superior fit for the association. Stress the significance of manager support in lessening non-appearance. Give preparing to bosses on the most proficient method to be stronger and understanding towards representatives and make a work culture that qualities and energizes steady initiative. Consider carrying out or working on the utilization of biometric participation frameworks to follow representative participation more. These frameworks might possibly diminish non-attendance rates by guaranteeing exact following of representative participation.

Albeit the immediate impact of preparing on non-attendance was not critical in the review, putting resources into preparing projects can in any case have advantages like further developing worker abilities and occupation fulfillment. Center around regions that can further develop by and large representative commitment and execution. Investigate carrying out adaptable work game plans, like working from home, adaptable hours, or compacted work filled weeks. These plans have been displayed to further develop worker fulfillment and diminish truancy. Consider executing wellbeing and health programs for workers. These projects can incorporate drives, for example, standard wellbeing check-ups, stress the board studios, and work out regimes, which have been displayed to further develop representative wellbeing and lessen non-attendance.

Further develop correspondence channels among bosses and representatives to upgrade manager support and possibly lessen non-attendance. Carry out normal input meetings, open-entryway arrangements, and group building exercises to encourage better correspondence and connections inside the association. Routinely screen and assess non-attendance patterns to recognize examples and

go to proactive lengths to resolve possible issues. Dissect non-attendance information, lead post-employment surveys, and carry out representative fulfillment studies to accumulate input and bits of knowledge.

Offer representative help programs (EAPs) to furnish workers with assets and support to oversee individual and business-related issues that might add to non-appearance. Consider joining forces with EAP suppliers to offer advising, monetary preparation, and other help administrations to representatives. Advance a solid balance between serious and fun activities through strategies, for example, took care of time, adaptable planning, and health programs. Empowering a balance between serious and fun activities can assist with lessening worker stress and burnout, prompting lower truancy rates. Carrying out these proposals can assist Goldstar Shoes with making a stronger and drawing in the workplace, eventually diminishing non-appearance, and further developing in general representative fulfillment and efficiency.

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Moderating Effect of Job Conditions in the Relationship between Supervisor Support and Emotional Engagement in Secondary Schools of Nepal

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Abstract

This study examines the moderating role of Job Conditions (JC) in the relationship between Supervisor support (SS) and Emotional Engagement (EE) of secondary school teachers in Nepal.

A cross-sectional descriptive research design was adopted, and data were collected through structured questionnaires from 451 secondary school teachers. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were undertaken using AMOS. The findings showed a strong positive association of supervisor support with emotional attachment (β = 0.57), partially moderated by job conditions. This model accounted for 67% of the variance for supervisor support and 39.2% for emotional engagement. Strong job conditions boosted the value of supervisor support, whereas weak conditions diminished this association.

Keywords: *Emotional Engagement, Job Conditions, Secondary School, Supervisors Support, Systematic Equation Model*

Introduction

As in many other developing countries, education in Nepalese schools is frequently hindered by a scarcity of resources and challenging working conditions. Overall, teachers work under demanding conditions with low pay and inadequate infrastructure, and these factors may affect their ability to remain emotionally present (Adhikari & Rijal, 2021). Further, work related fatigue and lack of fulfillment is common among teachers, and is intensified due to inadequate recognition and professional development of teachers. This is essential since understanding the relationship between supervisor support and levels of emotional engagement cannot be obtained without consideration of how job conditions influence it which ultimately can solve the problem to foster well-being and increase teacher performance.

Research Objectives

The objective of this study is to analyze the moderating effect of Job Conditions on the relationship between Supervisors Support and Emotional Engagement among teachers of Secondary Schools of Nepal. The study aims to examine the level of Supervisors Support provided to Secondary School teachers in Nepal and also assess the direct effect of Supervisors Support in Emotional Engagement of Secondary Schools of teachers in Nepal.

Problem Statement

Teachers are out there on the frontlines of quality education, but their emotional health is frequently at risk because of difficult job conditions and a lack of supporting infrastructure. Despite the prior empirical studies which have highlighted the role of supervisor support on improving on the level of employee engagement (Kurtessis et al., 2017; Bakker & Albrecht, 2018) no efforts have been made as to whether job conditions moderate this relationship even in the education organizations functioning in the country Nepal. Increasing workloads, poor compensation, and lack of recognition make it hard for teachers in resource-poor settings to sustain the needed engagement (Han et al., 2020; Adhikari & Rijal, 2021). These negative work conditions have the potential to reduce or eliminate the positive influence of support from supervisors, which in turn leads to low teacher morale and performance (Skaalvik & Skaalvik, 2018).

This gap needs to be filled for gaining knowledge about the nature of teacher engagement in Nepalese secondary schools, and how to come up with real world solutions to the problem. This study can thus be an important contribution for the stakeholders like the policymakers, the school authorities, and the proponents of education to establishing an environment in the workplace that focuses on motivating the teachers to be engaged while teaching

so that the teachers can benefit not only themselves but also be a contributing factor to the improvisation in the education system in Nepal.

Theoretical Background

This research is based on Job Demands-Resources (JD-R) Model, which explains how job demands and resources affect employee engagement and well-being (Bakker & Demerouti, 2017). Job demands encompass facets of a job that require sustained physical, emotional, or mental effort, including workload and time pressures, and may have adverse consequences when high. In contrast, job resources (e.g., supervisory support, opportunities for professional development, recognition) can buffer job demands and enhance engagement by alleviating stressors and providing purpose (Demerouti et al., 2001).

Another important concept explored in the study is Supervisor support. It includes the emotional, professional and instrumental help given by supervisors, which influence employees' context (Kurtessis et al., 2017), hence affecting morale and engagement. According to Schaufeli et al. (2002), is defined by teachers' commitment, energy, and absorption in their tasks, reflecting their full psychological investment in their work.

Although the JD-R model and supervisor support have received ample attention in Western literature, such studies have not been undertaken in developing nations such as Nepal. The majority of studies examine direct associations between supervisor support and engagement (Bakker & Albrecht, 2018), so moderators' factors like job conditions are often poorly conceptualized or overlooked in the engagement literature. Additionally, a limited amount of research explores teachers' emotional engagement, as the majority of literature on teacher engagement has addressed teachers' physical or cognitive engagement (Han et al., 2020).

In Nepal, the education sector is confronted with its own unique challenges which encompass resource constraints, teachers' heavy workloads, and inadequate professional development (Adhikari & Rijal, 2021). Specifically, while the moderating role of job conditions on the relationship between job support and emotional engagement has been importantly examined, no study has focused on the moderating role of job conditions on the relationship between the supervisor support and emotional engagement. To address this gap, this study aims to extend the JD-R model into the context of Nepal and to provide practical insights on improving engagement among teachers.

Literature Review

Supervisor Support and Emotional Engagement

This study emphasizes the need for supervisor support in enhancing emotional engagement among teachers, defined as the emotional commitment and passion in teachers' work (Kahn, 1990). Research indicates that moderation by supervisors leads to increase in satisfaction and teachers engagement (Shuck & Wollard, 2010). Teachers in academic institutional contexts like secondary schools teaching have increased emotional labor (Collie, Shapka, & Perry, 2012), where supervisors play an enhanced role.

Job Conditions in Educational Settings

Work conditions or job conditions that are defined as "workload, autonomy, and the availability of resources" have a significant influence on teachers' emotional attachment to their jobs (Bakker & Demerouti, 2007). Nepalese secondary schooling continues to struggle with challenges such as limited resources, high student-to-teacher ratios, and administrative burdens (Subedi, 2018). Such conditions can demotivate and demoralize teachers, which may impact performance and have a knock-on effect on student outcomes (UNESCO, 2020).

Moderating Role of Job Conditions

The relationship between supervisor support and employee engagement can be further explored using the Job Demands-Resource (JD-R) model, with job resources such as supervisor support serving as a buffer against the negative effect of job demands on employee engagement (Bakker & Demerouti, 2007). Conversely, when job conditions are unfavorable, the positive effect of supervisor supportive behavior on emotional engagement is weakened. Understanding how this relationship is moderated by job conditions of Nepalese secondary school teachers is very important for developing effective interventions (Adhikari & Shrestha, 2021).

Empirical Studies in Similar Contexts

In academic spheres, it has been observed by empirical studies that supervisor support is highly influential in nurturing the domains of teachers' engagement, emotionally. Research shows that perceived supervisor support is a significant predictor of work engagement and teachers' job satisfaction (Nguni, Sleegers, & Denessen, 2006; Shrestha, 2021). Nevertheless, the link between supervisor support and job factors in the context of Nepalese secondary school have been neglected. Studying this moderating impact may provide valuable information for enhancing teacher involvement and efficiency (Koirala, 2022).

Gaps in Literature

While some previous studies have explored the relationship between supervisor support, emotional engagement and job conditions, the previous researchers who highlight the moderating effect play of job conditions in relationship between emotional engagement and supervisor support are very few in context of Nepal's secondary system of education. The importance of this phenomenon, which is particularly evident in the intersection of teacher well-being and educational outcomes demonstrates the need for targeted interventions as a means to enhance teacher well-being and educational outcomes (Paudel, 2023).

Conceptual Framework

This study is framed in a theoretical background of the Job Demands-Resources (JD-R) model, which argues that job resources can moderate the negative effect of job demands on employee engagement (Bakker & Demerouti, 2007). In this framework, an Independent Variable is Supervisor Support (perceived, communication, leading ability), dependent Variable is Emotional Engagement (enthusiasm, dedication, and emotional investment in teaching) and the Potential Moderating Variable is Job Conditions (e.g., load, autonomy, resources). Under this framework, supervisor support directly increases emotional engagement for teachers. Nonetheless, this relationship is moderated by job conditions, such that the effect of supervisor support is strengthened under positive job conditions and weakened in negative job conditions. The current study used this model to show how supportive supervisory conditions and workplace conditions together impact secondary teachers' engagement in Nepal.

Hypotheses

The following hypotheses are proposed based on the literature review and conceptual framework.

H1: Supervisor support have significant effect on emotional engagement of secondary school teachers of Nepal

H2: Job Conditions moderates the relationship between supervisor support and emotional engagement of secondary school teachers of Nepal.

The findings suggest that supervisor support may play a crucial role in emotional engagement of secondary school teachers, as discussed in mainstream literature. The importance of job conditions as a potential moderator in this relationship is also highlighted. More in-depth investigation will be required in the Nepali context, before we can devise textual strategies aimed at improving fellow teacher engagement and furthering educational quality.

Research Methodology

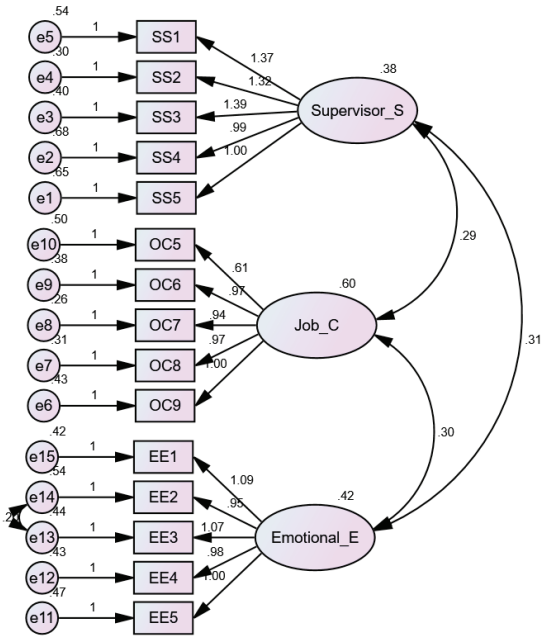


Figure 1: Confirmatory Factor Analysis

Table 1

Model Fit Measures

Measure	Estimate	Threshold	Interpretation
CMIN	210.108	--	--
DF	86	--	--
CMIN/ DF	2.443	Between 1 and 3	Excellent
CFI	0.961	>0.95	Excellent
SRMR	0.039	<0.08	Excellent
RMSEA	0.057	<0.06	Excellent
PClose	0.126	>0.05	Excellent

The following figure illustrates a Confirmatory Factor Analysis (CFA) model that contains three latent constructs (Supervisor Support (Supervisor_S), Job Conditions (Job_C), and Emotional Engagement (Emotional_E)) and the relationships between them. The model fits the data well; CMIN/DF = 2.443, CFI = 0.961, SRMR = 0.039, RMSEA = 0.057, PClose = 0.126. The final values reinforce that the observed variables (SS1–SS5 for Supervisor Support, OC5–OC9 for Job Conditions, and EE1–EE5 for Emotional Engagement) used in this study secure reliable and valid representations of their underlying constructs, respectively. These high factor loadings (from 0.95 to 1.39) provided considerable support for the extent to which these constructs were accurately measured.

The CFA results confirm the uniqueness and interrelatedness of Supervisor Support, Job Conditions and Emo-

tional Engagement. The observed positive relations between these latent variables indicate that more supervisor support reflects better job conditions, and higher levels of positive emotions at work. This model fits well to the data and shows a theoretical structure among these constructs,

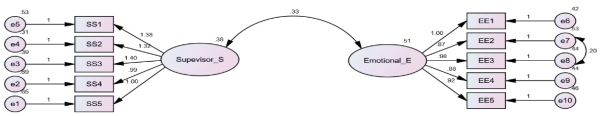


Figure 2: Structural Equation Modeling

Table 2

Model Fit Measures

Measure	Estimate	Threshold	Interpretation
CMIN	104.672	--	--
DF	33	--	--
CMIN/DF	3.172	Between 1 and 3	Acceptable
CFI	0.964	>0.95	Excellent
SRMR	0.041	<0.08	Excellent
RMSEA	0.069	<0.06	Acceptable
PClose	0.016	>0.05	Acceptable

The figure depicts a Structural Equation Model (SEM) testing the effect of Supervisor Support (Supervisor_S) on Emotional Engagement (Emotional_E). The fit indices of the model were acceptable to excellent. 2. Chi-Square/Degrees of Freedom (CMIN/DF) = 3.172, which on the acceptable range of 1 to 3 (Wang Pu, 2014). The CFI shows a value of 0.964, which surpasses the 0.95 threshold, indicating that the model fits excellently the data. In addition, the standardized root mean square residual (SRMR) of the model was also 0.041, far below the threshold of 0.08 [23], reflecting the small discrepancy between the observed correlations and those predicted by the estimated model.

The Root Mean Square Error of Approximation (RMSEA) shows value of 0.069 slightly above threshold value 0.06, indicate acceptable fit yet it does shows room for data model improvement. Second, RMSEA has a PClose=0.016 value that is lower than 0.05, which indicates that the RMSEA differs significantly from 0.05, which constitutes a sign of structural improvement in the model. While these minor issues are present, we have a coefficient for the direct effect between Supervisor Support and Emotional Engagement (0.33) that is positive and significant, indicating that if Supervisor Support level increases so will that of Emotional Engagement. The high-factor loadings (0.99 to 1.40 for Supervisor Support and 0.88 to 1.00 for Emotional Engagement) also confirm the reliability and validity of the measurement model.

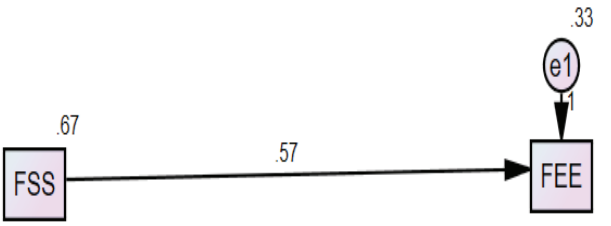


Figure 3: Path Analysis

Path Analysis of Supervisor Support and Emotional Engagement

The Path Analysis Model presented in the figure illustrates the strong direct effects of the Computed Supervisor Support (FSS) on the Computed Emotional Engagement (FEE). Standardized path coefficient value from FSS to FEE was 0.57, demonstrating a deep and positive association. This indicates that it highly statistically improves full engagement of employees if overall supervisor support is higher. If employees at a workplace have overall perception of supervisor support, it will significantly increase their emotional attachment, engagement and commitment towards work.

This value (0.67) represents the squared multiple correlation for FEE, which indicates that supervisor support accounts for 67% of the variation in emotional engagement as supervisor support makes a significant impact on emotional engagement. For instance, the residual error term (e1) of FEE which stands at 0.33, signifies that 33% of the variance accounted on emotional engagement stems from unexplained factors. This analysis compared and highlighted the importance of supervisor support on emotional engagement in the work environment.

The SEM analysis indicates a strong and positive relationship between Supervisor Support (SS) and Emotional Engagement (EE). This is an unstandardized regression weight of 0.568 (SE = 0.033, CR = 17.042, $p < 0.001$), showing that greater supervisor support predicts increased emotional engagement. In addition to the binary nature of the path, a standardized regression weight of 0.626 reinforces the notion that supervisor support contributes significantly to emotional engagement in a positive manner. Furthermore, the squared multiple correlation reveals that the model accounts for 39.2% of the variance in emotional engagement, leaving 60.8% to be explained by other variables outside the model.

Both variance estimates for supervisor support (0.667) and the error term for emotional engagement (0.333) were statistically significant, suggesting that supervisor support contributes well over half of the explained variance in emotional engagement. Additionally, the residual covariance between the variables are all equal to zero, signifying an outstanding model fit with virtually no unexplained relationships at play. In conclusion, these findings emphasize the importance of supervisor support for the facilitation of workers' emotional engagement at work.

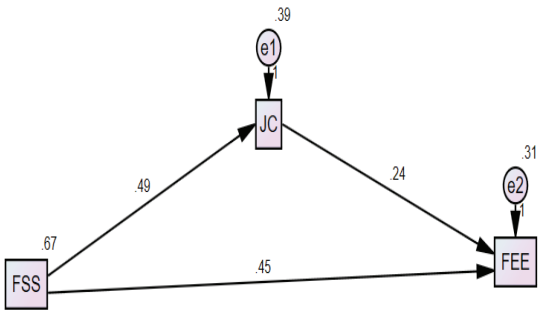


Figure 4: Moderating effect

The Structural Equation Model (SEM) analysis illustrated in the figure explored the direct and indirect effects of Computed Supervisor Support (FSS), Job Conditions (JC) on Computed Emotional Engagement (FEE). The results show that FSS had a significant direct effect on FEE with a standard path coefficient of 0.45, which indicates that a higher level of supervisor support leads to a direct increased of emotional engagement. FSS had an indirect impact on FEE mediated by JC (the coefficient value from FSS to JC is 0.49 and from JC to FEE 0.24). This means that higher levels of supervisory support lead to better work environments and, indirectly, more affective commitment.

This results in an FSS model, which explains 67% (R2=0.67) of the variance. This implies that there are more constructs, which account for these constructs as the error variance of JC and FEE are respectively 0.39 and 0.31. In brief, the model proposes that supervisor support directly influences emotional engagement and indirectly influences it through improving job conditions. This highlights the dual role of supervisor support, in due to creating a positive work environment and in directly enabling employees' emotional engagement towards their work

Discussion

The findings are consistent with literature describing the powerful influence of supervisor support over the emotional engagement and job satisfaction of employees. Research has demonstrated the association between helpful supervisory behaviors with higher levels of employees' work engagement and lower levels of emotional exhaustion. For instance, Nahrgang et al. (2011) conducted a meta-analytic study and found that there is a significant positive correlation between supervisor support as job resource group and work engagement as well as safety outcomes.

Likewise, Grobelna (2021) analyzed the hospitality industry and reported that support from supervisors is essential in alleviating emotional exhaustion and improving service quality. These findings highlight the integral role supportive leadership plays in high-demand service settings. On the other hand, Nasurdin and Ling (2016) revealed that the employees of the hotel had a positive correlation between supervisor support and their work engagement, and male employees were found to benefit more from supervisor support than female employees.

These findings align with our findings in the structure equation modeling of our study that found supervisor support had both direct and indirect effects through enhanced job conditions on emotional engagement. These findings indicate that organizations seeking to improve employee engagement should target supervisory support and job characteristics instead. These strategies will create an employee experience that encourages a more committed and unified work environment, resulting in higher operational performance and lower turnover intentions.

To sum up, our research adds to the growing evidence of the crucial inconsistent friend of supervisor support in enhancing employee well-being and engagement. It not only leans together with earlier research but also strengthens the aspect that supervisory practices that help employees create a motivated and loyal workforce are essential.

Conclusion

Our study highlights the importance of supervisor support in increasing the emotional engagement of employees. The strong positive connection between these factors is in accordance with recent studies focusing on organizational psychology. For instance, Pohl et al. (2023) found that supervisor emotional support at the group level predicts nurses' work engagement, emphasizing supervisor behaviors as an important factor for increasing employees' involvement.

Moreover, Carvalho and Chambel (2023) conducted a systematic review that provided compelling evidence for the importance of supervisor support (especially related to work-family practices) in promoting employee well-be-

ing and engagement. According to their findings, supervisors who are sensitive to employees' work-family needs can actually drive higher levels of work engagement.

Similar to our findings, these studies emphasize the importance of supervisor support in fostering emotional engagement in organizational settings. Providing supervisors with training in supportive behaviors might serve as an especially useful intervention for improving employee engagement and performance at the organizational level.

Overall, this research adds to the emerging evidence emphasizing the important role that supervisor support plays in facilitating emotional engagement within the workplace. Organizational efforts should focus on encouraging positive supervision practices that can help create a more engaged and emotionally present employee base, a working population that feels safe to be seen, heard and understood.

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Entrepreneurial Learning and Bowen's Differentiation of Self: A Cross-Cultural Analysis Between Italy and South Korea

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Abstract

Entrepreneurial intentions are deeply influenced by cultural and contextual factors, which shape entrepreneurial archetypes and perceptions of successful entrepreneurs. Role models play a pivotal role in guiding young individuals' aspirations toward entrepreneurship, interacting with personal traits such as family education, cultural background, and psychological characteristics. Among these traits, the concept of "differentiation of self," rooted in Bowen's family systems theory, emerges as a critical psychological factor.

Bowen's theory underscores the universality of self-differentiation as a developmental goal, balancing autonomy with intimacy. However, cultural contexts profoundly shape how these characteristics manifest, with significant variations between individualistic and collectivist societies. Despite the universal relevance of this construct, further research is required to explore its cultural dimensions and implications for entrepreneurship.

This study investigates the relationship between self-differentiation and psychological well-being within entrepreneurial development, comparing Italy, a Mediterranean culture, and South Korea, a Confucian collectivist society. The research aims to identify cross-cultural similarities and differences, offering insights into how cultural contexts influence self-differentiation processes and their potential impact on fostering entrepreneurial intentions. These findings contribute to contemporary entrepreneurship research by integrating psychological and cultural perspectives.

Keywords: *Bowen theory, differentiation of self, cross-cultural study, entrepreneurial development, collectivistic and mediterranean countries.*

Introduction

The perceived attributes of successful entrepreneurs and the entrepreneurial archetypes within a given country are significantly shaped by its cultural and contextual factors. These factors, in turn, exert a profound influence on entrepreneurial intentions, shaping how individuals envision and approach entrepreneurial activities. The impact of role models is pivotal in this context, shaping young individuals' perceptions and aspirations toward entrepreneurial pursuits. These influences interact dynamically with personal characteristics such as familial upbringing, cultural heritage, and individual traits, collectively fostering the development of entrepreneurial intentions from an early stage (Fayolle & Liñán, 2014; Krueger Jr et al., 2000; Obschonka & Stuetzer, 2017).

Regarding individual traits, the concept falls under psychological aspects, particularly the "differentiation of the self," as rooted in Bowen's theory (Bowen, 1978). Differentiation of the self refers to an individual's capacity to preserve their sense of identity and emotional independence while managing close relationships and navigating social pressures, particularly those arising within the family of origin. In the entrepreneurial context, this trait is pivotal for coping with the inherent stresses and uncertainties associated with business development. This is especially pronounced in the case of family businesses (Chua et al., 1999; Rovelli et al., 2022). Consequently, the psychological development and nature of the individual have become central to contemporary entrepreneurship research, providing key insights for advancing entrepreneurial initiatives (Obschonka & Stuetzer, 2017).

More specifically, the differentiation of self is shaped not only by the relationships and upbringing provided by one's family of origin or caregivers during the developmental process but also by the cultural context of the country in which an individual is raised. This highlights the existence of multiple levels of differentiation influenced by both personal and sociocultural factors.

Bowen's (1978) family systems theory is widely recognized as one of the most comprehensive frameworks

for analyzing family dynamics and emotional processes across generations, with the construct of differentiation of self frequently regarded as its foundational element (Lee & Johnson, 2017). Many scholars consider differentiation of self to be a universal developmental objective, emphasizing the necessity for individuals to achieve a balance between their need for autonomy and their ability to establish and maintain close, meaningful relationships with others (Knerr & Bartle□Haring, 2010).

Bowen's theory underscores the universality of the differentiation of self as a process, emphasizing its pivotal role in psychological well-being and personal development. However, it is crucial to recognize that the attributes Bowen linked to varying levels of differentiation, including those associated with higher differentiation or psychological health, may manifest differently across cultural contexts. Core elements of differentiation, such as autonomy and intimacy, are deeply shaped by cultural influences and can vary considerably among individualistic, Mediterranean, and collectivistic societies.

Kerr and Bowen (1988) posited that individuals with a highly differentiated self typically demonstrate superior psychological adjustment and greater efficacy in managing social interactions and relationships. Conversely, those with a less differentiated self are more susceptible to relational anxiety, impaired functioning in stressful circumstances, and an increased likelihood of developing physiological and psychological symptoms in social settings. While Bowen underscored the universality of the differentiation of self construct, further research is necessary to examine its interplay with cultural factors (Lampis et al., 2020; Manzi et al., 2006).

Research question

This research seeks to analyze the similarities and differences between a Mediterranean country, Italy, and a Confucian-based collectivist society, South Korea, in the context of the relationship between levels of self-differentiation and psychological well-being, and their potential impact on entrepreneurial development. The study addresses the following research questions:

RQ1: *Do Italian and Korean individuals exhibit differences in self-differentiation influenced by their cultural contexts?*

RQ2: *If differences in self-differentiation between Italian and Korean individuals are present, in what ways might these cultural variations shape entrepreneurial development?*

Methodology

To explore the research questions, this study first conducts a comprehensive review of the literature, emphasizing Bowen's concept of self-differentiation within various cultural contexts and existing studies on entrepreneurial development. Subsequently, an empirical analysis is carried out in Italy and South Korea, involving a sample of 352 young adults to investigate the presence of cultural differences in self-differentiation between these two nations.

Results

The analysis indicated that higher levels of self-differentiation are associated with lower levels of psychological distress in both Italian and Korean participants. Notably, the dimension of fusion with others seems to play a protective role among Korean young adults.

Implications

This study offers both theoretical and practical contributions. Theoretically, it advances psychological research by presenting a novel comparative analysis of Italy and South Korea, an area previously unexplored. Additionally, it deepens the understanding of entrepreneurship by investigating how self-differentiation influences entrepreneurial development, while accounting for cultural variations in the interpretation of differentiation and psychological well-being. Practically, the findings hold significant relevance for consultants and managers, especially in the context of family-owned businesses, though their applicability extends beyond this domain.

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The Interplay of Absorptive Capacity, Organisational Learning, and External Knowledge in SMTEs Innovation: A Systematic Review

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Extended Abstract

In the dynamic and fiercely competitive tourism industry, innovation is not merely a strategic option but an existential imperative. It is recognised as a critical means to achieve and maintain competitive advantage (e.g. Aldebert et al., 2011; Damanpour et al., 2009; Gomezelj, 2016; Hall & Williams, 2008; Tidd et al., 2005), empowers firms to anticipate and respond to shifting consumer preferences, leverage emerging trends, and navigate the complexities of a globalised and ever-dynamic marketplace (Jansen et al., 2006; Martin-Rios & Ciobanu, 2019; Ottenbacher, 2007). Extensive research has underscored the symbiotic relationship between innovation and firm performance, establishing a clear cause-and-effect linkage (e.g. Camisón & Villar-López, 2014; Kitsios & Grigoroudis, 2020). Moreover, scholarly investigations have explored diverse facets of innovation, encompassing typologies (e.g. Camisón & Monfort-Mir, 2012; Hjalager, 2010), technological integration (e.g. Buhalis & Law, 2008; Neuhofer et al., 2014), collaborative paradigms (e.g. Baggio & Cooper, 2010; Novelli et al., 2006), and barriers (e.g. Hall & Williams, 2008; Hjalager, 2002; Pikkemaat et al., 2018), thus enriching the comprehension of this domain. The dynamics of innovation within the tourism industry reveal diverse details and subtleties, underscoring that this sector comprises multiple subsectors. Each subsector possesses distinct characteristics and includes firms that vary in size, entrepreneurial orientation, and the specific challenges they encounter.

Small and medium-sized enterprises in tourism (SMTEs) have gained more attention in recent years due to their increasing role in the global economy and investigating how they address their innovation needs is becoming increasingly important. The relevance of small and medium-sized firms in the tourism industry is confirmed by the United Nations World Tourism Organisation (UNTWO, 2022), which reports that they dominate the global tourism industry, accounting for approximately 80% of all tourism businesses worldwide. SMTEs' close relationships with customers allow them to better understand specific needs, leading to customer-driven innovations (Sundbo et al., 2007). Moreover, their smaller organisational structures provide a significant advantage by facilitating quick decision-making and adaptability to market trends, enabling the rapid implementation of innovative practices (Mintzberg, 1979; Thomas et al., 2011), and their informal management and communication frameworks can promote creativity and flexibility, thereby enhancing their capacity to innovate. However, SMTEs traditionally face challenges in growth, investing in research and development (R&D) and adopting advanced technologies, not only generically due to limited financial and human resources, leading them to rely on cost-effective and prudent innovation strategies (Morrison & Teixeira, 2004). Their informal structures may also impede scalability and obstruct the establishment of formal innovation processes, potentially constraining long-term growth (Novelli et al., 2006). To overcome resource limitations, SMTEs often collaborate with other businesses or organisations to share resources, knowledge, and ideas (Hjalager, 2002), a practice that aligns with the resource-based view, which highlights the importance of leveraging external resources—physical or other assets outside the firm's direct ownership but accessible through relationships with other firms and organisations (Das & Teng, 2000).

Amidst this landscape, the role of knowledge as a catalyst for innovation processes has emerged as paramount. Moreover, knowledge is no longer confined within organisational boundaries but extends across external networks, partnerships, and ecosystems (Novelli et al., 2006). As a result, the competitive edge and innovativeness of firms increasingly depend not solely on internal knowledge but also on the ability to integrate and leverage external knowledge (EK) effectively (Gebauer et al., 2012). However, even if the role of knowledge, both internal and external, in fostering innovation (Awad & Ghaziri, 2008; Hjalager, 2002; Nonaka & Takeuchi, 1995) and fortifying long-term competitiveness within the tourism sector (Abdollahi et al., 2023; Hoarau, 2014; Paraskevas et al., 2013) is primarily recognised, the mechanisms of EK assimilation remain under-investigated (Cooper, 2006; Shaw & Williams, 2009).

EK refers to the knowledge acquired from sources outside of an organisation, and its role as a crucial resource is mitigated by the complexities inherent in managing it, particularly its tacit nature (Hoarau, 2014; Shaw & Williams, 2009). This is a considerable challenge for innovation, and it becomes paramount in the context of SMTEs, which, due to their limitations and resource allocation constraints, actively engage in innovation by acquiring and applying EK rather than

innovating internally from R&D (Thomas & Wood, 2014). To effectively harness the innovation potential of EK, it is essential for SMTEs to acquire and transform it into a valuable new source of innovation. This process necessitates the development of Absorptive Capacity (AC) and Organizational Learning (OL) within these enterprises.

AC empowers firms to access EK and serves as a crucial stimulus for innovation (Cohen & Levinthal, 1990; Thomas & Wood, 2015; Zahra & George, 2002). It denotes an organisation's aptitude to acquire, assimilate, transform, and apply external knowledge, which is a pivotal driver of innovation (Zahra & George, 2002). In the turbulent context of SMTEs, due to their necessity to rapidly adapt to customer preferences and survive while facing multifaceted constraints, understanding how to recognise, assimilate, and apply EK effectively to innovate becomes a primary objective. Moreover, to support this effort, organisations need to retain the knowledge acquired and systematise it internally in a never-ending process of inimitable self-definition. To this end, OL facilitates the internalisation and utilisation of acquired knowledge, transforming it into tangible, innovative outcomes (Argyris & Schön, 1978). It can drive innovation and adaptability by cultivating a learning culture that encourages experimentation, idea-sharing, and collaboration, which is the foundation for incremental and transformative changes (Senge, 1990). Moreover, OL underpins the development of dynamic capabilities, in which AC is a key component (Zahra & George, 2002), empowering firms to reconfigure internal and external resources to respond swiftly to changing environments (Teece, 2007).

AC and OL are closely intertwined with EK. From an integrated perspective, SMTEs effectively leverage AC in the presence of valuable EK and can internalise it through OL. However, despite their inherent agility and adaptability, SMTEs frequently encounter difficulties managing and applying knowledge, especially tacit knowledge. As a result, the interplay between EK, AC, and OL represents a complex yet vital area for investigation. Moreover, the undefined structural characteristics and typical managerial and financial limitations of small firms can lead them to engage in the processes of AC and OL without formally recognising or labelling them, as latent activities.

The abovementioned reasons highlight the need for a comprehensive understanding of the dynamics among EK, AC, and OL to examine their interactions effectively. To the authors' knowledge, no literature review currently integrates these knowledge-based concepts within the context of innovation in SMTEs, resulting in fragmented insights and an incomplete understanding of the phenomenon. This research aims to fill this gap by synthesising current academic findings and providing an in-depth perspective on the synergistic role that EK, AC, and OL play in driving innovation within SMTEs. It illustrates how knowledge-based strategies can enhance innovation processes in SMTEs, providing actionable insights for managers and policymakers, and aims to answer the following research question: How do absorptive capacity, organisational learning, and external knowledge impact innovation in small and medium-sized enterprises within the tourism industry?

The systematic literature review (SLR) provides the methodological foundation of this study, ensuring a high level of transparency, rigour, and reproducibility throughout the research process (Tranfield et al., 2003). Five main keywords, innovation, tourism, SMEs, external knowledge, absorptive capacity, and organisational learning, have been selected based on previous studies and after a discussion with peer researchers. Over these, 58 other keywords were included as synonyms. Following the steps proposed by the PRISMA methodology (Page et al., 2021), data collection, first screen, second screen, and analysis were performed. Data collection involved 158 items extracted from three primary research databases: Web of Science, Scopus, and EBSCOhost. After applying the initial exclusion criteria, 75 articles underwent detailed analysis in the second screening stage. A narrative synthesis (Popay et al., 2006) is currently being conducted, focusing on methodological approaches, theoretical frameworks, and contributions to the interplay of EK, AC, and OL.

The preliminary results highlight several critical insights and emerging implications. Firstly, a lack of a systemic vision is emerging as AC, OL, and EK are often explored in isolation, underscoring the need for an integrated perspective. Secondly, a relevant body of current studies emphasises innovation as a mediator between knowledge dynamics and firm performance, suggesting a narrow scope that may overlook broader organisational processes. Thirdly, a relevant part of the reviewed literature employs quantitative methods, indicating a potential gap in qualitative, in-depth explorations of the phenomena. Lastly, non-tourism journals are relevant; approximately 45% of the studies are published outside the tourism domain, highlighting a multidisciplinary interest and the opportunity for cross-sectoral learning.

Findings will be expected to clarify the relationships and interactions among EK, AC, and OL within the specific context of innovation in SMTEs. Emerging themes will be identified, shedding light on theoretical frameworks, patterns, and dynamics that define their collective essence. The study aims to provide a nuanced understanding of how these knowledge-based concepts interplay to drive innovation. The results are expected to reveal how SMTEs leverage EK to overcome resource constraints, how AC influences the assimilation of EK, and how OL transforms these insights into actionable strategies.

This research holds significant theoretical and managerial implications. The proposed systematic approach synthesises

existing knowledge, identifies critical gaps, and highlights emerging trends, offering a comprehensive foundation for future research. The findings will enrich academic discourse by advancing knowledge on the application of EK, AC, and OL in SMTE innovation, offering novel insights into their interplay and role in fostering innovation. This research offers actionable insights for practitioners to integrate knowledge-based strategies into innovation efforts. By addressing the unique challenges SMTEs face, this study underscores the importance of tailored approaches to managing EK, leveraging AC, and fostering OL. Moreover, the study has broader implications for policymakers and industry stakeholders, emphasising the need for supportive actions that facilitate knowledge exchange and innovation in SMTEs. The integration of EK, AC, and OL is not merely an academic exercise but a strategic imperative for driving sustainable growth and competitiveness in the tourism industry.

Keywords: Tourism Innovation, SMEs, Absorptive Capacity, Organisational Learning, External Knowledge.

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Developing Startup Business Models Using ChatGPT: Prompt Writing Strategies and Affordance Design Focused on Task Type

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Abstract

The emergence of generative AI has brought significant changes to chatbot technology. ChatGPT, developed based on large language models, has played a crucial role as a 'game changer' in various fields since its release in November 2022. Based on these technological advancements, this study aims to present prompt writing strategies for effectively utilizing ChatGPT in developing entrepreneurial business models and to derive affordance design strategies for creating optimal prompts according to task types.

This study divided the tasks for developing entrepreneurial business models into data exploration and idea generation stages. In each stage, one-shot, few-shot, and chain of thought prompting strategies utilizing ChatGPT were applied, and user satisfaction with the results was analyzed. Additionally, an experimental study was designed to compare and analyze the impact of the provision of affordances on satisfaction with ChatGPT utilization. The findings of this study provide important implications for entrepreneurs developing business models by offering practical prompt writing guidelines tailored to task characteristics. Furthermore, it suggests affordance design strategies for companies providing generative AI services to optimize user experience.

Keywords: *Generative AI, One-shot prompting, Few-shot prompting, Chain of thought prompting, Affordance, Business model development*

Introduction

The advancement of generative artificial intelligence (AI) technology has brought innovation to various fields, such as programming, language translation, and content creation. In particular, the AI chatbot ChatGPT, developed by OpenAI, is an essential tool among entrepreneurs. Since its release on November 30, 2022, ChatGPT has demonstrated a wide range of potential applications, quickly gaining attention by reaching 1 million users within five days and 2 million users within two weeks (NIA AI Future Strategy Center, 2023). Developed based on a large language model (LLM), ChatGPT is designed to perform various tasks through user interactions, leveraging natural language processing (NLP) technology.

Entrepreneurs are benefiting from generative AI tools in various areas, such as information retrieval, idea generation, and the support of building innovative business strategies (Lee et al., 2023). Additionally, in university entrepreneurship education, ChatGPT contributes to enhancing problem-solving skills and improving learner satisfaction (Kim, 2023).

However, the effective utilization of ChatGPT heavily relies on prompt crafting strategies, and various studies have shown that the quality of responses from generative AI services like ChatGPT varies depending on the level of prompt crafting (Wei, Jason, et al., 2022). A prompt refers to formulating questions or requests in a manner that an AI model can understand and respond to. Crafting appropriate prompts according to the nature of the task directly impacts the AI's performance and user satisfaction. For tasks that require precise information, meticulously constructed prompts are necessary, whereas for tasks requiring creative idea generation, more open-ended prompts can be more effective.

The fact that the quality of outcomes generated by generative AI services varies with the level of prompt crafting suggests the need to apply affordances. Affordances for users of generative AI services are expected to be used through various types, such as context awareness, familiarity, and privacy, leading to the development of more mature and reliable services in the future (Mygland et al., 2021).

In this context, the present study aims to propose prompt crafting strategies for effectively utilizing ChatGPT in the development process of entrepreneurial business models and to derive affordance design strategies for crafting optimal prompts according to task types.

Through this, the study seeks to maximize the work efficiency of entrepreneurs using generative AI tools and provide better guidance in addressing the various challenges entrepreneurs face. It is also expected to enhance AI's utilization within the entrepreneurial ecosystem.

Literature Review

Generative AI Services and Prompt Engineering

Generative AI models can engage in natural conversations with humans, and among them, ChatGPT has garnered significant interest across various fields. ChatGPT is a pre-trained language model based on vast data, demonstrating excellent performance in natural language understanding and generation tasks across diverse domains (Lee, 2023). Introduced by OpenAI in 2022, ChatGPT is an AI system that fine-tunes the GPT model, one of the natural language processing (NLP) models, for chat-based interactions. Natural language processing models refer to technologies that enable AI to comprehend human natural language directly, rather than computer code, and produce output in human natural language (Kim, 2023).

A prompt refers to the instructions or additional information inputted into AI to assist GPT in performing specific tasks (Gu et al., 2023). It is necessary to study prompt engineering techniques to achieve users' desired results through manipulating questions in the ChatGPT model. Prompt engineering refers to designing and optimizing prompts that effectively convey the user's intent to a generative AI model to achieve the desired outcomes (Ekin, 2023). Therefore, prompt engineering is guided by fundamental principles such as maintaining specificity, focusing on data and contextual understanding, and principles based on algorithms (Seo & Chae, 2023; Cho, 2023; Nyakundi, 2023).

Users need to follow specific prompt design rules to derive the desired results through prompts. First, under the principle of clarity, it is essential to maintain the specificity of the prompt. Since GPT probabilistically predicts the next word, specific keywords must be input to increase the likelihood of obtaining the user's desired answer. Additionally, the extent to which users employ context that ChatGPT can understand determines the quality and accuracy of the results. The algorithm-based principle arises from the complexity of natural language. Even if users design prompts in a way ChatGPT can understand, providing complex and diverse instructions simultaneously reduces the likelihood of obtaining the desired answer. Therefore, users need to analyze the results and objectives they wish to achieve, formulate them into a step-by-step algorithm of questions, and simplify them.

Additionally, studies providing guidelines for prompt writing are being conducted. Users must understand their desired goals and requirements when writing prompts and apply algorithmic conditions accurately. Greater algorithmic clarity can lead to better results if expressed concretely with precise numbers that a computer can understand. When seeking solutions to significant problems, it is necessary to decompose the problem appropriately and specify it step-by-step in the prompt to solve the overall issue (Lee, 2023).

This way, studies on refining questions to derive desired results from ChatGPT users are actively conducted in prompt engineering. Although numerous prompt design techniques are being researched, the currently representative techniques include the Few Shot technique, Role Assignment technique, Markdown Utilization technique, Hukatsu Prompt technique, Format Specification technique, CoT (Chain of Thought) technique, Multi-Persona technique, Hallucination Induction technique (Seo Seung-wan, 2023). In particular, the CoT (Chain of Thought) technique has recently gained attention in many studies, as proposed by Wei et al. (2022) in 'Chain-of-Thought Prompting Elicits Reasoning in Large Language Models,' suggesting that constructing prompts in a chain-like manner following the process of thought can improve performance in arithmetic, common sense, and symbolic reasoning tasks.

Among the various prompt design techniques mentioned above, this study aims to analyze the differences in satisfaction with the results of responses by applying the One-Shot technique, which typically provides only one comprehensive example when asking AI questions; the Few-Shot technique, used to obtain responses in the desired format by providing two or more specific examples; and the CoT (Chain of Thought) prompt design technique, used to guide the process of deriving results in stages to reduce errors through the flow of thought, to the tasks of entrepreneurs.

New Technology (ChatGPT) and Affordance

Affordance refers to action possibilities within the relationship between an object and an agent, indicating behavioral fluidity (Gibson, 1997). It signifies agentic action that becomes possible through the characteristics of particular objects (Hutchby, 2001). Scholars differ in their perspectives, with some defining affordance as the physical relationship between users and objects (Gibson, 1977), while others describe it in terms of perceived characteristics of objects or their actual properties (Norman, 1986). Previous studies have systematically discussed affordance primarily based on the physical

interaction between objects or devices and users. Existing research has verified that applying affordance in the process of human-computer interaction enhances the usability of objects through user behavior (Norman, 1986), and researchers have argued that affordance is a characteristic that contributes to users' decision-making and performance.

Affordance is researched by subdividing it into cognitive affordance, physical affordance, sensory affordance, and functional affordance (Hartson, 2003), and it has the following characteristics.

Table 1 - Types of Affordance

Types of Affordances	Contents	Reference
Physical Affordance	Provides opportunities to manipulate information technology, including structural features that allow users to interact with applications. Users can perform tasks without additional instructions as physical affordance is facilitated by viewing icons on the computer.	Hartson (2003) Norman (2013) Pols (2012)
Cognitive Affordance	It supports users in performing perceived actions and encourages them to think about the technology's features. This helps users understand how to utilize physical affordance.	Bemgal (2018) Hartson (2003)
Affective affordance	Attributes of IT artifacts that evoke emotional responses from users. Inducing emotional affordance through features such as 'like' on social media and 'subscribe' on YouTube falls under this category.	Zhao et al.(2013)
Functional affordance	It refers to the utility provided by technology to help users achieve their goals and is related to how useful it is for the user's goal achievement.	Bemgal (2018) Faraj & Azad (2012) Hartson (2003)
Social affordance	Attributes arise from the interaction between an object and a user. Attributes such as interaction with other users and sharing real-time information become properties of social affordance in user-to-user interactions.	Hogan (2009) Wellman et al. (2003)

To understand the affordance of new technology, it is necessary to closely observe the context in which interactions between users and technology occur (Deseris, 2021). Recent studies emphasize the relational aspects of affordance, focusing on understanding its characteristics through the interactions between technology and users. Technological affordance emphasizes mutuality, which enables specific actions by combining an agent's intentions and technological capabilities (Bygstad, Munkvold, & Volkoff, 2016; Majchrzak, Faraj, Kane, & Azad, 2013).

Affordance is also a useful concept because it integratively considers the physical characteristics of technology and users' subjective experiences. In particular, technological affordance is a concept proposed to analyze interactions between users and technology when new technologies emerge (Leonardi, 2013), and it has been used to understand how users accept new technologies in various media fields such as social media, online shopping, and live commerce (Yoo Hyeri, Min Young, 2023).

Recently, as the importance of generative AI services has increased and their use in various fields has expanded, studies related to affordance to promote user behavior have been conducted. Lin et al. (2022) used the concept of disaffordances to describe characteristics of AI chatbots that do not encourage user behavior, such as limited understanding, lack of emotion, and null decision-making. This highlights the need for generative AI services to apply affordance to overcome the limitations of AI services to induce user behavior.

In studies on AI chatbot affordance, the most frequently mentioned affordance characteristics are human-like conversing and assistance provision. The importance of distilling information, enriching information, context identification, personalization, and fostering familiarity is also emphasized.

Yoo Hyeri and Min Young (2023) identified personalized assistance provision, human-like conversing, and context identification as the core affordances of the generative AI chatbot ChatGPT. Since the core functions of a chatbot are to provide users with the necessary information (Stoeckli, Dremel, & Uebemickel, 2018) and to assist with problem-solving or enhance work efficiency (Waizenegger, Seeber, Dawson, & Desouza, 2020), the affordance of personalized assistance can improve the perception of usefulness and foster a positive relationship with the user by providing personalized responses tailored to the user's needs and requests.

Chatbots generate messages using natural language similar to human speech and provide them to users. ChatGPT can infer user intentions and respond in natural language, remembering the context of conversations to answer follow-up questions. The affordance of human-like conversing is implemented through human conversational

styles (speed, intensity, tone, rhythm, etc.) and message characteristics (informational, interactive, emotional). The personification of chatbots enhances users' interaction efficacy, thereby improving perceived usefulness (Epley, Waytz, & Cacioppo, 2007). Lastly, context identification is an affordance type that can deepen interactions between chatbots and users (Mygland et al., 2021). It refers to the affordance that allows understanding the context of users' questions to provide the desired answers.

This study aims to present guidelines for affordance design that entrepreneurs can use to derive satisfactory responses for business model development based on the importance of the affordance functions of ChatGPT mentioned above.

Research Hypotheses

Based on the theoretical background, this study sets as its leading research hypotheses the differences in user satisfaction with the results according to the type of prompt writing and the provision of affordance in developing business models by entrepreneurs using generative AI. In the business development process for startups, tasks are categorized into data exploration tasks such as market and industry analysis and competitor analysis, as well as idea generation tasks for solving given problems, which are set as the scope of the study. The types of prompt writing applied include one-shot, few-shot, and chain-of-thought prompting strategies. Affordance is divided into cases where prompt writing guidelines are provided and not provided to verify differences in result satisfaction.

Hypothesis 1: *There will be differences in the quantitative satisfaction of one-shot prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance.*

Hypothesis 2: *There will be differences in the quantitative satisfaction of few-shot prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance.*

Hypothesis 3: *There will be differences in the quantitative satisfaction of CoT prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance.*

Hypothesis 4: *There will be differences in the quality satisfaction of one-shot prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance.*

Hypothesis 5: *There will be differences in the quality satisfaction of few-shot prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance.*

Hypothesis 6: *There will be differences in the quality satisfaction of CoT prompt search results depending on the task characteristics of entrepreneurs and the provision of affordance."*

Research Method and Result

Experimental Research Design

This study is designed as an experimental research project to compare and analyze differences in user satisfaction with results based on the type of prompt writing and the provision of affordance in developing startup business models using generative AI.

The experiment was conducted by designing four groups according to task type (data exploration, idea generation) and the provision of affordance (whether guidelines are provided), as shown in <Table 2>. The research was conducted with university students from Seoul and Gyeongnam regions taking a startup business model development course. The experiment took place in May and June 2024, and to explore the impact of ChatGPT prompt writing, prompts required by the given tasks were designed and input into the ChatGPT-3.5 model to derive results.

Table 2 - Experimental Groups

G1: Data Exploration, Guidelines Provided	G3: Data Exploration, Guidelines Not Provided
G2: Idea Generation, Guidelines Provided	G4: Idea Generation, Guidelines Not Provided

Each experimental group applied One-shot, Few-shot, and CoT (Chain of Thought) prompting strategies to achieve the desired results for the given tasks, as shown in the experimental design example in <Figure 1>. Finally, satisfaction with the results was surveyed. Satisfaction with ChatGPT was measured using a 5-point Likert scale (1 = 'Not at all' to 5 = 'Very much') for both quantitative satisfaction with the results and satisfaction with the quality of the results.

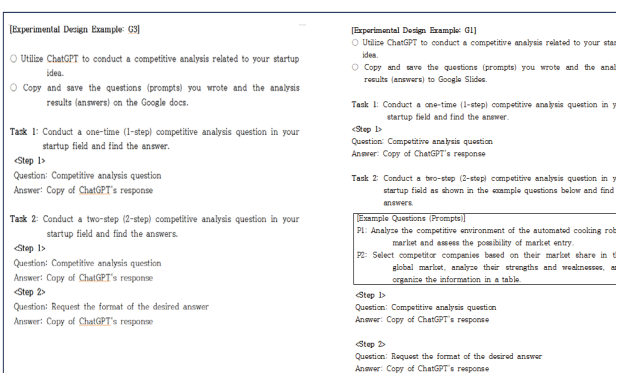


Figure 1- Experimental Design Example

Verification of Research Hypotheses

The experimental satisfaction survey results collected to verify research hypotheses were analyzed using the SPSS statistical package after undergoing a data coding process. A One-Way ANOVA was conducted to compare the mean differences between experimental groups, and the

results are shown in <Table 3>. The analysis showed that Hypothesis 1, posited that the quantitative satisfaction of one-shot prompt search results would differ according to the task characteristics of entrepreneurs and the provision of affordances, was adopted with a significance level of 0.001. In detail, when a prompt writing guide was provided during the idea exploration task, satisfaction was the highest at 4.14 points. The group without a prompt writing guide during the idea exploration stage showed the lowest satisfaction at 3.29 points.

Hypothesis 2, which posited that the quantitative satisfaction of few-shot prompt search results would differ according to the task characteristics of entrepreneurs and the provision of affordances, was also statistically significant with a significance level of 0.005 and thus adopted. In the case of a few shots, when a prompt writing guide was provided during the idea exploration task, satisfaction was the highest at 4.14 points. The group without a prompt writing guide during the idea exploration stage showed the lowest satisfaction at 3.52 points.

Hypothesis 3, which posited that the quantitative satisfaction of CoT prompt search results would differ according to the task characteristics of entrepreneurs and the provision of affordances, was not statistically significant, with a significance level of 0.098, leading to its rejection. However, even in this case, it was shown that providing a prompt writing guide when entrepreneurs perform idea exploration tasks resulted in the highest satisfaction at 4.31 points.

Next, the hypothesis testing for the satisfaction with the quality of results revealed that Hypothesis 4, which posited that the quality satisfaction of one-shot prompt search results would differ according to the task characteristics of entrepreneurs and the provision of affordances, was statistically significant with a significance level of 0.009 and was thus adopted. Hypothesis 5, which analyzed the quality satisfaction differences in few-shot prompt search results, showed a significance level of 0.071, indicating it was not statistically significant, leading to its rejection. When examining the averages between experimental groups, it was found that providing a prompt writing guide during the idea exploration task resulted in the highest satisfaction at 4.17 points, while not providing a guide during the data exploration task resulted in the lowest satisfaction at 3.66 points.

Hypothesis 6, which posited that the quality satisfaction of CoT prompt search results would differ according to the task characteristics of entrepreneurs and the provision of affordances, did not meet the criterion of $p<0.01$ with a significance level of 0.01. Still, the mean difference between experimental groups can be interpreted as significant. The satisfaction of the G2 group, which was provided with a prompt writing guide during the idea generation process, was the highest at 4.14 points, while the satisfaction of the G4 group, which was not provided with a guide, was the lowest at 3.39 points.

Table 3 - ANOVA Analysis Results

Dependent Variable	Characteristics of Experimental Groups	Mean	Standard Deviation	F-value/ Significance Probability
One-shot Quantitative Satisfaction	G1(n=37)	3.86	.855	5.991 **/0.001****
	G2(n=35)	4.14	.845	
	G3(n=38)	3.47	.893	
	G4(n=31)	3.29	1.071	
Few-shot Quantitative Satisfaction	G1	4.00	.850	4.401 **/0.005****
	G2	4.14	.845	
	G3	3.53	.979	
	G4	3.52	.962	
CoT_ Quantitative Satisfaction	G1	3.97	.897	2.142 /0.098
	G2	4.31	.867	
	G3	3.92	.997	
	G4	3.74	1.032	
One-shot_ Result Quality Satisfaction	G1	3.73	.902	4.019 **/.009****
	G2	4.09	.853	
	G3	3.53	.951	
	G4	3.29	1.189	
Few-shot_ Result Quality Satisfaction	G1	3.70	.996	2.399 /0.071
	G2	4.17	.857	
	G3	3.66	.966	
	G4	3.68	.945	
CoT_Result Quality Satisfaction	G1	3.76	.863	3.960 **/0.010**
	G2	4.14	.912	
	G3	3.92	1.050	
	G4	3.39	.803	

*p<0.05, **p<0.01

In-depth Analysis of Prompt Strategies and Affordance Design

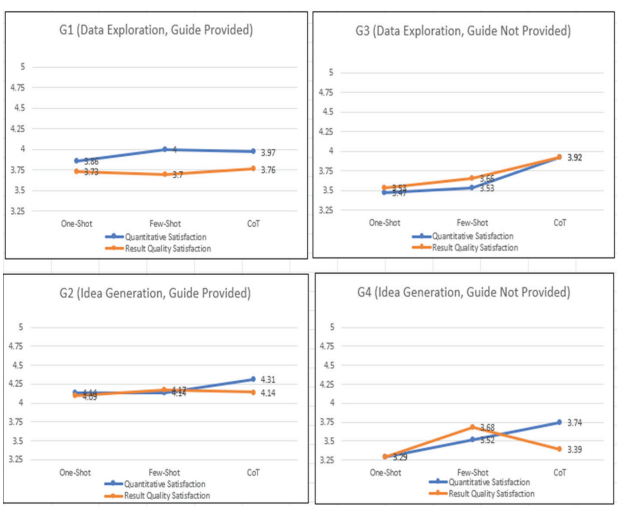


Figure 2- Comparison of Satisfaction by Experimental Group

Figure 2 is an analysis that compares the satisfaction results between experimental groups, illustrating the satisfaction outcomes of different prompt strategies (One-shot, Few-shot, CoT) according to task type and the presence of a prompt writing guideline.

G1 is the group that experimented with a prompt guide provided for the data exploration task. The analysis showed that quantitative and result quality satisfaction slightly increased in the Few-shot method but remained stable without significant differences compared to the CoT method. This suggests that when a prompt guide is provided, the prompt method of ChatGPT does not significantly affect satisfaction in relatively simple tasks like data exploration.

G3 is the group that completed the data exploration task without a prompt guide. The analysis showed that the One-shot method had the lowest quantitative and result quality satisfaction. In contrast, satisfaction gradually increased in the Few-shot and CoT methods, with the highest satisfaction in the CoT prompt. This indicates that without a guide for prompt writing, users need to provide systematic prompts to maximize ChatGPT's performance in data exploration. It demonstrates that the CoT method, which supports a step-by-step approach, is an effective alternative.

G2 is the group that performed the idea generation task with a prompt writing guide. This group showed high satisfaction even with the One-shot method, and satisfaction increased further with the Few-shot and CoT methods. This implies that the CoT method, which supports step-by-step thinking processes, is highly effective for solving complex and creative problems, and combining a prompt writing guide with the CoT method is very effective in enhancing user satisfaction.

G4 is the experimental group that performed the idea generation task without a prompt writing guide. This group showed the lowest quantitative and result quality satisfaction with the One-shot method, but satisfaction significantly increased with the Few-shot and CoT methods. This indicates that the CoT method helps solve complex idea-generation problems by guiding users through specific and systematic thinking processes. It also suggests that the CoT prompt method enhances user satisfaction when no prompt writing guide for creative tasks exists.

This study draws the following in-depth insights by comprehensively analyzing the experimental results in Figure 2. First, users generally showed high satisfaction when a prompt writing guide was provided. This indicates that a prompt writing guide, or affordance, is a critical factor that simplifies the initial prompt design and helps maximize the performance of ChatGPT.

Second, examining the differences by task type, in relatively structured tasks like data exploration, the differences in satisfaction and result quality according to prompt type were relatively small. In contrast, satisfaction differed significantly in creative tasks like idea generation depending on the prompt type (One-shot, Few-shot, CoT).

Consequently, the One-shot type is simple and quick but inefficient for complex tasks, while the Few-shot type can enhance satisfaction by providing additional contextual information. Notably, the CoT type can significantly improve result quality by solving complex problems step by step. This suggests that entrepreneurs can use the CoT prompt type to maximize task performance in high-difficulty tasks like creative problem-solving.

Conclusion

Generative AI services like ChatGPT, which are said to be the fastest-spreading technologies in history, are expanding their application range beyond corporate work areas to education, learning, research, and creation, thereby contributing to enhancing human task productivity (Koo, 2023). However, the results we obtain through generative AI services are directly linked to the user's ability to create prompts, leading to significant differences in the perceived usefulness and satisfaction with the service. Despite these limitations, generative AI services are gradually becoming more user-centric. They are recognized as valuable tools for quickly obtaining desired information based on vast amounts of data.

This study proposed prompt writing strategies that entrepreneurs can use to effectively leverage ChatGPT in developing business models and to derive affordance design strategies for writing optimal prompts according to task types. To verify the research hypotheses, tasks for developing startup business models were divided into data exploration and idea generation stages. An experimental study was conducted by applying one-shot, few-shot, and CoT (chain of thought) prompting strategies using ChatGPT, and user satisfaction with the results was analyzed.

The analysis of the satisfaction with ChatGPT among different experimental groups collected through the experiments verified the hypotheses that there are differences in quantitative satisfaction of One-shot (Hypothesis 1) and Few-shot (Hypothesis 2) prompt search results according to the entrepreneur's task characteristics and the provision of affordance. Additionally, the hypothesis that there would be differences in the quality satisfaction of One-shot (Hypothesis 4) and CoT (Hypothesis 6) prompt search results was verified. These results indicate that when entrepreneurs use generative AI services like ChatGPT, satisfaction can vary depending on the prompt writing strategy according to the task characteristics, and the quantity and quality satisfaction of the results can differ depending on whether a prompt writing guide is provided.

An in-depth analysis of the experimental results confirmed that providing a prompt writing guide, or affordance function, significantly enhances user experience and

result quality when performing tasks using ChatGPT. Furthermore, the analysis of the optimal prompt types according to task characteristics revealed that for simple tasks, One-shot or Few-shot methods can achieve sufficiently high performance, but applying the CoT prompt type is essential for complex tasks. It was noted that for high-level tasks such as creative problem-solving, idea generation, and in-depth exploration, actively utilizing the CoT type is necessary.

In conclusion, the results of this study hold significant implications by offering practical prompt writing guidelines suitable for task characteristics to entrepreneurs developing startup business models and proposing affordance design strategies for optimizing user experience to companies providing generative AI services. Moreover, it provides specific insights into how generative AI, like ChatGPT, can be utilized in the startup process. It is expected to offer practical assistance in discovering creative ideas and designing business models for entrepreneurs.

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Exploring the Diversification Potential of Bitcoin Forks in Cryptocurrency Portfolios

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Abstract

Bitcoin forks ,including Bitcoin Cash ,Bitcoin SV ,and Bitcoin Gold ,have emerged to overcome the shortcomings of Bitcoin or to further its potential .Despite their shared heritage ,there is a lack of scholarly research on the ability of these forks to contribute to the diversification of cryptocurrency portfolios .This study explores the feasibility of diversification through Bitcoin forks by analyzing their historical price patterns ,volatility ,and relationships with Bitcoin as well as among themselves .Using advanced statistical methods ,our analysis shows that while most forks track Bitcoin's price movements closely ,a few exhibit unique behaviors that could potentially enhance portfolio diversification .These results shed light on the role of Bitcoin forks in cryptocurrency markets and offer useful insights into achieving superior risk-adjusted returns in a volatile environment.

Keywords :*Bitcoin forks ,Portfolio diversification ,Cryptocurrency markets ,Risk and return analysis*

Introduction

Cryptocurrencies ,particularly Bitcoin and its cousins, have turned into a hot asset class within the global financial ecosystem .This was not what it was from the inception of Bitcoin in ,2009 as an anonymous individual called Satoshi Nakamoto) Nakamoto ,n.d ;(.it has given rise to many Bitcoin forks since then .There exist alternative cryptocurrencies which are simply called Bitcoin forks that are taken from the original Bitcoin blockchain and are developed to give new features ,fix alleged flaws, or even create other governance structures)Kong et al,. .(2023Bitcoin Cash ,Bitcoin SV ,Bitcoin Gold ,Bitcoin Diamond ,Bitcore ,Bitcoin Atom ,Bitcoin God ,Super Bitcoin ,and United Bitcoin are some of the more well-known ones)Bazán-Palomino .(2021 ,Every fork has unique traits and underlying value propositions that affect its market performance and potential usefulness for diversifying a portfolio)H .Kim et al.(2022 ,.

Spreading investments across a variety of assets to lower risk and increase returns is known as portfolio diversification ,and it is a fundamental component of contemporary investing theory)Markowitz .(1952 ,Diversification is especially important in this environment due to the extreme volatility of the cryptocurrency market and the strong correlation between different digital assets .Even though Bitcoin remains the largest cryptocurrency ,owning more than 40% of the market capitalization as of early2025)CoinMarketCap ,(2025 ,its forks offer investors wishing to diversify in this niche asset class both special opportunities and difficulties.

Bitcoin forks vary in their technical features ,governance structures ,and market behaviors ,which can result in different levels of risk and reward .For example ,Bitcoin Cash) BCH (was established in 2017 to tackle Bitcoin's scalability challenges ,providing larger block sizes to facilitate quicker transactions)Briere et al .(2015 ,.Bitcoin SV) BSV ,(another iteration of Bitcoin Cash ,focuses on reinstating the original Bitcoin protocol while further increasing block sizes .Other forks ,like Bitcoin Gold)BTG (and Bitcoin Diamond) BCD ,(aim to make mining easier by using algorithms that are not accessible to specialized mining equipment .Smaller-known forks ,including Bitcoin God) GOD (and Super Bitcoin) SBTC,(also research smart contracts and greater privacy features. Despite these improvements ,market capitalization and adoption rates are very different among these forks ,and Bitcoin Cash and Bitcoin SV are enjoying a relatively higher profile than their peers.

The main objective of this study is to evaluate how portfolios can be diversified within the context of Bitcoin forks. Using historical price trends ,volatility behaviors ,and correlation indicators between these forks ,this research aims to enlighten whether they might help investors in cryptocurrencies achieve better risk-adjusted returns.

Moreover ,it investigates if Bitcoin forks are independent enough from Bitcoin and each other to ensure investment in them in a diversified portfolio is justifiable.

This study contributes to the growing body of literature on cryptocurrency investment methodologies by focusing on a niche subcategory of digital assets that is often overlooked in mainstream financial studies .Understanding Bitcoin forks 'behavior is crucial for institutional and individual investors alike at this juncture ,characterized by increased regulatory scrutiny and rapid technological advancement in blockchain technologies.

Literature Review

There are two primary types of Bitcoin forks :hard forks and soft forks .Hard forks create new cryptocurrencies as they are modifications to the Bitcoin protocol that are not compatible with previous versions) Schär .(2020 ,Soft forks are changes that are backward compatible without creating new coins .The most widely known hard fork is Bitcoin Cash) BCH ,(which was developed in 2017 in an attempt to solve the scalability problems with Bitcoin. Later forks ,such as Bitcoin SV) BSV (and Bitcoin Gold)BTG ,(have included innovations like bigger block sizes and changed algorithms to fight mining centralization)Bazán-Palomino.(2021 ,

Most of the basic characteristics of Bitcoin ,including decentralization and the use of blockchain technology ,are often transferred to Bitcoin forks .Their market capitalization ,liquidity ,and adoption rates ,however ,vary significantly) Conlon et al .(2024 ,.While Bitcoin God and Super Bitcoin remain niche projects with little market activity ,Bitcoin Cash and Bitcoin SV ,for instance ,have very strong ecosystems .These differences underscore the importance of evaluating the distinctive risk-return profile of each fork and how it might contribute to portfolio diversification.

Correlations and Volatility in Cryptocurrency Markets

The extreme volatility of cryptocurrencies has been the focus of research ,with Bitcoin often being used as a benchmark for the market .Studies have shown that altcoins ,such as Bitcoin forks ,tend to be closely related to Bitcoin ,especially when the market is down) Corbet et al .(2019 ,.However ,some forks have unique price swings that are influenced by their community support and special technological characteristics .For example ,the large-block strategy of Bitcoin SV and the democratized mining of Bitcoin Gold have resulted in niche user communities that could trigger strange market activity.

Despite these differences ,there remains a relatively strong overall correlation structure between Bitcoin forks and between forks and Bitcoin ,which limits their applicability as vehicles for diversification) W .Kim et al.(2020 ,. This phenomenon is often attributed to the same market forces that operate in the cryptocurrency space ,such as macroeconomic factors and investor sentiment.

Prior Research on Portfolio Diversification with Cryptocurrencies

There has been increasing research on the role of cryptocurrencies in diversified portfolios .Some studies indicate that Bitcoin and other cryptocurrencies have relatively little correlation with traditional asset classes ,which is the reason behind their attractiveness as diversification instruments) Bouri et al .(2020 ,.However ,the literature on the diversification with cryptocurrencies is thin ,and this area of research often neglects Bitcoin forks) .Yermack, (2015presents an exception :the work suggests that it is important to separate large cryptocurrencies from smaller, less liquid alternatives when composing portfolios.

Recent studies are investigating the role of specific subsets of cryptocurrencies ,such as stablecoins and DeFi tokens, in portfolio building) Wang ,Liu & ,Zhang .(2022 ,Yet, despite their differences and the historical ties of some of these Bitcoin forks to the original Bitcoin blockchain, very little is known about Bitcoin forks .This highlights the importance of investigating whether Bitcoin forks, both alone and in conjunction with other cryptocurrencies ,can provide significant diversification benefits).Conlon et al(2024 ,.

Theoretical Base

Harry Markowitz's 1952 introduction of Modern Portfolio Theory) MPT (and its later modifications in the context of cryptocurrency markets form the theoretical basis of this investigation .By using diversification to balance risk and return ,MPT offers a framework for building the ideal portfolio .It highlights how crucial it is to choose assets with low or negative correlations to maximize expected returns and reduce overall portfolio risk) Markowitz.(1952 ,

Application of Modern Portfolio Theory in Cryptocurrencies

Historically ,MPT has been applied to the more conventional financial markets of equities ,bonds ,and commodities .However ,ideas are becoming ever more applicable to cryptocurrencies ,an entirely new asset class that happens to be extreme in its variability .Due to their low correlations with traditional classes of assets ,studies have established that cryptocurrencies could offer diversification benefits despite volatility) Bouri et al .(2020 ,.More basically ,to effectively use MPT in the cryptocurrency space, there is an immense need to understand the unique nature of these digital assets ,including their technological basis, market dynamics ,and investor sentiment)Chen.(2023 ,

Characteristics of Bitcoin Forks and Their Role in Diversification

Bitcoin forks are an interesting case for diversification research since they are subgroups of the larger cryptocurrency market .Although the technological underpinnings of Bitcoin are transferred to these forks ,their functionality ,governance ,and community support are different. For instance:

- **Bitcoin Cash) BCH (**increased block sizes to accelerate the transaction process.
- **Bitcoin SV) BSV (**was developed to scale the blockchain for business applications.
- **Bitcoin Gold) BTG (**has developed a mining algorithm that is resistant to ASIC gear in a bid to promote decentralization.

These distinguishing characteristics infer that ,in theory, despite sharing a bloodline with Bitcoin ,bitcoin forks may differ in their risk-return profile .In the theoretical framework for including bitcoin forks in a portfolio ,it may be argued as justified since price movements in bitcoins will be regulated by different factors in the marketplace ,thereby minimizing the overall risks of the diversified portfolio by minimizing the correlations.

Efficient Frontier in the Context of Bitcoin Forks

One of the main concepts in MPT is the efficient frontier: the set of optimal portfolios offering the highest possible predicted return for a given level of risk .Building such an efficient frontier for Bitcoin forks involves examining the correlations ,volatility ,and past performance of different assets) DeMiguel et al .(2009 ,.Some Bitcoin forks may shift the efficient frontier outwards ,offering investors better risk-adjusted returns because of their distinct characteristics and market behavior.

Research Gaps and Objectives

Even though the previous research offers insightful information about the overall dynamics of cryptocurrency markets ,there are still some gaps:

1. Bitcoin forks are paid less attention to as a class of assets in themselves.
2. The Bitcoin fork ecosystem‘s links and diversification potential are not relatively well explored.
3. Not enough empirical research has been conducted on the risk-adjusted performance of portfolios that contain Bitcoin forks.

The present study endeavors to close the above gaps and comprehensively evaluate their potential for diversification by methodically examining the price behavior ,volatility ,and correlation patterns of Bitcoin forks.

Data and Methodology

The information for this research was sourced from Forkdrop.io and CoinMarketCap .Forkdrop.io ,a comprehensive database of Bitcoin forks ,reported 75 forks in total. Some of the most notable forks included Bitcoin Cash)BCH ,(Bitcoin SV) BSV ,(Bitcoin Gold) BTG ,(and others ,providing extensive information on their goals ,technical specifications ,and launch dates .However ,when the data of historical price and market was fetched from CoinMarketCap ,only 10 Bitcoin forks contained enough data for analysis .Such forks that have enough data contain Bitcoin Cash) BCH ,(Bitcoin SV) BSV ,(Bitcoin Gold) BTG ,(Bitcoin Diamond) BCD ,(Bitcore) BTX,(Bitcoin Atom) BCA ,(Bitcoin God) GOD ,(Super Bitcoin)SBTC ,(United Bitcoin) UBTC ,(and yet another forksuch as Bitcoin Private or another variant .This limited data availability underscores a frequent obstacle in cryptocurrency research ,emphasizing the fragmented and emerging nature of various cryptocurrency projects.

The analysis period spans from April ,2020 ,10 to November .2024 ,9 This period has been chosen to represent the performance of Bitcoin forks since the peak of their creation in 2017 and the further development in the cryptocurrency landscape .This period represents several market cycles ,which can provide an insightful view of the performance of the forks under different market conditions.

The research employed a multi-faceted approach to evaluate the diversification potential of Bitcoin forks ,which included descriptive statistics ,correlation assessments ,and portfolio optimization strategies .Descriptive statistics, such as average returns ,standard deviations) volatility,(and maximum drawdowns ,were calculated to encapsulate the performance and risk profiles of each Bitcoin fork. These indicators laid the groundwork for comprehending the distinct risk-return profiles of the selected assets.

Correlation analyses were conducted to explore the relationships between Bitcoin and its forks ,as well as between the forks themselves .Pearson correlation coefficients were calculated ,where lower correlations represented higher diversification potential and higher correlations represented reduced benefits .Then ,MPT was applied to develop optimized portfolios with Bitcoin and its forks. Using the mean-variance optimization model ,efficient frontiers were constructed ,showing the portfolios with the highest expected returns for a given level of risk .The portfolio optimization cases included equal-weighted portfolios ,risk-minimized portfolios ,and return-maximized portfolios.

To evaluate the performances of these portfolios ,risk-adjusted measures such as Sharpe Ratio ,Sortino Ratio ,and beta values were calculated .These metrics allowed for the comparison of the relative attractiveness of Bitcoin forks

in a diversified portfolio .Analytics was executed using Python ,with data manipulation done via Pandas and NumPy libraries along with Matplotlib and Seaborn for visualization ,among these correlation matrices and efficient frontier charts .Preliminary data review and setup were completed using Microsoft Excel.

Specifically ,the study encountered certain limitations that are concerned with the historical availability of data: only 10 forks gave a sufficient history for analysis .It is thereby prone to survivorship bias because less successful or dormant forks are excluded from the analysis .Lastly, the highly speculative and evolving nature of the cryptocurrency markets could introduce external effects from regulatory change or macroeconomic events that have impacted the conclusions of the research.

This research study aims to provide an enhanced understanding of strategies related to portfolio management for bitcoins through informative insights regarding the potential of Bitcoin forks to diversify by utilizing powerful statistical and portfolio optimization methods for a specified time horizon.

Results & Discussion

In **Table** ,**1** statistical analysis of the relationship between Bitcoin and its forks is performed by using the MIC ,Pearson correlation ,T-value ,and P-value .The high MIC values of 0.4425 and 0.3954 along with Pearson correlations of 0.6779 and 0.6718 in Bitcoin Cash and Bitcoin Gold show strong linkages with Bitcoin and indicate significant linear and non-linear dependencies .Their high T-values of 30.8728 and ,30.3655 along with P-values of ,0 further strengthen their substantial statistical significance. However ,the MIC and Pearson correlations of BitcoinX, Bitcore ,Bitcoin God ,and Super Bitcoin are modest ,indicating little reliance on Bitcoin‘s returns .United Bitcoin has a high MIC of 0.6425 but a low Pearson correlation of ,0.1018indicating possible non-linear interactions .There was no statistically significant connection between Super Bitcoin) P (0.0648 = and Bitcoin God) P .(0.4142 = In all aspects ,it is evident that while some of the forks are closely related to Bitcoin ,including Bitcoin Cash and Bitcoin Gold ,others have relatively weak or no connection at all ,with the possibility of some non-linear effects in certain situations.

With the Pearson and MIC correlation being considered, KPSS tests were carried out to filter off the non-stationary series and thereby bring down the influence of Bitcoin over all the series .From **Table** ,**2** it can be seen that all Bitcoin and its forks ,such as Bitcoin Cash ,Bitcoin SV ,and more ,came out with a KPSS p-value above the threshold ,such as ,0.05 indicating its stationary nature. All were marked as" TRUE "in the" Stationary "column, and the lag order was set to be determined automatically for the best result .With consistent observations) mostly 1121or 1122 data points ,(the stationary data was ready to be used in a variable selection based on BIC .This will refine the dataset ,removing noise and preparing it for robust modeling with meaningful variables.

After confirming stationarity using the KPSS test ,the BIC values for variable selection were evaluated for various Bitcoin-related cryptocurrencies ,as shown in **Figure**.**1** The trends reveal distinct patterns over time .For instance, Bitcoin) Bitcoin_log_return (shows a sharp improvement in model fit from 2021 to ,2022 with a steep drop in BIC, but its fit weakens again in subsequent years .Cryptocurrencies like Bitcoin Gold_log_return maintain consistently lower BIC values ,indicating better model performance, while others ,such as Bitcoin God_log_return ,struggle with persistently higher values .The figure highlights how market dynamics and structural differences influence the model‘s ability to explain log returns for each cryptocurrency over the years .The correlation heatmap in **Figure2** reveals Bitcoin‘s strong ties with some forks like Bitcoin Cash (0.62) and Bitcoin Gold ,(0.59) while others ,like Bitcoin SV (0.02-) and United Bitcoin ,(0.02-) show independence .Among the forks ,Bitcoin Cash and Bitcoin Gold (0.85) and BitcoinX and Bitcore (1.00) share strong connections ,while Bitcoin Atom stands out with negative correlations ,diverging from the group .This highlights the mixed dynamics of alignment and independence within Bitcoin‘s forked ecosystem.z

After ensuring stationarity using the **KPSS test** and selecting key variables with **BIC** ,we moved to cluster identification .Using the **Elbow Method in Figure** ,**3** we plotted inertia against the number of clusters and identified the" elbow "at around 3 or 4 clusters ,marking the optimal balance for grouping the data.

After identifying the optimal clusters using the Elbow Method ,the dendrogram -**Figure 4** revealed how cryptocurrencies were grouped .Bitcoin and its major forks—Bitcoin Cash ,Bitcoin SV ,and Bitcoin Diamond—formed a tight cluster ,showing similar return patterns .Bitcoin Gold ,while somewhat distinct ,remained loosely connected .Excluding Bitcoin in **Figure** ,**5** the forks stayed closely grouped ,but cryptocurrencies like BitcoinX, Bitcore ,and Bitcoin God appeared in separate ,far-flung clusters ,reflecting their unique behaviors .This analysis highlights how Bitcoin and its forks are strongly interconnected ,while niche cryptocurrencies offer diversification opportunities due to their independence.

Table 3 categorizes Bitcoin forks into four clusters based on return characteristics .**Cluster**) **1** Bitcoin Cash ,Bitcoin SV ,Bitcoin Diamond (shows moderate volatility ,with Bitcoin Diamond being the most volatile .It has positive skewness ,suggesting a higher chance of positive returns. **Cluster**) **2** Bitcoin and Bitcoin Gold (is more stable ,with Bitcoin being low volatility and steady ,while Bitcoin Gold shows higher volatility and unpredictability .**Clus-**

ter) **3** BitcoinX and Bitcore (has high volatility ,symmetric return distributions ,and moderate outliers .**Cluster4**)Bitcoin God ,United Bitcoin ,Bitcoin Atom ,Super Bitcoin (is the most volatile ,with United Bitcoin showing extreme results .Bitcoin God has negative skewness ,indicating a higher chance of negative returns .These clusters reflect different risk-return profiles ,with Clusters 1 and2 offering stability ,while Clusters 3 and 4 present higher risks and potential for larger profits or losses.

Table 5 categorizes Bitcoin forks into four clusters based on return characteristics .Cluster 1 includes Bitcoin Cash, Bitcoin SV ,and Bitcoin Diamond ,all using the Bitcoin Core codebase and PoW consensus ,with Bitcoin Cash and Bitcoin SV considered mainstream .Cluster 2 features Bitcoin Gold ,while Cluster 3 includes BitcoinX ,both marked as experimental .Cluster ,4 with Bitcoin God, United Bitcoin ,Bitcoin Atom ,and Super Bitcoin ,uses various consensus models ,some with hybrid functions, and is also experimental .The table also provides details on Bech32 support ,SegWit ,block height ,fork date ,and projected type for each fork.

Conclusion and Policy Recommendations

The analysis of Bitcoin forks shows that there are distinct clusters by volatility and technical features .The mainstream forks ,like Bitcoin Cash and Bitcoin SV in Cluster ,1are stable ,whereas the experimental forks ,such as BitcoinX and Super Bitcoin in Cluster ,4 carry more risk but probable returns could be even bigger .Such differences in risk-return profiles among the forks highlight why diversification is important for investors.

Policy recommendations involve promoting diversification with stable forks for conservative investors and more volatile ones for high returns .Regulation authorities should clarify rules for experimental forks to ensure that market security prevails ,whereas developers should make stability improvements toward long-term success, especially the promising forks of Clusters 1 and.2

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Exploring the Role of Instagram Micro-Influencers in Shaping Consumer Purchase Intention for Restaurants in Nepal.

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Abstract

This study aims to investigate the impact of Instagram micro-influencers on consumer purchase intentions in the restaurant sector of Nepal. Utilizing a quantitative research methodology, data was collected through a survey distributed to 332 respondents who follow food influencers on Instagram. The analysis revealed significant positive correlations between endorser trustworthiness and likability with consumer purchase intentions. The findings suggest that micro-influencers play a crucial role in shaping consumer behavior, highlighting the importance of authenticity and relatability in influencer marketing. The study recommended that restaurant marketers strategically collaborate with micro-influencers to enhance their social media presence and drive customer engagement. Future research should explore the long-term effects of micro-influencer partnerships and their impact across different demographics to further understand the dynamics of influencer marketing in diverse cultural contexts.

Keywords: *Micro-influencers, Trustworthiness, Likability, Instagram*

Introduction

Celebrity endorsement is a very old marketing communication strategy whereby popular culture and celebrities that are part of this popular culture are used to create a brand image and to deliver the messages regarding the brand image (Yores, 2017). With boom of social media platforms such as Twitter, Facebook and Instagram, individuals who gain popularity through their content have been targeted by large corporations to propagate their marketing material (Evans et al., 2017).

In the Internet age, the emergence of new information technologies and social networking applications such as Instagram, Facebook, Twitter, Skype, and blogs, have brought innovation to the way in which people communicate, and have empowered social networks, which are visited more and more often by today's users (Lee et al., 2021). Social media platforms have become integral to the social and business world (Shrestha, 2019). With the rise of social media, companies are granted the opportunity to market their products or services through an entirely new approach (Peres & Silva, 2021). During the era of social media, influencer marketing has become a widely used marketing strategy for brands to maximize their profit and raise brand awareness causing traditional marketing to take a backseat (Djafarova & Rushworth, 2017). Social media influencers, individuals with a considerable following and significant online engagement on platforms such as Instagram, have become invaluable assets in driving brand visibility and profitability (Khan & Phung, 2021).

Micro influencers have emerged as a compelling alternative to macro influencers for brand collaborations, offering a more intimate and personalized online presence (Kim & Kim, 2021). Today's consumers, who are increasingly informed, empowered, and discerning, value authenticity, trust, and personal connections with brands (Evans et al., 2017). Unlike macro influencers, micro influencers typically have between 10,000 and 100,000 followers. They are known for their high engagement rates and trustworthy online personas, resulting in a highly active and engaged following (Waqas, 2015). Micro influencers often operate within niche communities centered around specific interests, passions, and areas of expertise. Consequently, despite their smaller follower count, the collaboration between micro influencers and companies has significantly grown (Rahmayanti et al., 2018).

Among the many social networks available, Instagram and Facebook are undoubtedly the most frequently used

by influencers today. However, when it comes to micro influencers, blogs also play a significant role. Many hotel and travel micro influencers often maintain a blog to complement their social media posts (Nurfadila & Riyanto, 2020).

This is evident by use of Influencers by restaurants in Nepal. Social media has become a common place to find food reviews, pictures, online stores and anything else. For the scene of food blogging, a few years ago in Nepal not many people knew what it actually meant. And now social media is filled with pictures of various cuisines and reviews. People look up to food bloggers for the restaurants to visit and make decisions based on that (Nepal News, 2021). Micro influencers in form of food vlogging started from Siddharth Ghimire or Nepal Food and now has grown into a large industry in itself. Influencers such as lil. foodie, my darling food, foodnommics, etc. boast a huge following of more thousands of followers (Upadhyay, 2022).

Their engaging videos and authentic reviews have made them trusted sources of food recommendations, significantly influencing dining trends and consumer choices. This digital culinary revolution has fostered a vibrant community of food enthusiasts and has provided local restaurants and street vendors with unprecedented exposure, contributing to the growth of the hospitality and tourism sectors in Nepal (Malla, 2024). A number of studies willing to accumulate understanding of effectiveness of micro influencers use Source Credibility Model (Seiler & Kucza, 2017). Celebrity Likability, Celebrity Expertise and Celebrity Trustworthiness are majorly used in order to measure effects of endorsers.

The impact of Instagram micro-influencers on consumer purchase decisions for restaurants in Nepal remains largely unexplored. As social media continues to shape consumer behavior, understanding how micro-influencers those with a following between 10,000 and 100,000 affect dining choices is critical for the hospitality industry. Despite the growing presence of these influencers who often provide personalized and authentic content, there is limited research on their effectiveness in influencing potential customers' decisions to visit or order from specific restaurants. This study aims to bridge this gap by examining the extent to which Instagram micro-influencers impact the consumer purchase decision-making process in Nepal's restaurant sector. Identifying these effects can provide valuable insights for restaurant marketers to develop more effective social media strategies and harness the power of micro-influencers to drive customer engagement and sales.

The major objective of this study is to evaluate the impact of micro influencers on Consumer Purchase Intention in restaurant business.

The objectives of the study are as follows in details:

- To assess the relation between endorser likability, endorser trustworthiness with purchase decision in restaurants.
- To examine the impact of endorser likability, endorser Trustworthiness on purchase decision in restaurants.

Literature Review

Sternthal et al., (1978) examined theory is primarily defined in terms of two key components: expertise and trustworthiness. Expertise refers to the perceived capability of the source to provide accurate and reliable information, suggesting that a credible source is perceived as knowledgeable in the subject matter. Trustworthiness reflects the extent to which the audience believes the source is honest and has their best interests at heart.

Furthermore, endorser likeability refers to the perceived appeal or attractiveness of the influencer, which can significantly enhance audience engagement and affinity towards the endorsed product. Similarly, endorser trustworthiness relates to the credibility and reliability attributed to the influencer, which fosters consumer confidence in the recommendations made. Both dimensions have been shown to play essential roles in shaping consumer attitudes and behaviors, particularly in the digital marketing landscape where authenticity and relatability are paramount. Prior research indicates that consumers are more likely to accept and engage with endorsements from individuals they find likable and trustworthy, making these factors pivotal in the context of micro-influence marketing (Khamis et al., 2017).

The relationship posited suggests that higher levels of endorser likeability and trustworthiness will lead

to increased consumer purchase intentions regarding restaurants in Nepal. The findings provide strategic insights for restaurants aiming to leverage micro-influencers effectively, enhancing their marketing tactics to drive consumer engagement and sales.

Khan and Phung (2021) investigated the efficacy of social media influencers in the context of advertising. It employed a plain and nonperson message to explicitly target a certain audience, aiming to attract attention, create awareness, generate desire, and increase brand exposure. Advertising has transitioned from conventional media to new media platforms, such as social media. This shift has not only introduced new media channels, but also innovative methods of advertising. Online Social Networks, such as Facebook, Instagram, and others, have become the most popular online platforms in recent years. The company has also initiated the practice of purchasing followers, referred to as social media influencers. The research approach used in this study was quantitative, using a survey questionnaire. The poll used a non-probability sampling technique known as virtual snowball sampling, which included 200 respondents. Consumers see social media as a crucial instrument in making purchase choices, and social media influencers have a significant impact on those decisions. This study enhances our comprehension of the mechanisms behind advertising, particularly its evolution towards social media platforms.

Frimpong and Khurshed (2020) analyzed the effect of internet marketing influencers on customer purchase intention in Ghana. This study also examined the elements that affect customer decision-making. To achieve the goal of the research, primary data was gathered. Data was acquired from 10 individuals of different background, including age, educational background, and professional career, using a semi-structured telephone interview. Online marketing is gaining popularity in Ghana, with an increasing number of people participating. Furthermore, it is evident that the online purchase of fashion items surpasses that of any other product category. Influencers use social media platforms to exert influence on customers' purchasing intentions and buying behaviors.

Peres and Silva (2021) studied the role of micro-influencers in consumer decision making in the hospitality field. The results obtained in the surveys show that users turn to micro-influencers' posts to help in their decision making, as they represent already lived experiences, on the basis of which they can form a reliable idea of what their stay will be like.

Djafarova and Rushworth, (2017) revealed that micro influencer marketing could potentially have a significant effect on brand image; however, it is crucial for a micro influencer to resonate with their audience's values, interests, and visual preferences. Attributes that play a significant role in influencing individuals to follow and trust a micro influencer are genuineness, relatability, and credibility.

Ateke et al., (2015) believed that celebrity endorsement enhances persuasion and improve advertising effectiveness. And, if it is used effectively makes the brand stand out from the advertising clutter, enhances brand awareness, facilitates brand distinction and gives personality to the brand. The use of celebrity endorsements helps to increase the recall value of the brand warranting the use of celebrities in mainstream advertising is a common marketing communication strategy and practice.

Conceptual Framework

On the basis of studies from Ohanian (1990), and Carvalho (2012), the following theoretical framework has been established.

Micro Influencer

Figure 1. *Research framework*

From the theoretical framework adapted, the following hypotheses are formed in order to investigate the influence of features of Micro

H1: There is significant impact of micro-influencer likability on purchase decision for restaurants.

H2: There is significant impact of micro-influencer trustworthiness on purchase decision for restaurants.

Research Methods

Quantitative research approach and confirmatory survey research design are utilized for the study. Quantitative tools used to analyze variables identified in the theoretical framework based on past studies. Furthermore, the study adopted descriptive design to determine characteristics of the findings and causal comparative design because

of the use of correlation and regression of independent variables i.e., Micro-influencer likability and micro-influencer trustworthiness and dependent variable which is Consumer Purchase Decision.

The population of the study are all users of Instagram from the age group of 15 – 59 in Nepal. Sample was based on individuals who follow almost one food influencer (food vlogger). Printed questionnaires used within Kathmandu valley and majority of the questionnaires are sent through Google Forms.

The sample size for the study was derived from the Corchan equation, which is:

$n = Z2 * p * q/e2$

Where,

n = sample size for infinite population

q=1-p

Z = Z value (e.g., 1.96 for 95% confidence level)

p = Population proportion (expressed as decimal) (assumed to be 0.5)

e = Margin of error at 5%

For unknown populations, it is recommended that the population of p and q shall be set at 50%. Similarly, the confidence interval of 95% with z value=1.96 and sampling error e=5% is considered.

$n=1.962 * 0.5 * 0.5/0.052$

$=384$

Convenient sampling will be used which will decrease the reliability of the model however is important for the completion of research and analysis within the given frame of time.

Result and Discussion

The table 1 presents the demographic profile of 332 respondents in the study. In terms of gender, the sample is fairly balanced with 51.8% male and 48.2% female participants. The majority of respondents are single (68.4%), followed by married individuals (30.4%), with a small percentage (1.2%) identifying as "others."

Table 1. Profile of respondents

Variables	Characteristics	Frequency	Percent
Gender	Female	160	48.2
	Male	172	51.8
	Total	332	100
Marital Status	Single	227	68.4
	Married	101	30.4
	Others	4	1.2
	Total	332	100
Age Group	16 - 25	106	31.9
	26 - 35	174	52.4
	36 - 45	52	15.7
	Total	332	100
Education level	SEE	9	2.7
	Plus 2	26	7.8
	Bachelor	128	38.6
	Master	165	49.7
	Others	4	1.2
	Total	332	100
Profession	Student	87	26.2
	Business Owner	40	12
	Employee	168	50.6
	Freelancer	21	6.3
	Unemployed	11	3.3
	Others	5	1.5
	Total	332	100

Most respondents are aged between 26 and 35 years (52.4%), with a significant number from the 16-25 age group (31.9%), and fewer from the 36-45 age group (15.7%). Regarding education, nearly half of the participants have a Master's degree (49.7%), followed by those with a Bachelor's degree (38.6%). A small percentage have completed their SEE (2.7%) or Plus 2 (7.8%). Professionally, half of the respondents are employees (50.6%), followed by students (26.2%), business owners (12%), and freelancers (6.3%). The remaining respondents are either unemployed (3.3%) or fall into other categories (1.5%).

The table 2 shows the relationships between the variables Influencer Trust, Influencer Likability, and Purchase Intention based on Pearson correlation analysis.

Table 2. *Relationship between variables for all samples*

Variables		Influencer Trust	Influencer Likability	Purchase Intention
Influencer Trust	Pearson Correlation	1		
	Sig. (2-tailed)			
Influencer Likability	Pearson Correlation	.695**	1	
	Sig. (2-tailed)	0.000		
Purchase Intention	Pearson Correlation	.677**	.535**	1
	Sig. (2-tailed)	0.000	0.000	

** Correlation is significant at the 0.01 level (2-tailed).

There is a strong positive correlation between Influencer Trust and Purchase Intention ($r = 0.677$, $p < 0.01$), meaning that as influencer trust increases, so does the intention to purchase. Similarly, Influencer Likability is also positively correlated with Purchase Intention ($r = 0.535$, $p < 0.01$), indicating that when an influencer is liked more, the likelihood of consumers intending to purchase from the recommended restaurant increases.

Regression analysis

Regression analysis helps to find out the impact of independent variables on the dependent variable. The regression analysis is conducted for the whole sample. In the study, regression analysis is done for the different determining factors of Instagram micro-influencers on consumer purchase intentions.

Table 3. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.683a	0.467	0.463	0.55041

a Predictors: (Constant), Influencer Likability, Influencer Trust

The table 3 presents the model summary for the regression analysis examining the impact of Influencer Likability and Influencer Trust on Purchase Intention. The R value of 0.683 indicates a moderate positive correlation between the predictors (Influencer Likability and Influencer Trust) and the dependent variable (Purchase Intention). The R Square value of 0.467 means that approximately 46.7% of the variance in Purchase Intention can be explained by Influencer Likability and Influencer Trust. The Adjusted R Square value of 0.463 takes into account the number of predictors in the model, showing that the model is quite reliable in explaining the variation in purchase intention. Finally, the Std. Error of the Estimate of 0.55041 reflects the average distance that the observed values fall from the regression line, providing an indication of the model's accuracy.

The ANOVA table 4 shows the overall significance of the regression model. The Sum of Squares for the regression is 87.165, indicating the variability explained by the predictors (Influencer Trust and Influencer Likability) in predicting Purchase Intention. The Residual Sum of Squares is 99.673, which represents the unexplained variability. The Total Sum of Squares is 186.838, which is the total variation in Purchase Intention.

Table 4. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.165	2	43.583	143.858	.000b
Residual						
99.673						
329						
0.303						
	Total	186.838	331			

a Dependent Variable: Purchase Intention

b Predictors: (Constant), Influencer Likability, Influencer Trust

The F-statistic is 143.858, with a p-value of 0.000, indicating that the regression model is statistically significant. This means that the combination of Influencer Trust and Influencer Likability significantly predicts Purchase Intention. The model explains a substantial portion of the variation in Purchase Intention, and the results are highly reliable.

The table 5 presents the results of the regression analysis, showing how Influencer Trust and Influencer Likability affect Purchase Intention. The constant value of 1.137

represents the baseline Purchase Intention when both Influencer Trust and Influencer Likability are zero.

Table 5. Coefficientsa

Model	Unstandardized Coefficients B	t	Sig.
(Constant)	1.137	7.217	0.000
Influencer Trust	0.581	10.553	0.000
Influencer Likability	0.134	2.206	0.028

a Dependent Variable: Purchase Intention

The analysis reveals that Influencer Trust has a significant positive effect on Purchase Intention, with a coefficient of 0.581, meaning that for every one-unit increase in Influencer Trust, Purchase Intention increases by 0.581 units. This relationship is highly significant, as indicated by the t-value of 10.553 and a p-value of 0.000. Similarly, Influencer Likability also positively influences Purchase Intention, with a coefficient of 0.134, suggesting that for each one-unit increase in Influencer Likability, Purchase Intention rises by 0.134 units. This effect is statistically significant, with a t-value of 2.206 and a p-value of 0.028.

Discussion

The findings of this study reveal a significant relationship between micro-influencer characteristics specifically endorser trustworthiness and likability with consumer purchase intentions in the restaurant sector of Nepal. Supporting the results, prior research indicates that trustworthiness is a critical factor in influencer marketing, as consumers are more likely to engage with endorsements from sources they perceive as credible and relatable (Khamis et al., 2017). This aligns with the strong positive correlation found in this study between influencer trust and purchase intention, suggesting that increased trust leads to higher purchase likelihood.

Conversely, some studies highlight the potential limitations of micro-influencer effectiveness, noting that their impact can vary significantly based on niche and audience engagement levels (Djafarova & Rushworth, 2017). This contradiction suggests that while micro-influencers generally enhance consumer decision-making, their influence may not be uniform across all demographics or restaurant types. Thus, the study contributes valuable insights into the significant role of micro-influencers in shaping consumer behavior within specific cultural contexts like Nepal, while also acknowledging the variability in their effectiveness as highlighted by previous literature (Frimpong et al., 2020; Peres & Silva, 2021).

Conclusion

The study concludes that Instagram micro-influencers significantly influence consumer purchase intentions in the restaurant industry in Nepal, particularly through the dimensions of trustworthiness and likability. The results demonstrate that higher levels of influencer trust and likability positively correlate with increased consumer purchase decisions, emphasizing the role of authenticity and relatability in shaping consumer behavior. These findings suggest that restaurants can leverage micro-influencers as a strategic marketing tool to enhance customer engagement and drive sales. By focusing on influencers who are perceived as trustworthy and likable, businesses can effectively connect with their target audience, fostering stronger brand-consumer relationships in a competitive digital landscape.

Future research could explore the long-term effects of micro-influencer campaigns on brand loyalty and customer retention, as well as the potential differences in impact across various demographics and cultural contexts. Additionally, examining the evolving nature of influencer marketing in response to changing consumer preferences and technological advancements will provide deeper insights into effective marketing strategies in the digital age.

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Eroding Trust in Banks and Financial Institutions: Causes, Consequences, and the Impact of Declining Interest Rates on Fixed Deposits and Savings

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Abstracts

This article discusses and develops insight into the multifarious effects that can bring to the decreased fixed deposit interest rate. By adopting social constructivism theory and interpretism, it has found that there is a double standard of games being played in society because, on one side, the slogan of the UN's sustainable goal to enhance the life of the people, the coin of Society Five and Industry 5, which value high preference to people of societies and in another side decreases the fixed deposit interest and prefers few borrowers and investors at the sacrifices of large number savers. It leaves possible implications for society in the future, such as the increased result of social and economic inequalities in larger societies for unrest.

Keywords: *rate of fixed deposit interest, impact on the economy, UN sustainable goals, Society 5, Industry 5, social-ecological environment*

Background

In the later days, international efforts have been observed to protect human beings for social and economic wellbeing by reaching out to them with different missions. Such missionary movements are some of the sustainable goals of the UN(THE 17 GOALS | Sustainable Development), society 5, and Industry 5. It is also observed that such movements are challenged to exit due to the economic crises and national policy. For instance, the decreasing interest rate of banks can affect the living standard of the savers, who, for no reason, are penalized.

Objective

To analyze the possible effect of reduced fixed deposit interest from the perspective of sustainable development policy of UN, society 5, industry 5, and sociological environment.

Methods and materials

The study is based on interpretivism and social constructivism by methods. Under this, the researchers have reviewed various literature and consulted academicians and deposit holders to gain insight into their feelings and pains from the reduced income for which they delve into a couple of decades.

Review of literature

The following outcomes are illustrated in a Pettinger paper on economics on the effects of lesser effects that Tejvan published on August 3, 2019: (1) The return on savings is lower when interest rates are lower. Customers will be more inclined to spend than hoard money due to this diminished incentive to conserve. (2) Borrowing is less expensive when interest rates are lower. It will allow businesses and people to borrow money to fund extravagant investments and expenditures. (3) The monthly cost of mortgage repayments will decrease if interest rates decline. As a result, householders will have more money to spend, which should lead to an increase in consumer expenditure. (4) Purchasing assets like real estate is more appealing when interest rates are lower. House prices will increase as a result of growing wealth. As confidence rises, greater wealth will also stimulate consumer spending. (5) It reduces the appeal of saving money in the nation. As a result, the value of the national currency declines due to a decrease in demand. When the exchange rate declines, UK imports become more costly and exports more competitive. Additionally, this contributes to raising aggregate demand. The aggregate demand (AD) components of an economy are represented by the equation AD=C+I+G+X−MAD = C + I + G + X - MAD=C+I+G+X−−M. What each phrase means is as follows: The aggregate demand for all economic products and services is called aggregate demand, or AD.

• C: Consumption or the money households spend on products and services.
• I: Investment, the money that households and corporations spend on new homes and capital goods, respectively.
• G: Spending by the government, including purchases of goods and services.
• X: The value of goods and services sold to foreign nations or exports.
• M: Imports, the amount spent on products and services purchased from other nations (deducted since they are not produced there).
Justification: The total demand in an economy over a

specified period and at a set price level is measured by aggregate demand. According to the equation, household consumption, business investments, government spending, and net exports (X−MX - MX−M), or the difference between imports and exports, are the main drivers of AD.

Table 1: Low-interest's effects

Personal	Economy
Reduced borrowing costs	When the currency depreciates, exports become more competitive, and imports become more costly.
Low-cost mortgage installment	There may be inflationary pressure as a result.
Low dividend payments and low interest rates for savers	Theoretically, it should accelerate economic expansion.
The reduction in savings' actual worth when inflation exceeds interest rates	Investment is perhaps more appealing.
Banks are less profitable when interest rates are low.	The cost of borrowing will be comparatively low for the government.
Banks are less profitable when interest rates are low.	The value of the currency will likely decline:
Because it is inexpensive to borrow, asset prices may increase.	When the currency depreciates, exports become more competitive, and imports become more costly.

Results and discussion

When interest earners are affected by reduced interest, their earnings directly decline. Several consequences are seen in the society. These can be classified as social, economic, and political effects.

Social effects:

Social differences brought forth by inequality breed animosity and mistrust among various groups, eventually generating polarization. People from underprivileged origins frequently do not have access to good healthcare, education, or employment possibilities, which feeds the poverty cycle. Poorer populations experience higher rates of sickness, hunger, and shorter life expectancies as a result of inequality, which also results in unequal access to healthcare. Marginalized communities may turn to violent uprisings, strikes, or protests in response to perceived injustice when inequality gets severe. Potential inequality prevents people from realizing their maximum potential, leading to a loss of abilities and inventiveness that could benefit society.

Impact on the Economy

Because a more significant percentage of wealth is concentrated in the hands of a small number of people who spend less proportionately than those in lower income categories, high inequality lowers total economic demand. Because people in poverty may turn to criminal activity in order to survive, economic inequality is frequently associated with an increase in crime. Because economic inequality hinders upward mobility, it is more difficult for people to improve their financial situation throughout generations. Inequality persists because wealthy people have better access to resources like investments and education, which help them preserve or grow their advantage. Businesses are hampered, and consumer spending is reduced when there is a significant income gap because fewer people have disposable cash.

Political Repercussions:

Economic might frequently translate into political clout, allowing the rich to sway laws to suit their interests, occasionally at the expense of the majority. Whenever governments attempt to address the discontent among underprivileged groups, inequality can result in frequent policy changes. Populist movements that take advantage of public ire and offer drastic remedies can be fueled by social and economic inequality.

Cultural and Psychological Effects:

Social divisions are widened by economic inequality, which frequently breeds prejudice and misconceptions about underprivileged groups. In unequal societies, tension, anxiety, and feelings of inadequacy are more common and impact people of all income levels. Traditional community ideals like reciprocal assistance and group accountability may be undermined by inequality. Social and economic inequality must be addressed to create an equitable, inclusive, and sustainable society. These adverse effects can be lessened by implementing policies like fair taxation, social welfare programs, and equal access to healthcare, education, and employment opportunities.

Decreased income effects on sustainability goal

A number of SDGs, particularly those pertaining to financial inclusion, poverty alleviation, and economic growth, may be jeopardized by lower interest rates: Goal 1 (No Poverty) of the UN sustainability agenda prioritizes reducing poverty. However, these interest-cutting measures make poverty worse. This is because those who rely only on interest and savings end up poorer. Goal 8 (Decent Work and Economic Growth) is further drawn to sustainability goals, placing them in the category of vulnerable individuals and even capturing additional vulnerability. Lowering lending rates makes it even harder for them to invest in profitable industries. It becomes impossible to achieve Goal 10 (Reduced Inequalities). The primary source of income for low-income groups is fixed deposits. Thus, lower interest rates make wealth disparity worse. Diversified investment choices, such as

stocks, real estate, and private equity, are available to wealthier people. Goal 12 (Responsible Consumption and Production) is significantly impacted since low loan rates favor short-term spending over long-term budgeting, which could result in unsustainable consumption patterns. People believe financial institutions prefer investors and borrowers above savers, so Goal 16 is related to Peace, Justice, and Strong Institutions. It indirectly impacts Goals 9 (Industry, Innovation, and Infrastructure) and 6 (Clean Water and Sanitation). Lower interest rates may affect the money available for infrastructure projects, such as those that enhance sanitation and water quality. Reduced investment in these vital sectors could result from lower interest rates, hindering efforts to provide everyone access to clean water and sanitary facilities. The financing of sustainable infrastructure and industrialization projects can also be impacted by lower interest rates, which may incentivize borrowing and investment in sustainable infrastructure and technologies. However, they may also result in higher debt levels, impeding long-term economic growth and stability.

Reduced Interest Rates and Society 5.0

A Japanese program called Society 5.0 seeks to use data and digital technologies to build a human-centered society. It aims to solve several societal issues by integrating online and physical space in a balanced manner. A human-centered, knowledgeable society, Society 5.0 aims to strike a balance between technical advancement and the welfare of society. The problem of lower interest rates fits into its structure as follows: Because it excludes ordinary people from wealth development and financial security, lower interest rates are incompatible with human-centric finance. Policies promoting financial and digital inclusion may impede the decline in the economic standing of known individuals. People's declining economic standing can undermine Society 5's core objective of fostering resilience. Lower interest rates may stimulate investment in the technology developments that support Society 5.0. However, this investment may be redirected elsewhere, impeding progress if individuals mistrust banks. People may experience financial stress due to lower savings returns, which could affect their general well-being and capacity to contribute to a balanced, digitally integrated society. Reduced returns on savings could deter people from spending money on education and skill-building, which would impede the creation of a highly qualified and flexible workforce—a crucial component of Society 5.0. Decreased savings may result in less money being available for R&D, which could impede the development of novel solutions and technological breakthroughs essential for Society 5.0. Lower interest rates can worsen economic inequality and hinder the development of an inclusive and equitable super-smart society if they disproportionately affect low-income people.

Reduced Interest Rates and Industry 5.0

Industry 5.0 prioritizes human-centric solutions over efficiency and automation, which were the main goals of Industry 4.0. It seeks to improve creativity, innovation, and sustainability by fostering a synergy between humans and machines. It is believed that moving from Industry 4 to Industry 5 will achieve sustainable objectives. A human-centered, resilient, and sustainable industrial paradigm is what Industry 5.0 aims to achieve. This is the relationship between lower interest rates. Industry 5.0 emphasizes human empowerment in addition to automation and technology. This vision conflicts with policies that impair people's financial stability by undermining savers. Sustainable economic models are encouraged by Industry 5.0. If governments reroute savings to sustainable businesses and green industries, lower interest rates could support this objective while guaranteeing savers continue to gain. Resilience is emphasized by Industry 5.0. Even with lower interest rates, people and the economy can only be financially resilient with a well-designed savings plan. Interest rates may have an impact on investments in AI and advanced manufacturing. Reduced interest rates can lower borrowing costs and encourage new developments in human-machine cooperation. However, the total amount of funding available for these projects may be impacted by a decline in public confidence in banks. Sustainability is emphasized by Industry 5.0. Progress may be hampered if low interest rates result in lower savings and less money available for sustainable industrial ventures. The goal of Industry 5.0 is to use technology to empower employees. Low interest rate-induced financial instability may make it more difficult for employees to invest in their personal growth or upskill, affecting their preparedness for Industry 5.0. The shift to a human-centric and sustainable industrial model may be hampered by lower savings rates, which can restrict the amount of money available for companies to spend on Industry 5.0 technologies like biotechnology, robots, and artificial intelligence. Decreased investment in Industry 5.0 may hinder economic expansion, which could affect the generation of jobs and the general well-being of society.

Reduced interest rate and social-ecological environment

The reduction in bank interest rates on public deposits can indirectly affect the social-ecological environment through its influence on savings, investments, consumption patterns, and resource allocation. Here's an analysis of the potential impacts:

Social Effects

Reduced interest rates may promote more consumer spending and deter people from saving. Increased resource extraction may result from this. Increased demand for commodities due to higher consumption frequently results in over-extraction of natural resources. Low-income

individuals and retirees who depend on interest income are under financial duress, which may result in them spending less on necessities like housing, healthcare, and education. People may look for alternate investments like stocks, gold, or real estate since these provide lesser deposit returns. Increased real estate investment could come from this, which could fuel urban growth and damage nearby ecosystems by intruding on green areas. Overinvestment in some industries may cause financial systems to become unstable, which would indirectly impact communities that depend on stable economic conditions. Elderly or risk-averse people who rely on fixed income sources may experience stress due to declining deposit incomes. Social instability and debt cycles may result from people turning to unofficial lenders with higher interest rates.

Effects on the Environment

Purchasing expensive goods and services frequently increases output, which raises waste and pollution. Garbage accumulation results from increased use of short-lived products, particularly non-biodegradable garbage like electronics and plastics. Low loan rates might encourage real estate investments that result in land conversion, which can cause deforestation and biodiversity loss. Growing cities can burden nearby water supplies and degrade soil, harming ecosystems. Investments in high-return but environmentally unsustainable sectors, such as intensive agriculture or fossil fuels, may be encouraged by low interest rates. This makes ecological degradation and climate change worse. Reduced interest rates can boost economic expansion, which could increase resource consumption and industrial activity and have adverse environmental effects. Businesses and governments may find investing in sustainable practices and green technologies more affordable when interest rates are lower, which could have a positive environmental impact. Lower interest rates may encourage governments to loosen ecological restrictions to boost economic growth, which could have adverse environmental effects.

Conclusion

The conclusion drawn from this article is countries like Nepal run with ambiguous policies; in one way, it continuously boasts of following principles of UN sustainable goals, society 5, industry 5, and social-ecological policies, and at the same time, they are practicing, ad-hoc games to run the country without being cautious to the future effect of society.

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Effect of Merger and Acquisition on Financial Performance of Commercial banks in Nepal

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Abstract

The main objective to perform this study is with the aim of identifying the effect of merger and acquisition on financial performance of commercial banks in Nepal. Data are collected through Secondary sources and used to analysis and study the variables. Three year pre-merger and acquisition with three recent year post merger and acquisition data are collected from the published annual reports of sampled commercial bank Siddhartha Bank Limited and Rastriya Banijya Bank Limited . ROA and ROE are considered as dependent variables while LAR, LLPR, ER, CCR, ER and DCR are considered as independent variables. To address the aim of the study, inferential statistics is conducted where correlation analysis is used to study the association between dependent and independent variables and regression analysis undertaken to study the relationship between the variables. A multiple regression analysis is conducted with the help of excel sheet to develop the regression model relating the study variables. Financial performance of both the sampled banks SBL and RBB seemed to be decreasing or negatively affected by merger and acquisition. As both dependent variables ratio ROA and ROE decreases after merger and acquisition. For both the Sample, regression analysis of dependent variable ROA and ROE with independents variables showed that the value of r square is 1 before the merger, it showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. After merger and acquisition also dependent variable ROA and ROE with independents variables, LAR, LLPR, ER, CCR and DCR showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. This study also suggest that merger and acquisition may not be good for some organization or banks. So, it is necessary to think twice before carrying ***out merger and acquisition by the concerned party.***

Keywords: *Merger, Acquisition, Financial performance, Profitability, Assets profile*

Introduction

Mergers and acquisitions are agreements in which the ownership of companies, other business organizations, or their operating units are transferred or combined. As an aspect of strategic management, M&A can allow enterprises to grow, shrink, change the nature of their business or improve their competitive position.

To address these conflicting results, this research aims to uncover the true impact of mergers and acquisitions on the financial performance of banks. Some of the research questions relating to this research are as follows:

- What is the profitability position of sampled commercial banks pre and post-merger and acquisition?
- What is the position of assets profile, credit risk, cost controlling and capital structure of sampled commercial bank pre and post-merger and acquisition?
- How does the merger and acquisition effect financial performance of sampled commercial bank?

Methods

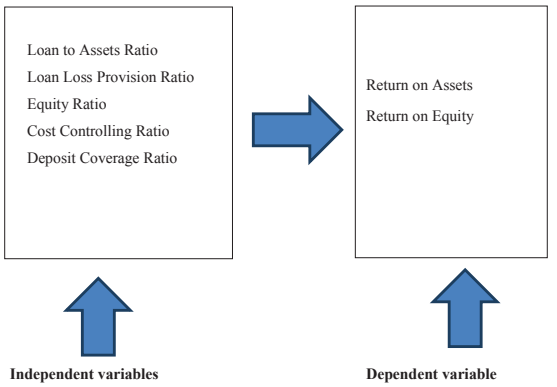
The following research methodology is followed while caring this research.

Descriptive research design is a scientific method used to systematically collect, organize, and present data in order to describe phenomena or characteristics of a population or phenomenon being studied. It aims to provide a clear and detailed picture of the subject of study, without manipulating variables or seeking to establish cause-and-effect relationships.

This entire group of 15 banks is considered the population for this study. For the research, two banks, Siddhartha Bank Limited and Rastriya Banijya Bank Limited, are selected as the sample. Convenience sampling method is employed to ensure the sample's representation. Data are collected from secondary sources through financial reports of selected commercial banks published on internet and other relevant sources. Total six-year data for pre-merger and acquisition, three years data before merger from F/Y 2013/14 to F/Y 2015/16 for SBL and before acquisition from F/Y 2072/73 to 2074/75 for RBB are taken. In the same way for post-merger and acquisition three-year recent data after merger from 2020/21 to F/Y 2023/24 for SBL and after acquisition data from F/Y 2077/78 to F/Y 2079/80.

Figure 1

Research framework and variables of research



Independent variables Dependent variable

Major Findings

The major finding of the study from the analysis of data collected is that merger and acquisition both has negatively affected the financial performance of sampled banks. As the ROA and ROE both the dependent variables of financial performance decreases after the merger of SBL and after acquisition of RBB which clearly shows the negative impact of it.

Some other majors' findings of this study are listed below:

- It is found that before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum ROA is 0.015 while maximum is 0.017 with the average of 0.016 and SD of 0.001. But after merger from the data pf F/Y 2020/21 to F/Y 2022/23, minimum ROA is 0.011 and maximum of 0.012 with the average of 0.011 and SD 0.001. The average ROA after merger seems to be decreasing. In the same way, it is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum ROA is 0.014 while maximum is 0.019 with the average of 0.016 and SD of 0.002. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum ROA is 0.011 and maximum of 0.013 with the average of 0.011 and SD 0.002. The average ROA after acquisition seems to be decreasing by 0.005.
- Before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum ROE is 0.201 while maximum is 0.233 with the average of 0.213 and SD of 0.017. But after merger from the data pf F/Y 2020/21 to F/Y 2022/23, minimum ROE is 0.125 and maximum of 0.140 with the average of 0.133 and SD 0.008. The average ROE after merger seems to be decreasing. It is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum ROE is 0.192 while maximum is 0.230 with the average of 0.208 and SD of 0.020. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum ROE is 0.071 and maximum of 0.140 with the average of 0.110 and SD 0.036. The average ROE after acquisition seems to be decreasing.
- It is found that before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum Loan-to-Asset Ratio **is** 0.675 while maximum is 0.744 with the average of 0.712 and SD of 0.0035. But after merger from the data F/Y 2020/21 to F/Y 2022/23, minimum Loan-to-Asset Ratio **is** 0.662 and maximum of 0.719 with the average of 0.694 and SD 0.029. The average Loan-to-Asset Ratio after merger seems to be decreasing. before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum LAR is 0.516 while maximum is 0.616 with the average of 0.580 and SD of 0.056. But after acquisition from the data F/Y 277/78 to F/Y 2079/80, minimum LAR is 0.617 and maximum of 0.692 with the average of 0.644 and SD 0.041. The average LAR after acquisition seems to be increasing.
- Before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum Equity Ratio is 0.074 while maximum is 0.084 with the average of 0.077 and SD of 0.006. But after merger from the data F/Y 2020/21 to F/Y 2022/23, minimum Equity Ratio is 0.082 and maximum of 0.089 with the average of 0.086 and SD 0.004. The average Equity Ratio after merger seems to be increasing. It is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum ER is 0.068 while maximum is 0.097 with the average of 0.078 and SD of 0.016. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum ER is 0.093 and maximum of 0.129 with the average of 0.105 and SD 0.021. The average ER after acquisition seems to be increasing.
- It is found that before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum Cost Controlling Ratio is 0.311 while maximum is 0.692 with the average of 0.357 and SD of 0.042. But after merger from the data F/Y 2020/21 to F/Y 2022/23, minimum Cost Controlling Ratio is 0.414 and maximum of 0.426 with the average of 0.426 and SD 0.017. The average Cost Controlling Ratio after merger seems to be increasing. In the same way it is also found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum CCR is 0.468 while maximum is 0.578 with the average of 0.512 and SD

of 0.058. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum CCR is 0.453 and maximum of 0.534 with the average of 0.496 and SD 0.041. The average CCR after acquisition seems to be decreasing.

- Among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum Deposit Coverage Ratio is 0.111 while maximum is 0.237 with the average of 0.162 and SD of 0.066. But after merger from the data F/Y 2020/21 to F/Y 2022/23, minimum Deposit Coverage Ratio is 0.071 and maximum of 0.092 with the average of 0.080 and SD 0.011. The average Deposit Coverage Ratio after merger seems to be decreasing. IN the same way it is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum DCR is 0.231 while maximum is 0.400 with the average of 0.294 and SD of 0.092. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum DCR is 0.094 and maximum of 0.136 with the average of 0.110 and SD 0.022. The average DCR after acquisition seems to be decreasing.
- For SBL before merger, there exist positive correlation between LAR, LLPR, DCR with the dependent variables ROA and ROE both. ER and CCR shows the negative relation with dependent variables. DCR shows higher relation of 0.75 with ROA and 0.86 with ROE respectively. CCR shows high negative relation with ROA of -0.89 and ER shows high negative relation of -0.80 with ROE. But after merger, there exist positive
- correlation between LAR, LLPR, ER with the dependent variables ROA. DCR and CCR shows the negative relation with both ROA and ROE dependent variables. LAR shows higher relation of 0.76 with ROA and 1 perfect positive with ROE respectively. CCR shows high negative relation with ROA of -0.62 and DCR shows high negative relation of -0.80 with ROE than other independent variables.
- For RBB before acquisition, that there exists positive correlation between LAR, LLPR, ER with the dependent variables ROA. CCR and DCR shows negative relation with ROA. LAR only shows positive relation with ROE other all variables shows negative relation with ROE. ER shows perfect positive relation of 1 with ROA. LLPR shows high negative relation of -0.9 with ROE. CCR and DCR also shows high negative relation of -0.9 with ROA dependent variable. But after acquisition, independent variable LAR only shows high positive relation with ROA of 0.9 but all other independent variables LLPR, CCR, ER and DCR shoes negative relation with dependent variable ROA. In the same way LAR and DCR shows positive relation with ROE. Independent variables LLPR, CCR and ER shows negative relation of -1, -1, -0.9 respectively with ROA. LLPR, CCR, ER shows perfect negative relation with independent variable ROE.
- For SBL regression analysis of dependent variable ROA and ROE with independents variables shows that the value of r square is 1 before the merger, it showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. In simple words, 100% change in ROA is caused due to change in independent variables, LAR, LLPR, ER, CCR and DCR. Since the standard error is 0 which shows that the estimated value of dependent variable Return on Assets can be fluctuated by $_{+}$- 0 than the actual value. Same result is obtained for after merger too. This showed the relationship and impact between these dependent and independent variables for SBL.
- For RBB the value of r square is 1 before the acquisition, it showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. In simple words, 100% change in ROA is caused due to change in independent variables, LAR, LLPR, ER, CCR and DCR. Since the standard error is 0 which shows that the estimated value of dependent variable Return on Assets can be fluctuated by $_{+}$- 0 than the actual value. Same result is obtained for after acquisition too. This showed the relationship and impact between these dependent and independent variables for RBB.

Summary and Conclusion

The primary objective of this study is to assess the impact of mergers and acquisitions on the financial performance of commercial banks in Nepal. Data have been gathered from secondary sources, focusing on a comparative analysis of variables. Specifically, financial data from three years prior to the mergers and acquisitions, as well as three years post-merger, have been sourced from the published annual reports of the selected banks, SBL and RBB. In this study, return on assets (ROA) and return on equity (ROE) are used as the dependent variables, while the independent variables include LAR, LLPR, ER, CCR, ER, and DCR. To achieve the research objective, inferential statistical methods were employed. Correlation analysis was used to explore the relationships between the dependent and independent variables, while regression analysis was conducted to examine how these variables interact. A multiple regression model was developed using Excel to analyze the connections between the study variables.

It is found that before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum ROA is 0.015 while maximum is 0.017 with the average of 0.016 and SD of 0.001. But after merger from the data pf F/Y 2020/21 to F/Y 2022/23, minimum ROA is 0.011 and maximum of 0.012 with the average of 0.011 and SD 0.001. The average ROA after merger seems to be decreasing. In the same way, it is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum ROA is 0.014 while maximum is 0.019 with the average of 0.016 and SD of 0.002. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum ROA is 0.011 and maximum of 0.013 with the average of 0.011 and SD 0.002. The average ROA after acquisition seems to be decreasing by 0.005. Before merger among the three years past data of SBL from F/Y 2013/14 to F/Y 2015/16, the minimum ROE is 0.201 while maximum is 0.233 with the average of 0.213 and SD of 0.017. But after merger from the data pf F/Y 2020/21 to F/Y 2022/23, minimum ROE is 0.125 and maximum of 0.140 with the average of 0.133 and SD 0.008. The average ROE after merger seems to be decreasing. It is found that before acquisition among the three years past data of RBB from F/Y 2072/73 to F/Y 2074/75, the minimum ROE is 0.192 while maximum is 0.230 with the average of 0.208 and SD of 0.020. But after acquisition from the data pf F/Y 277/78 to F/Y 2079/80, minimum ROE is 0.071 and maximum of 0.140 with the average of 0.110 and SD 0.036. The average ROE after acquisition seems to be decreasing.

For both the Sample, regression analysis of dependent variable ROA and ROE with independents variables showed that the value of r square is 1 before the merger, it showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. In simple words, 100% change in ROA is caused due to change in independent variables, LAR, LLPR, ER, CCR and DCR. Since the standard error is 0 which shows that the estimated value of dependent variable Return on Assets can be fluctuated by $_{+}$- 0 than the actual value. Same result is obtained for after merger too. This showed the relationship and impact between these dependent and independent variables for both the banks.

Dependent variable ROA and ROE with independents variables, LAR, LLPR, ER, CCR and DCR showed that 100% of the total variation of dependent variable Return on Assets and ROE has been explained by five independent variables, LAR, LLPR, ER, CCR and DCR. In simple words, 100% change in ROA is caused due to change in independent variables, LAR, LLPR, ER, CCR and DCR. Since the standard error is 0 which shows that the estimated value of dependent variable Return on Assets can be fluctuated by $_{+}$- 0 than the actual value. Same result is obtained for after merger too. This showed the relationship and impact between these dependent and independent variables for both the banks.

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Annual reports of Siddhartha Bank Limited and Rastriya Banijya Bank Limited from 2013 to 2024

An Overview of the Difficulties in Introducing New Whisky to the Nepali Market.

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Abstract

The whisky industry in Nepal presents significant opportunities due to a growing consumer base, increasing urbanization, and a trend toward premium products. However, introducing a new whisky brand into the Nepali market is fraught with challenges. These obstacles arise from regulatory, cultural, economic, and competitive factors. An overview of the key difficulties faced by whisky producers and distributors trying to establish themselves in Nepal. The research method is based on a comprehensive analysis of Alcohol Industry data, Industry profiles, and sectoral contributions to Nepal's economy. It incorporates data from national surveys, government reports, publicly published reports and international sources to examine five years whisky sales trends, consumer shifts, and revenue yield. The finding of this research is the study reveals a significant improvement in on various challenges on new Whisky launching in Nepal's market.

Keywords: *Significant opportunity, Consumer shifts, Alcohol industry, revenue, internal challenges.*

Introduction

Many countries of the world have framed strict codes to restrict alcohol production, distribution and consumption due to the probability of harm to the lives of the people, who use alcohol. India and Shrilanka have fixed liquor zones to watch for excessive drinking by the people and take action to mitigate it. Though, recent research lapse on alcohol consumption. Which research conducted a decade ago showed in Nepal. In terms of overall population 2% of people are drink in dangerous ways, whereas 17.8% have daily habit of drinking. As per the WHO 2014 reports estimate alcohol use account for about fifty people death among one lakh death in nation. Further state WHO that 3.3million people die every year, with 200plus injures and diseases, the cause of which is alcohol consumption, 25% death in age of 20-39 years take place due to uncontrolled alcohol consumption. This scanty must necessitates research on the nation's alcohol control policy.

Objectives of the study

This study aims to explain the overview and challenges to introduce new whisky brand in Nepal market to make the value for Nepal concerning its revenue, production, distribution, consumption and social issues.

Methodology and materials

The method adopted is the review of market, Policy and practices of alcohol product registration distribution, production and consumption in the country, as well as practices of other countries' guidelines and WHO reports concerning alcohol regulations. Utilize observation instruments to examine the legal documents and policies of selected sectors regarding the licensing procedure.

A survey questioner was designed to see the perception of society towards the country's existing policies.

Limitations of the study

There are more than 70 distilleries registered in Nepal. Many distilleries launched new brand of whisky in market. They are not succeeding. This researcher could not be reached in all industries one by one. Only top 5 of them were visited, who are able to introduced premium whisky product. Hence, whether or not all the industries of the nations practiced the policies could not be generalized through this study.

Results

Opinion of civilians regarding restriction strategy of alcohol products

There seems to be a debate in society on how the unnecessary use of alcohol is reduced. Basically, such debates relate to how it should be restricted. A range of possible strategies to be adopted is listed. They include controlling the manufacturing and sale of alcohol, regulating and controlling its consumption, and increasing family knowledge. Most of the respondents supported regulating the amount of alcohol produced and sold.

A significant proportion of respondents emphasized the importance for choosing family, especially for the head of the household.

A sample of 421 defendants were randomly selected from civil society. Respondents were (1) Medical practitioners

of hospitals, (2) Active members of different Society and clubs, (3) Bureaucrats, and (4) Teachers and Professors of various schools and universities. The representative samples from each group were 120 each.

Several experts and social service workers inquired about the measures necessary to regulate alcohol consumption. Their response is presented in Table 1.

Table 2 Minimizing or restrictions strategies on alcoholic consumption (n=421)

Minimizing strategies recommended by defendants	**Results**
Need to Control production and selling	45.20%
Policy, Regulation, and prohibition of alcohol use	22.10%
Public Awareness in the family	23.70%
Familiars on Knowledge of Quality	2.40%
No responses	6.60%
Total	100.00%

Source: Field survey

No common consensus can be derived from different people and different countries on how the overconsumption of alcohol can be restricted and save societies from ensuing effects. Table 2 displays such differences in opinions. Opinions of societies are divided into three categories: (1) There should be control of production and sales of whisky, (2) Regulation and prohibition of use of Whisky, and (3) spreading awareness among senior family members knowledge of Whisky. Nearly half of the samples are of the opinion that if these things are not produced and sold in the market, they will not be consumed.

Discussions

The liquor and beer industry has been defined in different ways. The beverage industry produces drinks, particularly alcoholic beverages, ready-to-drink, and soft drink products (autimix.com). According to WHO's definition, the alcohol Industry includes not only manufacturers but also all enterprises that function as intermediaries, such as importer, exporter, wholesalers, dealers, retailers, etc. The Liquor Act 1974 of Nepal is silent about defining the alcohol Industry.

Location of Industry: Regarding the standard code for the area of establishing the alcohol industry, the Industrial Promotion Board, in its meeting on 2069.06.09, decided three conditions to be fulfilled while selecting the location of the sector. Such a location should not be in the municipal area and metropolitan city. Its distance should be at least 5 KM from the International border area. Such a location should be at least 500 meters away from public places like schools, hospitals, temples, national parks, and historical places.

Land Ownership Agreement: The industry must own at least three hectares of land for brewery (making beer) and distillery (making distilled liquor). In case it produces wine and ciders, in addition to beer and distilled liquor, it must own four hectares of land. If the land used belongs to the industrial estate, an agreement about using land rights must be made with industrial estate management.

Ensuring Environmental Impact: Environmental Impact Assessment (EIA) and Initial Environmental Examination (IEE) of the industry must be prepared by the industry to ensure the government that the industry will not harm people, flora, and funna. Such an industry will not degrade water, land, air, climate, and landscape. The enterprise, if established, will not have a negative impact on cultural heritage and material assets. Further, the report must also declare that the enterprise is not harming any international effects that exist in nature due to the presence of people, animals, plants, water, soil, cultural heritage, etc. The report also must state that the industry will make provisions for prescribed green belt areas inside the premises.

Adherence of provisions related to registration, capacity addition, and infrastructure: For the registration and capacity increments, the industry should pay specific deposits, which will be returned after the industry starts its operation. In case the sector fails to start the operation, the deposit will be forfeited. Similarly, provisions are envisioned for the smooth operation of the industry by installing tanks for storage, considering the safety of the enterprise. For example, it is mentioned that the tank should be installed at the ground level for Molasses and Rectified (RS) spirits Mild Steel (MS). The minimum capacity of the tank should be fixed at one month's storage based on the plant's annual production capacity. The plant should be inside the factory to maintain the purity of water in a demineralized state. All necessities of the factory work, like washing, filling, sealing, leveling, and inspecting, must be installed at the right place. For safety, secrecy, and protection from outside, the physical infrastructure should be 18 ft high. A quality control mechanism must be developed under one trained supervisory staff.

Ensuring the industry establishment standards through a monitoring committee: The government of Nepal forms committees to see whether the industries comply with the issued industry establishment standards or not.

Foreign investment: The government of Nepal does not issue permits for foreign investment to establish industry if it produces below 40% volume concentration of alcohol. Such foreign investors can transfer up to 10% of the profit.

Finding

In no country alcohol production, distribution, and consumption is found to be made entirely free. However, the

level of freedom in its output, distribution, and consumption varies from country to country. WHO Spirit seems to have strict control over alcohol production, distribution, and consumption.

Nepal, too, seems to follow the guidelines and instructions of the WTO because it has enacted many laws to control the alcohol industry, production, import, distribution, and consumption. Such acts are the Hotel Management and Sale and Distribution of Liquors Control Act, 2023; National Broadcasting Act, 1992; Local Administration Act, 1972; Vehicle and Transport Regulation Act, 1992; and Alcohol Rules, 1977.

Conclusion

Introducing a new whisky brand into the Nepali market is a challenging endeavor due to regulatory barriers, competition, consumer preferences, and logistical issues. However, with the right strategies, including competitive pricing, strong branding, and efficient distribution networks, businesses can tap into the market's potential. Addressing these challenges thoughtfully will not only ensure market entry but also long-term success in a dynamic and evolving industry.

Further Research Issues

Further research is needed to understand culturally rooted alcohol consumption habits and their harmful impacts and measures to be taken by the country. Research is also immediately required to investigate the factors that elucidate the youngsters of school age to alcohol consumption habits and methods to mitigate them:

- Further investigation is required to comprehend the socio-cultural attributes of alcohol in communities where it is integrated into daily life.
- Examine children and young people across various geographical, economic, cultural, and social contexts to comprehensively assess the impact of alcohol on them at both national and global levels. • Further investigation is warranted regarding the environmental effects of industrial activities in proximity to residential zones.

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Developing Generative AI-driven ESG Report Generation System

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Abstract

Environmental, Social, and Governance (ESG) reporting has become a critical requirement for organizations worldwide, driven by increasing regulatory demands and stakeholder expectations for corporate sustainability transparency. However, traditional manual report preparation processes present significant resource challenges, particularly for small and medium enterprises (SMEs). This paper introduces a novel generative AI-driven system designed to automate and streamline the ESG reporting process. We present a comprehensive framework that integrates advanced natural language processing (NLP) techniques with parameter-efficient fine-tuning methods to create an automated ESG report generation system. Using a dataset compiled from eight leading Taiwanese information and communication technology (ICT) companies, we implement and evaluate three different language models with various optimization techniques. Our results demonstrate the feasibility of automated ESG report generation while identifying key challenges and opportunities for future development. The findings contribute to both the theoretical understanding of AI-driven corporate reporting and practical applications in sustainability disclosure automation.

Keywords: *ESG Reporting, Generative AI, Natural Language Processing, Sustainability Reporting, Corporate Disclosure*

1. Introduction

The integration of ESG considerations into corporate reporting has emerged as a fundamental requirement in today's business landscape (Mohamed Riyath & Inun Jariya, 2024). Global sustainability challenges and increasing stakeholder demands for transparency have led to more stringent reporting requirements, creating significant operational challenges for organizations. Traditional approaches to ESG reporting, typically involving manual data collection, analysis, and report writing, are resource-intensive and time-consuming, presenting particular difficulties for SMEs (Moussa & Elmarzouky, 2024).

Advancements in artificial intelligence (AI), particularly in NLP and generative AI, provide a transformative opportunity for ESG reporting (Lim, 2024).. These technologies offer the potential to automate report generation while maintaining compliance with various reporting standards and ensuring content quality. However, applying these technologies to ESG reporting presents unique challenges due to the specialized nature of sustainability disclosure and the need for accurate, verifiable information (Ozkan, 2024).

This study aims to develop a Generative AI-driven ESG report generation system that effectively processes and synthesizes sustainability-related data into coherent, standards-compliant reports.

This research contributes to both theoretical and practical domains of sustainability reporting and AI applications. Theoretically, it advances the understanding of how generative AI can be applied to specialized corporate documentation tasks. Practically, it provides a framework for organizations to automate their ESG reporting processes, potentially reducing resource requirements while maintaining reporting quality.

2. Literature Review

The intersection of artificial intelligence (AI) and Environmental, Social, and Governance (ESG) reporting represents a significant frontier in corporate sustainability and transparency. As organizations face mounting pressure to provide comprehensive ESG disclosures while managing resource constraints, AI technologies offer promising solutions for automating and enhancing the reporting process. This literature review examines the theoretical foundations and practical applications of AI in ESG reporting, with particular emphasis on recent developments in natural language processing (NLP) and generative AI, exploring three interconnected themes: the evolving landscape of ESG reporting and its regulatory framework, the emergence of generative AI technologies, and their applications in corporate disclosure practices.

2.1 Evolution of ESG Reporting and Regulatory Landscape

ESG reporting has evolved in response to increasing stakeholder expectations for corporate transparency and accountability. Regulatory frameworks such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and Task Force on Climate-related Financial Disclosures (TCFD) have established standardized guidelines for ESG disclosures (Ben Mahjoub, 2024; Luo & Tang, 2023). These frameworks aim to

enhance comparability, reliability, and relevance in corporate sustainability reporting. However, compliance with these standards remains a challenge, particularly for small and medium enterprises (SMEs), due to the resource-intensive nature of manual ESG reporting (Moussa & Elmarzouky, 2024).

Several studies highlight the growing importance of ESG reporting in investment decision-making and risk assessment (Bannard, 2023). Investors increasingly demand high-quality, verifiable ESG disclosures, prompting companies to seek automated solutions to streamline reporting processes while ensuring compliance with evolving regulations (Gafni et al., 2024). The advent of AI-driven automation offers promising avenues to address these challenges by enhancing efficiency and accuracy in ESG reporting (Moussa & Elmarzouky, 2024).

2.2 Generative AI

Generative AI encompasses a class of artificial intelligence algorithms capable of producing novel content across multiple modalities, including text, images, audio, and video, by learning patterns from training data (Ghebrehiwet et al., 2024; Liu et al., 2025; Schmitt & Flechais, 2024; Schneider, 2024). These systems employ sophisticated deep learning architectures to generate outputs that exhibit high fidelity to real-world data, enabling applications across diverse domains such as creative design, multimedia content generation, and automated report writing (Javed et al., 2025; Kumar, 2024; Rather et al., 2024).

The field experienced a transformative breakthrough with the development of Generative Adversarial Networks (GANs), which introduced an innovative architecture featuring two competing neural networks, a generator and discriminator, engaged in an adversarial training process (Goodfellow et al., 2014). This advancement catalyzed rapid progress in image synthesis and paved the way for subsequent technological innovations, including enhanced GAN architectures, Variational Autoencoders (Higgins et al., 2017), and the emergence of diffusion models (Ho et al., 2020). Concurrent developments in natural language processing saw the rise of transformer-based architectures, notably GPT-4o and Llama 3.2, which demonstrated unprecedented capabilities in generating contextually appropriate and coherent text, spurring extensive research into large language models (LLMs) (Banik et al., 2024; Kumar, 2024).

2.2 AI and NLP Applications in Corporate Disclosure

Advancements in AI, particularly NLP and generative AI, have facilitated automation in corporate disclosure processes, including financial reporting, regulatory compliance, and sustainability disclosures (Lim, 2024). Generative AI models, such as GPT and BERT, have demonstrated the ability to generate human-like text, summarize complex information, and structure reports in accordance with predefined standards (Bengesi et al., 2024; Zhang et al., 2025).

Research has explored the application of AI in sustainability reporting, demonstrating that NLP models can extract, classify, and synthesize ESG-related information from corporate documents (Lim, 2024). AI-driven ESG reporting systems leverage structured datasets, machine learning algorithms, and automated text generation techniques to produce high-quality disclosures that align with regulatory frameworks (Suárez Giri & Sánchez Chaparro, 2024). These studies indicate that AI-powered reporting can enhance consistency, reduce human error, and optimize resource allocation.

Despite these advancements, AI-generated reports must ensure accuracy, verifiability, and compliance with regulatory standards. Fine-tuning AI models using domain-specific datasets, integrating contextual learning mechanisms, and incorporating validation processes are essential to improving the reliability of AI-driven ESG reporting (Ozkan, 2024).

2.4 Summary of Literature Review

This literature review has examined the convergence of AI technologies with ESG reporting practices, highlighting both opportunities and challenges in this rapidly evolving field. The review traced the development of ESG reporting frameworks and their growing importance in corporate governance, while exploring advances in generative AI technologies that have enabled more sophisticated approaches to corporate disclosure. Current applications of AI and NLP in ESG reporting demonstrate promising capabilities in automating disclosure processes, though important considerations remain regarding accuracy, verification, and regulatory compliance. The integration of AI technologies offers a potential pathway to more efficient and reliable disclosure practices, provided that appropriate validation mechanisms are implemented.

3. Research Methodology

This study focuses on the development of a system that uses generative AI to create ESG (Environmental, Social, and Governance) reports. The system combines structured data processing, specialized language models, and an automated reporting framework. Built to maximize both efficiency and accuracy, it ensures full compliance with major sustainability reporting standards including GRI, SASB, and TCFD frameworks. This integrated approach enables automatic generation of thorough ESG reports that satisfy regulatory requirements while maintaining high content quality and consistency.

3.1 ESG Report Framework and Data Preparation

The development of our structured ESG reporting framework began with a comprehensive analysis of ESG reports from eight leading ICT companies in Taiwan. This

analysis focused on extracting essential elements such as chapter structures, data presentation formats, and regulatory compliance requirements. To ensure effective model training, we standardized the dataset using the Alpaca format, which established consistent input-output relationships for text generation tasks.

For efficient data extraction and structuring, we implemented ChatGPT-4.0 to automate the extraction of text, tables, and charts from ESG reports. This automation process ensured comprehensive capture of relevant information while maintaining data integrity. The AI system systematically classified and structured the content based on predefined ESG frameworks, including GRI, SASB, and TCFD, ensuring consistency across all reports. The extracted data underwent standardization into a structured format, optimizing it for AI model training and seamless integration into the ESG report generation system.

3.2 AI Model Training and Optimization

The study employed three lightweight, open-source large language models: Phi-3.5, LLaMA 3.2B, and Mistral 7B. These models were fine-tuned using Unsloth, a parameter-efficient fine-tuning framework specifically designed to optimize model performance while minimizing computational requirements. The fine-tuning process incorporated LoRA adaptation, which enhanced efficiency by selectively adjusting key model parameters, and 4-bit quantization, which substantially reduced memory usage while maintaining performance integrity.

Through systematic hyperparameter tuning and rigorous model selection processes, we successfully developed multiple AI models specialized in ESG report generation. Each model underwent optimization to achieve an optimal balance between content accuracy, structure adherence, and linguistic coherence. This careful calibration ensured that the generated ESG reports consistently aligned with global regulatory standards while maintaining high-quality content delivery.

3.3 System Deployment and Interface Development

The deployment phase began with the implementation of the fine-tuned model using Ollama, a lightweight local execution framework that ensures efficient real-time ESG report generation. To enhance system accessibility, we developed a comprehensive web interface using Gradio, providing users with an intuitive and interactive platform for ESG report generation. This interface incorporates model selection capabilities, allowing users to choose the most appropriate model for their specific reporting requirements. The system supports structured ESG data input and automatically generates compliance-ready reports aligned with global sustainability standards.

The interface design enables dynamic interaction with AI-generated content, allowing users to refine and customize reports to ensure accuracy and relevance to their corporate sustainability disclosures. To maintain system reliability and performance, we implemented a robust model selection mapping mechanism and comprehensive error-handling system. These features ensure consistent stability, flexibility, and accuracy in the generation of AI-driven ESG reports, while providing users with the necessary tools to produce high-quality sustainability disclosures that meet regulatory requirements.

4. Experimental Results and Analysis

This section presents the experimental results and analysis of our ESG report generation system, which integrates three primary components: training dataset preparation, AI model training, and model evaluation. We evaluate the system's performance across multiple dimensions and discuss the challenges encountered and their corresponding solutions.

Our experimental implementation began with the construction of a comprehensive training dataset derived from ESG reports of eight leading enterprises in Taiwan's information and communication technology (ICT) sector. The data preprocessing phase followed the Alpaca format to standardize inputs and outputs, facilitating consistent model training. This standardization process involved structural mapping of ESG reporting elements and systematic content categorization to ensure data quality and industry relevance.

Initial evaluation of the fine-tuned models revealed several critical challenges in the system's performance. These included content redundancy in generated reports, factual inconsistencies (particularly evident when reference data was limited), and language mixing issues affecting report coherence. To address these challenges, we implemented three key improvement strategies. First, we expanded the training corpus with additional verified ESG reports to improve coverage and representation. Second, we refined the data preprocessing pipeline to enhance data structuring and standardization processes across different ESG frameworks. Third, we adjusted model fine-tuning parameters to reduce hallucinations and enhance contextual relevance.

Our comparative analysis of three AI models evaluated for ESG report generation focused on three key metrics: content quality, structure adherence, and language consistency. Table 1 presents a comparative analysis of generative AI models used for ESG report generation, evaluating their performance in terms of content quality, structure adherence, and language consistency. The Phi-3.5 model demonstrates moderate content quality but struggles with low structure adherence and poor language consistency, making it less suitable for high-accuracy reporting. In contrast, LLaMA-3.2 3B offers good content quality with moderate adherence to structured formats and consisten-

cy, providing a more balanced performance. The Mistral 7B model outperforms the others, achieving very good content quality alongside good structure adherence and language consistency, making it the most reliable choice for generating structured and coherent ESG reports.

Table 1. Comparative Analysis of AI Models for ESG Reporting

Model	Content Quality	Structure Adherence	Language Consistency
Phi-3.5	Moderate	Low	Poor
LLaMA-3.2 3B	Good	Moderate	Moderate
Mistral 7B	Very Good	Good	Good

5. Conclusion

This research set out to develop and evaluate a generative AI-driven system for automating ESG report generation, addressing the growing challenges organizations face in meeting sustainability disclosure requirements. Our primary objective was to create a framework that could effectively process sustainability data and generate standards-compliant reports while maintaining high content quality and reducing resource requirements.

The study's major findings demonstrate the technical feasibility and practical viability of AI-driven ESG reporting. Through comparative analysis of three lightweight language models (Phi-3.5, LLaMA 3.2B, and Mistral 7B), we found that the Mistral 7B model achieved superior performance in content quality, structure adherence, and language consistency. The implementation of parameter-efficient fine-tuning techniques, including LoRA adaptation and 4-bit quantization, successfully optimized model performance while minimizing computational requirements. However, our experiments also revealed important challenges, including content redundancy and factual consistency issues, which were effectively addressed through expanded training data and refined preprocessing pipelines.

This research makes several significant contributions to both theory and practice. Theoretically, it advances our understanding of how generative AI can be effectively applied to specialized corporate documentation tasks, particularly in the context of sustainability reporting. The study provides insights into the optimization of language models for domain-specific applications and demonstrates the effectiveness of parameter-efficient fine-tuning approaches. Practically, our research offers a comprehensive framework for organizations to automate their ESG reporting processes, potentially democratizing access to high-quality sustainability disclosure capabilities for businesses of all sizes.

In conclusion, this study demonstrates that generative AI-driven automation represents a promising solution for the challenges of ESG reporting, offering potential benefits in efficiency, accessibility, and standardization. As regulatory requirements and stakeholder expectations continue to evolve, such technological innovations will play an increasingly critical role in enabling organizations to meet their sustainability disclosure obligations effectively.

Acknowledgments

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A Study on Management Procedures for Efficient Implementation of Technology Demonstration Projects: Focusing on the Climate and Environmental Sector

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Abstract

Efficient implementation of public sector support programs for identifying and disseminating innovative technologies or services from SMEs requires detailed procedures distinct from standard research execution processes. These include agreements with commissioning agencies, project planning, announcements, submissions, selection, evaluations, and post-management. Non-specialized institutions, such as research organizations, often establish internal guidelines focusing on research contracts rather than program management, which limits their applicability.

Support programs differ from typical research projects as their outcomes depend on interactions with external entities. Defining and sharing roles, responsibilities, and tasks between internal and external stakeholders is crucial. Adopting operational guidelines from other institutions is common but often problematic due to differences in frameworks and procedures, underscoring the need for tailored processes.

This study reviews detailed procedures for managing support programs in the climate and environmental sectors, including scope, selection processes, task management, result evaluation, and post-management, considering their unique characteristics.

Keywords: *Technology Demonstration Projects, Public Sector Support, Project Management, Climate and Environment*

This document is based on the Seoul Institute's report 2024-UR-08: Study on Establishing Management Procedures for Technology Demonstration Projects.

Introduction

For the efficient execution of various projects aimed at supporting the private sector from the public domain, it is essential to establish detailed procedures that regulate key processes such as project planning, announcement, application, selection, agreements with vendors, result evaluation, and post-management. Since the primary outputs of these support projects are generated through communication with external entities under agreements, it is necessary to clarify the roles, responsibilities, and required tasks of both internal organizations and external counterpart institutions while ensuring shared understanding among all stakeholders.

Considering the characteristics of demonstration projects, this study seeks to review detailed procedures encompassing the scope and targets of support, selection processes, post-selection project management strategies, outcome evaluation, and post-project management to ensure effective administration of support projects.

This study analyzes the current status of representative demonstration support projects in the fields of environmental technology and urban infrastructure and management, implemented by central government agencies and metropolitan governments. Through this analysis, it examines the overview, support details, and procedures of each project and highlights unique characteristics specific to individual projects.

Based on these findings, projects similar to those carried out by the Seoul Institute were selected for comparison. Procedural elements across these projects were compared to propose practical procedures for project implementation, including applicable aspects of demonstration projects.

Current Status of Demonstration Support Projects in the Environmental Sector, Applicable Regulations, and Proposed Management Procedures

Understanding the Current Status of Demonstration Support Projects in the Environmental Sector

Overview of Demonstration Projects

In the public sector, various demonstration support projects are being conducted. Generally, these projects can be categorized into fields such as policy, technology, society, education and culture, and infrastructure and urban management, depending on their target areas and objectives.

Demonstration support projects in the policy fieldare initiated by governments or public institutions to empirically test and validate policies. These projects are often employed to pilot and assess the effectiveness of new policies or policy changes. In the technology field, demonstration support projects involve the development and pilot application of new technologies or technical solutions within the public sector. These projects span diverse areas, including smart city technologies, environmental conservation technologies, and transportation management systems. Social fielddemonstration projects focus on creating and validating innovative solutions to social issues. These projects address challenges such as poverty, social inequality, and aging populations, providing an experimental platform for solution development. In the education and culture field, demonstration support projects are carried out to validate experimental initiatives in education, culture, and the arts. These projects aim to test innovative educational methodologies or assess the sustainability of cultural and artistic activities. Demonstration projects in the infrastructure and urban management fieldtarget urban management issues such as city infrastructure maintenance, urban environmental conservation, and transportation system improvements. These projects explore practical solutions to enhance urban functionality and livability.

This study specifically focuses on technological demonstration projects commissioned by the Seoul Metropolitan Government and implemented by the Seoul Institute. Among the categories mentioned, the study highlights representative demonstration support projects in the fields of environment-related technologiesand urban infrastructure and management, presenting their current status and key features.

Ministry of Environment (Korea Environment Corporation): 2024 Win-Win Cooperation Demonstration Program

The Win-Win Cooperation Demonstration Program, led by the Ministry of Environment and managed by the Korea Environment Corporation, is a project designed to support commercialization funding for small and medium-sized enterprises (SMEs) and mid-sized companies possessing green innovative technologies and equipment in the environmental sector. The program aims to expand the industrial application of these technologies and foster related companies.

This demonstration program operates through a consortium model, matching technology-supplying enterprises (SMEs and mid-sized companies developing innovative environmental technologies) with demand-side institutions (organizations such as eco-friendly facilities-requiring businesses, local governments, and public institutions).

The Win-Win Cooperation Demonstration Programwas established to promote the development and dissemination of green technologies and support corporate environmental management. By facilitating collaborations between green technology suppliers and demand institutions, the program enables suppliers to secure on-site demonstration data (track records), expanding their market opportunities. Simultaneously, it assists demand institutions in addressing environmental challenges by applying innovative green technologies and equipment.

The key areas of support include: □ Clean Air, □ Climate Tech(e.g., carbon capture and utilization), □Smart Water, □Resource Circulation(e.g., byproducts from production processes), □Environmental AI/ICT, □Biogas

These categories encompass all sectors of the environment, reflecting the program's comprehensive scope.

Table 1 - Detailed Support Areas of the Win-Win Cooperation Demonstration Program

Areas	Detailed Support Areas
Clean Air	Technologies and solutions aimed at reducing air pollution and improving air quality.
Climate Tech	Innovations such as carbon capture, utilization, and storage (CCUS) technologies and other climate-focused solutions.
Smart Water	Advanced water management systems, including smart monitoring, treatment, and conservation technologies.
Reseource Circulation	Solutions for managing and utilizing byproducts from production processes, enhancing resource efficiency.
Environmental AI/ICT	Application of artificial intelligence (AI) and information and communication technology (ICT) to address environmental challenges.
Addresses	Technologies for biogas production, management, and utilization as a renewable energy source.

Organizations eligible to apply as the lead research and development institution or as a collaborative research and development institution include corporations, universities, research institutions, research associations, business associations, medical institutions, and local governments. This eligibility is specified under Article 2, Paragraph 3 of the National Research and Development Innovation Act, Article 2, Paragraph 1 of the Enforcement Decree of the same Act, Article 12, Paragraph 1 of the Energy Act, Article 8-2 of the Enforcement Decree of the same Act, Article 11, Paragraph 2 of the Industrial Technology

Innovation Promotion Act, Article 11 of the Enforcement Decree of the same Act, and Articles 2, Paragraph 1, Subparagraphs 3, 4, and 4-2, and Articles 9-3 through 9-5 of the General Guidelines for Operating Industrial Technology Innovation Projects.

Ministry of Environment (Korea Environmental Industry & Technology Institute): 2024 Commercialization Support Program for Small Environmental Enterprises

The Commercialization Support Program for Small Environmental Enterprises, led by the Ministry of Environment and implemented by the Korea Environmental Industry & Technology Institute, provides funding to enhance the success rate of technology commercialization for small environmental enterprises with advanced technologies and to expand the dissemination of environmental technologies in industrial applications.

The support areas are divided into two categories: "Commercialization"and "Green New Industries":

1. "Commercialization"includes fields such as clean air, smart water, resource circulation, climate response, and natural and living environments.
2. "Green New Industries"covers fields such as biogas, ultrapure water, environmental AI/ICT, and future waste resources.

The program targets consortia (implementing entities) consisting of technology-supplying companies with green innovative technologies and demand-side institutions intending to install related facilities.

3. The supplying companiesmust be small or medium-sized enterprises (SMEs) or mid-sized companies that hold the environmental technology rights related to the proposed project.
4. The demand-side institutionsinclude large corporations, SMEs, mid-sized companies, local governments, or public institutions that provide demonstration sites.

An implementing entity can be composed of one demand-side institution and one or more supplying companies. Matching between supplying companies and demand-side institutions is a prerequisite for applying to the program.

Incheon Technopark: "Incheon Startup Park Smart-X Eco" Program

The Incheon Startup Park Smart-X Ecoprogram, managed by Incheon Technopark, is part of the demonstration programs of Incheon Startup Park. Operated in collaboration with the Incheon Environmental Corporation, this program targets startups based in Incheon that can provide products and services related to the corporation's technological needs. It offers demonstration resources and business funding of up to 30 million KRW per company.

While Incheon Technopark serves as the managing organization, the demand institutionsinclude LG Science Park and the Incheon Environmental Corporation. The program aims to identify and nurture environmental startups capable of addressing the technological needs of private corporations and public corporations, as well as proposing innovative products and services.

The program targets startupsestablished within 7 years as of the announcement date, based in Incheon, that possess products or services with a Technology Readiness Level (TRL) of 6 or higher. Eligible companies must be able to either address the technological needs of the Incheon Environmental Corporation or propose products and services related to the corporation.

Gyeonggi Province: "Support Program for Carbon-Neutral Technology Commercialization in Materials, Parts, and Equipment"

The Support Program for Carbon-Neutral Technology Commercialization in Materials, Parts, and Equipment, managed by the Gyeonggi Business & Science Accelerator, targets companies in Gyeonggi Province with outstanding carbon-neutral technologies. The program provides differentiated funding based on the classification of companies into "excellent enterprises" and "selected enterprises."

The program is open to small manufacturing enterprisesin Gyeonggi Province with a head office or factory located within the region, at least three years of business operations, and active carbon-neutral technology commercialization projects. Eligible companies include those in the materials, parts, and equipment sectors working on carbon-neutral initiatives. The program aims to support process and product innovation packages for such companies, enhancing their global market competitiveness and facilitating the transition to a low-carbon economy.

Support Areas

The program focuses on six key areas of the Green New Deal: □Green IT, □Advanced Materials, □Renewable Energy, □Carbon Reduction, □Green Vehicles, Ships, and Transportation, □Clean Production

The program targets small and medium-sized enterprises (SMEs)in Gyeonggi Province that are engaged in the production, manufacturing, or development of materials, parts, and equipment. Support is provided by categorizing operational areas into process innovationand product

innovationwithin the detailed fields of technology commercialization mentioned above.

Derivation of Characteristics of Applicable Regulations for Each Project

Guidelines for Managing the Ministry of Environment's Win-Win Cooperation Demonstration Program

These guidelines are established to specify the details necessary for the efficient implementation of the Win-Win Cooperation Demonstration Program(hereinafter referred to as "the Program"), promoted by the Minister of Environment in accordance with Article 6 of the Environmental Technology and Industry Support Actand Article 17 of the Enforcement Decree of the same Act.

The Ministry of Environment's procedures and management guidelines for the Win-Win Cooperation Demonstration Program define the nature of the program not as an R&D support project but as a general corporate support initiative by the government. This distinction entails specific characteristics, such as requiring the submission of cost estimates before signing an agreement and dividing project funding into advance payments and final payments.

Given the nature of demonstration projects, the program includes pre-application processes before the project begins and organizes matching daysto improve efficiency in connecting suppliers with demand institutions.

From a management perspective, unique features include:

5. Conducting on-site inspections between the document review and selection evaluation phases.
6. Applying weighted scores to both document and selection evaluation scores to determine the final recipients.
7. Deciding the continuation of projects during mid-term evaluations and issuing final payments accordingly.

These characteristics differentiate the program from other similar initiatives.

Guidelines for Managing the Ministry of Environment's Commercialization Support Program for Small Environmental Enterprises

These guidelines apply to the Commercialization Support Program for Small Environmental Enterprises, promoted by the Ministry of Environment (Korea Environmental Industry & Technology Institute). The program is designed to support the stable market entry and revenue generation of completed technologies by providing funding for prototype production, commercialization, and consulting.

The program is divided into two categories:

1. Commercialization Support for Small Environmental Enterprises: Focused on technologies that have completed development, offering funding for prototype production, commercialization, and consulting to facilitate market entry and revenue creation.
2. Green New Industry Commercialization Support: Aimed at small enterprises in emerging green industries, such as energy transition and the circular economy, providing funding and consulting to promote market entry and revenue growth.

This program emphasizes the management of funds to support the commercialization of small environmental enterprises through the use of e-Nara System, which facilitates project progress monitoring. As multi-year support is possible, mechanisms are in place to terminate agreements if progress is deemed insufficient during mid-term evaluations.

Incheon Startup Park "Smart-X Eco" Program

The implementation stages of this program are as follows: Announcement and Recruitment→Document Evaluation→Presentation Evaluation→Task Confirmation and Working-Level Meeting→Agreement Signing and Demonstration→Project Cost Settlement and Final Evaluation

This program does not apply its own management regulations but is governed by relevant provisions of the Incheon Technopark Establishment and Operation Ordinance. Project management is conducted in accordance with the project cost calculation criteria specified in the program announcement.

Gyeonggi Province Support for Carbon-Neutral Technology Commercialization in Materials, Parts, and Equipment

This program, initiated by Gyeonggi Provinceand the Gyeonggi Business & Science Accelerator (GBSA), is designed to foster an eco-friendly ecosystem by promoting technology commercialization tailored to the needs of carbon-neutral companies within the materials, parts, and equipment sectors in Gyeonggi Province. No specific management regulations or guidelines have been established for this program; instead, it is operated according to the program announcement and internal guidelines of GBSA.

The general process of the program follows similar stages to other support initiatives, including: Program Announcement, Review and Evaluation, Agreement Signing, Project Implementation and Progress Monitoring, Final Settlement.

A distinctive feature of this program is the inclusion of a pre-check phaseas part of its management practices. This phase, introduced after evaluations, involves verifying whether applicant companies have any legal violations

and conducting cost analysis through external professional organizations.

Implications from the Review of Applicable Regulations

Examining the procedures of each project highlights a distinctive feature of the Ministry of Environment's Win-Win Cooperation Demonstration Programcompared to other initiatives: the inclusion of pre-application and supplier-demand matching proceduresprior to the official announcement. Although these pre-application procedures do not directly influence scoring or result in immediate connections, they provide an opportunity for companies seeking support and demonstration institutions to establish a mutual understanding of demonstration technologies and targets. This approach significantly reduces the likelihood of failure during the actual application and implementation phases.

For instance, in the Testbed Seoul Programmanaged by the Seoul Business Agency, the acceptance rate of demonstration projects by demonstration institutions averaged only 46% during the first to third quarters of 2022. This indicates that nearly half of the supported projects faced challenges in securing locations for installation, emphasizing the need for greater efforts in securing demonstration institutions. The difficulties and efforts required to match proposed technologies with demonstration targets highlight the importance of robust matching mechanisms.

Thus, the pre-application and matching support procedures of the Win-Win Cooperation Demonstration Programcould serve as an effective strategy to enhance the overall completion and success of the program.

Proposed Management Procedures for Efficient Execution of Demonstration Support Projects

Based on a review of the environmental demonstration support projects and applicable regulations by central government agencies and metropolitan governments, the following management procedures can be established. A distinguishing feature of this proposal is the suggestion to mitigate the difficulties in selecting demonstration institutions and enhance the achievement of policy objectives by not selecting all projects solely based on corporate proposals. Instead, demand institutions could first present the required fields, and pre-designated tasks could be selected to resolve these needs through demonstration.

Additionally, to align with the intent of supporting local governments effectively through excellent innovative technologies, it would be appropriate to lift restrictions based on company size, as seen in the Ministry of Environment projects or existing non-budgetary support models, instead of limiting eligible companies to small enterprises alone.

Reflecting these considerations, the following management procedures are proposed.

Table 2 - Steps and Details of the Proposed Management Procedure

Step	Description
Planning	The local government's lead department develops the plan, supported by the Seoul Institute.
Announcement, Application, and Selection of Designated Tasks	Tasks are announced and received internally via official documents, with selection support from the Seoul Institute.
Open Call and Application	Public announcement on the website; submission of technical proposals and supporting documents.
Preliminary Review	Review of proposal eligibility (e.g., company location, submission of required documents).
Document Screening	Evaluation of technology duplication, TRL (Technology Readiness Level), technical excellence, etc.
Outreach and Negotiation with Demonstration Institutions	Assessment of willingness from potential demonstration institutions and integration of detailed demonstration plans.
Presentation Evaluation	Evaluation of technical feasibility (completion, validity, excellence, innovation), local government contributions, and business potential.
On-Site Inspection	Verification of location within the local government jurisdiction, facility availability, etc.
Agreement Signing	Revision of demonstration proposals based on evaluations and expert feedback, followed by agreement signing.
Demonstration and Monitoring	Execution of demonstrations by task, with performance monitoring through monthly reports.
Final Evaluation	Assessment of achievement of demonstration goals, including greenhouse gas reduction effects.
Budget Settlement	Final settlement of project expenses.
Post-Project Management	Issuance of demonstration confirmation by the Seoul Institute, along with support for financing, investment, market development, and promotional activities.

Conclusion

This study analyzed the detailed procedures required for the efficient execution of technological demonstration projects, including project planning, announcements, application, selection, agreements with companies, result evaluation, and post-management.

Initially, the study examined the current status of

representative demonstration support projects in the fields of technology, environmental technologies, urban infrastructure, and urban management implemented by central government agencies and metropolitan governments. It analyzed the overview, support details, and procedures of each project while identifying unique characteristics of individual projects. Based on this analysis, similar projects carried out by the Seoul Institute were selected for comparison, leading to the identification of applicable elements for demonstration projects and the proposal of project execution procedures.

To address one of the most challenging aspects of demonstration support projects—selecting demonstration institutions—the study proposed a shift from solely selecting projects based on corporate proposals to pre-designating tasks by first identifying the needs of demand institutions. This approach allows for targeted solutions through demonstrations and enhances the achievement of policy objectives. Furthermore, to align with the goal of effectively supporting Seoul's municipal initiatives through innovative technologies, the study suggested removing restrictions based on company size, instead opening the program to companies of all scales.

Considering the characteristics of demonstration projects and institutional management systems, this study provides foundational recommendations for establishing effective project management guidelines. It encompasses support scope and targets, selection procedures, post-selection task management, result evaluation, and post-management. These insights aim to facilitate the development of more efficient management guidelines for future projects.

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Performance Evaluation of Guheshwori Wastewater Treatment Plant (GW-WTP), Kathmandu, Nepal

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Abstract

The present study has been undertaken to evaluate the performance efficiency of the Guheshwori Wastewater Treatment Plant (GWWTP) in Kathmandu Valley, Nepal. The oxidation ditch method employed in the plant faces operational challenges such as insufficient capacity, high operation costs, and underperforming pollutant removal efficiencies. Wastewater samples were collected at different stages for both influent and effluent samples from June and July 2023 for the major parameters. The BOD, COD, ammonia, and phosphate failed to meet national effluent standards, revealing removal efficiencies are 62.7%, 74.58%, 24%, and 39.07% respectively. The high value for food-to-microorganism ratios and low sludge retention times represents an incomplete treatment process and quick biomass washout. The study recommends integrating advanced technologies like Moving Bed Biofilm Reactor (MBBR) to enhance efficiency and reduce hydraulic retention times. Additionally, renewable energy sources and routine maintenance are proposed to address energy and operational challenges. These findings highlight the need for technological upgrades and improved management to ensure ***compliance with regulatory standards and sustainable wastewater treatment.***

Keywords: *Guheshwori Wastewater Treatment Plant, pollutant removal efficiency, advanced wastewater treatment, Moving Bed Biofilm Reactor, Kathmandu Valley*

1. Introduction

Guheshwori Wastewater Treatment Plant (GWWTP) is the only functional centralized wastewater treatment plant located in Kathmandu Valley on the premise of Bagmati River (Figure 2). This plant was built to treat design 16.2 MLD of wastewater through a biological process known as the oxidation ditch method (Green et al., 2003; Shah & Das, 2002). The GWWTP consists of three components. The primary treatment process includes screening and a grit chamber followed by a secondary treatment process consisting of two carousel-type oxidation ditches and two clarifiers. The third components are included with sludge drying beds for sludge dewatering. Despite having this design capacity, the plant faces challenges of high wastewater treatment influent due to its insufficient tank capacity. It is often seen these days that the removal efficiencies of this treatment plant are far behind the design efficiencies. A study performed by (Thapa et al., 2020) showed that the removal efficiencies for COD and BOD for GWWTP are found to be not more than 76.12% and 78.51% during pre-monsoon and 76.13% and 76.18% during monsoon respectively. Similarly, phosphate removal is found to be 47.61% and 55.60% during pre-monsoon and monsoon periods, whereas ammonia-nitrogen removal is seen to be only 12.67% and 29.11% respectively. The study results when compared to design effluent standards failed to meet the necessary efficiencies, ultimately raising questions about the ongoing wastewater management process in Nepal. Another, one of the major problems faced by GWWTP in 2005 was its high operating cost which is over 10 million, and 65% of this operating cost is associated with electricity bill. Foaming in the aeration tank and high sludge rise in secondary clarifiers were also seen (Timilsina, 2010).

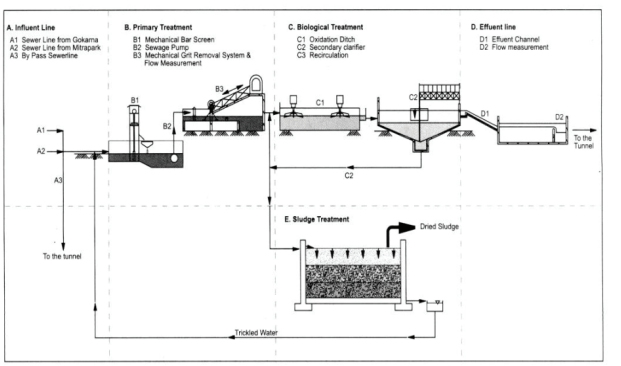


Figure 1. Flow diagram for sewage treatment at GWWTP

The introduction of improved technology with the addition of the Activated Sludge Process (ASP) increases the capacity of the treatment center by an additional 16.2 MLD, ultimately increasing the total capacity up to 32.4 MLD (ADB, 2018). With loan support from the Government of Nepal and the Asian Development Bank, the project began in 2016 and was completed in 2020. Still, several challenges in terms of operational efficiencies and design capacity persist in this operational plant.

Over the years the performance parameters of GWWTP have also changed. The design and performance parameters of GWWTP are shown in Table 1 (Green et al., 2003; Shah & Das, 2002). The population has tremendously increased above the projected population for 2021. Various studies show that the capacity is still insufficient for large volumes of wastewater produced and the plant is underperforming for its operational efficiencies.

Table 1. Design and Performance Parameters for GWWTP *(Green et al., 2003; Shah & Das, 2002)*

Guheshwori WWTP Design Parameters		**Guheshwori WWTP Performance**			
Service Area	5.37 km2	Parameter	Influent	Effluent	Removal
Service Population (1996)	58,000	BOD_5 (mg/L)	270	25	91%
Projected Population (2021)	198,000	COD (mg/L)	1150	250	78%
Wastewater Produced	80 L/cap-d	TSS (mg/L)	216	100	54%
WWTP Footprint	51 m2 (164 ft2)	TKN (mg/L)	48	30	38%
Energy Consumption	2.3 KW-hr/kg BOD	NH_4-N (mg/L)	41.7	22.1	47%
Annual Operating Costs	$167,000 US	P (mg/L)	6.71	3.2	52%
Design Flow	0.19 m3/s (4.3 MGD)				
MLSS	3,500 mg/L				
F/M	0.34				

2. Methods and Methodology

2.1. Components of GWWTP

The major components of the treatment plant include a bar rack, grit chamber, oxidation ditch, clarifiers, and sludge drying beds (Figure 3). There are two carrousel-type oxidation ditches, each with three aerators of size 80 x 20 sqm. The effluent is discharged into two secondary clarifiers where biomass is settled down. Some portion of the sludge is recycled whereas the remaining sludge is sent to a sludge drying bed for drying (Green et al., 2003; Thapa et al., 2019).

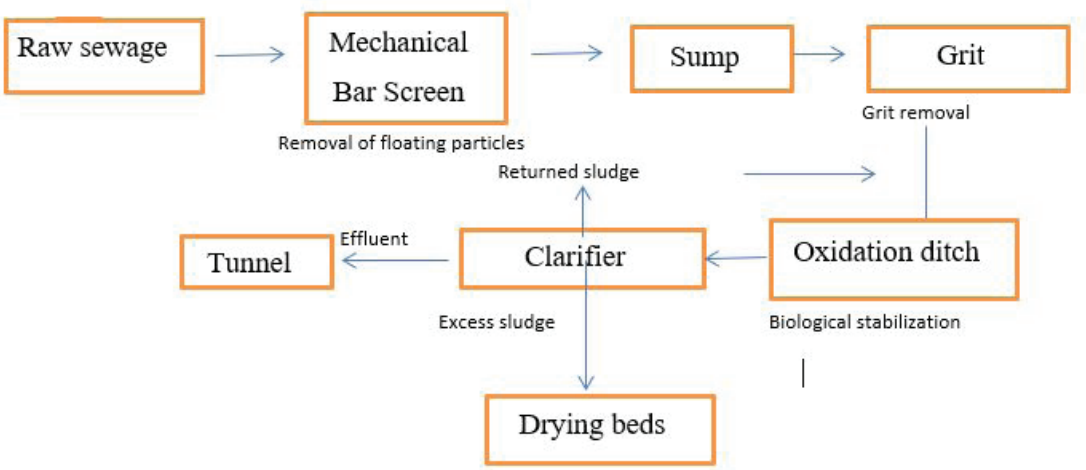


Figure 3. Flow diagram of Guheshwori WWTP

The following are the essential components of the treatment plant:

A. Primary unit operation: It consists of the following:

1) Mechanical Bar Screen: The mechanical bar screen is the first part of the treatment plant. The wastewater from the different areas is mechanically filtered through a screener in this unit. In this chamber, the larger solid wastes are separated. After that, the water is directed into a sump well.

2) Sump well: Water in the rainy season (i.e., when the amount of wastewater is high) is directly passed into the second component through the sump well. If not, the water is pumped into the mechanical grit chamber after being screened.

3) Mechanical Grit Chamber: A grit removal system in this unit separates smaller wastes as wastewater is slowly passed through them. The second part of the treatment plant is where the water is then passed for biological treatment.

B. Biological Unit Operation: The system consists of two secondary clarifiers and two oxidation ditches.

1) Oxidation Ditch: Each oxidation ditch measures 80 meters by 20 meters and can hold 10400 m3 of air. Each ditch has a high oxygen aeration level, which kills various kinds of organisms. Each ditch has an overall oxygen demand of 355 kg/hr. It takes the wastewater approximately 15 hours to exit this chamber. After that, secondary clarifiers receive the water from this chamber.

2) Secondary clarifier: There are two secondary clarifiers, each with a capacity of 1650 m3 and a diameter of 27 meters. The secondary clarifier, which resembles a funnel, holds the water there for a set amount of time. The result is that the heavier particles settle out, leaving the treated water to remain in the upper section of the unit. The cleaned sewage is then discharged into a tunnel that runs underneath the temple and merges with the river close to Tilganga.

C. Sludge Treatment: In drying beds with a size of 27 m x 75 m each, the solid wastes gathered from the mechanical grit chamber and the secondary clarifier are collected and dried. The wastes need to dry for a total of one to three weeks, depending on the environment and other factors. The farmers then sold this dried waste as compost.

D. Sewer Tunnel: The sewer tunnel was built so that the treated wastewater could be delivered directly to Tilganga. The tunnel has a 2 m diameter and a 572 m length. Most of the tunnel travels through sandy soil with a significant groundwater table. The tunnel has a 0.17% longitudinal slope.

2.2. Sampling

The data used for this study were collected on the existing site. Grab samplings were taken to analyze physio-chemical and biological parameters. Wastewater samples were taken weekly from the Influent, aerator, Oxidation Ditch, outlet of Oxidation Ditch, Clarifier, and from the Recirculation and Effluent of the Guheshwori Wastewater Treatment plant in June and July 2022 as shown in Figure 1. There were thirteen sampling points. Wastewater samples were collected from a depth of 30 cm for analysis after the sampling bottles were ringed. DO, pH, conductivity, and temperature were measured at the site. The samples collected were then transferred to the laboratory in a labeled sampling bottle for further analysis.

2.3. Analytical methods

The analytical methods were used for the analysis of various physicochemical characteristics of the collected samples, as presented in Table 2. All the parameters that were analyzed in the laboratory were recorded in MS Excel for further analysis and interpretation of the data.

Table 2. Laboratory Analytical Methods

Parameters	Methods
TSS	2540 D. APHA 21st edition
Ammonia	4500 NH3 F. Phenate Method, APHA 21st edition
Nitrate	4500 NO3- B. UV Spectrophotometric method, APHA 21st edition
DO	4500-0 B. Iodometric method, APHA 21st edition
BOD	5210 B. 5-Day BOD Test, APHA 21st edition
COD	5220 B. Open reflux method, APHA 21st edition
Phosphate	4500-P E. Ascorbic Acid Method, APHA 21st edition

3. Results and Discussion

3.1. Performance Metrics

The characteristics of wastewater collected through grab sampling for June and July 2023 from oxidation ditch and analyzed in the laboratory to oxidation ditch are presented in Table 3.

Table 3. Analysis of sample from treatment plant

Parameters	Units	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
pH		7.325	7.6	7.55	7.55	7.6	7.55	7.55	7.55	7.55	7.6	7.6
Conductivity	µS/cm	995.8	863	863	845	863	863	863	863	863	854.25	842
Temperature	mg/L	25.5	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	25.95	26.1
SS	mg/L	554.8	332	334	251	370	357	345	356	312	109	91
VSS	mg/L	237.3	120	121	98	136	144	132	112	122	63	55
DS	mg/L	425.8	361.4	361.4	360	357	361.4	361.4	361.4	361.4	346.75	431.75
DO	mg/L	0	2.7	1.8	2.45	1.3	2.6	1.2	1.4	1.5	0	2.35
COD	mg/L	544	294	275	278	227	280	273	271	271	269	203
BOD	mg/L	240	103	81	86	84	87	79	71	79	74	61
Phosphate	mg/L	18.2	10.8	10.53	10	9	8.6	8.42	8.17	8	8.9	11.09
Ammonia	mg/L	75	66.3	70.9	73	68	64	64	60	59	57	57
Nitrate	mg/L	19	26.1	16.8	21	19	21	18	19	19	15	15

The removal efficiencies (in percentage) during the period are presented in Table 4. The analysis shows that the removal of BOD and COD is 74.58% and 62.68%. The removal of ammonia is 24%. The variability in the concentration of SS and VSS shows that the MLSS and MLVSS in the treatment plant are not maintained as per the design. The quality of wastewater after recirculation (sample 12) for MLSS and MLVSS are shown to be 8425 mg/L and 4540 mg/L respectively.

Table 4. Removal efficiencies of different locations of GWWTP (S1-S11)

Parameters	Units	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
SS	mg/L	40.16	39.80	54.76	33.31	35.65	37.82	35.83	43.76	80.35	83.60
VSS	mg/L	49.43	49.01	9.27	-6.32	-19.38	1.69	13.49	4.21	20.65	28.23
DS	mg/L	15.12	15.12	15.45	16.16	15.12	15.12	15.12	15.12	18.57	-1.40
COD	mg/L	45.96	49.45	48.90	58.27	48.53	49.82	50.18	50.18	50.55	62.68
BOD	mg/L	57.08	66.25	64.17	65.00	63.75	67.08	70.42	67.08	69.17	74.58
Phosphate	mg/L	40.66	42.14	45.05	50.55	52.75	53.74	55.11	56.04	51.10	39.07
Ammonia	mg/L	11.60	5.47	2.67	9.33	14.67	14.67	20.00	21.33	24.00	24.00
Nitrate	mg/L	-37.37	11.58	-10.53	0.00	-10.53	5.26	0.00	0.00	21.05	21.05

3.2. Compliance with the Standards

The effluent samples collected and analyzed in June and July (monsoon season) show that the wastewater effluents meet the national effluent discharge standards. However, the average effluent characteristics from the past years show that the effluent does not meet the national effluent discharge standards. The decreasing trend of DO in the OD ditch during the year 2022 shows that the aeration is not sufficient to maintain the required MLSS as shown in the value of DO < 2 mg/L. The average COD, and BOD removal percentages in June and July 2023 are 74.58% and 62.7% respectively. The amount of DO in the oxidation ditch is around 2 mg/L but the oxidation ditch didn't maintain the value of MLSS. For the proper functioning of the treatment plant, the improvement of the plant is necessary accordingly. The inefficient working mechanism of the treatment units could be considered as a result of increasing wastewater loadings.

Similarly, the performance of the treatment plant has gone down as compared to previous years because of the routine power cut schedule, the treatment plant cannot be operated continuously to the efficiency of the treatment plant has been affected. Also due to the combined sewer system, the total incoming flow of wastewater is higher than the designed hydraulic capacity of the plant i.e. 16.4MLD. During the rainy season and owing to the combined sewer system, the quantity of sand in wastewater is very high. The sand gets deposited at the bottom of the grit chamber, and oxidation ditch affecting the operation of STP. The strength of wastewater is higher than the designed level (COD 1150 mg/l, BOD5 270 mg/l).

3.3. Performance Evaluations

After the laboratory analysis of the wastewater, the performance of the treatment plant was evaluated based on SRT, F/M ratio, and specific growth rate. The typical layout of the activated process is shown in Figure 5. The result shows that the food-to-microorganism ratio (F/M) is found to be quite high for the activated process of the treatment plant. A high F/M ratio of value 2.4/day indicates biomass is not properly utilized and the ongoing treatment process is insufficient and incomplete. It indicates underutilized biomass and incomplete treatment. Similarly Solid Retention Time (SRT) of value 0.82 da is quite low in the monsoon period which seems to encounter the problem of biomass being washout. Specific growth rate (μ) is the indicator of the microorganism's growth per unit of time, i.e., 1.22 /day, which is sufficient for the growth of bacteria for carbon removal. However, the other nitrifying organisms thrive to survive. The longer SRT supports the growth of slower-growing nitrifiers.

a. F/M ratio

Here,

Q_o = 8500 m^3/day, Q_e = 0.1 m^3/s Q_w = 180 m^3/day Q_r = 5100m^3/day

X_o = 554 mg/L, Xe = 91 mg/L, X_r = 8425 mg/L

S_o = 544mg/L, S_e = 203mg/L,

V = 80*20*3.5 = 5600m^3 S= 215mg/L X = 332 mg/L

= 2.4/ day

b. Sludge Retention Time (SRT)

= 0.82 day

c. μ: Specific growth rate

= 1.22

4. Conclusion and Recommendations

The Guheshwori Wastewater Treatment Plant (GWWTP) is the only functional treatment plant existing in the Kathmandu Valley of Nepal and has got significant role in dealing with the current challenges of wastewater treatment. However, the plant has not performed well over these years due to various factors such as insufficient design capacity, high energy costs, and inefficiency in maintaining performance parameters due to dissolved oxygen insufficiency and maintaining mixed liquor suspended solids. Despite upgrading the plant capacity and adopting advanced technologies like the Activated Sludge Process (ASP), the plant still struggles to achieve the desirable removal efficiencies. The BOD, COD, Ammonia, Nitrate, and Phosphate removal even during peak monsoon periods are below the standards and are represented as per the study: 62.7%, 74.58%, 24%, 21.05%, and 39.07% respectively. The performance evaluations based on the food to microorganism ratio (F/M) Solid Retention Time (SRT), and Specific Growth Rate (μ) for microorganisms all fall apart from the set standards as well. These shortcomings highlight the need for more advanced technology and better operational management for compliance with the nation's effluent standards.

The implementation of integrated advanced technologies such as Moving Bed Biofilm Reactor (MBBR) could help to improve treatment efficiencies and reduce hydraulic retention times. The plant operation based on renewable energy sources and energy recovery systems will be fruitful in cutting high operating costs. Regular maintenance and monitoring along with public awareness and support can enhance the plant's performance and overall life. Long-term solutions based on further research and feasibility study of other innovative technologies could be the best option in dealing with socio-economic and environmental impacts.

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Electric Vehicle in India: A Review of Challenges and Opportunities

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Abstract

Every year environmental impacts due to public mobility are increasing in greenhouse gas emissions; it contributes more than any energy sector. According to the International Panel on Climate Change, it will increase by 50% by 2050. To tackle such a situation, Electric Vehicles (EVs) can be seen as a sustainable option as it has zero tail pipe emissions.

In India a significant growth of EVs can be observed in the past decade. This study aims to investigate the contribution in literature related to EVs in the past decade. It can help the policy makers to capture the change in the landscape of EVs I India. This study uses Prisma framework for literature review to include as many insightful studies as possible.

Keywords: *Electric Vehicles, Prisma Frame-work, Literature Review, India*

Introduction

The transportation sector in India has experienced significant growth driven by urbanization, economic development, and increased mobility demand [1]. However, it has also become a major contributor to greenhouse gas emissions and air pollution, particularly in urban areas where the concentration of vehicles is highest [2]. The need for sustainable and eco-friendly transport solutions has prompted both public and private sectors to focus on the electrification of the transportation system through electric vehicles (EVs) [3]–[5]rapid urbanisation, and technological developments in renewable energy in recent years have led to the rise of electric vehicles (EVs. This shift is critical as urban areas account for around 70% of global greenhouse gas emissions, with a significant portion attributed to the transportation sector, accentuating the urgency of decarbonizing urban mobility systems in India [6].

The Indian government has recognized the strategic importance of EVs in addressing the dual challenges of energy dependency and climate change [7]. Public sector initiatives have been instrumental in deploying EVs at a broader scale. The Indian government has launched various schemes such as FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) to incentivize EV adoption through financial subsidies and tax rebates for consumers and manufacturers alike [8].

However, the expansion of the EV sector is not without challenges. The current charging infrastructure in India is inadequate, with a significant disparity in the availability of charging stations across urban and rural areas[3], [9]. As of now, there are only about Few thousands operational charging stations, resulting in an average of 200 EVs per station—far below global standards [10].

This study aims to investigate the challenges and opportunities for EV adoption in India. A systematic literature review has been carried out using PRISMA framework in this study for this purpose.

Literature Review

India's transportation sector is shifting toward electric vehicles (EVs) in both the public and private sectors. This transformation is being pushed by a combination of environmental concerns, government legislation, technology improvements, and market forces. As India grapples with concerns such as air pollution, energy security, and climate change, the adoption of electric vehicles is viewed as a key step toward sustainable development. This literature review examines the important trends, difficulties, and possibilities in India's EV market, focusing on a variety of research papers and reports.

In this study the literature is divided in 3 sections:

- Literature on EV adoption
- Literature on stakeholders
- Literature on EV charging infrastructure planning

These three aspects are important in understanding the challenges and opportunity for EVs in India.

Literature on Identification on adoption

This literature provides us the understanding how to interpret adoption and its significance. It shows us that adoption of EV is can be analysed of the basis of consumer's preference, ie.

How likely they are willing to have an EV?

How much likely they will recommend others to buy EV?

From the literature, different economic, behavioural, technical, environmental, and socio-demographic factors affect EV adoption at the mass level [11]it finds that consumer interest in BEVs is relatively low and a large proportion of the respondents have a "wait and see" attitude. Consumers are unsure about BEVs performance, with safety, reliability, and range per charge being the top three concerns. Respondents who focus on vehicle performance express significantly lower BEV acceptance. High battery cost is the main technological barrier to widespread BEV adoption. In terms of public service support, poor public charging infrastructure ranks as the largest impeditive. In terms of respondent personal characteristics, older respondents have a more optimistic attitude to BEVs than younger generations, more respondents express interest to adopt BEVs as the second family car, experienced drivers are more concerned with the cost of battery and maintenance, and consumers who are more concerned about the environment are more likely to adopt BEVs.",Some factors such as short driving range and high acquisition costs are universal in most studies. Consumers' Pro-environmental behaviour varies in a huge band from being not significant in some studies to most significant in others [12].

Table 1- Literature on adoption

S.No	Author	Remark
2	[13]	This study concludes that Factors that prevent adoption are cost, infrastructure, and social acceptance.
3	[12]	This study reveals that psychological and, less so, socio-demographic factors play a role in predicting membership of the defined adoption segments. This finding agrees with the literature on environmental behaviours, which found equally low explanatory power for socio-demographic variables
4	[14]	This study shows that ride-hailing and adaptive cruise control have penetrated the market more extensively than have electrified vehicles or car-sharing services. Over half of the respondents in this study have adopted or expressed interest in adopting all levels of vehicle automation. Overall, there is substantial potential for market growth for the technologies and services they have analysed.
5	[15]	Study demonstrates that data techniques are recognizing that individuals' imperfect information-processing capacities can be financially savvy intercessions for advancing EV appropriation. Accordingly, it is of handy significance to nearby governments that face an expanding need to create reciprocal intercessions to alternate fuelled vehicles' diffusion.
6	[16]	This review aimed to synthesize user experiences, to be included in a study needed to offer valuable insight into PEV user experiences.

Literature on Identification of Stake Holders

Stakeholders are the ones who got affected during the transition position of implementation of EVs. If they and their nature of correlation with the implementation are not identified at early stage, can create unnecessary obstruction to the implementation process. These can be Local or state government, oil distribution companies, power sector companies, etc.

Table 2- Literature on Identification of Stake Holders

S. No	Author	Remark
1	[17]we study the strategies of the most relevant stakeholders with regard to the development and commercialization of electric vehicles (EVs	This study identified stakeholders include the car manufacturers, national and local governments, the main stakeholders in the electricity industry, newly started businesses, and even some of the traditional oil companies

2	[18]	Main challenges for the deployment of EVs are related rather to the periphery of the EVs
3	[19]with buyers being categorised as early adopters or pioneers. However, if electric vehicles are to successfully contribute to the decarbonisation of transportation, they must reach mainstream consumer segments. To investigate the underlying causes of EV interest and to determine the potential next wave of EV buyers, this study draws data from an original dataset (n = 5067	In this study a machine learning model, based on the k-means technique, is utilized for the examination, making six purchaser portions around forthcoming EV appropriation. The examination finds that three shopper bunches, that record for 68% of the (tested) populace, are prepared for EV selection and speak to the close term standard EV advertise

To fully understand potential users' perspectives about the EV market in the coming decade, a novel initiative has emerged that focuses on gathering insights into consumer sentiments and expectations. This initiative aims to inform stakeholders about consumer needs and barriers in EV adoption, which will ultimately influence policy and market strategies towards more sustainable transportation solutions[4].

Literature on Charging Infrastructure Planning

The available literature focuses mainly on two issues: charging infrastructure location planning and charging infrastructure capacity planning. These aspects are interrelated and use mathematical models to provide optimum location or capacity. So far, no standards are available worldwide for planning charging infrastructure. Expansion of charging facilities is a major step in promoting electro-mobility. According to the White paper, 2017 Many stakeholders in China, including the central Government, local governments and utilities, are building a chagrining infrastructure network at a very high pace; this will help greatly fulfil China's ambition of increasing its EV market growth.

Table 3 - Literature on Charging Infrastructure planning.

S.N	Author	Remark
1	[21]energy efficiency and noise reduction, the electric mobility market is below expectations. In fact, electric vehicles have limitations that pose several important challenges for achieving a sustainable mobility system: among them, the availability of an adequate charging infrastructure is recognized as a fundamental requirement and appropriate approaches to optimize public and private investments in this field are to be delineated. In this paper we consider actual data on conventional private vehicle usage in the urban area of Rome to carry out a strategy for the optimal allocation of charging infrastructures into portions	Reliable and widespread data acquisition systems produce big data that help develop better traffic information and understand driver behaviour.
2	[22]the charging station characteristics and the EVs flow. After verifying the model and the solution procedure on a test road network, the methodology is applied in a high dimension case, considering the Italian highway network.",formattedCitation"	Using the demand (the flow of EVs) and the supply (the road network where they will be positioned) through a two-level model were the locations initially identified (first level) and after that the number of charging stations for each service area (second level) evaluated.
3	[23]where the optimization objective function is the minimization of overall (installation, maintenance, operation	proposed optimization model presents an upgrade of an existing optimization formulation since it includes a power system reliability check based on a DC power flow model. To show the general applicability and significance of the model, a test 10 × 10 grid road network and a standard six-bus test power system are taken.

4	[24]prices of electricity, and destination and route choices of plug-in hybrid electric vehicles (PHEVs	equilibrium modelling framework that captures the interactions among availability of public charging opportunities, prices of electricity, and destination and route choices of plug-in hybrid electric vehicles (PHEVs) at regional transportation and power transmission networks coupled by PHEVs.
5	[25]revealed preferences (RP	This uses the Logit model and takes a residential type as a significant dummy variable with value 1 for apartments and 0 otherwise. The apartment residents are less inclined towards non-CVs, especially PEVs
6	[26]	EVs' limited driving range and the insufficient charging stations have restricted the widespread adoption of EVs. The driving range It would be difficult to enhance the driving range for upcoming few years.
7	[27]for finding the optimal locations of charging stations. In this model, the upper level is to optimize the position of charging stations so as to maximize the path flows that use the charging stations, while the user equilibrium of route choice with the EV's driving range constraint is formulated in the lower level. In order to find the optimal solution of the model efficiently, we reformulate the proposed model as a single-level mathematical program and further linearize it in designing the heuristic algorithm. The model validity is demonstrated with numerical examples on two test networks. It is shown that the vehicle's driving range has a great influence on the optimal charging station locations.",	In order to increase the adoption of electric vehicle it is crucial to construct sufficient number of charging stations for attracting private vehicle drivers to use EVs.
8	[28]	The charging infrastructure should be carefully well planned for optimal location of public charging stations in order to provide a good charging service and to reduce social cost and to facilitate large deployment of electric vehicle.

In conclusion, the transition of India's transportation sector towards electric vehicles is pivotal for fostering sustainable urban mobility, reducing pollution, and enhancing energy security. The convergence of public policies aimed at incentivizing EV adoption, coupled with private sector innovation and investment, will be fundamental in realizing this vision. Overcoming infrastructural challenges and ensuring consumer acceptance will be critical as India forges ahead in its electrification journey, with the ultimate goal of creating a cleaner, more efficient transportation ecosystem that meets the needs of its burgeoning population. The subsequent sections will delve into the empirical data surrounding EV adoption in India and analyze the ongoing initiatives in more detail

Methods

For this study, literature is selected based on academic databases, grey Literature (Google) or expert recommendations. This thesis used a set of inclusionary and exclusionary keywords for academic databases. Two exclusion criteria were used in particular; the searches were restricted to references in the English language and those dating from 2010 to 2024. For this thesis, three academic databases were searched: Scopus, Web of Science, and Science Direct. There was a significant overlap between the articles here. So, Scopus was used as it was having maximum number of documents. A total of 65 results were obtained, which were further screened. The screening flowchart is based on PRISMA 2020 framework as shown in Figure 1

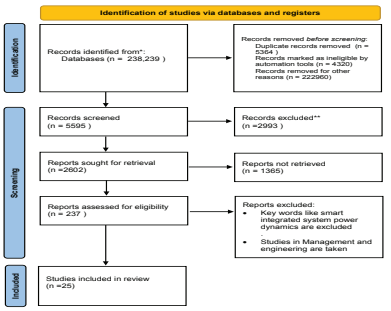


Figure – 1: PRISMA Framework

Conclusion

By utilizing the PRISMA framework, the aim of this study was to undertake a comprehensive review of literature to determine the problems that hinder the adoption of electric vehicles (EVs) in India. The findings have indicated the main problems such as insufficient charging infrastructure, high initial costs, and limiting the government incentives, as well as technological issues including battery performance and range anxiety. Gaps in policies and regulations, as well as a lack of alignment among the stakeholders, are the main hindrances to the progress of these measures. In a similar vein, poor awareness of consumers and opposition to change are the two other problems of electric car adoption. The authors of the study also insist that a holistic approach is the most suitable for addressing this issue and as such, in particular, recommend, alongside traditional financial incentives, investments in infrastructure and local manufacturing, more uniform policies, and consumer awareness campaigns. These findings can act as a strong basis for the faster transition of India to environmentally friendly transport.

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Application of Wastewater for Reclamation of Desert: A Life Cycle Cost Analysis (LCCA)

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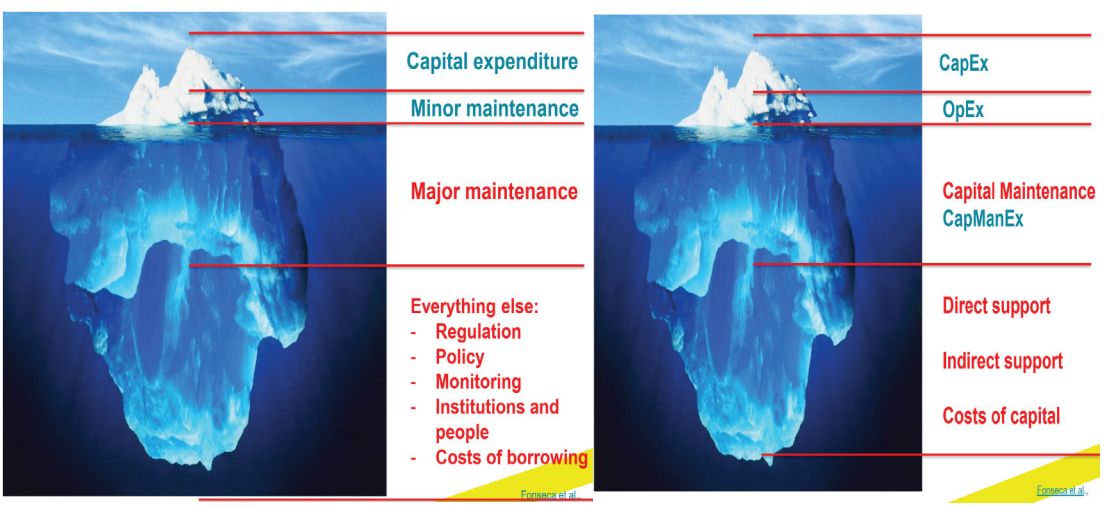
Abstract

This article explores the financial potential of using wastewater for desert reclamation to convert barren land into arable areas capable of growing food in hunger-affected regions. It emphasizes the need to assess the financial feasibility of such projects, providing a detailed Life Cycle Cost calculation to evaluate the long-term financial viability before initiating pilot experiments. The article compares the Net Present Value (NPV) of agro products and the system after 15 years against the NPV of Life Cycle Costs incurred. It reveals a 15-year deficit of USD 292,312 per hectare in desert reclamation through continuous wastewater application over three years in each plot. Reclaimed desert land can be used to produce grains, oilseeds, and cotton indefinitely, providing long-term agricultural benefits. Additionally, the increased greenery plays a crucial role in carbon sequestration. This transformation not only boosts food production but also enhances environmental quality by reducing carbon dioxide levels and improving local ecosystems, making desert reclamation a sustainable solution for both food security and environmental preservation.

Keywords: *Life Cycle Cost Analysis (LCCA), Desert Reclamation, Waste Water Reuse, Environmental benefits, Hunger, Crops Production*

Introduction

In the least developed and developing countries, project costs are often viewed solely as capital expenditures. However, (Fonseca, 2017) emphasizes the importance of non-capital expenses, which are crucial for sustainable system construction and operation. These additional costs include operation, maintenance, and administrative expenses, essential for long-term success. Figures 1 (a) illustrate these components, highlighting that a holistic approach to financing, beyond initial capital costs, is necessary for project sustainability and effective resource management. Figure (b) below gives a comprehensive description of other costs like; Capital Expenditure (CapEx), Operational Expenditure (OpEx), Capital Maintenance Expenditure (CapManEx), Direct/ Indirect Support (DS or IS), and Costs of Capital (CoCEx).



(a) **(b)**

Figure 1: (a) Costs and Financing- Importance of non-capital expenditure (b)Costs: the accounting names. Source: (Fonseca, 2017)

Life-cycle costs: The total cost of delivering a service over its entire life span encompasses capital investments, operational expenses, repairs, and maintenance. These costs continue until the facility or service is retired or replaced, ensuring full financial consideration of all expenditures required for long-term sustainability and functionality (Reddy & Batchelor, 2012).

Capital expenditure (CapEx): The initial investment for developing a project or system includes both infrastructure costs and expenses related to other inputs during construction. This covers materials, labor, equipment, and any preparatory work needed to establish the foundation of the project, ensuring readiness for future operations and functionality (Abadie R, Oxford Economics, 2024).

Operation and minor maintenance expenditure (OpEx): OpEx covers regular, ongoing expenses such as labor (staff salaries), management (transport, fuel), energy, chemicals, materials, and minor infrastructure repairs. These costs are essential for the day-to-day functioning and maintenance of a system or project (Schaetz T, 2024).

Capital maintenance expenditure (CapManEx): CapManEx covers costs for maintenance and irregular repairs, not performed regularly, such as asset renewal, replacement, and infrastructure rehabilitation. These expenses ensure the long-term functionality and durability of systems and infrastructure beyond routine upkeep (Nyarko, 2010).

Direct support (DS) costs: Expenses for backup support include costs for monitoring services, community and student training (if not included in the school budget), and technical assistance for communities and service providers. These expenses are essential to ensure the continuous operation and effectiveness of programs, fostering resilience and enhancing the overall quality of services provided to students and the community (Maier A, Klevan S, Ondrasek N, 2015).

Indirect support (IS) costs: Expenditures on non-WASH supplies or services during WASH system maintenance include costs for items like office supplies, administrative services, and training materials. These purchases support the overall functionality and efficiency of the WASH system, ensuring that related operational and administrative needs are adequately met to maintain effective service delivery (Maier A, Klevan S, Ondrasek N, 2015).

Cost of capital (CoC): The costs associated with COC include interest on borrowed funds and returns to the system owner. It's essential to calculate these expenses under detailed headings and compare them with alternative projects to ensure informed decision-making and effective allocation of resources (Harvard Business School).

A study of water supply projects in Ghana found that capital and maintenance expenditures (CapManEx) account for only 4% to 22% of recurring expenditures (OpEx), indicating a significant difference in investment levels compared to ongoing operational costs (Asante et al., 2013). Jason Fernando (2024) defines; Capital expenditures (CapEx) as the funds a company uses to acquire, upgrade, and maintain physical assets like property, plants, buildings, technology, or equipment. These expenditures are often made to initiate new projects or investments. Examples of **CapEx** include repairing a roof to extend its useful life, purchasing new equipment, or constructing a new factory (Ikechi & Emmanuel, 2015). Various assets can provide long-term value to a company, and several types of purchases fall under CapEx:

a. Buildings: Used for office space, manufacturing, inventory storage, or other purposes. **b. Land:** Can be developed further, with accounting treatment varying for land held as a speculative long-term investment. **c. Equipment and machinery:** Utilized to manufacture goods and convert raw materials into final products for sale. **d. Computers or servers:** Support a company's operations, including logistics, reporting, and communication. Software may also be considered CapEx in certain situations. **e. Furniture:** Furnishes office buildings, making the space usable for staff, clients, and customers. **f. Vehicles:** Used for transporting goods, picking up clients, or business purposes by staff. **g. Patents:** Hold long-term value if the right to own an idea is realized through product development.

Capital maintenance expenditure refers to the costs associated with renewing, replacing, rehabilitating, refurbishing, or restoring assets to maintain the original level of service performance. Examples include replacing

a motor on a power pump, the pump rods/rising main/ handle in a handpump, cleaning or re-excavating the base of a hand-dug well, relaying the drainage field for a septic tank, flushing a borehole that no longer delivers the desired flow, and cleaning a water tank (Franceys & Pezon, 2010). These renewals, often carried out after several years of operation, ensure that users continue to receive the same level of service as when the asset was first installed. Figure 3 shows the expenditure trend of CapManEx, time, and service standards.

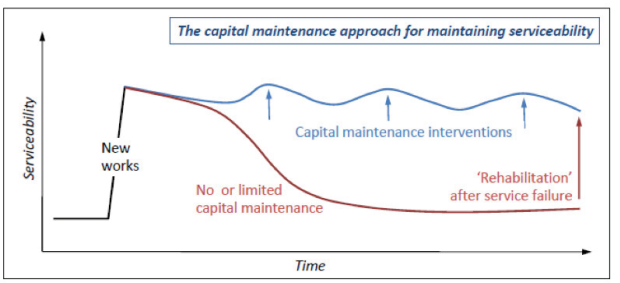


Figure 2: Serviceability vs. time against the amount of CapManEx

Source: Francis and Pezon, 2010

The graph illustrates that the Capital Maintenance Expenditure (CapManEx) directly correlates with the sustainability of the system. Operational Expenditure (OpEx) encompasses daily expenses such as equipment leases, rent, professional fees, license fees, payroll, utilities, internet and phone services, cloud computing, car leases, property taxes, and travel costs. Direct Support Costs refer to salaries or non-salary expenses associated with monitoring services, periodic technical assistance, and training for service providers. Indirect Support Costs typically involve advocacy, policy-making, transportation of WASH supplies and services, planning, and the procurement of non-WASH supplies. The cost of capital includes interest payments on micro-financing and loans, reflecting the financial obligations necessary for sustaining the project and ensuring its successful implementation over time. This comprehensive overview underscores the diverse financial components involved in the reclamation efforts. This article aims to calculate the Life Cycle Costs of desert reclamation through regular wastewater application, assessing its financial viability. It will compare the incurred costs with the anticipated benefits in the subsequent sections.

Theory and formula

A demonstration plot measuring 1 hectare (200 m long and 50 m wide) has to be fenced with Barbed Wire and equipped with a network of pipes. This plot is assumed to be approximately 1 km from a hypothetical sewered town in Western India, specifically in Gujarat or Rajasthan, where the wastewater treatment system is either non-existent or has become defunct. The project aims to showcase effective wastewater management practices in arid regions, highlighting the potential for land reclamation and sustainable agriculture.

Experimental setup: A configuration of the pipeline and other fixtures are shown below in Figure 3:

Figure 3: Configuration of Experimental Pipe Networks and Test Plot Boundary

Figure 3: A configuration of the pipeline and other fixtures

Life Cycle Cost Analysis: (LCCA) balances present and future costs by converting all expenses into present-day dollars. The total cost for each alternative, expressed as the Net Present Value (NPV), allows for easy comparison of different options. By calculating NPV, decision-makers can assess alternatives with consistent units. The NPV formula provides a clear method for determining the total cost over the life cycle of a project, helping guide cost-effective decisions (Mearig & Morris, 2018).

LCC = C + PV Recurring – PV Residual

Where 'LCC' represents the life cycle cost, 'C' denotes the initial construction cost at year zero or the **CapEx**, 'PV recurring' is the present value of all recurring costs, 'PV residual' value is the present value of the residual value at the end of the project. PV Recurring = PV of (OpEx + CapManEx + DSEx + IDSEx). Among the four recurring expenditures, the last one IDSEx does not seem to be very significant in this case and thus, has been omitted. So, PV Recurring = PV of (OpEx + CapManEx + DSEx).

The LCCA for the recurring expenses of the project has been carried out using standard formulae. For this analysis, an annual discount rate of 8.4%, reflecting the current interest rates in Indian commercial banks, has been used. The calculation of Life Cycle Costs includes PV Residual as the analysis covers only 15 years, despite the project lifespan being estimated at 50 years for typical civil engineering projects. The annual depreciation is deducted and NPV is added at the rate of the aforementioned discount rate. The cost components are categorized into four broad headings: CapEx (Capital Expenditure), OpEx (Operational Expenditure), CapManEx (Capital Maintenance Expenditure), and DSEx (Direct Support Expenditure). CapEx includes initial construction costs, while OpEx accounts for recurring operational expenses such as maintenance, salaries, and utilities. CapManEx

covers costs related to periodic major repairs or upgrades, and DSEx involves the costs associated with the project's technical support costs during its useful life. The CapEx calculation has been detailed in an Excel sheet, based on current Indian prices. Table 1 presents these costs, including reinforced concrete tank construction, HDPE pipes, office equipment, and other initial setup expenses as shown in figure 3. This thorough cost breakdown provides a clear picture of the initial investments required for the experimental project.

Table 1: Details of CapEx in Year One

SN	Item	Unit	Quantity	Rate, $	Amount, $	Remarks
1	RCC (1:2:4)	Cum	5	70-100	425	10 Cum size, 2m*2m*3m
2	Pump (150 KW)	pc	1	14000	14000	150 KW, 50 m head, 250 LPS discharge
3	HDPE Pipe 250 mm	m	1000	20	20000	
4	HDPE Pipes 75 mm	m	1000	1.5	1500	6 Kgf/ Cm^2 Pressure
5	HDPE Laying and jointing	m	2000	5	10000	
6	Fencing work	m	500	10	5000	2 m barbed wire fencing
7	Office equipment	Set	1	50000	50000	
	Sub Total, USD				100925	
8	Overhead cost	LS	25%		25231.25	
Total					**$126156.25**	

The total initial construction cost (CapEx) for the project is USD 126156.25. This includes key items such as a 10-cubic meter Reinforced Cement Concrete tank, 1 km of 250 mm diameter HDPE pipe, 1 km of 75 mm diameter HDPE pipe, and the associated laying and jointing work. Additionally, it covers the cost of initial office equipment and supplies, including a vehicle and a laptop, as well as the overall construction costs. This CapEx represents the investment for the first year of the project.

Calculation of OpEx: Operational costs encompass expenses related to minor repairs and daily maintenance, salaries for two staff members (one operator and one caretaker), laboratory testing fees, electricity for the pump, fuel costs, office rental, office supplies, and communication charges. These elements collectively contribute to the overall functionality and efficiency of the water supply system. The wastewater application will occur over three years on an initial 1-hectare plot, after which the land will be reclaimed. Following this, the pipe network will be relocated to an adjoining plot every three years. By the end of 15 years, five 1-hectare plots of desert will have been reclaimed, effectively transforming previously unproductive land into usable, fertile space through a systematic rotation of wastewater application and reclamation efforts, enhancing overall land productivity and sustainability. The annual costs have been detailed in an Excel sheet, reflecting prices in India and reasonable assumptions for minor expenses, as shown in Table 2 This comprehensive breakdown provides clarity on the financial aspects of the project.

Table 2: Details of OpEx for a year

SN	Item	Unit	Quantity	Rate, $	Amount, $
1	Maintenance/ Minor Repair	Annual	1	5000	5000
2	Staff Costs	Annual	2	4000	8000
3	Lab Test	Monthly	12	10	120
5	Fuel and Electricity	Monthly	12	2400	28800
6	Office Supplies	Monthly	12	300	3600
7	Miscellaneous	Annual	1	2000	2000
Total=					**$47520**

OpEx = USD 47520 per annum.

Calculations of CapManEx: The first Life Cycle Cost of WATSAN Schemes/ Systems in Nepal calculated by the Author, Ghimire, R. and Ojha, R., Dr. while working as a consultant to a **German I- NGO: WeltHungerHilfe (WHH)** in 2020 mentions the yearly **CapManEx** as percentage of the **CapEx** as following in table 3:

Table 3: Yearly **CapManEx** presented as a percentage of **CapEx**

% of maintenance in age intervals	
Interval	**%**
<5 Yrs of age	**2.36**
5-10 Yrs of age	**3.84**
10-15 Yrs of age	**1.77**
15-20 Yrs of age	**3.35**
>20 Yrs of age	**5.43**

The **CapManEx** based on the percentage of CapEx as mentioned in Table 4.3 is calculated in an Excel sheet and presented below in Table 4:

CapManEx for 15 years

CapEx $= 126156.25

Table 4: Yearly **CapManEx** for 15 years

SN	Year	CapManEx, $	Remarks
1	2025	2977.29	
2	2026	2977.29	
3	2027	2977.29	
4	2028	2977.29	
5	2029	4844.40	
6	2030	4844.40	
7	2031	4844.40	
8	2032	4844.40	
9	2033	4844.40	
10	2034	2232.97	
11	2035	2232.97	
12	2036	2232.97	
13	2037	2232.97	
14	2038	2232.97	
15	2039	2232.97	

Total for 15 yrs. $49528.94

Calculations of DSEx: The following table 5 includes all the Expenditures under the heading of Direct Support:

DSEx for 15 years

Table 5: Details of Direct Support Costs

SN	Items	Unit	Qty.	Rate	Amount	Remarks
1	Engineering Survey, Design	Activity	1	5000	5000	First Year
2	Construction Supervision	Activity	1	10000	10000	First Year
3	3 yearly Monitoring	Activity	12	3000	36000	In 3 Years
4	Inspection visits	Activity	3	5000	15000	In 3 Years
5	Training	Activity	3	1000	3000	In 3 years
Total					**$69000**	

The Net Present Value (NPV) of the total Life Cycle Cost (LCC) for the "Greening the Desert" project, involving wastewater application for 3 years and maintenance for 15 years, was calculated using an annual interest rate of 8.40%. This calculation provides a comprehensive estimate of the costs over the project's duration, combining initial investments, operational costs, and maintenance. The results are detailed in Table 6, offering insight into the financial scope of the entire experiment.

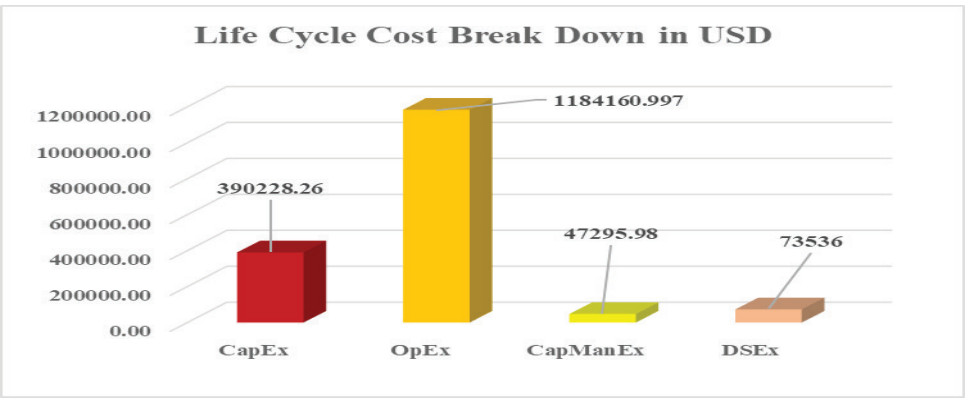
Net Present Value (NPV) of Life Cycle Cost (LCC) with Discount Rate: 8.4%

Table 6: Net Present Value of the Life Cycle Cost (LCC) of the Project

Year	CapEx	OpEx	CapManEx	DSEx	Rms
1	126156.25			33000	
2	136753.4	47520	2977.29	19512	
3	148240.66	51511.68	2977.29	21024	
4	160692.9	55838.66	2977.29		
5	174191.08	60529.11	2977.29		
6	188823.1	65613.55	4844.40		
7	204684.27	71125.09	4844.40		
8	221877.7	77099.6	4844.40		
9	240515.48	83575.97	4844.40		
10	260718.8	90596.35	4844.40		
11	282619.15	98206.44	2232.97		
12	306359.2	106455.8	2232.97		
13	332093.33	115398.1	2232.97		
14	359989.2	125091.5	2232.97		
15	390228.26	135599.2	2232.97		
NPV	**390228.26**	**1184161**	**47295.98**	**73536**	
Total NPV of 15 Years			**$1695221.24**		

The calculated Net Present Value (NPV) of the Life Cycle Cost (LCC) for the project is USD 1,695,221.24.

The following Bar Chart in Figure 3 shows the Cost Break Down of Total Life Cycle Cost of the Project:



The NPV of the created asset, including an electrical sewage pump with an economic life of 15 years (with proper maintenance), and other long-lasting components like pipelines and R.C.C. tanks with lifespans exceeding 50 years, has been determined. The NPV calculation, considering an annual asset depreciation rate of 2% (50 yrs. life span of civil infrastructures), is carried out in Excel sheet and presented in Table 7, providing a clear overview of asset value over time.

NPV of Asset for 15 years with a 2% annual depreciation rate

Table 7: NPV of the Assets created in 15 years with depreciation

S.N.	CapEx, $	CapManEx, $	Total NPV of Asset, $	Remarks
1				
2	134018.31	2917.74		
3	142311.03	3098.28		
4	151051.3	3338.37		
5	160255.79	3578.46		
6	169940.81	6472.12		
7	180122.16	6879.05		
8	190814.86	7285.98		
9	202033	7692.91		
10	213789.4	8099.84		
11	226095.32	4108.66		
12	238960.15	4296.23		
13	252390.93	4483.79		
14	266391.99	4671.36		
15	**280964.35**	4858.93		
Total	**USD**	**71781.72**	**352746.07**	

Total NPV Asset $ 352746.07

Benefit from the Reclaimed Desert Plot:

Gujarat, India, has favorable soil and climate conditions for growing a variety of crops year-round. Three major crops cultivated in the state are (Economy of Gujarat - Wikipedia):

A. **Cotton**: Gujarat is one of India's largest cotton producers. Cotton is sown in the summer and harvested in winter, thriving in the state's warm climate.

B. **Peanut**: Peanut is another important crop, primarily grown during the Kharif season. It is well-suited to Gujarat's semi-arid conditions, making it a staple in the state.

C. **Wheat**: Wheat is a significant winter crop, covering fields from winter until spring. It plays a key role in Gujarat's agricultural economy, ensuring year-round farming productivity

Yield of Various Crops: A typical yield of different crops is presented as follows in Table 8:

Table 8: Income from the Reclaimed Desert

SN	Crop	Yield, T/ ha	Price, $/T	Income per year, $
1	Cotton	0.569	860	490
2	Peanuts	1.2- 2.07	660	1080
3	Wheat	3.0	325	975

Total = USD 2545 per hectare year.

After 3 years, the first 1-hectare desert plot will be transformed into arable land, allowing agricultural practices to begin. With intensive cropping, three crops can be grown and harvested annually, generating an income of USD 2,545 per hectare per year. After 6 years, 2 hectares of land will be reclaimed, followed by 3 hectares after 9 years, 4 hectares after 12 years, and 5 hectares by the end of 15 years. This gradual reclamation will significantly increase the area available for farming, maximizing productivity. The total income from agriculture over the 15 years has been calculated in the accompanying Excel sheet and is presented in Table 9, illustrating the potential earnings from the reclaimed land.

NPV of crop yield

Table 9: NPV of Crop yield of 12 years in the reclaimed land

Year	Discount Rate		8.40%
	Area, Hectare	Annual Income, $	Total Income, $
4	1	3186.34	3186.34
5	1	3453.993	6640.333
6	1	3744.128	10384.46
7	2	8117.269	18501.73
8	2	8799.12	27300.85
9	2	9538.246	36839.1
10	3	15509.19	52348.28
11	3	16811.96	69160.24
12	3	18224.16	87384.41
13	4	26339.99	113724.4
14	4	28552.55	142277
15	4	30950.97	173227.9

NPV of Crop Yield, $173227.9

Conclusion

The 15-year Life Cycle Cost Assessment (LCCA) for the "Greening the Desert" project reveals a net deficit of USD 1.17 million, as shown in Table 10:

Table 10: Net Income and Expenditure of the Reclaimed plot

No. of Years		15			
Year	LC Cost, $	Income, $	Asset, $	Balance, $	Remarks
15	1695221.24	173227.9	352746.07	1169247.25	Deficit

The following Bar Chart in Figure 4 shows various components of Balance Sheet of the project:

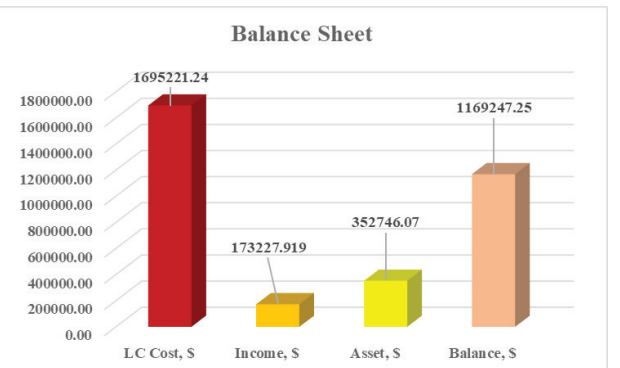


Figure 4: Balance Sheet of the project

This deficit is the result of comparing the total expenditures, income from agriculture, and asset values over the project's duration. A Viability Gap Funding Source for USD 292,312 per hectare must be identified to transform 4 hectares of desert into arable land.

Although; this calculation is limited to 15 years, the reclaimed land will remain fertile and productive far beyond this period. Despite the initial financial shortfall, the long-term benefits of the project are substantial. The final payback period becomes just over 35 years as per the calculation.

The reclaimed land will create sustainable agricultural opportunities for the local desert community, offering a significant improvement in livelihoods. Poor communities will benefit from increased food security and financial opportunities, while the project will also contribute positively to environmental sustainability by utilizing wastewater for land reclamation.

This initiative demonstrates a feasible approach to combating desertification and enhancing land productivity in arid regions in broader sense. The reclamation efforts not only help regenerate degraded land but also promote eco-friendly practices, fostering a resilient environment. Over time, the positive social and environmental impacts of the project will outweigh the initial financial deficit, making it a valuable long-term investment in both community welfare and environmental conservation.

Acknowledgment

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Smart Cities in a Sustainable and Intelligent Era: Exploring the Links to UN Goals, Society 5.0, and Industry 5.0

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Abstract

This article discusses three similar technology-driven efforts of the society emerging in three names and driving towards human welfare. Unsustainable Development Goal 11 presumes that human welfare activities will be performed through smart cities. Society 5, coined by a Japanese professor, gained popularity in Europe, and Technology 5, which is gaining popularity worldwide. Based on the analysis of social construction theory and intreoretism, these three take a motto to reach the benefit of technology at the grassroots level.

Keywords: *UN sustainable goals, society 5, and Industry 5.*

Introduction

Cities develop according to the development of industries and societies. The study of Aman and Jasvir (2020) explained this, indicating that a smart city was created after several conventional city developments. The Industrial Crises of 1857, also known as the second technological revolution, introduced the concept of industrial cities. The economic crises of 1929 necessitated the Industrial Revolution based on digitalization and gave birth to the digital city. The financial crises of 1987 gave birth to information technology and revolution, which introduced an informational city. The economic crises of 2008 introduced the widespread application of innovative technologies in societies and introduced smart cities.

In the initial days, people lived in caves, searched for convenience, and found huts called man-men huts. The collection of such huts transformed into villages, and the density increased, so they became conventional cities. People were compelled to live with traditional and indigenous technologies in such traditional towns. The continuance of the search for conveniences made men successful in developing different innovative technologies, like the latest technology related to smart infrastructure, bright traffic arrangements, and bright living standards. People search for three essential things: (1) sustainability, (2) competitiveness, and (3) advanced ICT (Aman & Jasvir, 2020).

Research gap

No literature discusses the three interrelated social and technological aspects of society design for the future.

Review of literature

Several authors have assumed a city concept depicting the features listed in Table 1. The different city concepts fulfill the needs of the city people.

Table1. Types of different cities:

Types	Characteristics and illustrations
Learning cities	• Accessible learning resources, such as libraries, colleges, and e-learning platforms, are a feature of learning cities. • Upskilling and reskilling programs. • Good cooperation between enterprises, educational institutions, and local governments. As an illustration, consider Gwangmyeong, South Korea, a UNESCO-designated learning city that fosters digital and cultural literacy.
Virtual Cities	• Immersive and interactive settings. • Frequently developed on platforms like virtual reality (VR) or augmented reality (AR), these technologies are used for social experimentation, citizen participation, and urban simulations. • Decentraland, for instance, is a blockchain-based virtual environment that provides community engagement and digital real estate.

Knowledge Cities	• Universities, research facilities, and hubs for innovation. Knowledge-based sectors, such as banking, biotechnology, and IT. Significant expenditures on R&D and education. Boston, USA, for instance, is well-known for emphasizing colleges and innovation clusters
Intelligent city	• Urban planning using predictive analytics. • AI-powered energy and traffic control systems. • AI applications for public services that are focused on citizens. • Singapore, for instance, uses AI to improve public safety, urban mobility, and traffic management.
Information city	• Strong telecommunications infrastructure in an information city. • Pay attention to software and IT services. • The availability of information to businesses and citizens. • For instance, Silicon Valley, a software-driven and IT sector center, is located in the United States in San Jose, California.
Green city	• Renewable energy sources, such as wind and solar power. Sustainable city infrastructure. • The encouragement of green areas, such as parks and forests. • For instance, Copenhagen, Denmark, is well-known for its green buildings, long bike lanes, and renewable energy projects
Sustainable city	• Eco-friendly city• Effective management of resources (waste, energy, and water). • The ability of cities to adapt to climate change. • Urban development that is equal and inclusive. For instance, Curitiba, Brazil, is renowned for its sustainable urban planning and cutting-edge public transit system.

Source: Jasvir Rattan and Aman Kumar. (2020). A Trip from Traditional to Intelligent Cities. Intechopen.91675, 10.5772.

Several authors have accepted a city notion that reflects the characteristics outlined in Table 1.

Hall (2002) concentrated mainly on the infrastructure, buildings' decent state, and city dwellers' safety. According to the California Institute's Cities and Regions in the New Learning Economy (2024), smart cities are modeled after creative communities. A knowledgeable community is prepared to use the newest technology. (2011) Caragliu et al. According to Caragliu, a smart city is built on the foundation of people, smart capital, and contemporary IT infrastructure, enabling a sustainable community and offering urban civilization a high standard of living. According to Su et al. (2011), a smart city is the result of combining the Internet of Things with a digital city. According to Batagan (2011), a smart city is one that functions successfully and is based on the "smart" fusion of resources and actions of residents who are self-aware, autonomous, and self-decisive. Lu and associates (2012) state that a smart city can lower its environmental impact and improve the lives of its residents by combining technology such as mobile communications, sophisticated energy systems, and water recycling. Smart cities are defined by Dameri (2013) according to the region in which he incorporates them—numerous factors, including living quality, cognitive growth, and green space utilization.

Various parameters such as quality of life, intelligence development, use of green, and Eco-friendly resources and able to state the rules and policies for the city government and its development.

Objective

To analyze the relations among smart cities as defined by sustainable development goals of the UN, society 5, and industry 5 in connection with technology use and human welfare.

Method and materials

The research reviews the available literature extensively and analyzes government policy papers on transforming Kathmandu into a smart city. The philosophical paradigm, interpretivism, and social constructivism theory have been applied to generate knowledge. Both theories belong to the qualitative research approach. Both inductive and deductive approaches have been used.

Result and discussion

Provisions made by sustainable development goals

"Make cities and human settlements inclusive, safe, resilient and sustainable" (UN 2021), the eleventh Sustainable Development Goal of 2015 involves smart cities. In particular, its transportation and urban management targets 11.2 and 11.3 offer a framework for implementing innovative city features. The targets are:

11.1:Upgrade slums and guarantee access to sufficient, secure, reasonably priced housing and basic services by 2030.

11.2:By 2030, everyone should have access to safe, affordable, accessible, and sustainable transportation systems. This includes enhancing road safety, particularly through the expansion of public transportation, while paying particular attention to the needs of women, children, people with disabilities, and the elderly.

11.3:Increase the ability for integrated, sustainable, and participatory human settlement planning and management in all nations by 2030, as well as inclusive and sustainable urbanization.

11.4:Intensify initiatives to preserve the natural and cultural assets of the planet.

11.5: By 2030, drastically cut the number of fatalities and displaced people, as well as the direct economic losses compared to the world's gross domestic product, brought on by disasters, including those involving water, with an emphasis on safeguarding the weak and the impoverished.

11.6: By focusing on air quality and municipal and other waste management, cities will lessen their negative environmental effect per capita by 2030.

11.7: By 2030, all people should have access to green and public areas that are safe, inclusive, and accessible, including women and children, older people, and those with disabilities.

11.8:Strengthen national and regional development planning to promote favorable economic, social, and environmental ties between urban, peri-urban, and rural areas.

11.9:Develop and implement comprehensive disaster risk management at all levels following the Sendai Framework for Disaster Risk Reduction 2015–2030. By 2020, the number of cities and human settlements that adopt and implement integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, and resilience to disasters will significantly increase.

11. A: Provide financial and technical support to least developed nations so they can construct robust and sustainable structures using local resources.

Analysis and Interpretation of sustainable goal through eyes of smart cities

The need for smart cities has emerged as a solution to the population increase problem. Almost 70% of people on the planet will reside in cities by 2050. Without sustainable development, rapid urbanization can result in poor sanitation, traffic jams, a shortage of housing, and environmental deterioration. More than 70% of greenhouse gas emissions worldwide are caused by metropolitan areas. Through eco-friendly infrastructure, renewable energy, and resource efficiency, sustainable cities lower their carbon footprints. Significant disparities exist in housing, healthcare, education, and employment in urban locations. SDG 11 places a strong emphasis on lowering urban poverty and providing opportunity for underserved areas. Urban areas are frequently the hardest damaged by natural disasters like earthquakes and floods. Disaster-resilient architecture and emergency preparedness measures are essential for sustainable cities. In order to prevent development from displacing history and variety, cities should preserve cultural heritage places and foster the cultural identity of their urban neighborhoods. SDG 11's main objectives are: (1) the provision of safe, affordable, and adequate housing and basic services; (2) universal access to sustainable transportation systems; (3) resilience to climate-related hazards and natural disasters; (4) the mitigation of urban environmental impacts, particularly air pollution; and (5) the preservation of cultural and natural heritage.

Connection Between SDG 11 and Smart Cities

To enhance urban living, a smart city combines creativity, data, and technology. Since technology may hasten the transition to inclusion, safety, resilience, and sustainability, the tenets of a smart city strongly correspond with the goals of SDG 11. IoT and AI are used in smart cities to assist sustainable resource use through energy-efficient technologies including waste management, water conservation, and smart grids. Real-time traffic monitoring, driverless cars, and public transportation optimization are examples of technologies that help cut emissions and give everyone access to inexpensive, sustainable mobility. Smart cities are more resilient to climate-related threats because they manage disasters using early warning systems and predictive analytics. Cutting-edge technology like GIS mapping guarantee improved urban planning for inclusivity and assist in identifying locations for affordable housing projects. To reduce pollution and slow down climate change, smart cities use renewable energy sources, green building guidelines, and air quality sensors. More public participation is made possible by digital

platforms in smart cities, guaranteeing that all communities' opinions are heard and that urban policies continue to be fair.

Opinions of citizens and news media

"Since Mayor Balen Shah took charge of the Kathmandu metropolis, he has attempted to beautify the capital city. The town's streets are being made wider, green, and colorful. The footpaths have started to look clean. It has become easier to walk. Road congestion has decreased somewhat. Those who set foot in Kathmandu felt that the city had become civilized and modern in one and a half years".

According to these viewpoints, enlarging roadways results in greater civic improvements. The media and public recognize that roadway widening improves urban mobility and eases traffic. It demonstrates an attempt to make room for the increasing number of cars and pedestrians. A concept of urban beautification is portrayed by the focus on greenery and lively streets, which enhances both aesthetic appeal and environmental sustainability. The goal of this endeavor is to make the environment more livable and healthful for the populace. It conveys the idea that better walkability and clean walkways are important stages in creating a city that is more pedestrian-friendly. It signals a change in urban planning, giving citizens' freedom of movement precedence over congested, car-dominated roadways. The statement notes that traffic congestion, which has long been a problem in Kathmandu, has decreased. Despite its partiality, the improvement demonstrates the value of improved infrastructure construction and planning. Outsiders view Kathmandu as more structured, sophisticated, and hospitable, and residents and the media take delight in the city's change. This implies that the modifications made under Mayor Shah's direction are in line with urban trends around the world. The views show hope and contentment with the mayor's efforts, particularly with regard to the usefulness and aesthetics of the city. The statement indicates that Kathmandu is rapidly progressing in a favorable direction, even though it doesn't address difficulties or critiques. This change, spearheaded by Mayor Balen Shah, is a noteworthy accomplishment that has improved the city's reputation internationally and the quality of life for its citizens. It implies that putting an emphasis on urban sustainability and efficient governance can produce observable outcomes in a very short amount of time.

Society 5.0

A Japanese academic created the idea of Society 5 to enhance people's lives through the use of cutting-edge technology. Utilizing technology to address social issues and advance economic development is the aim. This society aims to use big data, the Internet of Things, and technology to improve human welfare and address social and economic challenges (Atsushi et al., 2020).

Republica citizens' and news media's opinions

"*Japan's Society 5.0 encompasses more than just economics. It concerns the digitization of the entire civilization in order to make it extremely intelligent.*

Interpretation of Public and News Media Opinions Republica

The public and media understand that Society 5.0 encompasses more than just economic expansion; it also involves tackling more significant societal issues. This vision is an example of a human-centered strategy that puts sustainability, inclusivity, and well-being ahead of conventional economic goals. The statement emphasizes the objective of Society 5.0, which is to incorporate digital solutions into all facets of society by utilizing cutting-edge technology like artificial intelligence (AI), the Internet of Things (IoT), big data, and robotics. This covers daily living, infrastructure, education, healthcare, and transportation. The phrase describes a civilization in which technology improves people's quality of life, gets rid of inefficiencies, and strikes a balance between social progress and economic growth. In order to address social problems including urban congestion, environmental degradation, and aging populations, it imagines a future in which people and technology live in harmony. The public and the media recognize that Society 5.0 is about leveraging technical developments to increase accessibility, equality, and inclusivity at all societal levels, not only about advancing technology for corporations. It aims to close gaps between rich and poor, young and old, and urban and rural areas. In Society 5.0, digitization is seen as a means of achieving sustainability objectives like lowering carbon emissions, encouraging the use of renewable energy sources, and enhancing disaster management protocols. The general attitude shows enthusiasm and support for Japan's progressive stance. It demonstrates a common conviction that Society 5.0 serves as a blueprint for the future that can encourage other countries to implement comparable policies. People and the media stress that Society 5.0 is a paradigm change toward a more sustainable, efficient, and inclusive way of living as well as a technological or economic breakthrough. If it is successful, it might change the way societies around the world operate and establish Japan as a leader in innovation and human-centered development.

Industry 5

Industry 5.0, the Fifth Industrial Revolution, is a new and emerging phase of industrialization that sees humans

working alongside advanced technology and AI-powered robots to enhance workplace processes. This is coupled with a more human-centric focus, increased resilience, and improved focus on sustainability(Amr, 2022).

This new phase builds upon the fourth industrial revolution (Industry 4.0), encompassing more than just manufacturing. It is enabled by developments in IT that include facets such as artificial intelligence, automation, big data analytics, the Internet of Things (IoT), machine learning, robotics, intelligent systems, and virtualization.

Cüneyd İkbal Sarıoğlu of *Kocaeli University, Turkey's abstract about Industry 5 is* "*Recently, Industry 5.0 has created various innovative technologies, including big data, artificial intelligence (AI), the internet of things (IoT), virtual reality, cloud computing, and cobots. Industry 5.0 encompasses three core values: human centricity, resilience, and sustainability. Industry 5.0 has various enabling technologies supporting the industrial transformation, including digital twins, cobots, mass customization, and hyper-personalisation. Digital transformation has affected all areas, including business organizations with all functions and marketing. Marketers have created different and innovative strategies using technological supports stemming from Industrial and societal" revolutions." Industry 5.0 proposes a new marketing paradigm with mass customization, and in this process, a new type of "super-empowered customer" or "consumer 5.0" has been created* ."

Analysis of the Industry 5.0

Abstract by Cüneyd İkbal Sarıoğlu
The abstract by Cüneyd İkbal Sarıoğlu highlights the revolutionary aspect of Industry 5.0, emphasizing its basic ideals, technological advances, and impact on multiple sectors. The abstract emphasizes how Industry 5.0 transforms industrial processes by integrating cutting-edge technologies. By enabling smarter, faster, and more efficient systems, these tools move Industry 4.0 away from automation and toward human-machine collaboration. Enabling technologies include: (1) Digital twins are virtual models of real systems that are used to model and improve operations in the real world. (2) Collaborative robots, or Cobots, are machines made to collaborate with people to increase safety and productivity. (3) Mass Customization and Hyper-Personalization: Using automation and data-driven insights to mass customize goods and services to meet the needs of specific clients. By ensuring that technology meets people's demands and strengthens their responsibilities within industrial processes, Industry 5.0 moves the emphasis from solely machine-driven efficiency to empowering humans. The necessity to create industrial systems that can endure disturbances (such as pandemic supply chain difficulties) while preserving operational continuity is reflected in the emphasis on resilience. In line with global sustainability goals, Industry 5.0 incorporates eco-friendly practices by maximizing resource utilization, cutting waste, and supporting clean energy solutions. "Digital transformation has affected all areas, including business organizations with all functions and marketing." : Beyond manufacturing, Industry 5.0 is changing organizational structures, business models, and tactics. As these technologies have been integrated, marketing in particular has changed. To develop individualized, data-driven campaigns that engage consumers more deeply, marketers are utilizing technologies like artificial intelligence (AI), big data, and the Internet of Things. Hyper-personalization and virtual reality improve consumer experiences and brand loyalty. Industry 5.0 is positioned as an extension of earlier industrial revolutions, fusing technological breakthroughs with societal demands. This illustrates how companies have changed to accommodate global issues like sustainability, human wellbeing, and inclusivity. The abstract takes a constructive stance, emphasizing how Industry 5.0 has the ability to revolutionize innovation and meet pressing societal demands. It envisions a time where technology improves both productivity and life quality.

According to Cüneyd İkbal Sarıoğlu's abstract, Industry 5.0 is a revolutionary industrial shift that combines cutting-edge technologies, human-centric values, and sustainability objectives to promote inventive and resilient industries. The significant effects on business, especially marketing, highlight how these developments have the power to completely alter how sectors function and engage with society.

Conclusively, it can be said that the UN's Sustainable Development Goal 11, Society 5.0, and Industry 5.0 represent transformative frameworks that leverage technology to enhance human well-being, create sustainable communities, and foster a human-centric approach to development. Together, they highlight the potential of innovation to address global challenges and improve the quality of life for all.

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Social and Psychological Identities of Multiverse Life

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Abstract

Most social and psychological identities begin with life itself. The point of origin of any object is Zero and finally it dissolves into Zero. When life progresses from a dormant state, along with life. Life Survivable air, water, heat, soil. The social and psychological identity of the multiverse obtained from social life style which is influenced by the geography. People living in different continents have different social and psychological conditions. Human lives have more desires than other living beings and social and psychological ideas are also more developed. A result of that, both growth and destruction are taking place day by day during social and psychological development. Growth and development are equal, its final point becomes Zero. Nothing was yesterday, is today and will not be tomorrow. Therefore, the place of origin of any things is zero and its end is also zero.

Keyword: *Society, Development, Zero to Zero, Psychology multiverse life. Soul, conscience, social justice, government of Earth, Environment, Natural resources,*

Introductions

Most social and psychological identities begin with life itself. The point of origin of any object is Zero and finally it dissolves into Zero. When life progresses from a dormant state, along with life comes the need for all kinds of material that life needs, such as air, water, heat, and soil. Life is like a kind of clay idol which clay idol is protected by the combination of air, water and temperature and consciousness develops. Individuals form groups. A group becomes a society. In order to keep the society healthy, psychological conditions are created from that society. Psychological ideas are created from various activities in the society.

The social and psychological identity of the majority of life is obtained from the social life style which is influenced by the geography. People living in different continents have different social and psychological conditions. The land on which humans live has a social and psychological impact on human life. Society and psychology are connected with human life. Consciousness cannot exist without objects. The object itself develops consciousness. The development of consciousness has social and psychological effects. Every living being on this earth has its own intelligence and conscience and all of them have a social and psychological way of life. The difference is only that, it is separated only by the physical structure of life and geography.

According to the zenodo, Knowing about the cosmic Law of Divine - Evil Asymmetry can make our mind appreciate the slight yet sufficient supremacy of divine over evil. This may help restoring faith in the eventual creation of a just society, where social justice is defined as an administrative mechanism providing the right conditions for every human being to accomplish his or her Conscience-led Mission throughout life, while allowing each of these accomplishments to be reciprocated with the gratitude it induced in the involved social systems, small or large, to let equal opportunities in life coexist with due diversity in welcomed, not abused, social recognitions. (https://doi.org/10.5281/zenodo.7740165)

The way of life of aquatic animals is to live in water. Some organisms can live in both water and land, while some can live only in land and water. Aquatic All organisms that can live in both land and water have a social and psychological identity. The only difference is that in the way of life of human society, the social and psychological way of life is broad and conscious. According to that society is grazing.

Human lives have more desires than other living beings and social and psychological ideas are also more developed. As a result of that, both growth and destruction are taking place day by day during social and psychological development. When growth and development are equal, when social and psychological development is equal, its final point becomes Zero. Nothing was yesterday, is today and will not be tomorrow. Therefore, the place of origin of any thing is zero and its end is also zero.

We are talking about sustainable development and some countries are already starting. As we see, some countries are developed and some countries are under developing. But overall, there is no possibility of sustainable development when growth and destruction are equal. Even if it is done, it will last for a century, after that it will be silent.

The social and psychological issues that affect the majority of people's lives are positive and negative thoughts, which push the social and psychological conditions back and forth. The information system is the most important thing in the way of life of the majority of any country, which has a social and psychological impact. The effect of information on human society is having good or bad psychological effects. If the majority of people living in any society misunderstand the correct information, its effect will be misinterpreted by all the people living in that area because the psychological effect is also of the same type.

Social and psychological influence in life changes according to the speed of time. If we look at yesterday's situation and today's situation, twenty-four hours have already passed. What was twenty years ago cannot be applied today. Social and psychological conditions are changing with the passage of time.

Propose and Objects of Study

Mainly, the social and psychological impact of majority life will be found out due to the declining population of Nepal. This article will emphasize that the main factor impacts of depended about the geographical area, natural resources and political environment.

Research question of the study

Why is a majority and social psychological identities of The Multiverse Life?

How can improvement the socials psycho**social Identities of the multiverse life of** our society?

Limitations of research study

Socials, psychological and geographical deference multiverse life activities of our society.

Literature Review

Social and Psychological Identities of Multiverse Life .The real meaning of being born, living and dying. All creatures on earth are born from living creatures. After birth, they move forward in the process of life with a long or short lifespan and die on a certain day. We humans are also born from a living person and one day that living person dies. Reincarnation after death is just a fantandasy. Nothing goes away when a person dies. Some people say that the breath is gone, some scriptures say that the soul goes out and that soul enters another form.

Thematically Review

Social and Psychological Identities of Multiverse Life .When all the systems of the body are activated and the life-like fire is completely extinguished, the body parts remain in the same state as they are. Someone's mouth is open, someone's eyes are open, someone's other senses are open. And people assume that the life has gone out of that open part. Actually, that is not true, there is nothing to get out.

Social and Psychological Identities of Multiverse Life .Now let's talk briefly about birth. The body of an animal is made up of many different types of cells. Cells are living cells. At every moment, there is a continuous process of development and destruction of living cells in the body. By the combination of earth, water and air elements, living cells are closed, i.e. they are born and the process of dying continues.

Social and Psychological Identities of Multiverse Life .The dead cells are excreted in the form of faces, urine, pus, etc. Many types of cells are formed in the body. Cells that give birth to children like themselves are also formed. Man's children are born by man. After the female organ matures, the ovum closes in the ovary, similarly the male sperm closes. When a man and a woman have sexual intercourse, a fertilized cell begins with the union of a healthy and mature egg and Venus at the right time. Ovum and Venus are both living cells. Therefore, that fertilized fund is also vital.

Social and Psychological Identities of Multiverse Life .That vital cell lives in the mother's womb and receives nutrients from the mother's body, grows and develops, and after nine months, a fully developed baby is born. Therefore, there is no such thing as the soul or soul of a dead 4 creature entering the mother's womb. Therefore, at the time of death, one's soul does not leave, and at the time of conception, one's soul does not come.

So death is not something that goes away, but the energy inside the body becomes inactive. In the same way, to be born is to leave the womb after being fertilized and growing and developing for a period of time in a mature and favorable environment. There is no possibility of rebirth as another life after death. It is true that one must die at some point after birth. (Researcher thought, 2024)

What is life and what is death? Let's have a short discussion. Basically, life runs on a combination of 4 elements. They are earth, water, air and fire. Fire is produced by the combination of earth, water and air in the body. That fire element inside the body is soul, that is, life. As long as the element of fire remains in the body, it remains alive. When the fire element of the body becomes inactive or the fire of the body goes out permanently, it is considered that the person has died.

We all know that fire needs fuel to burn. Oil or electricity is needed to run the machine. In the same way, the fire of life requires nourishment. Everything that animals eat comes from the soil, which is called nutrition. This is the earth element i.e. soil. Water makes the earth element soluble and nutritious and the fire element within the air is also produced by the combination of fire with air (oxygen), which is called strong life.

Theoretical review

Social and Psychological Identities of Multiverse Life .This strong energy flows through all parts of the body and life goes on. Transmission, processing, flow and control systems are active within the body. As long as the systems of the body work properly, earth, water and air are properly supplied, then life lasts. Death is declared when the vital systems of the body are blocked or fuel is not supplied and the fire of the body goes out and does not rekindle.

After the death of a person, no one goes to heaven, no one goes to hell, and no one comes back with another life. When the fire burning from the combination of earth, water and air in this body is extinguished, life is over. After death, the soil, water, and air of the inert state in the body merge into their own elements. If the soul or life becomes inactive, then what will go to heaven or hell or take rebirth? Heaven, hell and rebirth after death are only imaginary statements. A person can experience heaven and hell during his lifetime, not after death. Heaven and hell can be considered as the subject that people experience in the practical life of the time they are saved.

When the physical needs of people are easily met, the state of mental satisfaction and happiness is called heaven, on the other hand, surrounded by all lacks, physically disabled, sick, mentally trapped by many kinds of stress, socially humiliated, inferiority complex. A life in a state of suffering and panic is hell, hell. Doing actions that should be done by human beings, having bad and sad thoughts and behavior in the mind is a sin, but good actions, righteous thoughts, righteous behavior, and adopting them are religion. 5 Therefore, sin and religion are a matter of individual's thoughts and behavior. Self-satisfaction is obtained through efficient actions, easy living is possible. Even if there is happiness for a few moments due to unskillful actions, the future results will be very sad. When a person is clean, selfless, fearless, calm and restrained, then he gets the feeling of enjoy, he sees and enjoys heaven. Therefore, heaven and hell are seen and experienced during life, not after death.

Human life is very important. It is possible for people to make this life worthwhile in their lifetime. The modern world has been built by human ability. There have been many miraculous discoveries. People have made their fame immortal even after death by doing good deeds. Even though the body and soul of a person is gone, he has made his name like long live with the remarkable contribution he made during his lifetime. It is said, work, and earn a name.

Finally, let us understand the reality of human birth and death. Let's understand the subject of birth and death mentioned in funny but fictional literature with our own knowledge, conscience and analysis. Let's not trust the hope of heaven and hell after death. Let's think cleanly, do good deeds. Make this life truly meaningful. Let's get the heavenly feeling in our lifetime. This is the success of life. Let us all embrace it.

From the point of view of natural resources, Jiri is in an area with a lot of potential. Especially in this city area, there is a lot of potential for the following resources.

Kiwi cultivation, potato cultivation, tea cultivation, herb cultivation etc. can be produced in wet and fertile soil, while in the forest and pasture areas there are possibilities for animal husbandry, cattle and forest production based industries such as herbs, wood and firewood. Similarly, the electricity generated from Khimti River, Jiri River in the water source is providing enough service to the consumers of this Jiri Municipality, and it seems that the efforts to be made in order to mobilize the above-mentioned natural resources in a more organized manner should be as follows. For example, local government, state government and central government need to identify needs and resources, public participation, environment creation, investment friendly environment and search for investors and coordination.

For example, the local government should coordinate with the provincial government by identifying needs and resources, seeking people's participation, and the provincial and central governments should conduct feasibility studies and resource management to make financial investments for large projects, while the community should start private enterprise businesses and search for businesses.

Nepal is a geographical continent with great natural diversity and immense resources. Aiming for its development and progress is one thing, achieving it and implementing it for the betterment of the entire country is another. Those who are throwing the life of a nation of nearly a century into the gutter by talking about revolution under the guise of development should first stop confusing the people by gossiping.

Empirical review

Social and Psychological Identities of Multiverse Life .Nepal does not need Marx and Engels to present the theory of economic development and implement it accordingly. Europe and America cannot be a model of development. There is a need for self-awakening among the common people about nation and nationality. In order to do this, we have to build up our centuries-old physical and emotional relationship with our customs, culture and nature. When the forest green wealth of Nepal is on fire, the hearts of Nepalese must burn.

The looting of our rivers should be countered and the agreement that is used by foreigners for one-sided interests should be canceled and regulations should be

made in the interest of the country. The first step is to accuse the current political forces of being traitors to the country, even when our self-respect has been trampled, and we have to get rid of them.

Revolution should not become a delusion and should not become a means of climbing the ladder of power. The revolution is not over. All previous revolutions in the history of the country did not have a clear roadmap of what to do after the revolution. Now there should be a revolution with a roadmap. Political revolution and economic revolution should be connected. Those who fight for power are traitors. Today's alternative is not Congress, UML or Maoists and cannot be. This is because as long as these parties exist, the country will not dream of development. The brokers of Indian expansionism and American imperialism cannot be nationalists.

Nepal is a country rich in natural resources. There are natural resources in Nepal such as rivers and streams, forests and herbs, fertile soil, vacant land and mining resources. There are various challenges to utilize the above mentioned natural potentials in which politics is the main reason. Politics of Nepal is not stable, there is a change of government in 6-6 months and due to the fact that the politicians of Nepal are running errands, a stable government has not been able to run in Nepal.

According to zenodo, knowing about the cosmic Law of Coexistence in Diversity can let our mind respect not only the endless diversity of human beings but also the cohesive force of space-time in which all are connected. This may help realizing the superiority of cooperation for shared goals over competition for gaining by harming others. .(https://doi.org/10.5281/zenodo.7740165)

Economic and food

Man+ women

Children

Political and sustainable development

Elements of Society

Families and villager

Health and education

Culture and Religion

Previous and District

Research Methodology

Social and Psychological Identities of Multiverse Life .In this chapter, the method adopted in connection with the present study is qualitative explained. The report has been prepared on the basis of research based on various reference materials and the experience gained from direct observation or visiting areas. The role of the researcher has been fully encouraged to present ideas and viewpoints from entrepreneurs such as individual, collective and different area such as geographical and human societal area of majority and social and psychological identities of The Multiverse Life. In this chapter, the title of the research, justification and analysis qualitative and explanatory my research.I will be using qualitative research as it is especially important in the utilization of human, psychological, multiverse social life and natural resources to sustainable development of society.

Explanatory Research Analysis

Social and Psychological Identities of Multiverse Life .Across academic disciplines, scientific progress is maximized when there is a balance between deductive and inductive approach. To promote this balance in organizational science, rigorous inductive research aimed at phenomenon detection must be further encouraged. To this end, the present research discusses the logic and methods of exploratory analysis, the mode of analysis concerned with discovery, exploration and empirically detecting phenomena analysis required to majority and social and psychological identities of the multiverse life. Phenomenological study, human behaviour study, political leadership study, natural resources study, study of the social sciences. Build of Society = Man+ women, Children, Families and villager, Health and education, Culture and Religion, Economic and food, Political and sustainable development.

Hypothesis of the Study

Social and Psychological Identities of Multiverse Life. Hypothesis depended about the earth geographical area, environment, natural resources and human resources of majority social and psychological identities multiverse life. Because every subject's fulfilment from hypothetical dreams and Phenomenological study, human behaviour study, Philosophical foundations that are supported by logic and scientific basis that is confirmed by direct use and testing. The country has a wide range of natural resources like forestry.

The natural resources will be the base for future development plans for sustainable development and economic growth. Despite the availability of resources within the country, some powerful political leaders and high level bureaucrats are negligent and are in trust of others' supports rather than on their own.

According to the zenodo, Hypothesized Soul of Multiverse and its possible laws, the present work examined the social aspects of four of these laws. The following key aspects were recognized. (https://doi.org/10.5281/zenodo.7740165)

All the countries of the world have some kind of natural resources. From common natural resources to precious resources, the pride of the earth is within nature. Today,

the developed countries of the world have succeeded in transforming the country's economy by using these natural resources in a timely manner and have succeeded in making their citizens live happily and happily. Being unable to do so, they have been deprived of development and happiness. The developed countries are going to exploit the natural resources within the country and use them to make their storage empty, while the poor and underdeveloped countries are yet to be mined. In this way, the future of countries that have yet to be mined but have abundant natural resources looks bright and beautiful.

The world people have three type of brain and thoughts. Positive, Negative, Negative positive both. Within this brain, there are many sub-centers from which all the organs of the body are mobilized. Human emotions such as anger, thirst, fear, happiness, laughter, kindness, love, etc., originate from different centers and sub-centers of the same brain. The brain is the central part of knowledge, wisdom, intelligence, thought, etc., which is active every moment. The active state of the brain is called the soul of the animal.

Conclusion

Social and Psychological Identities of Multiverse Human life is very important. It is possible for people to make this life worthwhile in their lifetime. The modern world has been built by human ability. There have been many miraculous discoveries. People have made their fame immortal even after death by doing good deeds. Even though the body and soul of a person is gone, he has made his name long live with the remarkable contribution he made during his lifetime. It is said, work, and earn a name. Sociology is consumed by the society itself. All the subjects in this world are consumed by the social beings in this society. Every kind of sustainable development is done through the natural resources available on this earth.

Even when a person is asleep, one part of the brain is operating one after the other, which is called the dream state. When there is an injury to the brain, a person faints, loses consciousness for a while. In such a state, the conscious cells remain inactive for a while, but when the cells start to become active, then the senses move. In the same way, using a drug to make you unconscious is just looting those cells. If the cells become unable to wake up, if the cells are permanently inactive, all the systems of the body are blocked, not closed.

Then the animal dies. Social and Psychological Identities of Multiverse Human life .Finally, let us understand the reality of human birth and death. Let's understand the subject of birth and death mentioned in funny but fictional literature with our own knowledge, conscience and analysis. Let's not trust the hope of heaven and hell after death. Let's think cleanly, do good deeds. Make this life truly meaningful. Let's get the heavenly feeling in our lifetime. This is the success of life. Let us all embrace it.

In this way, when the animal dies, nothing leaves the body. Some say that the breath is gone, the process of inhaling and exhaling is a regular process of the living state. The lungs continue to contract and expand, when the lungs expand, air enters through the nose or mouth through the breathing tube, and the fiery air in the air is absorbed by the blood cells, while the polluted air inside the lungs comes out. If the process of contraction and expansion of the lungs stops for a while, the cells do not get air and the cells die. Then the animal dies. Death is caused by cessation of breathing, not breathing. So That development process of sociology starts from Zero and passes through the middle stage and finally merges into Zero itself. For example: It was not existed yesterday, it is present today and it will not exist tomorrow. Sociology begins with nature, and sociology challenges nature. Different branches of sociology are connected. The said branches will be consumed by the society. In order for sociology to remain in a stable or dynamic state, it should be deprived of producing the latest weapons produced by the world society.

Finally I found in my life expansion of experience in this society three type of thoughts a. Positive thought. b. Negative thought. C. positive, Negative both thought.

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The Impact of Service Robot Usefulness and Enjoyment on Service Robot Satisfaction and Service Satisfaction

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Abstract

This study investigated whether the usefulness and enjoyment of service robots can affect satisfaction with robots and ultimately overall service satisfaction, and whether this relationship differs depending on anthropomorphism. The results and implications of the study are as follows.

First, the usefulness and enjoyment of service robots had a positive effect on robots, and satisfaction with robots had a positive effect on overall service satisfaction. This means that robots as service subjects can also be a factor that affects overall service quality.

Second, the level of anthropomorphism needs to vary depending on the role of the service robot. If the role of the service robot is to provide information or respond quickly, it is appropriate to lower the level of anthropomorphism. However, if the role of the service robot is to provide enjoyment, designing human-like expressions or appearances may be more useful in reducing consumers' negative reactions and inducing positive responses.

Keywords: *Service Robot, Usefulness, Enjoyment, Anthropomorphism, Service Satisfaction*

Introduction

The global market for service robots is expected to see a compound annual growth rate (CAGR) of 23.3% from $36.2 billion in 2021 to $103.3 billion by 2026. This projected growth indicates that service robots will soon become an integral part of everyday life.

It is important to distinguish between industrial robots, which are utilized in manufacturing, and service robots, which are robots whose applications extend beyond manufacturing (Kim, 2022). These robots can be further categorized into two main groups: home/personal service robots and professional/commercial service robots. Among the various types of robots, those designed for professional or commercial purposes are particularly prevalent in everyday life, such as robots that serve, cook, brew coffee, deliver goods, and provide guidance. In particular, robots designed for service and guidance are the most frequently utilized, primarily serving customers at service touchpoints and effectively replacing human employees.

The advent of service robots has the potential to facilitate standardization and automation within companies, which could ultimately result in enhanced productivity and reduced costs (Karen et al., 2017). For consumers, the mere existence of service robots is still a source of excitement. They will have the opportunity to experience innovative new services provided by service robots that assume human roles in stores. This indicates that service robots can also be assessed for their ability to provide satisfactory service as the recipients of service. Therefore, this study aims to investigate whether satisfaction with service robots can ultimately affect overall satisfaction with service.

Theoretical Background and Hypotheses

What is the customer response to service robots? Human reasoning and rational judgment are influenced by a complex interplay of cognitive logic and emotional factors (Damasio, 2000). Thus, it is imperative to ensure that users derive both functional and emotional satisfaction from utilizing novel information technology (Shiau and Luo, 2010). In other words, individuals may respond to and evaluate service robots from two distinct perspectives: cognitive and emotional. Cognitive evaluations refer to beliefs and knowledge about the object, whereas emotional evaluations refer to feelings about the object (Ward and Russell, 1981). In light of the supposition that emotional and cognitive aspects are inherently intertwined in the context of service robots, this study

posits the proposition that usefulness can be identified as an attribute of cognitive aspects, while enjoyment can be regarded as an attribute of emotional aspects.

Usefulness

At the point of service delivery, consumers assess the usefulness of the assistance provided by the robot. In order for a new system to be accepted by consumers, it must be perceived as useful (Davis, 1989). This is a cognitive evaluation of the extent to which the service robot is equipped to perform the required tasks. The level of consumer satisfaction with robot services is likely to increase if the service robot is able to perform the requested service in a satisfactory manner and is perceived as being useful by the consumer. Therefore, the following hypothesis was formulated.

H1: Usefulness will have a positive impact on satisfaction with service robots.

Enjoyment

A substantial body of research (e.g., Lin 2011) indicates that enjoyment is a pivotal factor influencing the intention to adopt a new technology. Enjoyment can be defined as the degree of enjoyment derived from the use of a computer or the Internet (Venkatesh et al., 2000). Van (2004) has discovered that the degree of enjoyment exhibited by an information system has a more pronounced impact on the intention to adopt than the ease of use. If the information presented is perceived as interesting and enjoyable, consumers may develop favorable and positive attitudes toward the information.

Conti et al. (2017) corroborates the assertion that a propensity for enjoyment is a significant predictor of intention to use in the context of robotics research. The emotional responses of consumers to products or services can be employed as a source of information about the object in question, exerting a direct or indirect influence on the evaluation process (McDougall and Levesque, 2000). Therefore, this study aims to determine whether enjoyment with service robots can influence the satisfaction with service robots.

H2: Enjoyment will have a positive impact on satisfaction with service robots.

Anthropomorphism

People tend to interact with machines in ways that are similar to their interactions with other humans (Fong et al., 2003). The addition of human-like characteristics to an artifact can enhance its approachability and predictability (Epley et al., 2007), which can, in turn, elicit a positive response from customers (Van den Hende and Mugge, 2014).

The anthropomorphic behaviors exhibited by robots, such as eye contact, nodding, and arm movements, have been shown to foster a heightened sense of trust and empathy in humans towards these machines (Kanda, 2007). Nevertheless, the uncanny valley theory (Mori, 1970) posits that a robot's human resemblance to humans initially increases the level of liking or closeness experienced by the observer, but that when the resemblance to humans exceeds a certain level, it can actually cause the observer to experience dislike. The service robots are designed with a human-like appearance, including the capacity for verbal communication, which serves to enhance their perceived friendliness. However, the realization of a fully anthropomorphic appearance continues to present a challenge, resulting in customer dissatisfaction with the services provided by service robots and even instances of rejection by users (Tang and Lee, 2019). In this context, this study seeks to ascertain whether the degree of anthropomorphism varies in response to the impact of usefulness and enjoyment on service robot satisfaction.

H3a: The impact of usefulness on the satisfaction with service robots will vary depending on the degree of anthropomorphism.

H3b: The impact of enjoyment on the satisfaction with service robots will vary depending on the degree of anthropomorphism.

In particular, robots designed for service and guidance are the most frequently utilized, primarily serving customers at service touchpoints and effectively replacing human employees (Kim and Kim, 2017). For example, in a hotel setting, a robot can facilitate the check-in process for guests in a prompt and courteous manner, thereby enhancing their overall experience. Therefore, this study aims to investigate whether satisfaction with service robots can influence the overall satisfaction with service experienced by consumers.

H4: Satisfaction with service robots will have a positive impact on satisfaction with service.

These hypotheses are modeled in Figure 1.

Methods

Data collection

The study employed a sample of consumers who had interacted with service robots in three or more restaurants, department stores, and other commercial settings within the previous three months to conduct an online survey. The respondents had experience with a variety of robots, including those designed for serving, beverage preparation, and receptionist duties. This resulted in a total of 305 responses, which were subsequently analyzed.

Measures

The usefulness of a service robot is defined as the extent to which it is able to perform its designated tasks effectively. This evaluation was conducted based on two key criteria: the robot's ability to "respond promptly" and its capacity to "provide information in a timely manner." Enjoyment was measured as the degree of consumer enjoyment of the robot service, with words such as "charming," "enjoyable," "fun," and "curious." Satisfaction with service robots is the degree to which consumers are satisfied with the experience of using service robots. It was measured by three items "satisfaction with the service provided by the robot," "overall satisfaction with the service robot," and "the quality of the service provided by the robot." Satisfaction with service is the customer's evaluation of the overall service. It was measured by three items: "overall satisfaction with the service," "overall satisfaction with the service provided," and "overall satisfaction with the quality of the service." Anthropomorphism was assessed through four questions pertaining to the degree of resemblance between a service robot and a human. These included the following: "similarity to a human," "behavioral responses similar to a human," "emotional responses similar to a human," and "personality similar to a human."

Results

Reliability and validity

The empirical analysis was conducted using the statistical software packages SPSS 26.0 and Lisrel 8.3. Cronbach's α was employed to verify the reliability of the measurement model, and confirmatory factor analysis was conducted to evaluate the validity. The results of the reliability analysis indicated that all concepts exhibited values exceeding the established threshold of 0.6, thereby confirming their reliability. The confirmatory factor analysis yielded the following fit indices for the measurement model: X2=277.17 (df=94, p=.000), CFI=0.95, GFI=0.89, AGFI=.84, CFI=.95, IFI=.95, RMR=.057. These indices collectively indicate an overall good fit of the model.

To assess the convergent validity, the significance of the t-values for the standardized loadings was evaluated, and the values of Cronbach's α, composite reliability (CR), and average extracted variance (AVE) were examined and presented in Table 1. The analysis demonstrated that the standardized loadings were all statistically significant at the p=.001 level. Additionally, the composite reliability of the items measuring each concept was greater than or equal to .60, and the AVE was greater than or equal to .50. These results met the criterion for convergent validity of the measurement model (Bagozzi and Yi, 1988). Discriminant validity compares the squared value of the correlation coefficient with the variance extracted. As a result, discriminant validity was achieved for all concepts (Fornell and Larcker, 1981). Table 1 shows the results of reliability and validity.

Table 1- Reliability and validity

Factor	Item	standardized loading	t-value	CR	AVE
Usefulness	X1	.81	15.18	.767	.622
	X2	.77	14.30		
Enjoyment	X3	.79	16.19	.886	.669
	X4	.85	18.06		
	X5	.78	15.86		
	X6	.82	17.06		
Robot Satisfaction	X7	.83	17.05	.867	.601
	X8	.83	17.05		
	X9	.82	16.93		
Service Satisfaction	X10	.89	19.21	.903	.688
	X11	.90	19.67		
	X12	.81	16.74		
Anthro-pomorphism	X13	.83	17.44	.882	.653
	X14	.91	20.32		
	X15	.81	16.75		
	X16	.87	18.86		

Hypothesis testing

In order to analyze the primary effect, a path analysis was conducted using Lisrel 8.3. The goodness-of-fit evaluation indicated that X2=5.10, df=2, p=0.078, NFI=.97, CFI=.98, IFI=.98, RMR=.041, GFI=.99, AGFI=.96, thereby substantiating the model's capacity to align with the data. First, Hypothesis 1 pertains to the correlation between usefulness and satisfaction with service robots. The results demonstrate that usefulness exerts a significant influence on satisfaction with service robots (β=.22, t-value=3.81). Therefore, Hypothesis 1 was supported.

Hypothesis 2 pertains to the correlation between enjoyment and satisfaction with service robots. The results demonstrate that usefulness exerts a significant influence on satisfaction with service robots (β=.30, t-value=5.24). Therefore, Hypothesis 2 was supported.

Hypothesis 3 pertains to the correlation between satisfaction with service robots and satisfaction with service. The results demonstrate that usefulness exerts a significant influence on satisfaction with service robots (β=.32, t-value=5.87). Therefore, Hypothesis 3 was supported. Table 2 shows the results of the primary effect hypothesis test.

Table 2- results of hypothesis testing

path	standardized coefficient	t-value	s.e.
Usefulness → Robot Satisfaction	.22	3.81	.06
Enjoyment → Robot Satisfaction	.30	5.24	.06
Robot Satisfaction → Service Satisfaction	.32	5.87	.05

Testing moderating effects

A multi-group analysis was conducted to test the hypothesis that anthropomorphism affected the impact of usefulness on satisfaction with service robots. To achieve this, the data set was initially divided into two groups, designated as low and high, based on the median value of anthropomorphisms (Reinartz and Kumar, 2000). First, to confirm that the groups were categorized as intended, a t-test was conducted to compare the low-anthropomorphism group 1.8193, n=166) and the high-anthropomorphism group (3.4676, n=139, 5-point scale). The resulting t-value was -25.975 ($p<.001$), indicating that the groups were well categorized.

A structural equation model analysis was employed to ascertain whether significant discrepancies existed between the groups under investigation. This was achieved by examining the $\chi 2$ change between the unconstrained and constrained models. At the $p<.05$ level of significance, a difference in $\chi 2$ change of 3.84 or greater is deemed to be statistically significant when the difference in degrees of freedom is one.

Following these steps, a multi-group analysis was performed, which revealed a significant moderating effect between enjoyment and satisfaction with service robots.

The distinction between the two models was notable, with a $\chi 2$ value of 4.053 ($p < .05$). The degree of alteration between the unconstrained model of the path coefficients, which illustrated a causal relationship between enjoyment and service robot satisfaction, and the constrained model of the same path coefficient values was considerable. To further substantiate the observed discrepancy, the individual sample values for each group were estimated and revealed to be higher in the high-anthropomorphism group ($\beta=.435$) than in the low-anthropomorphism group ($\beta=.294$). Thus, it can be posited that as anthropomorphism increases, so too does the influence of positive affect on satisfaction with service robots. The change in the $\chi 2$ value of the constrained model is 0.669 ($p>.05$), indicating that the path coefficient value is consistent between the unconstrained and constrained models. This suggests that the relationship between usability and service robot satisfaction is comparable. For individual samples, both the low-anthropomorphism group($\beta=.467$) and the high-anthropomorphism group ($\beta=.406$) yielded statistically significant results at the $p<.05$ level. In other words, regardless of the level of anthropomorphism, usefulness has a significant impact on satisfaction with service robots. However, it is noteworthy that the direct path coefficient was higher in the low-anthropomorphism group than in the high-anthropomorphism group. This indicates that a reduced level of anthropomorphism may be required for service robots to be perceived as useful. Table 3 presents the findings of the multi-group analysis.

Table 3 – results of moderating effects

Direct effect	Constrained model	Unconstrained model	$\Delta\chi^2$	Low group	High group
Usefulness→ Robot Satisfaction	28.813	28.144	.669	.467	.406
Enjoyment→ Robot Satisfaction	32.197		4.053	.294	.435

Conclusion

The purpose of this study was to determine whether the perceived usefulness and enjoyment of service robots can influence overall satisfaction with robots and, subsequently, satisfaction with the service provided. Additionally, this study aimed to determine whether these relationships vary by anthropomorphism. This study's findings and implications are as follows.

First, it was found that as the usefulness of the service robot increased, so did satisfaction with the robot. The swiftness with which a robot responds to a consumer's reaction can influence the level of satisfaction with the service robot. The usefulness of service robots is contingent upon the cognitive response of customers to the services they provide. It is thus imperative that the robot be designed in a manner that ensures responsiveness and a rapid response time with regard to the services it is to provide. Second, the enjoyment of a service robot influenced satisfaction with the robot. Enjoyment is the customer's emotional response to the robot, and the more enjoyable the interaction, the higher the satisfaction. Accordingly, the programming design should facilitate a positive emotional response from customers when interacting with the robot. Third, satisfaction with the robot affected overall satisfaction with the service. It can be reasonably deduced that robots in the capacity of service agents have the potential to influence the overall quality of service. Satisfaction with service robots is an important antecedent of service satisfaction, and strategies to increase satisfaction with robots may be a factor in increasing satisfaction with service and thus customer loyalty. Finally, the level of anthropomorphism should vary depending on the specific role of the service robot in question. A reduced level of anthropomorphic representation is deemed appropriate in a service robot

whose primary function is to provide information or respond rapidly to queries. Nevertheless, if the role of a service robot is to provide pleasure, it would be more beneficial to design a human-like facial expression or appearance in order to reduce consumer rejection and encourage positive responses.

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Deriving Knowledge Graph from Crowdsourced Civic Input: A Bangkok Love-Hate Story

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Abstract

Urban governance faces challenges in effectively addressing public complaints due to the complexity and interdependence of civic issues. This study explores the use of crowdsourced civic input, processed through natural language processing (NLP) and causal knowledge graph techniques, to enhance problem identification and policy decision-making. This research applies large language models (LLMs) for causality extraction and Latent Dirichlet Allocation (LDA) for topic modeling using complaint data from the Traffy Fondue platform, launched by the Bangkok Metropolitan Administration (BMA). The results categorize causes and consequences of urban issues into 15 key themes, revealing persistent concerns such as traffic congestion, infrastructure failures, and public safety hazards. A heatmap and causal knowledge graphs are constructed to visualize relationships between causes and effects, highlighting systemic inefficiencies and areas for intervention. The findings demonstrate the potential of participatory governance platforms in facilitating data-driven decision-making, improving resource allocation, and fostering more responsive urban management.

Keywords: *Crowdsourcing, Knowledge Graph, Causal Relationship Extraction, Participatory Governance, Urban Analytics*

Introduction

Crowdsourcing is defined as the process of outsourcing a task typically handled by internal agents such as employees to a large group of people with the belief that knowledge dispersed in the crowd (Howe, 2009; Zhao & Zhu, 2014). Once harnessed, the power of the crowd would enable a new way to solve a problem.

Online crowdsourcing platforms can be employed to gather public opinions to improve urban governance. Since June 2022, the Bangkok Metropolitan Administration (BMA) has operated an online platform, Traffy Fondue, allowing Bangkok citizens to submit complaints.The platform enabled BMA to reduce resolution time from a month to two days. This research attempts to utilize knowledge graphs to represent data in the form of entities and edges denoting the relationships between entities, helping people and machines better understand complex civic issues.

Grounded in Participatory Governance Theory, this study highlights the role of public involvement in shaping responsive governance systems. By providing citizens with a direct channel to voice their concerns, Traffy Fondue exemplifies how participatory platforms can foster collaborative problem-solving between the public and government agencies. Following the approach suggested by previous studies, data obtained from the platform were analyzed using NLP techniques for knowledge extraction and fusion. Latent Dirichlet Allocation (LDA) was also adopted to identify common themes of complaints.

Theoretical Background

This sections discuss theoretical fundamentals underpinning this current research. Knowledge Graph and Participatory Governance Theory are the two main theoretical concepts adopted for this study.

Participatory Governance

With the assumption that the misallocation of resources could lead to devastating impacts on citizens, the participation of citizens in voicing their rights for the allocation of public resources and the use of state authority is considered crucial (Wampler & McNulty, 2011). It is believed that the participatory programs would lead to improvements (Fung & Wright, 2001; Gibson & Woolcock, 2008; Labonne & Chase, 2009). Despite the diverse benefits of participatory governance, it often faces challenges related to inclusiveness and accessibility (Certoma, Corsi-

ni, & Rizzi, 2015). The advent of new digital technologies could potentially offer a new way to develop the participation from the members of the community (Hearn, Foth, & Stevenson, 2011). The online accessibility brought about by the internet impacted the participation of citizens in governance (Milakovich, 2010). Citizens were better informed about public issues and associated law making. Debates were facilitated and surfaced.

A new concept of a platform for participatory online activity was introduced. Crowdsourcing coined by Howe (2009) refers to an open online business model that utilizes voluntary participation and collaboration in order to develop creative solutions for a specific problem. It was viewed as an online decentralized problem-solving model (Brabham, 2008). This participative online activity can be initiated by an individual, an organization, or a non-profit organization (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). Governments quickly adapted to these new online platforms, primarily to enhance public participation. One of important reasons was to enable public online participation activities (Brabham, 2012). Crowdsourcing can be seen as the process of empowering citizens from the online participation to solve public problems (Liu, 2017).

Crowdsourcing can be applied to policy making as well. The policy cycle typically follows a series of steps beginning with agenda setting, problem definition, policy design and implementation, policy enforcement, and policy evaluations. Previous research provided the evidences that crowdsourcing were applied to all stages of the policy making (Prpić, Taeihagh, & Melton, 2015). Previous research also proposed the crowdsourcing framework applied to strategic digital city projects regarding discussing the typology of the crowdsourcing participants, types of crowdsourcing initiatives, motivations to participate, and strategies for crowdsourcing initiatives (Flores & Rezende, 2022).

In this regard, local governments can employ crowdsourcing to capture the citizens' knowledge to search for solutions. Similarly, since June 2022, the Bangkok Metropolitan Administration (BMA) launched its online platform, Traffy Fondue, allowing Bangkok citizens to submit their complaints. The platform enabled BMA to reduce resolution time from a month to two days. This research attempts to utilize knowledge graphs to represent data in the form of entities and edges denoting the relationships between entities, helping people and machines better understand complex civic issues.

Analyzing and synthesizing the crowd's input is considered as one of the main challenges of online crowdsourcing platform (Aitamurto, Chen, Cherif, Galli, & Santana, 2016). Next section will discuss fundamental concepts for analyzing a large amount of crowdsourced civic inputs. Causality Extraction is employed to understand causes and effects from complaint data. The results will help gain better understanding of what causes citizens' problems.

Knowledge Graph

The classical definition of knowledge is "…justified true beliefs, or true opinion combined with reason…" (Hilpinen, 1970, p. 109). This definition describes three main conditions including the truth condition, the belief condition, and the justification condition (Neta & Pritchard, 2009). It is required that the proposition is true. There is someone that believes in this proposition. And that someone can justify that the belief is true. This definition posited a challenge in the justification dimension. An individual may be justified in believing something which is entirely false (Bolisani, Bratianu, Bolisani, & Bratianu, 2018). Despite the on-going debate about the definition of knowledge, knowledge can be understood and considered as thoughts and feelings (Andriessen, 2006). The current research follows this definition to capture thoughts and feelings of Bangkok citizens and represent them as knowledge graph.

Once captured, knowledge from Bangkok citizens is represented in an easily understandable format. Knowledge Graph seems to be an applicable tool. The definition of Knowledge Graph proposed by Hogan et al. (2021) is a representation of knowledge about the real world illustrated by nodes and edges, which nodes display entities of interest and edges depict relations between these entities.

In this current study, to better understand the situations in Bangkok. Complaints will be analyzed to identify causes and consequences. These extracted causal relations from complaints would offer insights into the root cause of the problem.

nodes will represent complaint topics. The crowdsourced inputs are unstructured in nature. Following the approach suggested by previous studies, data obtained from the platform were analyzed using NLP techniques for knowledge extraction and fusion. To derive the topics from crowdsourced complaints, Latent Dirichlet Allocation (LDA) was also adopted to identify common themes of complaints.

Causal Knowledge Graph and Causality Extraction

Heindorf, Scholten, Wachsmuth, Ngonga Ngomo, and Potthast (2020) introduced causality graph representing the causal relations of knowledge. Later, Jaimini and Sheth (2022) proposed causal knowledge graph framework to represent the complex causal relationships using hyper-relational graph. The causal knowledge graph encompasses reasoning and prediction process, which in turns, offers better explainability. Causal knowledge graphs have proved to offers benefits in various domains such as identifying root causes of the quality problem (Zhaoguang Xu & Dang, 2023), representing causal patterns extracted from financial reports (Ziwei Xu, Takamu-

ra, & Ichise, 2024), and improving the root cause analysis of equipment failures (Zhou, Li, Li, Hua, & Bao, 2022), for instance. Nevertheless, constructing causal knowledge graphs requires extracting causal relations hidden within large text corpora.

Early attempts to extract causal relations were performed manually and were limited to small, domain-specific datasets (Asghar, 2016). The arrival of modern computing techniques such as machine learning offer a new way for causal relation extraction. Automatically detecting and extracting causal relations is vital in natural language processing (Blanco, Castell, & Moldovan, 2008). Not only will it help understand what happens, but also why happens. The cause–effect relation refers to a linkage between two entities, e1 and e2, where the occurrence of e1 leads to in the occurrence of e2 (Yang, Han, & Poon, 2022).

Three main causal extraction techniques were taxonomized into three groups: knowledge-based, statistical ML-based, and deep learning-based methods (Yang et al., 2022). Knowledge-based approach follows rule-based for extraction and statistical ML-based utilizes fundamental machine learning models. Deep-learning approach was seen to have advantages over knowledge-based and statistical machine learning (ML) models, particularly in addressing feature sparsity and improving performance through mechanisms like attention and unsupervised pretraining (e.g., BERT). The deep learning approach improved representations via dense vectors, contextual embeddings, and attention mechanisms. The advent of Large Language Models (LLMs) has made it possible to introduce a new apprach for causality extraction. LLMs introduced a significant breakthrough in NLP tasks such as mathematical reasoning, information extraction, machine translation, and sentiment analysis (Qin et al., 2024). The models can adapt to new domain with the help of prompt engineering, compared to traditional models which requires retraining (Cheung, 2024). With this ease of use, LLMs are seen to be fit with various tasks. Nevertheless, LLMs may occasionally provide false or misleading information which is known as hallucinations (Perković, Drobnjak, & Botički, 2024).

This present research follows the new approach of causality extraction utilizing the ability of LLMs to identify causes and consequences in complaints. Google Gemini is chosen with their notable ability in commonsense reasoning (Wang & Zhao, 2023). As causality extraction involves identifying causal relationships within textual data and distinguishing causes from effects in complaint, the selected model is particularly well-suited for causality extraction. an LLM with strong inferential skills is essential. This makes it a good fit for this study.

Topic Modeling

Even though causes and consequences can be extracted from the dataset, a large variation of words and terms are expected. Categorizing them based on their similality would offer better ways to understand and analyze them. Topic modeling plays a crucial role in computer science, especially in text mining and natural language processing. As described in Jelodar et al. (2019), a topic is a collection of words that tend to appear together in statistically significant patterns. This can apply to any form of unstructured text—emails, book chapters, blog posts, journal articles, or crowdsourcd data. However, topic models cannot define the meaning or concepts behind the words. Instead, they operate on the assumption that each section of text is formed by drawing words from a set of potential baskets, with each basket representing a different topic. The model repeatedly goes through this process, refining the distribution of words into these baskets until it lands on the most likely configuration. Topic modeling offers valuable insights into large collections of text, shedding light on the overall structure, the content of individual documents, and the connections between them.

Latent Dirichlet Allocation (LDA), introduced by Blei, Ng, and Jordan (2003), is commonly known as one of the most widely used techniques in topic modeling. LDA represents topics through word probabilities, where the words with the highest probabilities in each topic typically provide a clear sense of what the topic is about. LDA is an unsupervised, generative probabilistic approach designed to model large collections of text. LDA treats documents like a recipe made from various topics, and each topic is like a basket filled with certain words. The model figures out which baskets (topics) and which words are most likely to be part of each document. This organized yet flexible method is why LDA is one of the most popular tools for finding hidden topics in large collections of text.

Methodology

The workflow of this research is shown in Figure 1. The following steps outline the process:

1) Data Collection and Exploration

The study begins with the acquisition of crowdsourced civic input data. The data is then analyzed exploratorily to understand its structure, identify patterns, and determine its relevance to the research objectives. This step provides an initial understanding of the dataset, enabling informed decision-making for subsequent processes.

2) Data Filtering

To ensure the focus and relevance of the analysis, the dataset was filtered to include only entries from the year 2024.The total number of complaints within the Bangkok area was 251,034 records. This filtering process narrows the scope of the study, allowing for a targeted examination of causality within a specific temporal context.

3) Cause-and-Effect Labeling Using LLM

The filtered dataset underwent a stratified sampling process to preserve the proportional representation of complaints across different topics. Topics with fewer than 1,000 comments were excluded from the sampling procedure. A 20% sampling rate was applied, resulting in a final dataset of 33,331 records for the labeling process. The sampled dataset was processed using Google Gemini to annotate causal relationships.

4) Grouping Causal Relationships Using LDA

After labeling the data, the identified causes and effects are grouped using Latent Dirichlet Allocation (LDA), a topic modeling technique. LDA helps cluster related causes and effects into coherent groups, facilitating a thematic understanding of the causal relationships present in the dataset.

5) Visualization of Causal Relationships

The final step involves plotting the causal relationships to provide a visual representation of the findings. This visualization aids in interpreting the results, highlighting the key causal patterns, and enabling a more intuitive understanding of the data's underlying structure.

This methodological framework ensures a robust and systematic analysis of causality, combining exploratory data analysis, advanced reasoning with LLMs, and thematic grouping through LDA to derive meaningful insights from crowdsourced civic inputs.

Results

From the final dataset of 33,331 records, the labelling process by Google Gemini returned valid results of 30,904 records. The topic modelling technique categorized causes into 15 groups and consequences into 15 groups. Cause categories include:

1. Road Damage and Construction
2. Road Obstructions and Burning
3. Rain, Driving on Sidewalks, and Lighting Issues
4. Road Damage, Traffic Congestion, and Lighting Issues
5. Flooding and Sidewalk Obstructions
6. Vehicles Parked and Sidewalk Vendors
7. Damaged Manhole Cover, Sidewalk Vendors, and Lighting Issues
8. Parked Vehicles, Tree Cutting, and Water Hyacinth
9. Billboards and Potholes
10. Damaged Sidewalk, Trash, and Parking
11. Parking, Lighting Issues, and Damaged Sidewalk
12. Sidewalk Obstructions and Begging
13. Road Obstructions
14. Street Light Failure, Motorcycles Parked on Sidewalks, and Damaged Sidewalks
15. Power Outage, Damaged Manhole Cover, Construction, and Electrical Wires

Consequence categories include:

1. Road Damage and Construction
2. Road Obstructions and Burning
3. Rain, Roadside Driving, and Lighting Issues
4. Road Damage, Traffic Congestion, and Lighting Issues
5. Flooding and Obstructions on Sidewalks
6. Vehicles Parked and Merchandise on Sidewalks
7. Damaged Manhole Covers, Obstructions, and Lighting Issues
8. Parked Vehicles and Vegetation
9. Billboards and Potholes
10. Damaged Sidewalks, Trash, and Parking
11. Parking, Lighting Issues, and Damaged Sidewalks
12. Sidewalk Obstructions and Begging",
13. Road Obstructions",
    Lighting Issues, Parked Vehicles, and
14. Damaged Sidewalks",
15. Power Outages, Damaged Manhole Covers, Construction, and Wiring"



Figure 2 – Heatmap of cause-and-consequence relationships

Figure 2 represents a heatmap illustrating the relationships between various causes and their corresponding consequences, as observed in the dataset. The most frequent cause-consequence relationship is “Road Damage and Construction” as the cause and its impact on “Road Damage, Traffic Congestion, and Lighting Issues”. This highlights a cyclical issue where ongoing road damage and construction projects not only fail to resolve existing problems but also exacerbate traffic congestion and create additional safety hazards due to inadequate lighting. The high frequency of this relationship suggests that urban planning and infrastructure maintenance efforts are either insufficient or poorly coordinated, resulting in persistent challenges that negatively impact both mobility and public safety. Addressing this issue requires a comprehensive approach that includes better planning, resource allocation, and execution of construction and maintenance activities.

The causes “Damaged Manhole Cover, Sidewalk Vendors, and Lighting Issues” and “Damaged Sidewalk, Trash, and Parking” frequently lead to a variety of consequences, indicating broader systemic infrastructure challenges. The diversity of consequences suggests that these problems are not isolated but rather have cascading effects, impacting mobility, safety, and the overall urban environment. Addressing these systemic issues requires an integrated approach, combining infrastructure repair, regulation of public spaces, and effective urban governance to minimize the downstream impacts.

The frequent link between “Parking, Lighting Issues, and Damaged Sidewalk” and “Flooding and Sidewalk Obstructions” emphasizes the interconnected nature of urban infrastructure challenges. This relationship highlights the cascading effects of infrastructure neglect, where small-scale issues amplify larger systemic problems. Addressing these challenges requires a coordinated effort to improve urban planning, prioritize maintenance, and ensure proper design to prevent such interdependencies from worsening.

Figuire 3 – Figure 17 display causal knowledge graphs of each cause and their consequences. The cause is shown on the left and consequences are on the right of the chart. The thickness of the edge signifies the strength of the relationship based on the number of complaints.

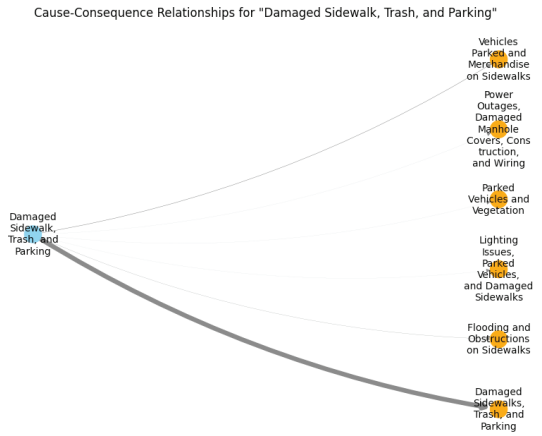


Figure 3 – Causal Knowledge Graph of Road Damage and Construction

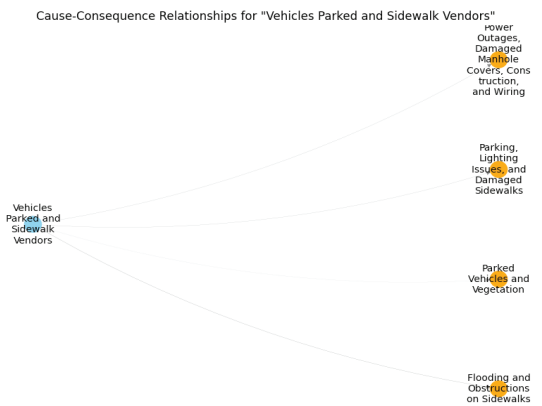


Figure 4 – Causal Knowledge Graph of Road Obstructions and Burning

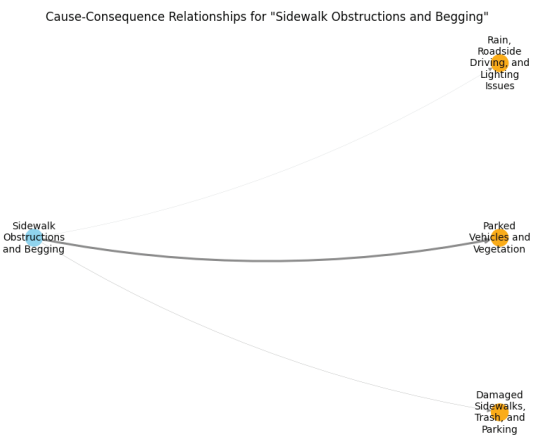


Figure 5 – Causal Knowledge Graph of Rain, Driving on Sidewalks, and Lighting Issues

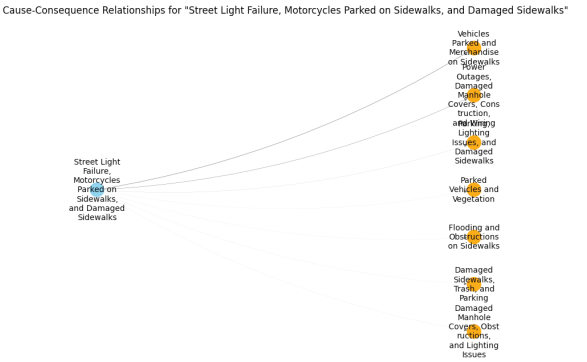


Figure 6 – Causal Knowledge Graph of Road Damage, Traffic Congestion, and Lighting Issues

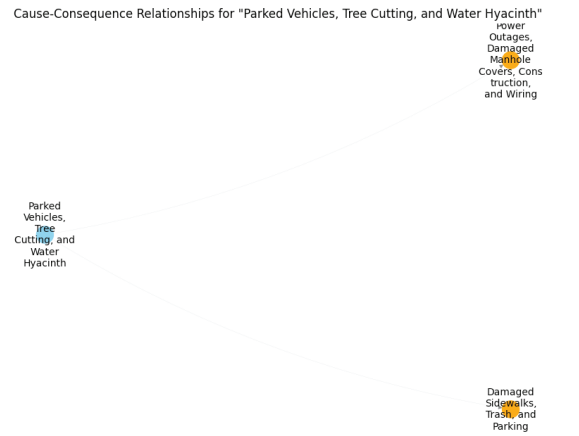


Figure 7 – Causal Knowledge Graph of Flooding and Sidewalk Obstructions

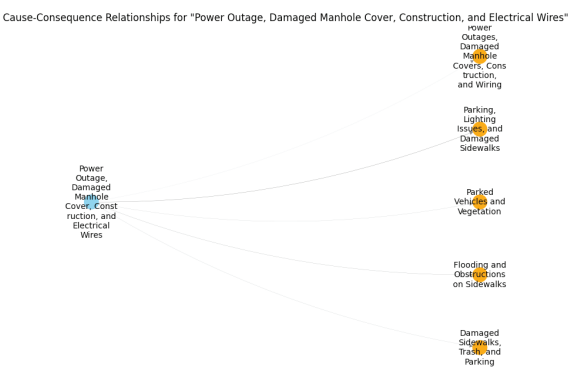


Figure 8 – Causal Knowledge Graph of Vehicles Parked and Sidewalk Vendors

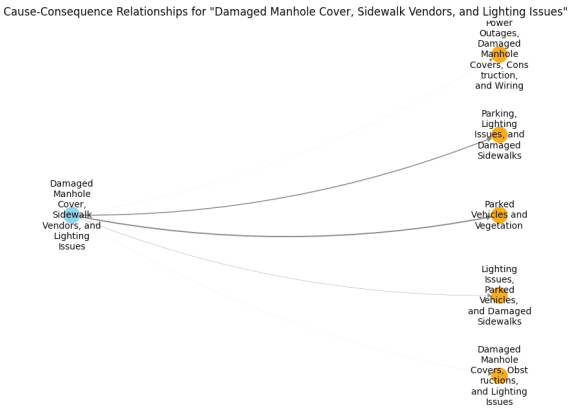


Figure 9 – Causal Knowledge Graph of Damaged Manhole Cover, Sidewalk Vendors, and Lighting Issues

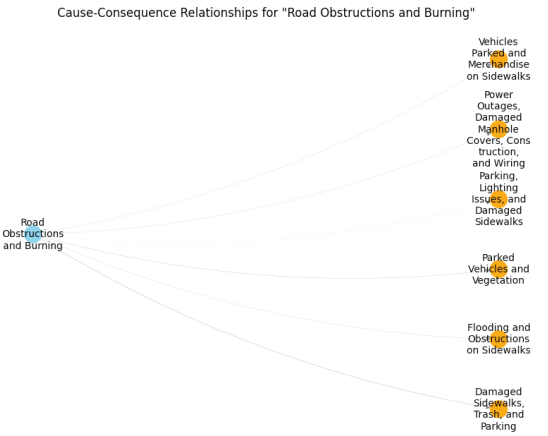


Figure 12 – Causal Knowledge Graph of Damaged Sidewalk, Trash, and Parking

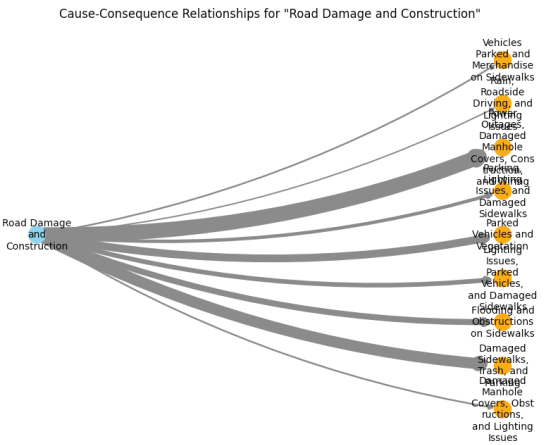


Figure 10 – Causal Knowledge Graph of Parked Vehicles, Tree Cutting, and Water Hyacinth

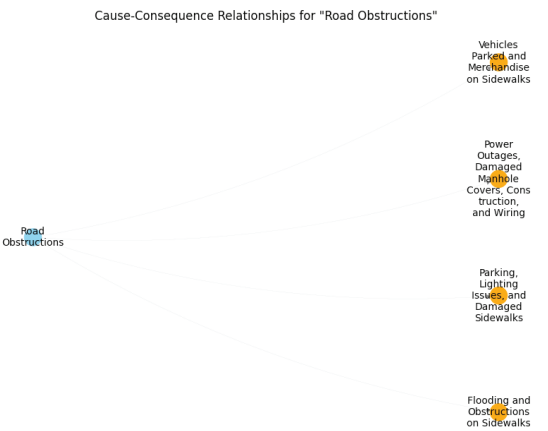


Figure 13 – Causal Knowledge Graph of Parking, Lighting Issues, and Damaged Sidewalk

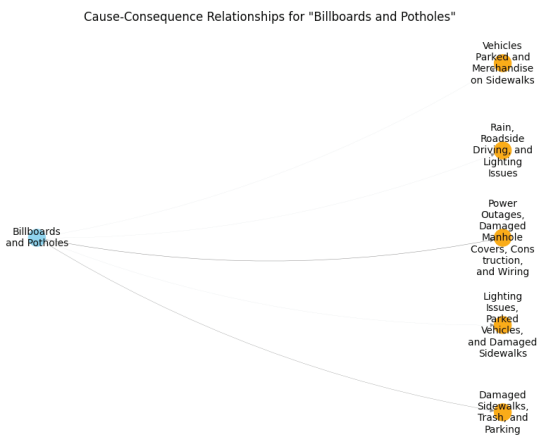


Figure 11 – Causal Knowledge Graph of Billboards and Potholes

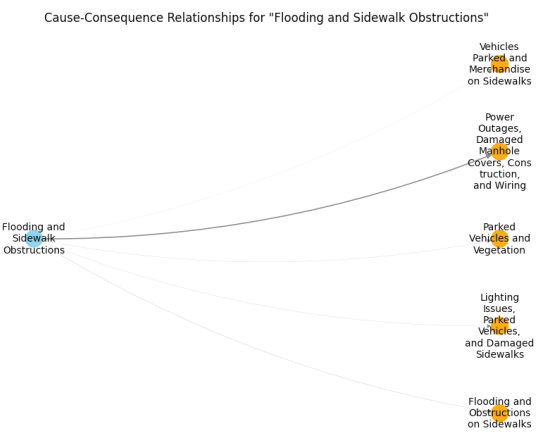


Figure 14 – Causal Knowledge Graph of Sidewalk Obstructions and Begging

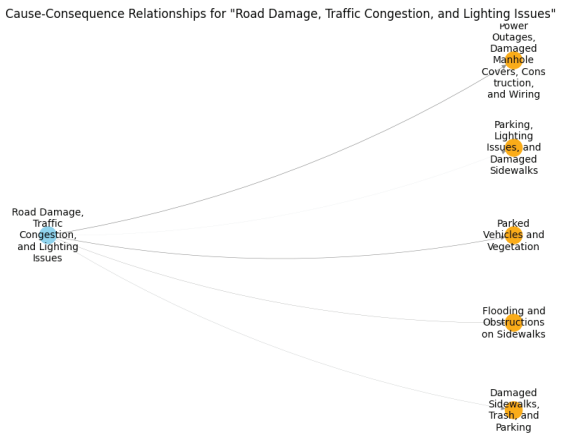


Figure 15 – Causal Knowledge Graph of Road Obstructions

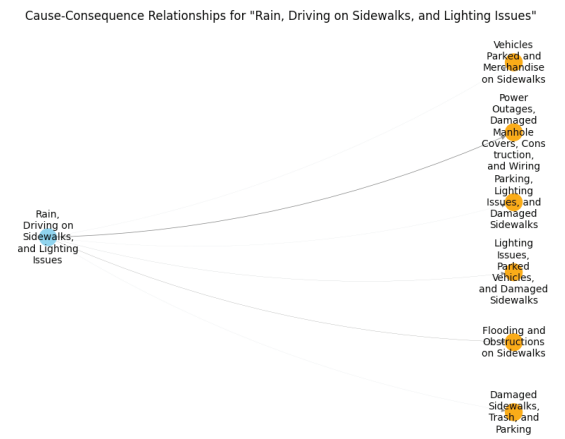


Figure 16 – Causal Knowledge Graph of Street Light Failure, Motorcycles Parked on Sidewalks, and Damaged Sidewalks

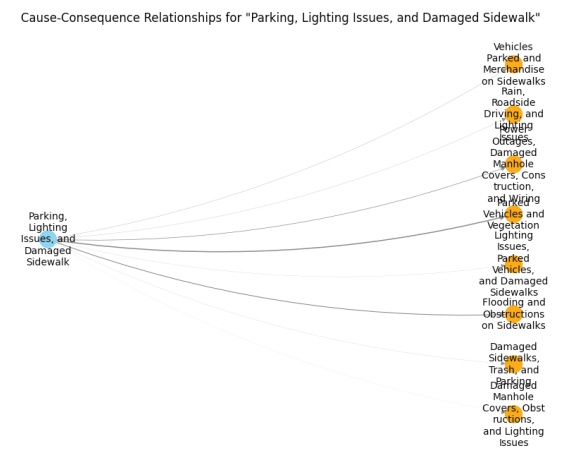


Figure 17 – Causal Knowledge Graph of Power Outage, Damaged Manhole Cover, Construction, and Electrical Wires

This section provides the results of the analysis of 33,331 records, with 30,904 labeled using Google Gemini and categorized into 15 groups for causes and consequences. The analysis reveals the most frequent relationship: "Road Damage and Construction" causing "Traffic Congestion and Lighting Issues," highlighting a recurring urban infrastructure problem. Key issues include diverse consequences from "Damaged Manhole Covers" and interconnected challenges like "Parking Issues" leading to "Flooding." The results of causal relations prompt the need for integrated urban planning and maintenance to address these systemic issues.

Conclusion

This study examines the use of crowdsourced civic input and advanced analytics in urban governance, highlighting both its potential and its limitations. By leveraging complaint data from the Traffy Fondue platform, causal relationships between urban issues were identified through large language models (LLMs) and topic modeling. The findings reveal a cyclical nature of urban problems—such as persistent road damage, traffic congestion, and infrastructure failures—indicating that short-term fixes may not address underlying structural inefficiencies. The causal knowledge graph provides a systematic approach to understanding these interdependencies, offering a data-driven framework for prioritizing urban interventions. However, the reliance on citizen-reported data introduces biases, as complaints may reflect the concerns of more digitally active demographics rather than a representative sample of the population (Wang & Zhao, 2023).

Moreover, while participatory governance platforms offer greater transparency and citizen engagement, their effectiveness depends on governmental responsiveness and institutional capacity. The visualization of systemic inefficiencies can highlight problem areas, but without adequate policy action and resource allocation, these insights may remain underutilized.

While this study highlights the potential of crowdsourced civic input and causal knowledge graphs for urban governance, several limitations must be acknowledged. First, the reliance on citizen-reported complaints introduces selection bias, as digitally active users may not represent the entire population. This can result in an overrepresentation of certain issues while neglecting others that disproportionately affect marginalized or less connected communities. To address this, future research should explore integrating additional data sources, such as IoT sensor networks, satellite imagery, and official reports, to enhance coverage and objectivity in urban issue detection.

Second, while large language models (LLMs) effectively extract causal relationships, they are prone to biases, inconsistencies, and occasional hallucinations. A more robust approach would involve training a deep learning

model on the labeled dataset to refine automated labeling and extend it across the entire dataset. This would reduce dependency on manual annotation and improve model accuracy in detecting nuanced causal relationships. Additionally, advanced causal inference techniques, such as structural causal models (SCMs) or reinforcement learning-based policy optimization, could enhance understanding of intervention effectiveness and long-term urban planning outcomes.

Another critical avenue for future research is the incorporation of time-series analysis into causal knowledge graphs (Donner & Donges, 2012). The current study provides a static snapshot of cause-effect relationships, but urban issues evolve over time. Analyzing historical complaint patterns and tracking causal relationships across different timeframes could uncover trends, seasonal variations, and emerging issues before they escalate. Time-series graph analysis would enable predictive modeling, allowing policymakers to anticipate recurring problems and allocate resources proactively. Implementing dynamic causal graphs within real-time governance dashboards could further improve decision-making by enabling policymakers to simulate interventions, forecast urban challenges, and adjust strategies based on evolving data. Extending this methodology to other cities with diverse governance structures would also help validate its effectiveness and adaptability across different urban contexts.

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Facility AI Platform Service and Organizational Performance based on SERVPERF Model

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Abstract

Most manufacturing companies are enhancing existing labor productivity and accelerating efforts for the digital transformation of organizations through smart factory and AI platform service. This study develops and empirically tests a SERVPERF model framework to investigate organizational adoption of facility AI platform service. Based on SERVPERF model, this study analyzed the relationship between SERVQUAL, perceived value, and organizational performance. Our findings indicate that organizations can improve their organizational performance through Value-based approach to adopt facility AI platform service. This study collects 106 data from manufacturing companies which adopted their AI platform service. After analyzing the data, we conclude that digital transformation through facility AI platform service enables management innovation for sustainable growth of the firm.

Keywords: *Facility AI Platform Service, Confirmation, Perceived Usefulness, Satisfaction, Reusage Intention*

1.Introduction

With big changes in the business environment, such as the development of 4th industrial revolution technology, the change of consumer demand and the fierce competition in the industry, company strategy and business processes have undergone profound changes. The rapidly changing business environment is making efforts to secure a new competitive advantage by redesigning existing business processes and promoting automation by allowing companies to develop and implement strategies for digital transformation. Digital transformation has become an indispensable foundation and way for companies to face the direction of networking and intelligence, improve quality and efficiency, and reshape the firm's core competitiveness (Lu et al., 2019).

In other words, with the development of digital technology, the company's business environment has become more and more networked and an intelligent digital environment. However, previous studies on resource-based view and core competency theory have certain limitations when it comes to explain this new digital transformation phenomenon (Yu and Moon, 2021). The success of an information technology (IT) depends on the continuance of its usage (Bhattacherjee, 2001). Following initial IT adoption by the organizations, they want to enhance their productivity and organizational capability with experiencing the benefits of a particular technology such as IoT, Cloud, Bigdata, and AI skills.

The rapidly changing business environment is making efforts to secure a new competitive advantage by redesigning existing business processes and promoting automation by allowing companies to develop and implement strategies of AI platform service for digital transformation. However, it is not easy to answer the question "How to measure the service quality of AI platform service?" Researchers attempting to measure the effects of organizational adoption on the subsequent usage of facility AI platform service may use perceived value and organizational performance as the primary measure (PZB, 1985, 1989). So it is important to study the impact of service quality of facility AI platform service on organization performance through organizational adoption like perceived value of the organization.

The questions with this study are: 1) What is the critical dimensions to evaluate facility AI platform service 2) How much does facility AI platform service have positive impact on organizational performance through SERVPERF mechanism? To solve this question, this study suggests a research model based on MIS literatures and SERVQUAL theory. Thus, this study proposes a research model to analyze the relationship between SERVQUAL dimensions, perceived value, and organizational performance through organizational adoption mechanism. This study focuses on facility AI platform service for smart factory of integrated enterprise systems, which understand both expressed and latent information needs or delivers superior value to the organization.

2.Literature Review

2.1 Digital Transformation of SMEs

In a couple of last decade, SMEs (small and medium enterprises) are small in scale and flexible in their business operations, and are most likely to organize production facility and equipment according to economic comparative advantages. With the increasing employment pressure in society, the advantages of SMEs in solving employment have also received more and more attention to digital transformation strategy like smart factory. Smart factory projects for digital transformation are particularly important for traditional manufacturing companies. Now that innovative technological advances and the 4th industrial revolution have begun, manufacturing companies are facing new competitive environments and opportunities. Manufacturing companies switch to production methods using digital technology and artificial intelligence along with existing production methods, and companies see service and quality improvement as an important value through feedback in the operation process, and decide whether to reuse the platform in the future. Digital transformation is an important phenomenon in the research of MIS, including the significant changes in society and industry through the use of digital technology. Digital transformation is an important phenomenon in the research of MIS, including the significant changes in society and industry through the use of digital technology. The digital technology trends and design principles used by SMEs in digital transformation process of 4th industrial revolution include artificial intelligence (AI), Internet of Things (IoT), big data analytics, cloud computing, 3D printing, mixed reality (virtual and augmented reality), simulation of connected machines (Paschou et al., 2020).

2.2 Facility AI platform service

The South Korean government announced an industrial policy to promote smart factory advancement as one of core manufacturing technology, build 1,500 leading models by supporting 30,000 smart factory demand companies by 2025, and cultivate 40,000 professionals by supporting advancement at the basic level. POSCO developed PosFrame, the world's first smart factory platform that reflects the characteristics of steel continuous processes, in 2018, and is the world's first steelmaker to introduce artificial intelligence into an intelligent steel mill (POSCO, 2018). Through this, a barrier-free operation system is realized, quality defects are identified in advance to minimize defects, and risk factors in the workplace are identified in real time to realize a safe production environment. Various data collected in a smart factory can predict temperature changes through deep learning algorithms, which can be controlled in advance be developing into. As a result of the application of this case, it was selected as a "lighthouse factory in the world" to lead the future of global manufacturing at the 2019 Davos Forum in Dalian, China (Seo et al, 2022).

SMEs that adopt digital transformation with information technology must be aware of both their product design and manufacturing environment. By constantly monitoring changes in the dynamic environments, SMEs can gain awareness of opportunities for greater access to new markets as well as advancements in technological initiatives. Facility AI platform service in this study refers to the action of transforming existing employ handling operation into smart factory operation with robot, vision, IoT, and cloud computing technology. For example, robot and vision technology with software applications could be utilized for job shop operations during production process. Generally, digitization mainly refers to digital operation processes, but have an influence on the value creation of business activities. Companies enhance the user experience and create additional customer value by allowing more efficient configuration between business processes (Pagani et al., 2017).

2.3 SERVPERF model

The SERVPERF model was suggested by Cronin & Taylor (1989). Service quality is an abstract and elusive construct because of three features unique to services: intangibility, heterogeneity, and inseparability of production and consumption (Parasuraman, Zeithaml, and Berry 1985). PZB(1989) proposed the model to apply many and retail businesses to seek profitable ways to differentiate themselves. Cronin & Taylor(1992) worked to enhance the usefulness of the SERVQUAL model through the verification of reliability and validity. They argued that perceived service can be conceptualized as an attitude, and perceived quality best reflects the service quality provided by a specific service provider. Therefore, they proposed the SERVPERF, which measures the actual perceived performance level of the service, as a more appropriate scale compared to the SERVQUAL by PZB (1989). Cronin & Taylor (1989) stated that the SERVPERF scale, which measures perceived levels of satisfaction, is more appropriate and has higher scale validity for service quality than the SERVQUAL model's measurement indicators developed by PZB (1989).

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operation processes, but have an influence on the value creation of business activities. Companies enhance the user experience and create additional customer value by allowing more efficient configuration between business processes (Pagani et al., 2017).

3. Research Model and Hypotheses

3.1 Research Model

Based on SERVPERF model (Cronin & Taylor, 1992), most manufacturing companies have conducted smart factory strategy implementation to improve operational performance for obtaining competitive advantage. This study proposes new approach of facility AI platform service and explores the impact of satisfaction of that service on organizational performance based on SERVPERF model. This study developed a research model (Fig. 1), which explain facility AI platform service for enhancing the organizational performance.

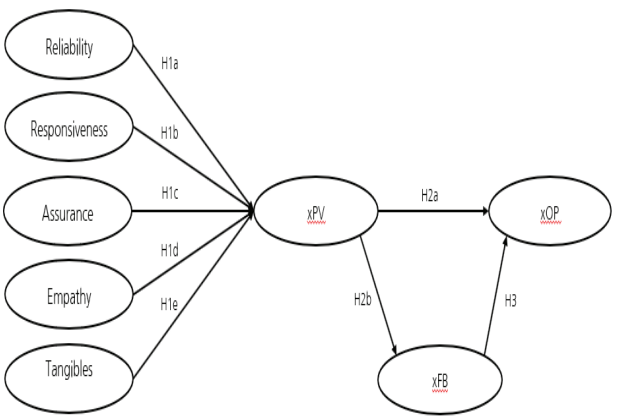


Fig. 1 Research Model

3.2 Research Hypothesis

Since this study has a research direction to explain the need for smart factory strategy implemented by AI platform service, an SERVPERF research model with reliability, responsiveness, assurance, empathy, tangibles on perceived value and organizational performance, was suggested. The sustainable competitiveness of the firm can be obtained by the adoption and use of AI platform service for digital transformation.

H1: In facility AI platform service, (a) reliability (b) responsiveness (c) assurance (d) empathy (e) tangibles has a positive influence on perceived values of the organization.

H2: Perceived value of facility AI platform service has a positive influence on (a) organizational performance, and (b) feedback mechanism of the organization.

H3: Feedback mechanism of the organization in facility AI platform service has a positive influence on organizational performance.

4.Research Method

4.1 Operational Definition

The purpose of this study is to conduct an empirical study on the relationship between five dimensions of SERVQUAL, perceived value and feedback on organizational performance through facility AI platform service of the firm. Preexisting construct measures have been used in this study.

Table 1 - Sample Statistics

Item	Type	Freq	Ratio(%)
Industry	Automobile	51	52.0
	Mechanic	20	20.4
	Electronic	27	27.6
Facility Team Members	Under 5	65	66.3
	6~10	28	28.6
	11~20	2	2.0
	21-30	2	2.0
	Over 30	1	1.0
Smart Factory Project Period (Month)	Under 6	10	10.2
	7~9	60	61.2
	10-12	20	20.4
	13~18	7	7.1
	Over 18	1	1.0
4th ICT Technology Use (multiple choice)	AI	24	24.5
	IOT	86	87.8
	Big Data	32	32.7
	Cloud	4	4.1
	Mobile	3	3.1
	Robot	83	84.7
	Vision	27	27.6

According to previous studies of resource-based theory and dynamic capability theory, this study developed the operational definition and measurement items of independent variable (SERVQUAL of facility AI platform service), mediating variables (perceived value and feedback), and dependent variable (organizational performance). Some of questionnaire items were measured using a 5-Point Likert Scale ranging from 1 (very disagree) to 5 (very agree). Data was analyzed in three steps. First, we tested for outliers, normality, and missing values. Then, we evaluated the internal and external validity of the measurement scales, and finally, examined the reliability, validity, correlations, model fit and mediation effects.

4.2 Sample Statistics

This study collected the data for analyzing the level of smart factory readiness from 106 manufacturing firms. Survey respondents were comprised of decision makers (entrepreneurs) of 106 Korean SMEs, which were implemented smart factory project with robot and vision technology. The survey was conducted from March 2023 to May 2023. A total of 106 firm data was collected, and valid responses were analyzed using SPSS 27 and PLS 4.0.

Table 2 – Convergent Validity

Var	Items	Cross-Loading	AVE	Composite Reliability	Cronbach-a
Reliability	3_1_1	0.898	0.758	0.901	0.894
	3_1_2	0.887			
	3_1_4	0.834			
	3_1_5	0.863			
Responsive-ness	3_2_1	0.727	0.635	0.842	0.813
	3_2_2	0.846			
	3_3_3	0.810			
	3_3_4	0.798			
Assurance	3_3_1	0.887	0.658	0.827	0.823
	3_3_2	0.852			
	3_3_3	0.725			
	3_3_4	0.769			
Empathy	3_4_1	0.859	0.659	0.866	0.829
	3_4_2	0.705			
	3_4_3	0.903			
	3_4_4	0.767			
Tangibles	3_5_1	0.799	0.637	0.819	0.811
	3_5_2	0.836			
	3_5_3	0.764			
	3_5_4	0.793			
Perceived Value	4_1_1	0.859	0.753	0.910	0.890
	4_1_2	0.895			
	4_1_3	0.900			
	4_1_5	0.816			
Feedback	4_2_2	0.929	0.826	0.896	0.929
	4_2_3	0.917			
	4_2_4	0.929			
	4_2_7	0.858			
Organization Performance	5_2_1	0.889	0.740	0.892	0.883
	5_2_3	0.817			
	5_2_4	0.853			
	5_2_5	0.881			

4.3 Validity and Reliability

The respondent of the firm was interviewed by field experts. Based on some of visits and interviews, the data were collected through self-diagnosis of level measurement and field survey by external smart factory experts of the promotion team. <Table 2> shows the sample statistics on 106 firms in this study.

Table 3 – Discriminant Validity

	Reli	Respo	Assu	Empa	Tang	xPV	xFB	xOP
Reli	0.871							
Respo	0.864	0.797						
Assu	0.759	0.785	0.811					
Empa	0.560	0.601	0.716	0.812				
Tang	0.543	0.442	0.524	0.526	0.798			
xPV	0.627	0.641	0.633	0.497	0.629	0.868		
xFB	0.661	0.642	0.644	0.580	0.672	0.806	0.909	
xOP	0.443	0.519	0.472	0.445	0.680	0.697	0.676	0.860

Field survey has some advantage of exact diagnosis by external experts. Based on the level measurement, some questionnaires were organized into research variables in the research model. To establish convergent validity as recommended by Hair et al.(2014), factor loading and average variance extracted (AVE) were used.

All the loadings for the final model were above 0.705. Furthermore, all the construct measures met the criteria of AVE > 0.5 ranging from 0.635 to 0.826. To establish internal consistency, All the Cronbach-a values are above the threshold 0.7 value which ranged from 0.813 to 0.929.

4.4 Hypothesis Testing

The results of hypothesis testing in this study are summarized as follows. From H1a to H1e, the results show that responsiveness and tangibles among 5 dimensions of facility AI platform service influence positively on customers' perceived value. For H2a and H2b, the results show that perceived value of facility AI platform service influences positively on organizational performance and feedback activity. For H3, the result shows that feedback activity between facility managers and AI platform managers influences positively on organizational performance. This result means that the usage of facility AI platform service enables the organizational members charged in facility maintenance to intend continued usage for improving organizational competitiveness.

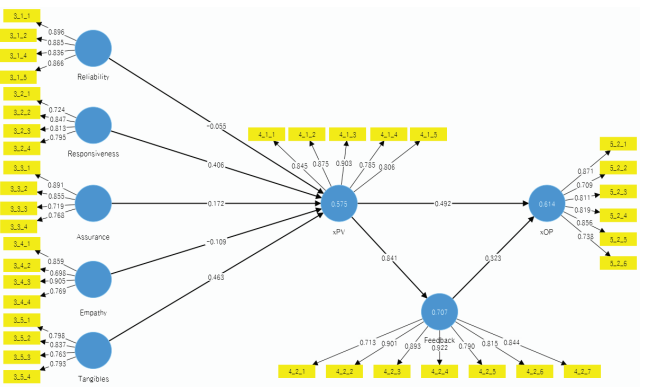


Fig. 2 The Result of Path Analysis

5. Discussion and Conclusion

The results from this study contribute to provide some theoretical basement for the development of corporate smart factory strategy. This study has suggested a new digital transformation strategy through facility AI platform usage. It emphasizes the importance of the relationship between customers' perception of value from the usage of facility AI platform service and customers' feedback activity through AI platform service. This study has some limitations. It is difficult to generalize the results because of small data sample size and limited research variables. In the future research, we will study value perception and feedback mechanism through smart factory strategy and the use of facility AI platform service. Also, future research needs to enlarge the sample size and empirically examine the different industries to implement smart factory projects.

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Will Graphic Designers Become Obsolete? Examining Individuals' Intentions to Self-Design Using Generative Artificial Intelligence Tools and the Role of Self-Efficacy

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Abstract

This study investigates the impact of AI and graphic design self-efficacy on individuals' adoption of generative AI tools for independent graphic design tasks. Using data collected from 209 participants, the findings demonstrate that AI self-efficacy significantly influences behavioral intention, positively impacting actual AI usage. Furthermore, actual AI behavior enhances individuals' willingness to conduct graphic design by themselves rather than seeking the help of professional graphic designers. In contrast, graphic design self-efficacy directly affects this willingness and moderates the relationship between actual AI behavior and independent design intention. The results highlight the interplay between domain-specific and AI-related self-efficacy in shaping the adoption of generative AI tools. These insights provide theoretical contributions to self-efficacy and technology adoption research and offer practical implications for AI tool developers, educators, and graphic design professionals.

Keywords: *Generative AI, Self-Efficacy, Graphic Design, Technology Adoption, AI Behavior*

Introduction

Artificial intelligence (AI) has become ubiquitous in daily life, with applications ranging from vehicle license recognition for parking fee collection[1] to AI-powered autonomous driving systems that enhance road safety[2]. AI is also widely used in customer service as chatbots to assist users[3]. The proliferation of AI applications continues to expand, introducing innovative solutions across various domains. As a result, the integration of AI into society is increasingly normalized and no longer surprises the public.

The emergence of generative AI, such as ChatGPT, has furtherly impacted enormous human skills in the workplace[4]. Consequently, deploying AI applications in various industries and professionals is challenging[5]. One such challenge is the potential risk of job displacement risk[6], as individuals may fear that AI will replace them whenever it is introduced into their fields [7]. Tasks that formerly required professional expertise can now be performed more efficiently with the assistance of generative AI.

We can also consider the outcomes of AI popularization from a positive perspective. With the generative capabilities of AI tools, non-professionals can now independently accomplish tasks that previously required professional expertise. While these developments may lead to the displacement of certain occupations, non-professionals might perceive this change positively, as they will no longer need to depend on professionals. However, this shift could reduce job opportunities for certain roles, with some positions potentially disappearing entirely as AI tools replace professionals.

Existing literature highlights the impact of AI on the job market[8, 9]. However, limited attention has been given to the factors that influence individuals to forego reliance on professionals and instead adopt generative AI tools for task completion. While research suggests that AI self-efficacy may shape the intention to adopt AI[10], the ability to use AI effectively does not guarantee successful task outcomes. Professional self-efficacy plays a crucial role in accomplishing specialized tasks. Few studies, if any, have examined the interplay between professional and AI self-efficacy in the context of AI adoption. This study aims to address this gap by exploring the roles of AI and professional self-efficacy in shaping individuals' adoption of AI tools.

Graphic design represents a significant application of generative AI. Tools such as Midjourney and DALL-E enable users to create images from text, posing new challenges in graphic design professionals [11]. While the literature has explored the adoption of generative AI by graphic designers [12], a critical issue arises from the accessibility of these tools to non-professionals. Tasks that were once exclusive to trained graphic designers can now

be undertaken by individuals without formal expertise, thanks to the capabilities of generative AI.

Hwang and Wu [11] highlighted the importance of visual literacy skills in using appropriate keywords to generate effective graphic designs with AI tools. This suggests that professional self-efficacy may also play a crucial role in enabling individuals to adopt generative AI tools for independent graphic design tasks.

This study investigates the impact of AI self-efficacy on adopting generative AI tools, with a particular focus on the role of professional self-efficacy. Using graphic design as a case study, it explores how these two forms of self-efficacy influence individuals' decisions to independently utilize generative AI for design tasks. The study proposes that generative AI adoption is significantly influenced by individuals' confidence in their ability to use AI tools (AI self-efficacy). However, the effective application of generative AI in graphic design also depends on professional self-efficacy in design. When individuals possess both AI self-efficacy and graphic design self-efficacy, they are more likely to engage in self-directed design rather than relying on professional graphic designers. This shift poses significant challenges for job stability within the graphic design industry.

The structure of this paper is as follows: The next section proposes hypotheses; Section 3 outlines the research design and methodology; Section 4 presents the findings; and Section 5 discusses contributions, limitations, and directions for future research.

Hypotheses

The concept of self-efficacy, originally proposed by Bandura [13], refers to an individual's belief in their ability to execute specific behaviors in a particular context. It reflects a subjective perception of one's capacity. Existing literature indicates that self-efficacy is an antecedent to behavioral intentions across various domains [14-16]. In AI adoption, studies have similarly demonstrated that AI self-efficacy influences the intention to adopt AI tools [16-18]. Based on this, the study proposes the following hypothesis:

H1: AI self-efficacy will positively influence the intention to use graphic design generative AI tools.

Perceptions shape behavioral intention and subsequently impact actual behavior. Many studies on technology adoption focus on behavioral intention rather than actual behavior, as intentions are easier to measure and strongly correlate with actual conduct. Therefore, behavioral intention is often treated as a proxy for actual behavior. However, when using generative AI for graphic design, individuals must adopt these tools before deciding whether to undertake design tasks independently. Thus, this study incorporates the measurement of generative AI adoption behavior and proposes the following hypothesis:

H2: The intention to use graphic design generative AI tools will positively influence the actual behavior of using these tools for graphic design.

When individuals use generative AI tools and recognize their utility in assisting with design tasks, they may choose to independently engage in graphic design rather than relying on professional designers. The more frequently individuals use generative AI for graphic design, the stronger they believe they can complete these tasks independently. Consequently, the study proposes the following hypothesis:

H3: The actual behavior of using AI tools in graphic design will positively influence the willingness to conduct graphic design independently.

Graphic design is a specialized profession, and not everyone possesses the self-efficacy to perform such tasks. While generative AI tools have become increasingly accessible, enabling users to complete graphic design projects, a lack of domain knowledge and self-efficacy in graphic design can hinder success. Therefore, this study hypothesizes that graphic design self-efficacy will affect individuals' willingness to engage in independent graphic design. Individuals with higher graphic design self-efficacy are likelier to undertake design tasks. Based on this, the following hypothesis is proposed:

H4: Graphic design self-efficacy will positively influence the willingness to conduct graphic design by self.

Using generative AI tools in graphic design is one aspect, but leveraging these tools without the support of professional designers demands higher self-efficacy. For individuals with strong graphic design self-efficacy, generative AI tools serve as a catalyst, significantly increasing their willingness to undertake design tasks independently. Conversely, for those with low graphic design self-efficacy, the influence of generative AI tools on their willingness to design independently is relatively limited. Based on this, the study proposes the following hypothesis:

H5: Graphic design self-efficacy will amplify the positive effect of the actual behavior of using AI tools in graphic design on the willingness to conduct design tasks independently.

Methods

The study investigates the influence of AI and graphic design self-efficacy on the willingness to design by self.

Measurement

This study measures AI self-efficacy, graphic design self-efficacy, AI intention, AI behavior, and the willingness to independently conduct graphic design. AI self-efficacy was assessed using a five-item scale. The first four items were adapted from the scale developed by Wang and Chuang [19], originally designed to evaluate AI self-efficacy. The fifth item, "Various AI terminology caused me serious trouble," was developed specifically for

this study to assess participants' comprehension of AI terminology.

Graphic design self-efficacy was measured with a five-item scale adapted from Graham, et al. [20], initially created to assess writing self-efficacy. The statements were revised to align with the context of this study. AI intention was measured using a three-item scale adapted from Strzelecki [21], with minor adjustments to reflect the scenarios relevant to this investigation.

AI behavior was assessed through a three-item scale developed for this study, which evaluated participants' engagement with tools such as Midjourney, Stable Diffusion, and DALL.E-3 for graphic design. Lastly, the willingness to independently conduct graphic design was measured using a two-item scale specifically developed for this study. Table 1 provides a detailed list of all measurement items.

Table 1 - Measurement items

Variable	Measurement Items	Source
AI self-efficacy	1. I'm confident in my ability to use AI tools to conduct graphic design. 2. I find it easy to use AI tools to help me to conduct graphic designs. 3. Interacting with AI tools to assist my graphic design is easy. 4. When I use AI tools to assist my graphic design, AI jargon does not baffle me. (reverse) (new item developed the study) 5. Various AI terminology caused me serious trouble.	Wang and Chuang [19]
Graphic design self-efficacy	1. When compared with others, my graphic design ability is good. 2. When conducting my graphic design, it is hard for me to decide what goes first, second, third, and so on. 3. When conducting my graphic design, I have trouble finding the right content for what I want to draw. 4. When I draw my graphic design, my design is one of the best. 5. When drawing my graphic design, it is easy for me to keep thinking of content to be included in the design.	Graham, et al. [20]
AI Intention	1. I have used or will use AI tools to my graphic design. 2. I have or will try to use AI tools to assist my graphic design (reverse) 3. I have used or plan to use AI tools frequently in my graphic design.	Strzelecki [21]
AI behavior	1. I often use various AI tools such as Midjourney, Stable Diffusion, DALL.E-3... for graphic design. 2. I hardly use AI tools such as Midjourney, Stable Diffusion, DALL.E-3... for graphic design. 3. I rarely use AI tools for graphic design	The study
Graphic design by Self	1. With the help of AI, I now tend to do graphic design myself 2. After using AI tools, I became more and more accustomed to doing graphic design by myself.	The study

Procedure

The questionnaire included measures in graphic design self-efficacy, AI self-efficacy, AI adoption intention, actual AI usage behavior, willingness to conduct graphic design by self, and demographic information (e.g., gender, age, education level). To ensure response accuracy, reverse-coded items were included as attention checks to assess consistency.

As an incentive, participants entered a lottery offering two cash prizes of NT$500 (US$15) and twenty cash prizes of NT$100 (US$3).

Table 2 - Demographic profile of subjects

	Frequency	Percent
Gender		
Female	125	59.81%
Male	80	38.28%
Not disclosure	4	1.91%
Age		
18-20	9	4.31%
21-30	71	33.97%
31-40	60	28.71%
41-50	48	22.97%
51-60	12	5.74%
61 or older	9	4.31%
Education		

High school and below	31	14.83%
College	137	65.55%
Master	36	17.22%
Doctoral	5	2.39%
Job		
Student	33	15.79%
Employed	145	69.38%
Unemployed	19	9.09%
Retired	9	4.31%
Missing	3	1.44%

Sample

The survey was promoted through online communities and supplemented with Facebook advertisements to expand its reach. Data collection occurred between May 13, 2024, and May 20, 2024, resulting in 278 responses. After applying validity checks—such as filtering questions, evaluating reverse-coded items, and excluding responses with excessively short completion times—a total of 209 valid responses were retained.

Table 2 summarizes the demographic characteristics of the participants. Among the valid respondents, 80 (38.28%) were male, 125 (59.81%) were female, and 4 (1.91%) preferred not to disclose their gender. Most participants were aged between 21 and 30 years (33.97%), followed by those aged 31–40 years (28.71%) and 41–50 years (22.97%). Regarding educational background, 85.7% of participants held a university degree or higher, with most having completed a college degree (65.55%). In terms of occupation, the largest group comprised employed individuals (69.38%), followed by students (15.79%).

Reliability and Validity

Table 3 highlights the reliability and validity of the assessment scales, assessed using Cronbach's α, Composite Reliability (CR), and Average Variance Extracted (AVE). Cronbach's α was used to evaluate the internal consistency of items within each construct. The Cronbach's α values were 0.75 in graphic design self-efficacy, 0.87 for AI self-efficacy, 0.88 for AI intention, 0.85 for AI actual behavior, and 0.80 in graphic design by self, all above the required threshold of 0.70. The results demonstrate strong internal consistency, consistent with the dependability standards set by Hair, et al. [22].

Confirmatory factor analysis assessed standardized factor loadings, convergent validity, composite reliability (CR), and average variance extracted (AVE). Table 3 indicates that the CR values were 0.84 in graphic design self-efficacy, 0.91 for AI self-efficacy, 0.93 for AI intention, 0.90 for AI actual behavior, and 0.90 in graphic design by self, all above the minimum threshold of 0.70. The AVE values for c were 0.51, 0.68, 0.81, 0.76, and 0.83, respectively. The results indicate that all CR values exceed 0.70 and all AVE values surpass 0.50, signifying that the measuring scales demonstrate sufficient reliability and convergent validity [22, 23].

Table 3 - Reliability and validity

Constructs	Cronbach's α	CR	AVE
AI Actual Behavior	0.85	0.90	0.76
AI Intention	0.88	0.93	0.81
AI Self-Efficacy	0.87	0.91	0.68
Graphic design by Self	0.80	0.90	0.83
Graphic design Self-Efficacy	0.75	0.84	0.51

Note: CR stands for composite reliability; AVE stands for average variance extracted.

This research utilized two different approaches to evaluate discriminant validity. The initial method assesses the correlations across constructs against the square root of their corresponding AVEs [22, 23]. As shown in Table 4, correlations among constructs were all lower than the square root of the corresponding AVEs, confirming favorable discriminant validity.

Table 4 - Correlation matrix for discriminant validity

	AI Behavior	AI Intention	AI Self-Efficacy	Graphic Design by Self	Graphic Design Self-Efficacy
AI Behavior	0.87				
AI Intention	0.81	0.90			
AI Self-Efficacy	0.74	0.74	0.82		
Graphic Design by Self	0.56	0.70	0.73	0.91	
Graphic Design Self-Efficacy	0.53	0.43	0.53	0.56	0.71

Note: The numbers in the table are correlation coefficients. The number on the diagonal is the average variance extracted (AVE).

The second method, proposed by Henseler, et al. [24], is the Heterotrait-Monotrait Ratio (HTMT), which evaluates discriminant validity by examining inter-construct correlations. The HTMT values below 0.85 indicate strong discriminant validity, while values between 0.85 and 0.90 warrant further examination of the model design. As shown in Table 5, all HTMT values were below 0.85, confirming favorable discriminant validity.

Table 5 - Heterotrait-monotrait ratio (HTMT)

Heterotrait-monotrait ratio (HTMT)	
AI Intention←→AI Behavior	0.81
AI Self-Efficacy←→AI Behavior	0.74
AI Self-Efficacy←→AI Intention	0.74
Graphic Design by Self←→AI Behavior	0.56

Graphic Design by Self←→AI Intention	0.70
Graphic Design by Self ←→AI Self-Efficacy	0.73
Graphic Design Self-Efficacy←→AI Behavior	0.53
Graphic Design Self-Efficacy←→AI Intention	0.43
Graphic Design Self-Efficacy←→AI Self-Efficacy	0.53
Graphic Design Self-Efficacy←→Graphic Design by Self	0.56

Results

This study employs SmartPLS 4, a partial least squares structural equation modeling (PLS-SEM) software to test the research hypotheses.

The path analysis results of the PLS-SEM indicate several significant relationships. AI self-efficacy positively influences AI behavior intention, which in turn positively impacts AI actual behavior. AI actual behavior subsequently influences the willingness to conduct graphic design by self. Additionally, graphic design self-efficacy directly enhances the willingness to conduct graphic design by self and moderates the relationship between AI actual behavior and this willingness.

The standardized path coefficient for AI self-efficacy on AI behavior intention is 0.67, demonstrating a strong positive effect. Similarly, the coefficient for AI behavior intention on AI actual behavior is 0.74, also indicating a strong positive effect. The path coefficient for AI actual behavior on the willingness to conduct graphic design independently is 0.37, reflecting a positive effect. Likewise, the coefficient in graphic design self-efficacy on the willingness to conduct graphic design by self is 0.30, indicating a positive impact. The moderating effect of graphic design self-efficacy on the relationship between AI actual behavior and willingness to conduct graphic design by self is represented by a coefficient of 0.18, suggesting a weak but positive influence.

The overall explanatory power (R^2) of the dependent constructs is as follows: 45% ($R^2 = 0.45$) for AI behavior intention, 55% ($R^2 = 0.55$) for AI actual behavior, and 36% ($R^2 = 0.36$) for the willingness to conduct graphic design by self. These values reflect a moderate level of explanatory capability for the proposed model.

The findings support the proposed model, confirming the significant effects of AI and graphic design self-efficacy on willingness to conduct graphic design by self. The results provide robust explanatory power and empirical evidence for the research hypotheses.

To assess participants' prior knowledge of graphic design, the study asked them to report their previous experience in the field. Among the 209 participants, only 13 identified as professional graphic designers actively engaged in graphic design at work. A total of 88 participants reported no formal training in graphic design and no professional involvement in the field. At the same time, 108 indicated having some knowledge of graphic design but no direct professional engagement.

As expected, the graphic design self-efficacy of ordinary individuals was lower than that of amateur and professional designers (Table 6). However, the study included only 13 professional designers, making the difference in self-efficacy between amateur and professional designers statistically insignificant due to the small sample size. Consequently, amateur and professional designers were grouped together as "designers" for analysis.

Table 7 presents the t-test results comparing designers and ordinary individuals across key variables, including graphic design self-efficacy, AI self-efficacy, AI behavior intention, AI actual behavior, and willingness to conduct graphic design independently. The results indicate that designers exhibit higher levels of graphic design self-efficacy, AI self-efficacy, AI behavior intention, AI actual behavior, and willingness to use generative AI tools in graphic design by self.

These findings suggest that individuals with some graphic design knowledge are more inclined to utilize generative AI tools for self-directed design tasks. In contrast, ordinary individuals are less willing to adopt these tools for independent graphic design. This reluctance may stem from a lack of self-efficacy in graphic design and the use of generative AI tools, which likely contributes to their reduced intention to adopt AI for independent design tasks.

Table 6 - Graphic design self-efficacy among professional designers, amateur designers, and ordinary people

Graphic design Expertise	N	Mean	SD	ANOVA	Post Hoc Test
(1)Without knowledge	88	2.51	0.65	F=31.22, P<0.005	(1) < (2) (1) < (3)
(2)With some knowledge	108	3.23	0.70		
(3)With professional knowledge	13	3.46	0.63		

Note: Dependent variable is Graphic design Self-Efficacy

Table 7 - T-test results between ordinary people and designer

	Ordinary People (n=88)	Designer (n=121)	t-test
Graphic design Self-Efficacy	Mean=2.53 (SD=0.65)	Mean=3.26 (SD=0.69)	t=7.70 p<.001
AI Self-Efficacy	Mean=3.05 (SD=0.85)	Mean=3.67 (SD=0.86)	t=5.15 p<.001

AI Intention	Mean=2.93 (SD=1.03)	Mean=3.55 (SD=0.98)	t=4.42 p<.001
AI Actual Behavior	Mean=2.37 (SD=0.93)	Mean=3.19 (SD=1.12)	t=5.59 p<.001
Graphic design by Self	Mean=3.03 (SD=0.69)	Mean=3.39 (SD=3.39)	t=3.46 p<.001

Conclusions and Discussion

This study explored the influence of AI self-efficacy and graphic design self-efficacy on individuals' intention to adopt generative AI tools in graphic design tasks by themselves. By analyzing data collected from 209 participants, the study confirmed several significant relationships: AI self-efficacy positively impacts AI behavior intention, which in turn influences actual AI behavior. Furthermore, actual AI behavior contributes to individuals' willingness to conduct graphic design tasks by themselves rather than seeking the help of professional graphic designers. Graphic design self-efficacy not only directly affects this willingness but also moderates the relationship between actual AI behavior and the willingness to engage in graphic design by themselves. These findings provide valuable insights into the roles of self-efficacy in the adoption and application of generative AI tools in graphic design, highlighting potential shifts in professional and amateur design practices.

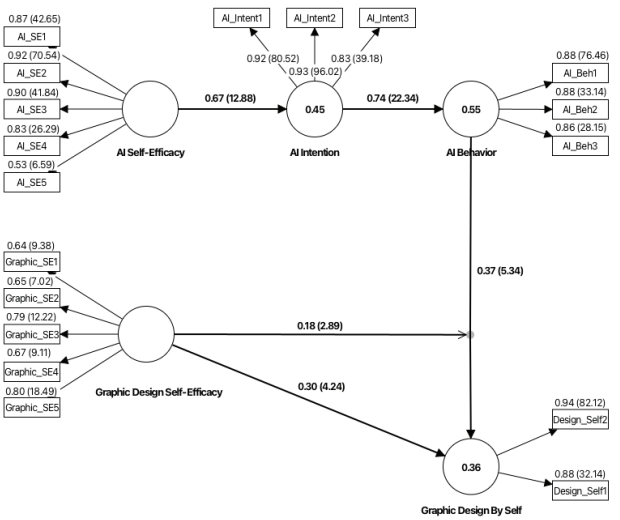


Figure 1 - PLS-SEM analysis results

Theoretical Contributions

This research makes several theoretical contributions:

- Integration of AI and Professional Self-Efficacy: Prior studies have focused on AI self-efficacy in technology adoption. However, this study uniquely incorporates graphic design self-efficacy, offering a new perspective on how domain-specific self-efficacy interacts with AI-related constructs.
- Behavioral Intention and Actual Behavior: By examining both behavioral intention and actual behavior in the context of generative AI adoption, this study addresses a critical gap in technology adoption research, which often overlooks the translation of intention into behavior.
- Moderating Role of Domain-Specific Self-Efficacy: The study highlights the moderating role of graphic design self-efficacy, showing that individuals with higher domain-specific self-efficacy are more likely to leverage AI tools effectively, advancing the understanding of individual differences in AI adoption.

Practical Implications

The findings offer practical insights for various stakeholders:

- AI Tool Developers: Developers of generative AI tools can enhance user interfaces and functionalities to accommodate users with varying levels of graphic design self-efficacy. Features such as guided tutorials, adaptive recommendations, and keyword suggestion tools can bridge the gap for users with lower self-efficacy.
- Educational Institutions: Training programs and workshops focused on building both AI and graphic design self-efficacy can help users maximize the potential of generative AI tools, fostering greater adoption among non-professionals.
- Graphic Design Professionals: The study underscores the need in graphic design professionals to adapt to the growing accessibility of generative AI tools. Professionals can enhance productivity and maintain a competitive edge by integrating AI into their workflows.

Limitations

Despite its contributions, this study employed a cross-sectional survey, which restricts the ability to establish causal relationships among variables. Besides, the study focused on graphic design as a case study, which may limit the applicability of findings to other fields where generative AI is used.

Future Research Suggestions

To address these limitations and extend the findings, future studies should consider conducting longitudinal studies to provide deeper insights into how self-efficacy and behavior evolve over time with the continued use of generative AI tools.

Besides, future studies may expand the scope of research to include other domains, such as content creation, architecture, or engineering design, which would help validate the findings and identify domain-specific variations.

Future studies may also investigate the impact of targeted training or interventions to enhance AI and graphic design self-efficacy, assessing their effectiveness in promoting generative AI adoption.

As generative AI tools evolve, further research should examine how advancements in tool capabilities influence user adoption, behavior, and self-efficacy over time.

By addressing these areas, future research can build on the current study to provide a more comprehensive understanding of the dynamics of generative AI adoption and its implications for both individuals and industries.

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What Drives AI Acceptance? Analyzing Nepalese Management Scholars' Intentions

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Abstract

This study examines the factors affecting the behavioral intention of management scholars to adopt artificial intelligence (AI) embracing perceived ease of use, output quality, and perceived enjoyment as predictors. The behavioral intention to adopt AI is an outcome variable. This study employed a deductive approach based on positivism philosophy. The cross-sectional 313 (59.17 percent) useful primary sources of data accumulated from management scholars in Kathmandu out of 529 structured questionnaires disseminated employing purposive sampling. Similarly, the statistical tools employed in the study were Cronbach's alpha for reliability, descriptive statistics, correlation, and regression analysis. The Cronbach's alpha for all variables remained ($\alpha > 0.70$) depicting the internal consistency. The finding of the study revealed a positive and significant effect of perceived ease of use, output quality, and perceived enjoyment on behavioral intention to adopt AI among management scholars in Kathmandu. The findings of this study contribute to existing theory and can be a benchmark for academic institutions and others designing AI platforms for learning. Future investigation can explore more factors affecting the behavioral intention to adopt artificial intelligence across different disciplines and regions.

Keywords: *Artificial Intelligence, Behavioral Intention, Management Scholars, Quality*

Introduction

The modern era of technological revolution with artificial intelligence has established a reliable foundation in the academic sector manifesting a tremendous solution to academic fields. Embracing artificial intelligence (AI) in the learning process gigantically fosters the learning and academic performance of management scholars. As a knowledge exploration immensely integrated with artificial intelligence, it becomes indispensable to understand the factors influencing the behavioral intention (BI) of management scholars to adopt AI for effective learning. Thus, this research investigates the several factors that affect behavioral indentation to adopt AI comprising the perceived ease of use, output quality, and perceived enjoyment. Interestingly, the integration of AI to boost the achievement of learners to intensify a robust education does contribute nationally prosperous atmosphere and individual well-being (Buerkle et al., 2023; Long et al., 2023; Acquash et al., 2024).

In addition, AI technology expands the depth learning pattern to examine text, image, and other information in different languages, allowing users to engage in an engaging and advanced learning environment (Lim et al., 2023; Wu et al., 2023; Kong et al., 2024). Surprisingly, ninety-three percent of users utilize AI for both personal and professional purposes, indicating that the adoption of AI in higher education is gaining significant pace (Ellucian, 2024). Similarly, the incorporation of advanced technology into the educational process is crucial, and its adoption must be evaluated since educational activities entail the use of AI for learning, which requires tutors and students to support its efficient usage (Sun & Mei, 2022; Kong et al., 2024). In particular, the adoption of AI-based learning in the classroom encourages students to investigate their creative and inventive potential (Thompson et al., 2024).

Artificial intelligence (AI) in technology-based learning provides easy access to material, as well as listening, interaction, and an AI library (Lama & Hamal, 2022). Thus, AI has revolutionized the educational landscape by introducing cutting-edge tools that motivate students to achieve higher academic results (Aljarboa et al., 2024). Importantly, AI has impacted every aspect of human existence and shows how machine learning may replicate certain people's talents, such as organizing, learning, and thinking (Petrescu et al., 2023). Moreover, as AI advances, its significance in the intellectual and educational sectors

grows, having a major influence on people's daily lives (Brynjolfsson & Mitchell, 2017; Elliott, 2019; Zhang & Dafoe, 2019)AI literacy is increasingly being integrated into K-12 education. However, students already form conceptions about modern technologies (especially AI. Thus, AI is the development of systems that use computers to do tasks, particularly academic learning, with less human intelligence.

Next, one of the elements affecting behavioral intention to adopt is perceived ease of use. The degree to which a user thinks that any kind of digital learning would be effortless is known as artificial intelligence (AI) (Davis, 1989). Previous empirical research in many settings showed that users' behavioral intention to embrace artificial intelligence is favorably and significantly influenced by perceived ease of use because AI functions are viewed as user-friendly, allowing for integration into the learning process (Zhou et al., 2024; Li & Wang, 2024; Ahmed et al., 2024). However, Contradictory findings from several fields of research on behavioral intention to adopt AI for work and learning revealed negative effects of behavioral intention with perceived ease of use for adopting AI (Smith et al., 2023; Rahman & Liu, 2023; Johnson, 2024). Similar conflicting results from other earlier studies showed that behavioral intention to embrace AI is not influenced by perceived ease of use (Nurunnisha, 2020; Singh et al., 2020; Verma et al., 2023).

Additionally, in terms of AI learning, output quality is the degree to which a system produces outputs that are pertinent, accurate, and dependable while also meeting the needs and expectations of particular users (Nelson et al., 2005). Numerous examples showed that the behavioral intention to use AI is influenced by the quality of the result (Li & Wang, 2024; Smith et al., 2024). However, the quality of artificial intelligence's output is not the only factor influencing its adoption (Brown et al., 2022). Next, perceived enjoyment, which essentially refers to an activity deemed delightful in its aspects reflecting the intrinsic desire of individual users to utilize the AI, is another component impacting the behavioral intention to embrace AI. It illustrates how using AI may be entertaining in some situations (Van der Heijden, 2024). Prior research has demonstrated that the behavioral intention to adopt AI is favorably enhanced by perceived enjoyment (Dwivedi et al., 2021; Venkatesh et al., 2012; Chopra et al., 2023). Conversely, the behavioral desire to embrace AI is not influenced by perceived enjoyment (Gefen & Straub, 2000; Dwivedi et al., 2021; Chopra et al., 2023).

In the context of Nepal, few studies revealed concerning AI comprising the studies exploring the role of artificial intelligence in education: insight from teachers' and students' perspectives in Nepal (Chapagain & Adhikari, 2024), artificial intelligence and computer-mediated communication undergrad classes in Nepal (Baskota, 2024). Similarly, few other studies found in the AI field containing the title A Paradigm Shift in ELT with Artificial Intelligence: A Review on the Current State in Nepal (Bohara, 2024), impact of AI in Education: An Evidence from the use of ChatGPT in management education in Nepal (Lawaju et al., 2024). The further study covered the area of knowledge, attitude, and practices at AI in education: students' perception (Bhattarai et al., 2024). However, previous empirical studies showed inconsistent findings and re-investigation of the factors influencing behavioral intention to adopt artificial intelligence is required in the Nepalese context. Thus, this study aims to examine the factors influencing the behavioral intention of management scholars to adopt AI.

Literature Review

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was first presented by Davis (1989) as a way to explain users' propensity to embrace new technology. The Theory of Reasoned Action (TRA), which Fishbein and Ajzen established in 1975, serves as the foundation for TAM concept. TAM was made up of several components, including behavioral intention (BI), perceived utility (PU), perceived ease of use (PEU), and attitude towards use (ATU). Perceived ease of use has an impact on consumers' behavioral intention, according to TAM.

Perceived Ease of Use and Behavioral Intention to Adopt AI

Perceived ease of use is a notion that describes how much individuals believe using a particular technology would be effortless. Users are more likely to adopt an application that find comfortable or easy to use than others, according to this argument (Randner & Rothschild, 1975; Davis, 1989). Similarly, the impression of perceived ease of use is a reflection of how each individual views the difficulty of adopting and using AI. If artificial intelligence gets simpler and doesn't require extra work to operate, users are more likely to welcome its adoption (Yan et al., 2021). Therefore, if it doesn't need additional work, the percentage of people who accept AI depends on the circumstances (Ng et al., 2022). The influence of perceived ease of use on users' behavioral intention was demonstrated by several researchers (Davis, 1989; Guriting & Oly Ndubisi, 2006). Moreover, Users' inclination to employ artificial intelligence is influenced by perceived simplicity of usage (Carlsson et al., 2005; Chuang et al., 2016; Hu et al., 2019; Marakarkandy et al., 2017; Venkatesh & Morris, 2000). Based on previous literature the following hypothesis is developed:

H_1: There is a positive and significant relationship between perceived ease of use and behavioral intention of management scholars.

Output Quality and Behavioral Intention to Adopt AI

The output quality illustrates the users' perceptions that higher productivity and improved job performance are the results of using artificial intelligence (Acquash et al., 2024). Further, output quality illustrates and connects to performance results as a person employs artificial intelligence to complete academic learning tasks. By using artificial intelligence, displays the cognitive process by which users arrive at a judgmental viewpoint about the predicted output quality. Thus, several earlier studies have demonstrated that output quality increases the behavioral desire to use AI (Venkatesh & Davis, 2000; Fang & Liu, 2017; Ismail et al., 2019). Similar evidence was found in other researchers' findings (Jameel et al., 2023; Yi & Choi, 2023; Jiao & Cao, 2024; Guo et al., 2024). Based on the literature, the following hypothesis is formulated:

H_1: There is a positive and significant association between output quality and behavioral intention of management scholars.

Perceived Enjoyment and Behavioral Intention to Adopt AI

Artificial intelligence is only useful when it is delivered smoothly, which encourages users to utilize it and gives them something to appreciate. Therefore, it is essential to provide engaging and entertaining material or information in order to build positive relationships with AI platforms. Additionally, the dynamic relationship between artificial intelligence adoption and subjective satisfaction is crucial (Kim et al., 2013; Wu et al., 2024). The behavioral desire to embrace artificial intelligence and subjective enjoyment was found to be positively correlated in several studies (Huang et al., 2024). Another consistent finding reveals for adoption of artificial intelligence (Thong et al., 2006; Islam et al., 2023; Xu & Thien, 2024). Based on the existing literature, the following hypothesis is formulated:

H_3: There is a positive and significant association between perceived enjoyment and behavioral intention of management scholars.

Behavioral Intention (BI)

People's desire to adopt artificial intelligence (AI) devices or portals, as well as the number of activities users engage in, are reflected in the behavioral intention outcome variable. These factors include perceived usefulness, ease of use, and other factors (Jiao & Cao, 2024). Numerous elements, particularly those pertaining to teaching faculty and students, impact this behavioral aim while using artificial intelligence (Zhang & Hou, 2024; Naseri et al., 2024).

Conceptual Framework

The conceptual framework used in this study is a way to arrange and represent the research topic, variables, and connection that the study is trying to investigate. Additionally, by defining the research issues, formulating research questions, and connecting those to theoretical foundations and empirical data, it demonstrates a study route that indicates the direction of the research process (Jabareen, 2009). This research adopted perceived ease of use, output quality, and perceived enjoyment as predictors and behavioral intention to adopt artificial intelligence as an outcome variable. Figure 1 below depicts the conceptual framework.

Independent Variables
Dependent Variables

Research Methods

The main objective of the study was to examine the factors affecting the behavioral intention of management scholars for the adoption of artificial intelligence in Kathmandu, Nepal. This study adopted objectivism ontology considering that reality exists independently of the perception of humans which can objectively be studied and its epistemology is grounded in positivism that focuses on acquiring knowledge based on observable, measurable, and empirical evidence. Moreover, the approach of this study is deductive and is adopted to test the pre-existing theories or hypotheses that are derived from established literature (Gray, 2014). Thus, this research employed a descriptive and explanatory research design to test the formulated hypothesis through empirical evidence which assists in understanding the causal relationship between predictors and outcome variables attempting to explain the reason for the observed phenomena. The population of the study was the management scholars pursuing bachelor's and master's degrees in education in Kathmandu. As the total population of the study from the management stream could not be figured out as an unknown population the estimated sample size was determined 384 as the targeted sample size (Cochran, 1977) with a 95 percent confidence level and a 5 percent margin of error. Thus, 529 structured questionnaires were distributed among the target respondents for collecting cross-sectional data, and received only 313 (59.17 percent) useful questionnaires. The research questionnaire was clustered into two different segments comprising the first part as general information of respondents and the second part consisting opinion based five-point Likert scale questionnaires ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, and 5 = Strongly Agree. The perceived ease of use construct was adopted from (Venkatesh et al., 2003) which consisted of four items. The sample items contain "Artificial intelligence (AI) based tools will be easier to use and more appealing in education", artificial intelligence (AI) based education tools will make the learning more interesting", and so on. Similarly, another construct output quality was adopted from the study of (Venkatesh et al., 2003). This

construct consisted of three statements stating "The artificial intelligence-based system consistently produces an output of high quality, I am completely satisfied with the AI-based robot's output quality", and so on. Further, the perceived enjoyment construct was adopted from the study of (Wang et al., 2024) and encompasses three statements stating " Using the artificial intelligence is an enjoyable experience for me, I derive enjoyment from operating the artificial intelligence tools", and so on. Finally, the outcome construct behavioral intention to adopt artificial intelligence was adopted from the study of (Venkatesh et al., 2003). This construct included four statements stating "Artificial intelligence-powered tools will be used in my learning if they are available, I would use AI-based tools because using AI-based tools these days is a good thing", and so on. Moreover, This study employed purposive sampling techniques. The collected data were analyzed using descriptive statistics with mean, standard deviation, frequency, and percentage to reflect the general characteristics of respondents who participated in the survey (Pare et al. 2022). Similarly, this study utilized correlation and regression analysis to test the degree of association and influence of predictor variables on outcome variables (Frost, 2020). Next, the reliability test was utilized through Cronbach's alpha and it depicts how better the items measure the construct in the study. In addition, Cronbach's alpha exceeds the threshold value 0.70 for all the constructs that reflect the internal consistency (Nunnally, & Bernstein, 1994). The study employed JAMOVI 2.6.13 and STATA 14.2 software for data analysis. The following table shows the details of Cronbach alpha of this study:

Table 1 Reliability test

Variables	Items	Cronbach's Alpha
Perceived Ease of Use	4	0.802
Output Quality	3	0.821
Perceived Enjoyment	3	0.793
Behavioral Intention	4	0.774
Overall	**4**	**0.840**

Table 1 of the reliability test represents the value of Cronbach's alpha for demonstrating the test of reliability of the instruments. The Cronbach alpha value for the perceived ease of use scale was ($\alpha = 0.802$) depicting internal consistency. Similarly, Cronbach's alpha for output quality and perceived enjoyment manifested ($\alpha = 0.821$, and $\alpha = 0.793$) respectively indicating good reliability. Moreover, Cronbach's alpha for the behavioral intention of management scholars to adopt artificial intelligence was ($\alpha = 0.774$). The value of Cronbach's alpha for all the variables remained more than 0.70 ensuring good internal consistency.

The estimated model

$$BI = \alpha + \beta_1 PEU + \beta_2 OQ + \beta_3 PE + \epsilon \ldots\ldots\ldots\ldots \text{(i)}$$

Where,

BI = Behavioral Intention

PEU = Perceived Ease of Use

OQ = Output Quality

PE = Perceived Enjoyment

α = Constant

$\beta_1, \beta_2, \beta_3$ = Coefficients

ϵ = Error term

Results and Discussion

Results

The profile of respondents presented in Table 2 comprises the information accumulated from 313 respondents. The female participants were 193 (61.70 percent) as the majority of respondents and male participants were 120 (38.30 percent) as the least respondents in the survey. Similarly, age groups ranging from 21 to 25 were the leading group of respondents 204 (65.20 percent) and 31 and above were 7 (2.20 percent) as the minimum group of participants. Moreover, marital status held single status 271 (86.60 percent) major survey participants, and the least was divorced 3 (1.00 percent) as least respondents. Further, respondents were mainly involved in government/ public colleges 304 (97.10 percent), and participants belonging to private colleges 9 (2.90 percent). The academic level holding a bachelor's level was 218 (69.60 percent) and a master's degree academic level depicts 95 (30.40 percent). Among all the respondents, BBA pursuing participants were major 99 (31.60 percent) and participants from the BHM program were the least 14 (4.50 percent). The monthly income of less than 16000 was the most group of participants 155 (49.50 percent) and income groups ranging from 25001 – 35000 were the least in the survey 22 (7.00 percent). Further, survey respondents with ever-used status reflecting the awareness towards artificial intelligence were the most 189 (60.40 percent) and the least were only 23 (7.30 percent). Next, the majority of survey participants used artificial intelligence for search and reading purposes 113 (36.10 percent) and the least of them used it for project work 52 (16.60 percent). Finally, daily users of artificial intelligence were the major group of respondents in the survey 74 (23.60 percent) and never-used respondents were only 14 (4.50 percent).

Table 2 Profile of Respondents

S.N.	Demographic Variables	Classification	Frequency	Percentage
1	Gender of Respondent	Male	120	38.3
		Female	193	61.7
		Total	**313**	**100.0**
2	Age of Respondent	16 – 20	68	21.7
		21 – 25	204	65.2
		26 – 30	34	10.9
		31 and above	7	2.2
		Total	**313**	**100.0**
3	Marital Status	Single	271	86.6
		Married	39	12.5
		Divorced	3	1.0
		Total	**313**	**100.0**
4	Types of College currently studying	Government/Public	304	97.1
		Private	9	2.9
		Total	**313**	**100.0**
5	Academic Level	Bachelor Level	218	69.6
		Master Degree	95	30.4
		Total	**313**	**100.0**
6	Academic Program	BBA	99	31.6
		BBM	44	14.1
		BHM	10	3.2
		BBS	63	20.1
		MBS	83	26.5
		MBM	14	4.5
		Total	**313**	**100.0**
7	Monthly Income	Less or equal to 16000	155	49.5
		16001 – 25000	41	13.1
		25001 – 35000	22	7.0
		35001 – 45000	52	16.6
		45000 and more	43	13.7
		Total	**313**	**100.0**
8	Awareness about Artificial Intelligence	Ever Used	189	60.4
		Awareness but non – use	101	32.3
		Do not know	23	7.3
		Total	**313**	**100.0**
9	Purpose of use of Artificial Intelligence	Assignment	61	19.5
		Further Search/reading	113	36.1
		Project Work	52	16.6
		Research Work	87	27.8
		Total	**313**	**100.0**
10	Frequency of use of Artificial Intelligence	Daily	74	23.6
		2 - 3 tImes a week	73	23.3
		Weekly	58	18.5
		Approximately every two weeks	22	7.0
		Monthly	30	9.6
		Only few times in a year	42	13.4
		Never used	14	4.5
		Total	**313**	**100.0**

Correlation Analysis

Pearson's correlation was employed in the study to assess the strength of the association between predictors and outcome variables. The predictors are perceived ease of use (PEU), output quality (OQ), and perceived enjoyment (PE). Similarly, the study adopted behavioral intention (BI) as the outcome variable for adopting artificial intelligence among management scholars.

Table 3 Correlation Matrix

Variables	Mean	Std. Deviation		PEU	OQ	PE	BI
PEU	3.7141	.73305	Pearson's r	1.000			
			p-value	—			
OQ	3.3759	.75976	Pearson's r	0.502***	1.000		
			p-value	< .001	—		
PE	3.6794	.71251	Pearson's r	0.546***	0.555***	1.000	
			p-value	< .001	< .001	—	
BI	3.7396	.77191	Pearson's r	0.637***	0.543***	0.629***	1.000
			p-value	< .001	< .001	< .001	—

Note. * p < .05, ** p < .01, *** p < .001

(PEU = Perceived ease of use, OU = Output quality, PE = Perceived enjoyment, & BI = Behavioral intention)

Source: Authors' Data Analysis with JAMOVI

Table 3 depicts Pearson's correlation indicating the association between independent variables and dependent variables. The correlation coefficient revealed a strong positive correlation between perceived ease of use and behavioral intention of management scholars for adopting artificial intelligence ($r = 0.637$, $p < 0.001$). It means that an increase in the perceived ease of use of artificial intelligence contributes to enhancing behavioral intention among management scholars. Similarly, a positive and significant association was revealed between the output quality of artificial intelligence and behavioral intention among management scholars ($r = 0.543$, $p < 0.001$). This evidence manifests that a rise in the output quality of artificial intelligence increases the behavioral intention of management scholars to adopt artificial intelligence. Next, the Pearson's correlation coefficient between perceived enjoyment and behavioral intention found a strong and positive relationship ($r = 0.629$, $p < 0.001$). It means that a rise in perceived enjoyment attached to artificial intelligence boosts the behavioral intention to adopt artificial intelligence among management scholars.

Regression Analysis

The regression analysis is based on 313 observations employing the linear regression model. The regression model estimated for this study represents $BI = \alpha + \beta_1 PEU + \beta_2 OQ + \beta_3 PE + \epsilon$, where the outcome variable for the study is behavioral intention (BI), predictors including perceived ease of use (PEU), output quality (OQ), and perceived enjoyment (PE) are employed in the study.

Table 4 Regression Coefficient

Model	Intercept	Regression coefficients			Adj. R-square	SEE	F-Value	VIF
		PEU	OQ	PE				
1	1.453***(9.17)	0.605***(14.56)			0.403	0.5663	211.88	1.85
2	1.375***(7.68)		0.535***(11.41)		0.293	0.6391	130.28	1.82
3	1.509***(9.71)			0.580*** (14.25)	0.393	0.5551	203.13	1.59
4	1.160***(6.90)	0.490***(10.19)	0.214*** (4.37)		0.436	0.5504	121.68	
5	0.949***(5.33)	0.410***(7.64)	0.160** (3.14)	0.188** (3.21)	0.453	0.5423	87.00	
6	1.078***(6.13)	0.460***(8.87)		0.249*** (4.43)	0.437	0.5501	122.07	
7	0.806*** (4.17)		0.316*** (5.55)	0.377*** (6.10)	0.367	0.6331	138.67	

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Note: *PEU = Perceived ease of use, OQ = Output quality, PE = Perceived enjoyment, & BI = Behavioral intention)*

Source: Authors' Data Analysis with STATA

Table 4 represents the regression coefficient for analyzing the impact of predictors on outcome variables. The beta coefficient for perceived ease of use found a strong positive and significant impact on the behavioral intention of management scholars for adopting artificial intelligence ($\beta = 0.605$, $t = 14.56$). It shows that an increase in the perceived ease of use of artificial intelligence enhances the behavioral intention of users to adopt AI. Further, a one percent increase in the perceived ease of use leads to an increase in the behavioral intention of management scholars by 0.605 percent. Similarly, the beta coefficient for output quality reveals a positive and significant effect on behavioral intention among management scholars to adopt artificial intelligence ($\beta = 0.535$, $t = 11.41$). It means that an increase in output quality leads to an increase in the behavioral intention of management scholars to increase the adoption of artificial intelligence. Moreover, a one percent increase in the perceived output quality increases the behavioral intention by 0.535 percent. Finally, the beta coefficient for perceived enjoyment depicted a positive and significant influence on behavioral intention among management scholars ($\beta = 0.580$, $t = 14.25$). This evidence showed that an increase in perceived enjoyment increases the adoption of behavioral intention by management scholars for artificial intelligence. It reflects that a one percent increase in perceived enjoyment leads to an increase in the behavioral intention of management scholars to adopt artificial intelligence by 0.580 percent.

$$BI = 1.453 + 0.605PEU + 0.535OQ + 0.580PE + \epsilon \quad \ldots\ldots\ldots\ldots \text{(ii)}$$

Table 5 Summary of Hypothesis

S.N.	Hypothesis	Results
1	H_1: There is a positive and significant relationship between perceived ease of use and behavioral intention of management scholars.	Confirmed
2	H_2: There is a positive and significant association between output quality and behavioral intention of management scholars.	Confirmed
3	H_3: There is a positive and significant association between perceived enjoyment and behavioral intention of management scholars.	Confirmed

Table 5 reveals the summary of the hypothesis. Hypothesis H_1: There is a positive and significant relationship between perceived ease of use and behavioral intention of management scholars is confirmed as a finding of the study found compatible results. Similarly, hypothesis H_2: There is a positive and significant association between output quality and behavioral intention of management scholars supported as the finding of this study remained consistent with the hypothesis. Finally, hypothesis H_3: There is a positive and significant association between perceived enjoyment and behavioral intention of management scholars confirmed as the finding of this study is congruent with the estimated hypothesis.

Discussion

The main objective of this research paper was to examine the factors affecting the behavioral intention of management scholars in Kathmandu, Nepal for embracing artificial intelligence. This study employed correlation and regression analysis to test the hypothesis and to meet the research objectives. The finding of the research reflected a strong positive and significant impact of perceived ease of use on the behavioral intention of management scholars to adopt artificial intelligence. It means understanding users as convenient while using artificial intelligence boosts the behavioral intention of its users to adopt artificial intelligence in a positive direction. This finding is in line with previous research findings of (Carlsson et al., 2005; Chuang et al., 2016; Hu et al., 2019; Marakarkandy et al., 2017; Venkatesh & Morris, 2000). Similarly, the finding revealed a positive and significant association between output quality and the behavioral intention of management scholars to adopt artificial intelligence. It means the output quality of the artificial intelligence enhances the behavioral intention of users to adopt artificial intelligence. This finding is in the same direction as the findings of previous research (Venkatesh & Davis, 2000; Fang & Liu, 2017; Ismail et al., 2019). Similar evidence was revealed in the findings of other researchers (Jameel et al., 2023; Yi & Choi, 2023; Jiao & Cao, 2024; Guo et al., 2024). Finally, the perceived enjoyment and behavioral intention found a positive and significant association. It means that the enjoyment and entertainment perception of management scholars drive towards the positive behavioral intention to adopt artificial intelligence in Kathmandu, Nepal. This finding is consistent with the previous empirical findings (Huang et al., 2024). Another consistent finding reveals for adoption of artificial intelligence (Thong et al., 2006; Islam et al., 2023; Xu & Thien, 2024).

Conclusion

The main objective of the study was to examine the factors affecting the behavioral intention of management scholars to adopt artificial intelligence in Kathmandu, Nepal. The finding of this research contributes valuable insights into what drives AI acceptance to analyzing Nepalese management scholars' intention extending the understanding of behavioral intention to adopt artificial intelligence. Thus, the study consisted of perceived ease of use, output quality, and perceived enjoyment as major predictor variables, and the behavioral intention was considered as the outcome variable in the study. By assessing these variables, the finding showed that a positive and significant influence of perceived ease of use was found on behavioral intention among the management scholars in Kathmandu. It means that an increase in the convenience of the use of artificial intention boosts the positive behavior among management scholars to adopt artificial intelligence. It can further be concluded that us-

ers' comfortability as perceived ease of use influences the behavioral intention for the adoption of artificial intelligence. Similarly, the finding revealed a positive and significant impact of output quality on the behavioral intention of management scholars to adopt artificial intelligence. It reflects that increasing the quality of output of artificial intelligence supports enhancing positive behavioral intention to adopt artificial intelligence among the management scholars in Kathmandu. It can be concluded that the output quality of artificial intelligence became a vital aspect of significance to boost the positive behavioral intention among management scholars to embrace artificial intelligence. Finally, the findings depicted a positive and significant effect of perceived enjoyment on behavioral intention to adopt artificial intelligence. It means the facility available for enjoyment in artificial intelligence enhances the behavioral intention of management scholars while adopting artificial intelligence. It can be concluded that entertaining ingredients for the enjoyment of users enhance the behavioral intention of users to adopt artificial intelligence. The finding of this research exerts both theoretical and practical implications. This finding significantly contributes to the existing body of knowledge revealing the evidence of factors associated with behavioral intention to adopt artificial intelligence from Nepalese management scholars' perspective. Further, the findings of this research can be a benchmark for several stakeholders comprising practitioners, policymakers, and organizations inclined toward artificial intelligence and its development whereas these results can contribute to better improving the strategic moves, better decision making, and can boost the significant outcomes. However, this research has several limitations as the study heavily relies on quantitative methods of deductive approach under the positivism philosophy which is based on the single reality of ontology. This ontological aspect is primarily inclined toward positivism emphasizing objectivism, measurable phenomena, and the pursuit of universal laws. Next, the study comprises only the management scholars only from Kathmandu city which limits the generalizability of the results to wider contexts. Further, this study was merely based on cross-sectional data with limited observations and incorporated few study variables. Thus, future studies can be conducted with qualitative methods, longitudinal, and in different geographical contexts with more observations including the respondents of other fields.

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Factors Influencing Continuous Use Intention of E-book Authoring Tools

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Abstract

This study examines the factors affecting the continuous use intention of EPUB3.0-based e-book authoring tools through the Technology Acceptance Model (TAM). EPUB3.0 introduces value propositions in education, publishing, and marketing by supporting multimedia and responsive designs. However, successful diffusion of these tools depends on long-term user adoption and satisfaction. This research investigates the relationships among software quality, perceived usefulness, user attitude, and continuous use intention through empirical analysis. The findings indicate that software quality significantly affects perceived usefulness and user attitudes, which in turn enhance continuous use intention. This study provides practical guidance for developing high-quality e-book authoring tools and contributes to understanding user behavior in digital publishing tools.

Keywords: *ePub3.0, Authoring Tool, Use Intention, S/W Quality, TAM*

Introduction

The widespread adoption of smartphones, tablets, and laptops has significantly influenced digital content consumption, making it a central aspect of modern life. This shift has transformed reading habits, moving away from traditional print books toward digital reading on mobile devices. The rapid evolution of digital technology has profoundly impacted the publishing and education sectors. E-books, in particular, offer unparalleled convenience by overcoming time and space constraints, enabling access to content across various devices.

EPUB3.0, an international standard by the International Digital Publishing Forum (IDPF), represents a significant advancement in e-book technology. By incorporating multimedia elements like audio, video, and interactivity, EPUB3.0 facilitates the creation of diverse content formats, including educational multimedia and interactive manuals. Despite its advantages, long-term adoption of such technologies depends on users' perceptions of their utility including authoring tools as well as ease of use. Initial adoption may be driven by novelty and potential, but sustained use often hinges on overcoming challenges such as complexity, learning difficulties, and environmental changes.

This study employs TAM to explore the factors influencing the continuous use intention of EPUB3.0-based e-book authoring tools. TAM, a well-established framework, examines relationships between perceived usefulness, perceived ease of use, user attitudes, and behavioral intentions. By applying TAM, this study aims to provide strategic directions for improving e-book authoring tools and fostering a sustainable ecosystem in digital publishing and education.

2. Literature Review

2.1 EPUB3.0-Based E-Book Authoring Tools

E-books represent a transformative evolution from print books, offering rich multimedia elements and interactive features. EPUB3.0 enables the integration of these elements using modern web technologies like HTML5, CSS3, and JavaScript, making it a powerful standard for diverse content creation (Temprado-Battad et al., 2019). Specialized authoring tools are essential for leveraging these capabilities, allowing users without programming expertise to design, produce, and distribute multimedia e-books efficiently.

Key Features and Characteristics of EPUB3.0 Authoring Tools are as follows:

WYSIWYG Editing: Tools provide real-time previews and drag-and-drop functionalities for intuitive content creation.

Multimedia Integration: Features include embedding audio, video, and interactive elements.

Responsive Layouts: Ensure content adapts seamlessly across devices.

Metadata and Accessibility: Include support for alternative text and screen reader-friendly tags.

Export and Compatibility: Facilitate easy packaging into EPUB3.0 standards and testing across platforms.

2.2 Technology Acceptance Model (TAM)

TAM, proposed by Davis (1989), is a robust framework for predicting technology adoption by focusing on perceived usefulness (PU) and perceived ease of use (PEOU). PU reflects users' beliefs about a technology's effectiveness in enhancing their tasks, while PEOU pertains to the effort required to use the technology. TAM suggests these perceptions shape user attitudes and subsequently influence behavioral intentions and actual usage. Extensions like TAM2 and UTAUT have incorporated variables such as social influence and facilitating conditions, enriching the model's applicability across various contexts (Venkatesh & Davis, 2000).

3. Research Model and Hypotheses

This study integrates software quality into the TAM framework, focusing on key attributes such as functionality, reliability, usability, efficiency, and portability (ISO, 2001). The hypotheses are outlined as follows:

H1: Software quality positively influences perceived usefulness.

H1a: Functionality positively influences perceived usefulness.

H1b: Reliability positively influences perceived usefulness.

H1c: Usability positively influences perceived usefulness.

H1d: Efficiency positively influences perceived usefulness.

H1e: Portability positively influences perceived usefulness.

H2: Software quality positively influences user attitudes.

H3: Perceived usefulness positively influences user attitudes.

H4: Perceived usefulness positively influences continuous use intention.

H5: User attitude positively influences continuous use intention.

H6: Perceived usefulness mediates the relationship between software quality and user attitudes.

H7: User attitude mediates the relationship between perceived usefulness and continuous use intention.

4. Methodology

4.1 Participants and Data Collection

A survey was conducted among 122 users of EPUB3.0-based e-book authoring tools like Namo Author. It cover diverse demographics (Table 1).

Table 1 - Formatting rules

Category		Frequency	Percentage
Gender	Male	73	59.8
	Female	49	40.2
Age	20s	36	29.5
	30s	24	19.7
	40s	31	25.4
	50s	20	16.4
	60s	11	9.0

4.2 Measures and Analysis

Constructs were assessed using Likert scales. Reliability and validity were verified through Confirmatory Factor Analysis (CFA). Multiple regression and mediation analyses were performed to test the hypotheses.

5. Results

Reliability and Validity: All constructs exceeded acceptable thresholds (Cronbach's alpha > 0.7; AVE > 0.5).

Hypothesis Testing: Significant relationships were observed between software quality, perceived usefulness, user attitudes, and continuous use intention.

6. Discussion and Conclusion

Practical recommendations include enhancing user-friendly designs and ensuring software stability. Theoretical contributions highlight the mediating roles of perceived usefulness and attitudes.

The findings emphasize the importance of software quality in shaping user perceptions and long-term engagement. Future research should consider external factors such as organizational support and market trends.

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Enhancing Road Safety Through AI-Powered Helmet Detection and ConnectedVehicle Systems

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Abstract

Road safety remains a critical concern, particularly for two-wheeler riders who are disproportionately impacted in traffic accidents. This study introduces a computer vision-based helmet detection system that integrates real-time image recognition with Python-based frameworks to ensure helmet compliance among motorbike riders. The system proactively disables the bike's ignition if no helmet is detected, promoting immediate safety enforcement. Testing under diverse conditions demonstrated a high accuracy of 96%, showcasing the system's robustness. Additionally, the study explores the scalability of the solution for deployment in smart city initiatives and itsimplications for connected and autonomous vehicle ecosystems. By leveraging AI-driven technologies, the system contributes to a significant reduction in road-related injuries and fatalities.

Keywords: *Road safety, Helmet detection, Computer vision, YOLO, AI-based compliance systems, Intelligent transportation systems*

Introduction

Road traffic accidents are among the leading causes of death worldwide, claiming over 1.3 million lives annually (World Health Organization, 2021). Two-wheeler riders are particularly vulnerable, accounting for a disproportionate number of these fatalities. Helmets are proven to reduce theseverity of head injuries in accidents, yet non-compliance with helmet regulations remains a significant issue in many parts of the world.

India, with its rapidly growing population and dependence on motorcycles, recorded more than 56,000

two-wheeler-related fatalities in 2020. Approximately 30% of these deaths were attributed to non-helmet use (Ministry of Road Transport and Highways, 2020). While helmet use is legally mandated, enforcement remains inconsistent, particularly in high-traffic, urban areas. Traditional methods such as manual inspections and periodic helmet checks are often ineffective due to resource limitations and the high volume of vehicles.

In response, this paper presents an AI-driven helmet detection system that integrates real-time image recognitionwith the bike's ignition mechanism. The system proactively ensures that the engine remains disabled unless a helmet is detected. By employing deep learning models such as YOLO (You Only Look Once), this solution can significantly reduce helmet non-compliance. Furthermore, the system's scalability and potential integration intobroader smart city infrastructure, as well as autonomous vehicle networks, are explored in this paper.

Methods

The proposed helmet detection system utilizes deep learning-based object detection algorithms, specifically YOLOv3 (You Only Look Once), known for its real-time performance and high accuracy. The steps in the development of the system include:

1. **Dataset Preparation:** Creating a robust AI model requires a comprehensive and diverse dataset. For this study, the dataset consisted of over 10,000 annotated images sourced from traffic surveillance footage, public datasets, and real-world scenarios. The images were labeled to indicate whether the rider was wearing a helmet, enabling the model to distinguish between helmeted and non-helmetedriders.

The dataset covered several important factors: **Environmental Variability**: Images were captured under different lighting conditions, such as daylight, low-light, and nighttime conditions, ensuring the model's robustness in various environments.

Helmet Diversity: *The dataset featured different helmet types, such as full-face, half-face, and open-face helmets, with varying designs andcolors.*

Rider Diversity: *The dataset included riders from different age groups, genders, and clothing styles to ensure that the model could generalize across various demographic groups.*

Data augmentation techniques such as flipping, scaling, and noise injection were applied to prevent overfitting and ensure that the model performed well in diverse, real-world conditions.

2. **YOLO Model Architecture**

YOLOv3 was selected for its ability to deliver real-time performance while maintaining high accuracy. YOLO (You Only Look Once) divides the input image into a grid and predicts bounding boxes and class probabilities for each grid cell.

YOLOv3 uses:

Darknet-53 Backbone: A convolutional neural network with 53 layers for feature extraction.

Multi-Scale Predictions: *YOLOv3 detects objects at multiple scales, improving performance for small objects like helmets.*

Bounding Box Prediction: *Each grid cell predicts multiple bounding boxes, confidence scores, and class probabilities, improving detection reliability. With real-time processing at 30 frames per second(FPS), YOLOv3 is ideal for applications like helmet detection, where immediate feedback isrequired.*

3.**Comparison of YOLO Versions**

The YOLO model has evolved significantly. The following table highlights the key differences between various YOLO versions:

YOLOv3 was chosen for its combination of **accuracy** and **real-time performance**, making it suitable for dynamic environments like traffic monitoring.

4.**Model Training:** The training process for the YOLOv3 model involved the use of **transfer learning**, leveraging pre-trained weights from the COCO dataset to accelerate the learning process. This was followed by fine-tuning with the custom dataset to improve the model's accuracy for helmetdetection.

The training process included the following steps: **Model Setup**: *The YOLOv3 model was set up with a custom configuration for helmet detection. This configuration was adjusted to work with thenumber of classes in the dataset (helmet or nohelmet).*

Transfer Learning: *Pre-trained weights from the COCO dataset were used to initialize the model. Transfer learning is beneficial as it allows the model to start with learned features (like edges, textures) that are generally applicable to a wide range of objects, reducing training time.*

Fine-Tuning: *The model was fine-tuned using the helmet dataset by updating weights through backpropagation. The model learned specific features related to helmet detection, such as the shape, texture, and appearance of helmets under various conditions.*

a) **Object Detection Model (YOLO):** The YOLO model divides the input image into a grid and predicts bounding boxes along with their associated classprobabilities. Each grid cell's prediction isdefined as:

P(x, y, w, h, C) = {P(x), P(y), P(w), P(h), *P(C)}*

Where \(x, y\) are the coordinates of the bounding box center, (w, h) are the width and height of the box, and (C) is the class probability (helmet or no helmet).

b) **Loss Function:** The training processminimizes a composite loss function that balances localization accuracy, confidence, and classification. The lossfunction is defined as:

L = Σ_i=0^N(IoU Loss + Confidence Loss + Class *Loss)*

Where the Intersection over Union (IoU) loss ensures accurate bounding box predictions:

IoU Loss = 1 - (Area Intersection / *Area_Union)*

Confidence Loss: *Penalizes the confidence scores for predictions that are far from the true object.*

Class Loss: *Measures the error between the predicted class (helmet or no helmet) and the actual class.*

5. **System Integration:** Once trained, the YOLOv3 model was integrated into a Raspberry Pi microcontroller, connected to a camera mounted on the bike. The system works as follows:

a) **Image Capture**: The camera captures video frames at 30 FPS.

b) **Helmet Detection**: Each frame is processed by the YOLOv3 model to detect whether the rider is wearing a helmet.

c) **Ignition Control**: If no helmet is detected,the ignition remains disabled, ensuring compliance before the bike can start.

This integration eliminates the need for manual checks, ensuring a seamless, automated process for helmet complianceenforcement.

The trained model was integrated into a microcontroller embedded in the bike's ignition system. The model processes livevideo feed from a camera installed on the bike and sends real-time decisions to the ignition system.

If the helmet is not detected, the engine is disabled.

This functionality can be expressed as: Ignition Status = {ON if HelmetDetected; OFF if Helmet Not Detected}

6. **Software Implementation:** The system was implemented using Python for model training and real-time deployment. Libraries like TensorFlow and OpenCV were used for image processing and model inference.

Results and Discussion

1. Performance Metrics: The system was evaluated using a test dataset of 1,000 images captured under various conditions (e.g., different weather, lighting, rider positions). The results were compared to abaseline system using traditional methods for helmet detection. Key performance metrics include:

- **Accuracy**: 96%
- **Precision**: 95%
- **Recall**: 94%
- **F1-Score**: 94.5%

These results show a clear improvement over baseline methods, particularly in terms of accuracy and reliability. The system performed well in various real-world conditions, including diverse lighting, rider positions, and backgrounds.

Table 1: Performance Metrics

Metric	Value	Baseline Comparison	Improvement(%)
Accuracy	*96%*	*85%*	*12.9%*
Precision	*95%*	*83%*	*14.5%*
Recall	*94%*	*80%*	*17.5%*
F1-Score	*94.5%*	*81.5%*	*15.9%*

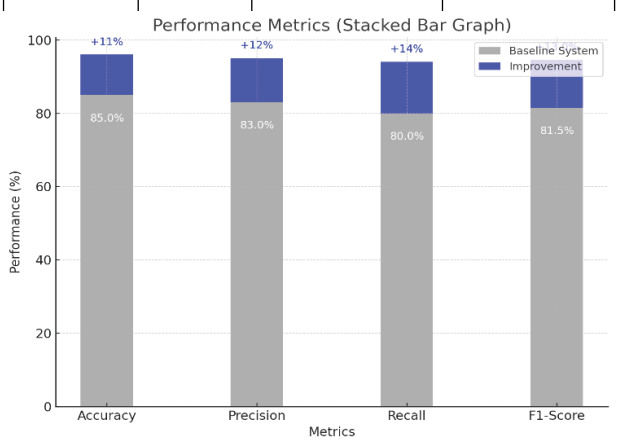


Figure 1: Performance Metrics (Stacked Bar Graph)

2. Model Evaluation and Comparisons: In addition to measuring performance metrics such as accuracy and precision, the system was compared with traditional approaches (e.g., manual inspections, basic image thresholding) and other object detection models (e.g., Faster R-CNN, SSD). YOLO demonstrated superior real-time performance and efficiency, making it a preferred choice for this application.

Compared to traditional image processing techniques, which struggle with low-light or occlusion conditions, YOLO's real-time performance in detecting helmets across varied environments sets it apart as an optimal solution forroad safety.

3. Real-World Applications

The system is highly applicable in **urban areas** *with heavy two-wheeler traffic, where manual enforcement is inefficient. In* **rural areas**, *where helmet use is less strictly enforced, this system could significantly improve road safety. Furthermore, it can be adapted for* **bike-sharing platforms**, *ensuring that helmets are worn before riders can access the bikes.*

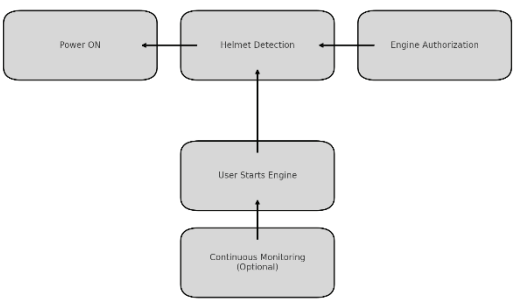


Figure 2: AI-powered helmet detection system

Limitations and Future **Work**

1. Dataset Expansion

The dataset used in this study was primarily focused on urban environments. Future work will involve expanding the dataset to include a broader range of environments, helmet designs, and cultural contexts to enhance the model's accuracy and generalizability.

2. Multimodal Sensing

To further improve the system's robustness, additional sensors, such as **infrared cameras** *or* **LIDAR**, *will be integrated. Multimodal sensing could provide more reliable performance in difficult conditions, such as low light, fog, or rain.*

3. Privacy and Ethical Considerations

The system ensures privacy by processing data in real-time without storing any personal information.

Future work will include further safeguards to comply with data privacy regulations like **GDPR**. *Additionally, addressing potential biases in the training data to ensure fairness and inclusivity will be an ongoing concern.*

4. Smart City Integration

Integrating the helmet detection system into smart city initiatives presents exciting possibilities. By connecting the system to traffic managementsystems and **vehicle-to-everything (V2X)** *communication networks, cities can optimize traffic flow, reduce accidents, and promote safer transportation.*

5. Integration with Autonomous Vehicles

This system could also be integrated into **autonomous vehicles**, *ensuring compliance with safety protocols such as helmet use. The system could prevent vehicles from operating unless the rider is wearing a helmet, contributing to a safer, smarter transportation ecosystem.*

Conclusion

This study presents an AI-powered helmet detection system that integrates computer vision with bike ignition control. The system's high accuracy, real-time processing capabilities, and scalability make it a promising solution for enhancing road safety, particularly for two-wheeler riders. Future developments will focus on expanding its applications, integrating multimodal sensing, and contributing to the broader vision of smart cities and autonomous vehicles. This work highlights the potential of AI-driven technologies to significantly improve road safety and save lives.

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Leveraging Technology to Enhance Banking Business Productivity in the Data-Driven Era

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Abstract

Digitization is altering banking in the data-driven era, leveraging cutting-edge technologies to increase productivity, efficiency, and customer satisfaction. The article discusses the role of modern and advanced technology like AI, ML, Big Data Analytics & Blockchain for transforming banking along with how they boost decision making, risk management, process efficiency, and customer experience. This research article also explores obstacles to technological adoption such as cybercrime, data privacy, and workforce upskilling. The integration of state-of-the-art technologies within the banking sector is one way in which they can improve productivity and remain competitive in the eye of the rapidly evolving financial industry. Technology plays a key role in resilient, efficient, and consumer-centric financial systems.

Keywords: *Technology, Productivity, Banking Business, Sustainable Competitive Advantage*

Introduction

The banking industry has its own share of technology to help them continue to be productive in the data disingenuous era. Technology management is needed by any business today for everyday banking operations, it can also help improve a bank's efficiency and customer satisfaction. According to numerous recent studies, innovation with technology allows for organizational agility and a sustainable competitive advantage in banks (Probojakti et al., 2024). Technology Management and Banking Productivity, the relationship between productivity and banking technology management is a complex one. Resilience: Well-organized technology management makes operations more efficient and allows banks to react quickly to market changes and client demands. Staying competitive in a rapidly changing financial landscape requires this level of flexibility. Employing digital technology in a strategic manner enhances client experience and operational efficiency within the bank, enhancing the market positioning of a bank (D'Agnoluzzo et al., 2023).

Technology use is an increasingly critical factor in banking competitiveness. Companies who align their core goals with technology can also outlast their competition. That means embracing new technologies and developing a culture of continuous improvement and customer-centric innovation. Data analytics, artificial intelligence (AI), and other digital tools there to be better used to increase both financial performance and market share (Asa et al., 2021). Sustainable competitive advantage mediates the effects of technology management and banking productivity. Technology strategy results in rare capabilities and resources. By enhancing efficiency and customer value, these unique capabilities assist banks in remaining competitive (Zhao et al., 2019).

The present study serves as an experiment testing sustainable competitive advantage as a mediating variable in between technology management and banking productivity. Surveys from various organizations will show how IT projects increase the productivity and competitiveness of banking institutions.

Problem Statement and Gap in Research

Data-driven era and importance of technology management that drives banking business productivity. Yet the pathways from technology to productivity, particularly intermediating variables such as sustained competitive advantage, remain poorly understood. According to recent studies, good technology management leads to banking efficiency and innovation (Chowdhury et al., 2023; Kumar & Malik, 2022). There is little research on the mechanism through which SCA mediates this association. However, few empirical studies have examined the role of SCA in mediating the relationship between technology management and firm productivity (Smith & Johnson, 2021) despite its importance to the organization's long-

term goals. So there is very little actual evidence from many banking situations (especially from emergence economies where technology is quickly changing the way we do business (Lee et al., 2023)). Targeted research is needed to connect theory with practice on this topic.

Objectives

1. How technology management has affected the productivity of banking business.
2. To analyze the mediating role of sustainable competitive advantage in this relation.
3. To enable actionable insights for banking organizations to enhance technology investments.

Hypothesis

H1: Technology management has a considerable positive influence on banking business productivity.

H2: Sustainable competitive advantage mediates the impact of technology management on banking business productivity.

Methodology

This study is quantitative in nature and involves a data collection method based on structured questionnaires, targeting a sample of managers and IT professionals from several banking institutions along with regulatory authority. Business productivity indicates the productivity generated in relation to the investment made. The questionnaire measures key constructions: technology management practices, sustainable competitive advantage and business productivity. This paper employs structural equation modeling (SEM) to test hypothesized relationships and assess the mediating impacts.

Research Findings and Discussion

The findings conclude that effective technology management significantly enhances bank efficiency, and that sustained competitive advantage plays an essential mediating role. Questionnaire data from several banks indicates that the adoption of modern technologies such as artificial intelligence, blockchain, and data analytics come into force based on the team as a particular target for their business, leading to the acceleration of decisions and operations and, consequently, to sustainable productivity generation. This is in accordance with Lee et al. (2023), who highlight the importance of linking technology investments with business goals. In addition, according to Chen and Zhou (2023), the study confirms that sustainable competitive advantage enables the link between technology management and productivity as it can help banks better differentiate their services, enhance clients experience, and make strong security available. Grounded in the resource-based view (RBV) paradigm, these results establish that technology management acts as a strategic resource that provides resilience and adaptation in a dynamic market context (Gupta et al. 2023). This research emphasizes the fundamental necessity of applying novel technological and sustainable processes to improve advancements in the banking industry.

Conclusion

The investigation conducted has proven the critical role of sustainable competitive advantage in the link between technology management and productivity in the banking business. It has demonstrated the significance of strategic fit and dynamic capabilities in enabling growth through technology implementation. With identified gaps addressed, the study has a major contribution to the academic field while also potentially benefiting the managerial sphere. The study's results may indicate how banking institutions can compete and perform in a data-driven environment.

Implications for future research

This study provides some useful insight, but there are a few important areas in which future research might build to gain further understanding and practical application. It is vital for longitudinal studies to investigate the long-term effects of managing technology on productivity, as they can provide a more accurate perspective on sustained benefits and potential pitfalls. Comparative analysis between different regions or banking sectors might highlight region-specific strategies which can serve as country-oriented solutions to varied functioning countries. "Going beyond, investigating (and forecasting) the impact of emerging tech (e.g., quantum) on banking productivity would give a pro-active view where the industry is prepared for transformational shifts." Exploration in these domains could greatly enhance the existing knowledge base and guide banking practices in a strategic manner.

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Perceived Value of Facilities AI Platform Service and Organizational Performance by Feedback: An Empirical Study Based on the IS Success Model

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Abstract

With the development of innovative technologies in the 4th industrial revolution, manufacturing companies are improving their existing production methods and switching to production methods utilizing digital technology and artificial intelligence, and are recognizing the development of product services and process improvement as important values through quality improvement efforts. In the era of digital transformation, not only the automobile, machinery, and shipbuilding industries, but also root industries such as forging and casting are demanding changes and innovations in facility management work. It is time for a digital transformation of the entire facility management, such as establishing a facility management system utilizing digital technology, conducting predictive maintenance through data analysis, and establishing response strategies for efficient repair and maintenance. The purpose of this study is to analyze the impact of facility managers' perception of the usefulness and value of AI platform services for IoT-based facility predictive maintenance in the automobile parts and machinery industries on organizational performance. To this end, the IS success model of facility AI platform services was applied as an independent variable, and the usefulness and value perception of facility managers were introduced as mediators, and organizational performance was set as a dependent variable to construct a research model and conduct empirical analysis.

Keywords: *Smart Factory, Perceived Value, Perceived Feedback, Facility AI Platform service*

1.Introduction

The business environment of companies is undergoing major changes with the advent of the 4th Industrial Revolution. With the advent of innovative technological development and the 4th Industrial Revolution, manufacturing companies are facing a new competitive environment and opportunities. Manufacturing companies are switching from existing production methods to production methods that utilize digital technologies such as the cloud, big data, and artificial intelligence based on the Internet of Things (IoT), and companies are considering service and quality improvement as important values through feedback during the operation process and deciding whether to reuse the platform in the future. As we enter the era of digital transformation, root industries such as automobile parts, forging, and casting require changes and innovations in facility management work. This is because, while existing facility management systems were used to manage the history of facility failures and repairs, we are now entering the era of digital transformation by establishing facility management systems utilizing digital technologies, conducting predictive maintenance through data analysis, and actively implementing strategies that utilize artificial intelligence for efficient predictive maintenance. Most SMEs are carrying out smart factory projects and pursuing facility predictive maintenance, but the reality is that there are difficulties in introducing AI platform services due to a lack of ICT experts or insufficient experience.

The facility AI platform service focuses on data collection and analysis for facility predictive maintenance. IoT sensors are installed to collect data such as vibration, temperature, and humidity of the facility, and cloud-based data is accumulated based on the data collected in seconds, and machine learning algorithms and deep learning technologies are used to identify abnormal signs of the facility in advance, perform accurate predictions, and establish response strategies for efficient repair and maintenance, etc., to support important decision-making. Therefore, it is of great help to SMEs to utilize this to build smart factories and secure competitiveness.

This study conducted an empirical study for the purpose of improving organizational performance through the value perception and feedback mechanism of AI platform services for IoT-based facility predictive maintenance in the automobile, shipbuilding, and machine parts industries. The information quality, system quality, and service quality of the facility AI platform service were set as independent variables, and the value perception and feedback mechanism of users for the AI platform service were set as parameters. In addition, we tried to empirically

analyze the correlation and influence relationship between variables by introducing organizational performance as a dependent variable. Through this, we tried to suggest the direction of introduction and improvement of facility AI platform service. This study conducted a survey targeting facility managers of 106 companies and presents the results of empirical analysis.

2.Literature Review

2.1 Facility AI Platform Service

This study empirically investigates the impact of the service value perceived by facility managers of demand companies and the feedback process on organizational performance by applying the IS success model, which is an information system success model, to facility AI platform services in the smart factory sector of the 4th industrial revolution era. The contribution of this study is that by considering the success factors of AI platform services for facility predictive maintenance for companies promoting smart factories in the manufacturing environment of the 4th industrial revolution era, it is possible to identify the impact on organizational performance through the value perception of demand company users and the feedback mechanism, and the results of this empirical analysis can have a positive impact on a new theoretical and practical foundation.

2.2 IS Success Model

The IS success theory was proposed by Delone and McLean (1992). They suggested that the dependent variable of information system (IS) research is IS success. Since the initial IS success model was published, research on information systems has evolved through better understanding and empathy for IS success. Recently, there has been a lack of comprehensive and integrated research on variables that affect IS success, such as AI platform services (Petter et al., 2013). SMEs enterprises that introduce digital transformation using information technology should be aware of both product design and manufacturing environments. Small and medium-sized enterprises should be able to obtain opportunities to increase accessibility to new markets as well as technology-driven changes and developments by continuously monitoring changes in the dynamic environment. In this study, facility AI platform services refer to the transformation of existing human employment methods into smart factory operation methods using robots and vision technologies. For example, robots and vision technologies that apply software can innovate new logistics and production processes in the production process. In general, digitalization mainly refers to digital operation processes, but it can also affect the value creation of business activities. It enables enterprises to better structure their business processes, thereby improving user experience and creating additional customer value (Pagani et al., 2017).

3. Research Model and Hypotheses

In this study, we analyzed the impact of AI platform services for predictive maintenance of facilities on the organizational performance of facilities through the value perceived by facility managers and the feedback mechanism with suppliers. To this end, we constructed a research model by introducing three factors, including information quality, system quality, and service quality of facilities AI platform services, as independent variables, and the mediating variables of value perception and feedback of services, and the organizational performance of AI platform services as a dependent variable. [Figure 1] presents the research model.

Based on these variables, we conducted an empirical analysis and examined the impact of services on organizational performance. The contribution of this study is that by considering the success model of AI platform services for predictive maintenance of facilities for companies promoting smart factories in the manufacturing environment of the 4th Industrial Revolution, we can empirically analyze the impact relationship of services on organizational performance through the value perception and feedback process of users of demand companies, and present new theoretical and practical implications on the impact relationship.

H1: The information quality of the facility AI platform service will have a positive effect on users' (a) value perception and (b) feedback process.

H2: The system quality of the facility AI platform service will have a positive effect on users' (a) value perception and (b) feedback process.

H3: The service quality of the facility AI platform service will have a positive effect on users' (a) value perception and (b) feedback process.

H4: The value perception of users of the facility AI platform service will have a positive effect on (a) feedback process and (b) organizational performance.

H6: The perceived feedback of the facility AI platform service will have a positive effect on organizational performance.

4.Research Method

4.1 Operational Definition

The IS Success model proposed in this study analyzes the relationship between the three independent variables of information quality, system quality, and service quality of facility AI platform services and the perception of value and feedback of facility managers in manufacturing companies and organizational performance. This study operationally defined the research variables based on previous research.

4.2 Research Methods

For the statistical analysis of this study, SPSS 27 and PLS4.0 programs were used. First, the sample characteristics were analyzed through descriptive statistics analysis of general items. S econd, Cronbach's α analysis was performed using SPSS to verify the internal consistency of variables. Third, c ross-factor values were applied to verify the converge nt validity of varia b les. Fourth, the degree of correla t ion between variable s was identified and PLS path analysis between independent variables, mediators, and dependent variables was performed.

4.3 Sample Statistics

Accordi n g to the survey results for respondents, the industries of the responding companies were classified into 52 automobile and parts industries, 1 shipbuilding industry, 1 steel industry, 20 mechanical equipment industries, 3 electron ic semiconductor industries, and 28 information and communication industries. The respondent affiliations include d 20 production management, 30 facility managem ent teams, 11 management planning, 1 quality control, 15 sales and sales, 2 information management, and 27 technology development teams. 85% of the facility management respondents were managers or higher, which suggests that the respondents who responded to the survey were well aware of the company's overall work process, facilit y AI platform, and knowledge of smart factories. The 4th industrial revolution technologies mainly used by the responding companies were mostly IoT devices and robots, followed by big data, AI, and vision technology.

Table 1. Demographic characteristics of the sample

Item	Type	Freq	Ratio(%)
Industry	Automobile	51	52.0
	Mechanic	20	20.4
	Electronic	27	27.6
Facility Team Members	Under 5	65	66.3
	6~10	28	28.6
	11~20	2	2.0
	21-30	2	2.0
	Over 30	1	1.0
Smart Factory Project Period (Month)	Under 6	10	10.2
	7~9	60	61.2
	10-12	20	20.4
	13~18	7	7.1
	Over 18	1	1.0
4th ICT Technology Use (multiple choice)	AI	24	24.5
	IOT	86	87.8
	Big Data	32	32.7
	Cloud	4	4.1
	Mobile	3	3.1
	Robot	83	84.7
	Vision	27	27.6

5. Empirical Analysis

5.1 Validity and Reliability

Validity verification is an analysis of whether the unique characteristics of the variable are reflected, and it verifies the combination between items related to a specific variable. <Table 2> shows the results of the convergent validity analysis by comparing the cross-factor loadings, and the factor loading of each variable measurement item is 0.6 or higher, and the Cronbach's α value, which indicates the internal consistency of the variable, is 0.7 or higher, securing the reliability of the research variables.

Table 2. Validity and reliability

Var	Items	Cross-Loading	AVE	Composite Reliability	Cronbach-a
InfQ	3_1_1	0.898	0.758	0.900	0.894
	3_1_2	0.890			
	3_1_4	0.833			
	3_1_5	0.861			
SysQ	3_2_1	0.742	0.637	0.820	0.811
	3_2_2	0.827			
	3_3_3	0.801			
	3_3_4	0.831			
SerQ	3_5_1	0.806	0.642	0.830	0.816
	3_5_2	0.835			
	3_5_3	0.759			
	3_5_4	0.792			
xPV	4_1_1	0.858	0.753	0.894	0.890
	4_1_2	0.893			
	4_1_3	0.899			
	4_1_5	0.819			
xFB	4_2_2	0.928	0.826	0.930	0.929
	4_2_3	0.919			
	4_2_4	0.931			
	4_2_7	0.855			
xOP	5_1_1	0.828	0.764	0.901	0.896
	5_1_3	0.907			
	5_1_4	0.897			
	5_1_5	0.862			

Discriminant validity is the opposite concept of convergent validity, and it evaluates whether there is a clear difference in the measured values between variables by showing a low correlation between the measured values. The most important criterion is the AVE value, and <Table 3> shows the results of the discriminant validity analysis according to the Fornell and Larker criteria. Since the square root of AVE is greater than the correlation between the variables, it can be said that discriminant validity is secured.

Table 3 Discriminant validity

	InfQ	SysQ	SerQ	xPV	xFB	xOP
InfQ	0.871					
SysQ	0.543	0.798				
SerQ	0.843	0.474	0.801			
xPV	0.626	0.628	0.654	0.868		
xFB	0.660	0.673	0.668	0.805	0.909	
xOP	0.561	0.670	0.612	0.791	0.769	0.874

5.2 Hypothesis testing

This study analyzed the path coefficient using SmartPLS 4.0 to verify the research hypothesis established through the structural model, and used bootstrap as a method to estimate the path coefficient. This study verified statistical significance through 5,000 bootstrap methods with the initial 105 samples.

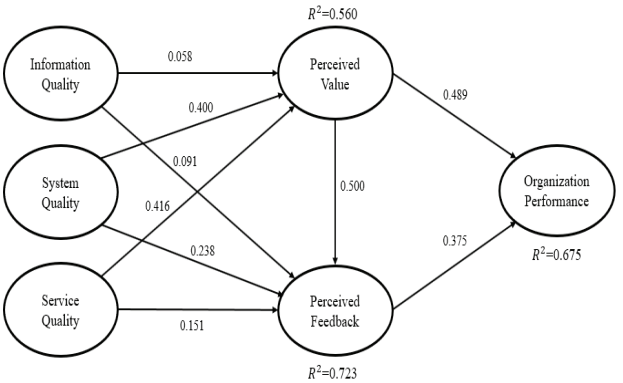


Figure 2. Path analysis results of the research model

[Figure 2] Looking at the results of the path analysis of the research model, the H1 path coefficient for the H1a InfQ→xPV hypothesis was 0.058 ($p<0.693$), and for the H1b InfQ→xFB hypothesis was 0.091 ($p<0.435$), thus rejecting them. The H2 path coefficient for the H2a SysQ→xPV hypothesis was 0.400 ($p<0.000$), and for the H2b InfQ→xFB hypothesis was 0.238 ($p<0.007$), thus accepting them. The H3 path coefficient for the H3a SerQ→xPV hypothesis was 0.416 ($p<0.001$), and for the H3b SerQ→xFB hypothesis was 0.151 ($p<0.142$), thus accepting H3a and rejecting H3b. The H4 path coefficient was 0.500 ($p<0.000$) for the H4a xPV→xFB hypothesis and 0.489 ($p<0.000$) for the H4b xPV→xOP hypothesis, indicating that H4a and H4b were accepted. The H5 path coefficient was 0.375 ($p<0.000$) for the H5 xFB→xOP hypothesis, indicating that H5 was accepted.

6. Discussion and Conclusion

With the advent of the 4th industrial revolution, large companies and mid-sized and small businesses are paying attention to the introduction and utilization of smart factories in order to adapt to the new manufacturing environment. However, unlike large companies, mid-sized and small businesses with many constraints in manpower and resources have limitations in the introduction of smart factories. This study empirically analyzed the influence of the value perception and feedback mechanism of the facility AI platform service on the user value perception and feedback process of the platform service at a time when the manufacturing environment is changing due to the introduction of robot automation and smart factories in the facility management work of domestic small and medium-sized businesses, and analyzed the influence of the facility AI platform service on the organizational performance. The results of this study are summarized as follows. First. H1: The information quality of the facility AI platform service did not have a positive (+) effect on users' value perception and feedback process. This means that the belief in the information quality provided by the service has not yet affected value perception or users' feedback. Second, H2: The system quality of the facility AI platform had a positive (+) effect on users' value perception and feedback. This shows that effective operation of improved AI platform is possible through screen design design and error feedback in use required for facility management business service. Third, H3: The service quality of facility AI platform service partially affects value perception and feedback process. It has a positive effect on value perception, but there is no statistical significance in the feedback process. This means that companies or individuals utilize platform service to secure competitive advantage and improve their ability to perform work efficiently, but it has a significant effect on value perception, but it has not yet had a significant effect on the positive feedback process with users. Fourth, H4: The value perception of facility AI platform service has a positive effect on both the feedback process of users and organizational performance. It can be understood that the value perception of AI platform service has a positive effect on feedback and organizational performance. Finally, H5: The feedback of facility AI platform service has a positive effect on organizational performance. It can be said that the feedback process with users in the use of AI platform service has a positive effect on organizational performance. Based on the hypothesis verification results of this study, the information quality, system quality, and service quality of the facility AI platform service in the smart factory project of medium-sized and small-sized companies were used as independent variables, and the value perception and feedback of the service were used as mediating variables to analyze the effect on the intention to reuse the service. As a result, it was found that facility managers perceived the organizational performance by the value perception of the service higher, and they also recognized a positive influence on the organizational performance through the feedback mechanism of users. The limitations of this study are as follows. First, in collecting the survey data, it was not possible to collect representative data by industry and size, and the empirical analysis was conducted in a situation where the sample size was insufficient at 105, so there is a limit to the generalization of the research results. In the future, efforts are needed to pursue the generalization of the research results by securing additional data. Second, although the IS success model was applied in conceptualizing the research variables, it seems necessary to introduce more realistic research variables and develop measurement items in developing the measurement items. In future studies, it is necessary to increase the explanatory power of the study by introducing additional antecedent variables (variables such as organization, technology, and strategy) that can increase the organizational performance of smart factories in addition to the research variables of this study.

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Exploring the Influence of Socio-Demographic Factors on the Type Preference of Electric Vehicles

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Abstract

Electric Vehicles (EVs) are being widely promoted currently. The government of India has been running various policies to significantly increase the adoption and manufacturing rate by promoting awareness and providing incentives. This has resulted in the growth of the EV sector. However, when we segregate the market of electric vehicles based on their types (based on the number of wheels of the EV), it is observed that the adoption rate varies significantly for different types of EVs.

This study has taken the Type of electric vehicle the potential users prefer to buy"as the dependent variable. A total of 275 datasets were used to evaluate 11 socio-demographic factors considered for further analysis. This study used a step-wise multinomial logistic regression (The backward-elimination approach) to identify the significant factors. [

Keywords: *Adoption Intention, Electric Vehicle, Socio-demographic Factors, Backward-elimination approach, Multinominal Logistic Regression*

Introduction

Fossil fuels have always been the primary source of energy for humans. It has contributed significantly to the power industry and transportation sectors [1]. Everything comes at a cost. So does the dependency on fossil fuels for our everyday life. Dependence on fossil fuels presents various risks and difficulties that impact our society and the environment [2], [3]. Climate Change, air pollution, the depletion of natural resources, energy insecurity, and economic instability are some of the major risks linked to reliance on fossil fuels [4].

Additionally, dependency on fossil fuels has created a health risk for the community [5], [6]. Using fossil fuels results in air pollution, which has been related to several health consequences, including respiratory conditions, cardiovascular disorders, and early death [4]. Residents close to transportation hubs and industrial enterprises are particularly at risk. To deal with such a huge problem, electric vehicles (EVs) are a small but very much-needed step toward a sustainable future [7]–[9]. In this case, the electric vehicle has been recognised as a promising alternative fuel to reduce traffic emissions and petroleum dependency [10], [11].

Smart urban mobility is part of a smart city, which is defined as a combination of sustainability and innovation. EVs have a lot of promises to improve society. They enhanced air quality and decreased greenhouse gas emissions [12]. Electric vehicles have no tailpipe emissions, dramatically reducing greenhouse gas emissions, improving air quality, and enhancing public health [1], [13]. As an innovative technology, EVs lead to sustainable urban mobility [14].

As electric vehicles evolve, recent trends underscore various options catering to various transportation needs. The emphasis on types based on the number of wheels reflects the industry's commitment to providing sustainable and efficient mobility solutions across different segments, from personal commuting to public transportation and freight logistics. To ensure continued growth, collaboration between governments, industries, and consumers is vital in addressing technological challenges, expanding infrastructure, and fostering a supportive regulatory environment. Initially, the challenge was who would be willing to buy the EVs in India [15], but with the increasing popularity of EVs, the question shifts to which segment they will buy.

Electric vehicles are being widely promoted currently. Globally, their adoption rate is increasing. A similar trend is also evident in India as well. The government has been running various policies to significantly increase the adoption and manufacturing rate by promoting awareness and providing incentives[6]. This has resulted in growth in the electric vehicle sector, demonstrating India has high hopes for its electric vehicle market. However, according to recent adoption data, the growth is not substantial. Although the large-scale deployment of electric vehicles (EVs) has societal benefits, such as improved air and benefits related to the reduction of CO2 emissions, adoption rates in many countries are still low (Wang et al., 2019;Mall & Anbanandam, 2022). There can be a possibility of barriers hindering adoption at various levels, such as social, economic, or pro-environmental

[17]. When we segregate the market of electric vehicles based on their types (based on the number of wheels), it is observed that the adoption rate varies significantly for different types of vehicles.

While two-wheelers and electric cars have seen substantial adoption, electric buses and trucks are gradually gaining momentum, driven by environmental considerations and regulatory support [18]. As the industry continues to evolve, ongoing advancements and supportive measures will likely contribute to the increased adoption of electric vehicles across diverse segments. The adoption across the three segments in India is shown in Figure 1.

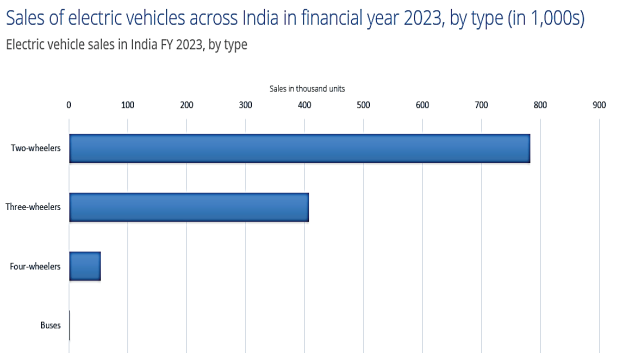


Figure 1- Sales of EVs in India for Financial Year 2023 by type [19].

This motivates this study to investigate socio-demographic factors that might be causing a huge difference in the adoption rates of different types of electric vehicles.

Literature Review

The research question of this research is: why do people choose EV-type alternative X over Y or Z? Such research Questions have been in the literature for a longer period. For example, Thrane, (2015) uses similar research questions to model tourists' transportation mode choices. As suggested by the literature, consumers act rationally and choose the alternative which will maximise their utility, which is subjective [21], [22]. In studies where among the alternatives, one has to be chosen, it has been observed that spawned an abundance of quantitative travel demand research designed to simulate how a preference for X over Y (or Z) or vice versa is influenced by a group of independent variables or regressors [20].

Dependent variable

The dependent variable is the type of Electric vehicle preferred. Types of electric vehicles specified on eAMRIT portal by the government of India are classified as Battery Electric Vehicles, Hybrid Electric Vehicles, Fuel Cell Electric Vehicles, and Plug-in Hybrid Electric Vehicles. But in this study, the type of vehicle is segregated based on the number of wheels of the vehicle. This classification based on the number of wheels is also provided in the Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles (FAME) – I and II scheme [23]. The classification of the type of vehicle is shown in Table 1.

Table 1- Classification of type of EVs

S. No	Type of EV	Explanation	Models available in India
1	Two Wheelers	E-bikes, electric motorcycles, and electric scooters fall within the category of two-wheeled electric vehicles. These cars are made to fit one or two passengers.	Ola S1, Ola S1 Pro TVS iQube Electric, Ather 450x
2	Three Wheelers	Although less popular, three-wheeled electric vehicles come in various designs, including enclosed electric three-wheelers. These vehicles are appropriate for specific niche markets and applications because of their steadiness and balance.	Mahindra Treo, Lohia Comfort F2F, Kinetic Safar Smart
3	Four Wheelers	Electric vehicles with four wheels are the most prevalent type of EV and come in various designs. Four-wheeled EVs' size, functionality, and features can vary, ranging from little city cars to opulent electric sedans and SUVs.	MG Comet EV, Tata Tigor EV, Tata Nexon EV
4	Six Wheelers	Six-wheeled electric cars are less common and usually specialised automobiles created for certain uses, such as electric trucks for hauling heavy loads.	Ashok Leyland BOSS EV, Tata Ultra E.9 Truck

For our study, the six-wheelers were not selected as a category as the target sample was not interested in the six-wheelers. So, only two-wheelers, three-wheelers and four-wheelers were the levels in our categorical dependent variable. The Four Wheelers in this study only refer to cars as the respondents were not interested in buying buses and trucks.

Socio-demographic factors

Socio-demographic data is important in research for several reasons, including how it aids in comprehending the study population's characteristics and gives context to findings. For example, age, gender, ethnicity, education level, income, and occupation are socio-demographic factors that contribute to the study sample's representation of the general population. The generalizability of study findings depends on this. Researchers might be unable to tell whether their sample is biased or representative of the target population without this information.

*To account for socio-demographic variables' potential i*mpact on the outcomes, they are frequently utilised as control variables in studies. By controlling these variables, researchers can better isolate and evaluate the effects of the key variables of interest. Socio-demographic data can shed light on the potential associations between behaviour or attitude and particular demographic groups. For programs or policies to be tailored to serve various communities better, this knowledge may be crucial. Furthermore, socio-demographic statistics are frequently used by government organisations and policymakers to develop and implement successful policies and programs that cater to the requirements of various segments of society.

In this study, the socio-demographic factors examined include household type, age, gender, education, profession, and Household type based on ownership and diving license availability. These factors have been identified from extensive literature surveys and discussions with experts. All statistical analysis was conducted using Excel and IBM SPSS version 27.

Table 2- Socio-demographic Factors

S. No.	*Factors*	*Explanation*	*Authors*
1	*Age (A1)*	*Age is a key demographic factor that is used to divide people into several groups according to their chronological ages.*	*[24]–[26]*
2	*Education (A2)*	*In research and statistical analysis, education is a crucial socio-demographic characteristic that is used to understand and classify people or communities according to their level of education*	*[24], [25]*
3	*Gender (A3)*	*gender is a demographic variable that is frequently used to classify people according to their sex or gender identity. It is a crucial socio-demographic factor that aids researchers in understanding how men and women or other gender identities are distributed and distinct within a society*	*[24]–[26]*
4	*Diving license holder (A4)*	*Driving license holders as a variable is used for categorising people who have them differently from those who don't.*	*Discussions with the experts*
5	*Profession (A5)*	*The profession as a demographic variable can tell us a lot about the type of job that people in a certain group do.*	*[20].*
6	*Ownership of House (A6)*	*This variable describes whether people have their own house or live on rent as it can create the issue of parking, and charging at home can prevail in paying guests compared to those who own their house.*	*Discussions with the experts*
7	*Type of House (A7)*	*The type of house describes whether the respondents belong to a low-income group (LIG), Middle-income group (MIG) or High-income group (HIG)*	*Discussions with the experts*
8	*Category of House (A8)*	*This variable indicates whether the respondent lives in a single-story house or in a multi-story type like an Apartment style, as this factor can increase the parking and charging issue for the EV*	*[24]*
9	*Household Structure (A9)*	*The household structure tells whether the respondents have any elderly or a child at home. Or they are living alone.*	*[24], [27], [28]*
10	*Experienced an EV (A10)*	*This variable tells whether the respondents have ever driven an EV. This helps to categorise the respondents who have experienced the technology differently than those who have not experienced the technology in person.*	*Discussions with the experts*
11	*Vehicle ownership (A11)*	*This variable captures how many vehicles the respondent already own*	*[24]*

Survey Design

1.1 Participants

The survey group was made up of potential users of EVs, which implies that the participants do not own an EV yet. The study area was Delhi, where data was collected at five locations (Connaught Place, Nehru Place, Palam, Janakpuri and Keshav Nagar. The government of Delhi and the central government have both been running various schemes and campaigns to promote the adoption of EVs in India. Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles (FAME) – I and II and Phased Manufacturing Programmes (PMP) are a few of them. This provides incentives for buying EVs and rapid development of charging facilities. This might explain the recent increase in the sales of electric vehicles in Delhi.

The survey was a revealed preference type. The data was collected through the pen paper methodology but using smart tablets. The survey was conducted from Dec 2021 to January 2023. The participants were informed that this survey was for academic research only. A total of 518 respondents answered the questionnaire. After cleaning for ambiguity and missing values, a total sample of 515 values is used for further analysis. Thrane, (2015) has mentioned a sufficient sample size to parameter ratio of 1:20, which justifies the survey size. Two hundred forty

respondents didn't want to buy any electric vehicle shortly. These data sets were excluded from our further analysis. A total of 275 datasets were used to evaluate 11 socio-demographic factors considered for analysis. Factors such as age and education qualification are quantitative. However, factors like gender, house type, profession, etc., are qualitative in nature as the data collected for these variables is categorical. These categorical variables are taken care of in the calculation using dummy variables. Dummy variables are proxy variables for different classes of these categorical variables.

The age of the survey group ranged from 18 to 50 years, a legal driving age in India. Of these, 42.9 per cent belong to the age group of 25 to 34. Males comprise the largest portion of the sample (66.67%). Most of the respondents were at the undergraduate level (32.8%). All calculations excluded respondents in the non-response categories (refusal, don't know, and not stated) for required questions. The respondents have also stated their preference for different EV-related characteristics. Their descriptive statistic is shown in Figure 2.

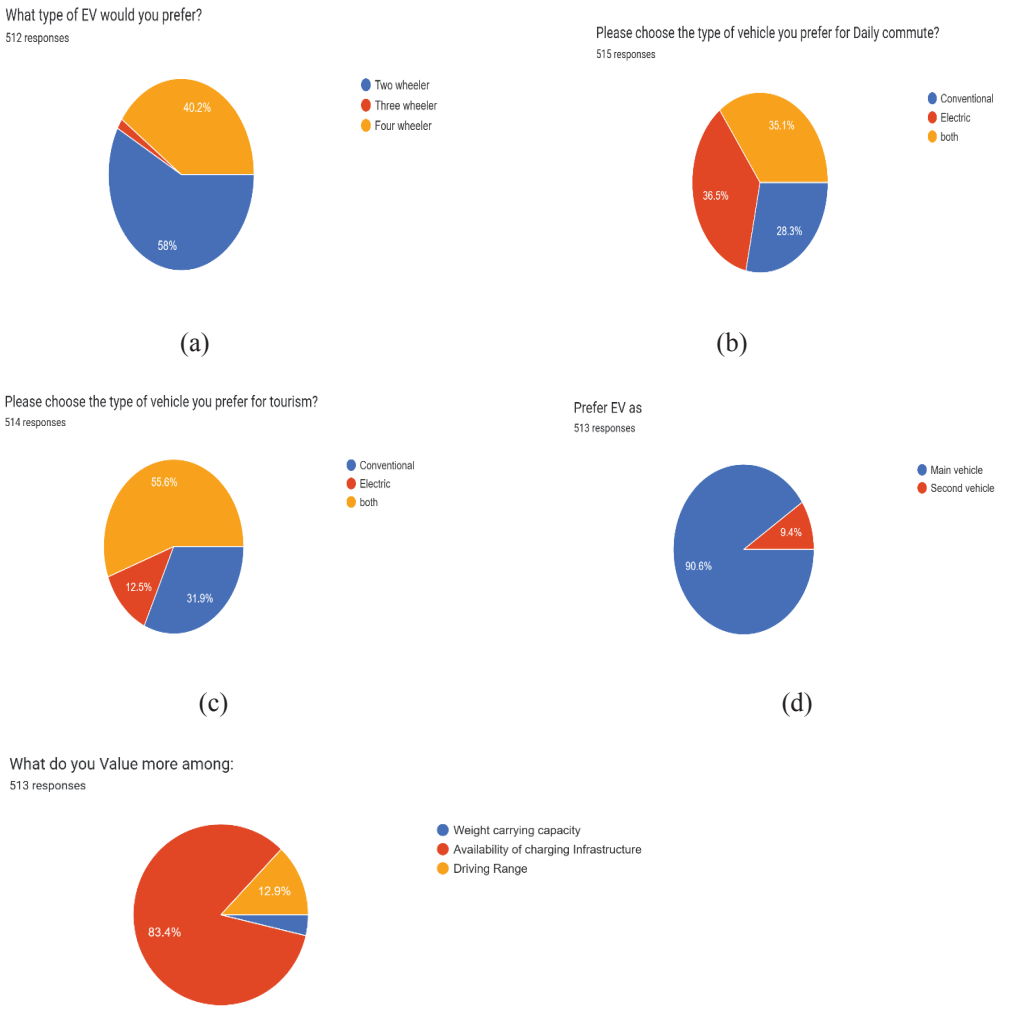


Figure 2 - Descriptive analysis

1.2 Measurements

The questionnaire consists of items that are qualitative and quantitative. The data is collected in ratio scale; for qualitative factors, they were pre-specified, and the participants responded to them respectively. The data was cleaned and handled using Excel before creating the model. The dummy variables were created and handled using IBM SPSS 27.

1. Methodology

Considering the objective of this study, there are two options: Multinomial Logit (MNL) or Multinomial Probit (MNP). This is due to the following three a priori factors: The dependent variable has just three distinct and separable choice alternatives, none of which are nested, and neither independent nor regressors are alternative-specific. The MNL model

was chosen because the MNP models' significantly higher computational demands led to results that were qualitatively comparable to those of the MNL model. The utility Uij obtained by the ith person from the jth decision might be used to derive this model within a random utility framework[20], [22], [28].

$$U_{ij} = \bar{U}_{ij} + e_{ij} U_{ij} = \bar{U}_{ij} + e_{ij} \quad (1)$$

$$\bar{U}_{ij} = \beta X_{ij} \; \bar{U}_{ij} = \beta X_{ij} \quad (2)$$

Where, $\bar{U}_{ij}\bar{U}_{ij}$ *is average utility*

$e_{ij}e_{ij}$ *is error term*

$\beta\beta$ *is the vector of parameters*

$X_{ij}X_{ij}$ *is a set of the independent variable*

Further, the model for this study will be given by Equation 3

$$P(Y_i = j) = \frac{e^{\beta'_j x_i}}{\sum_{k=0}^{2} e^{\beta'_k x_i}} P(Y_i = j) = \frac{e^{\beta'_j x_i}}{\sum_{k=0}^{2} e^{\beta'_k x_i}} \quad (j= 0,1,2) \quad (3)$$

Where P (Yi = j) is the probability of a respondent with characteristics xi, who will select the dependent variable's jth category.

MNL model is used when the dependent variable has more than two categories, and the independent variable may be categorical or continuous. It is an extension of the logit model where the dependent variable has only two categories.

Since there are more variables, the step-wise regression approach is added to the MNL model as step-wise regression is an automated approach that can be useful when dealing with many potential independent variables. It can help simplify the model and improve interpretability by including only the most significant predictors. It seeks to determine which independent variables are most crucial to leave out and which to include in a regression model. Statistical criteria are used to iteratively add or delete model variables until the best-fitting model is reached.

Step-wise regression can be done using two different methods:

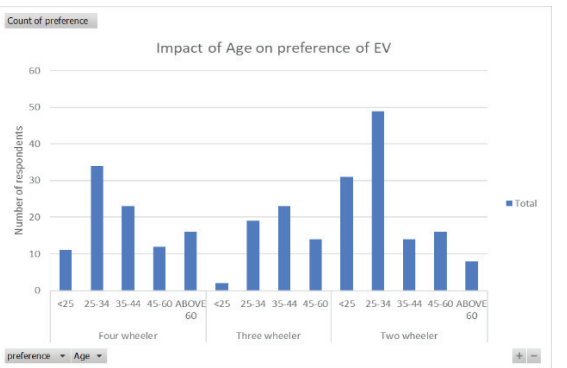
- Forward Step-wise Regression: Using a predetermined criterion (such as p-values, the Akaike Information Criterion, or the Bayesian Information Criterion), this method starts with an empty model and gradually adds independent variables one at a time. The variable that improves the model fit the greatest at each phase is added, and the process is repeated until no more variables fulfil the specified inclusion requirement.
- Backward Step-wise Regression: In this method, all independent variables are first included in a model before being eliminated one at a time according to a predetermined criterion. Until no more variables satisfy the selected exclusion criterion, the variable contributing the least to the model fit is eliminated at each stage.

In this study, we used backward elimination to form the MNL model. We started with a complete set, including all the variables. We proceeded further by eliminating the least significant variable in every iteration until we achieved all the significant variables in the model. The methodology flow chart is shown in Figure 3.

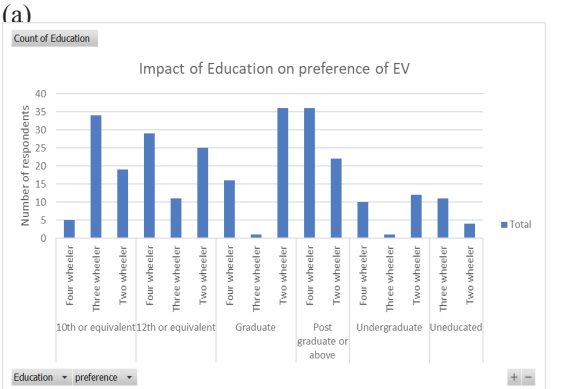
Results and Discussion

Descriptive analysis of the factors

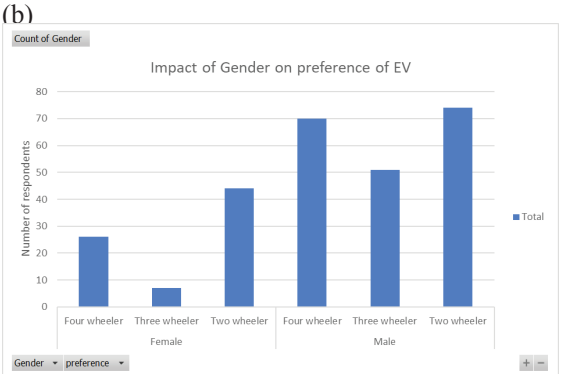
A descriptive analysis of the factors is performed to understand the adoption preference trends.



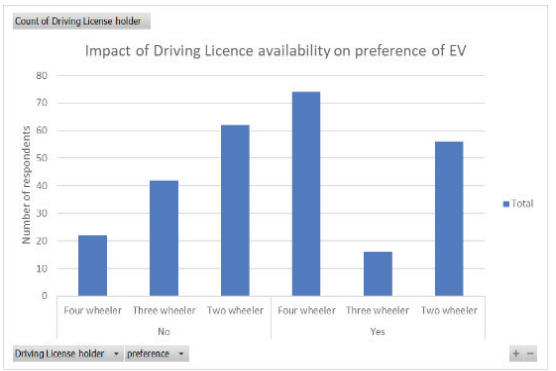
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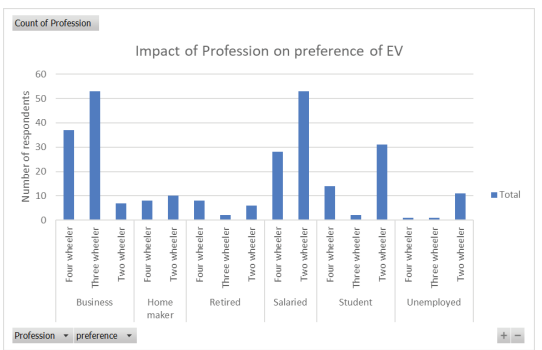
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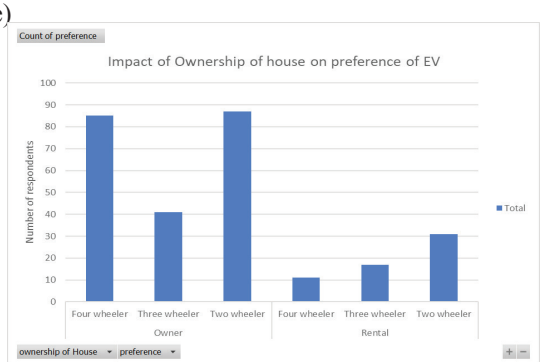
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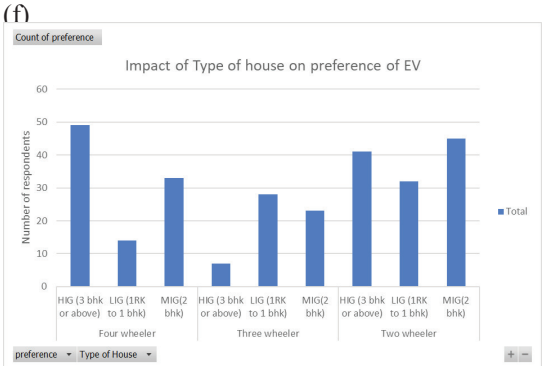
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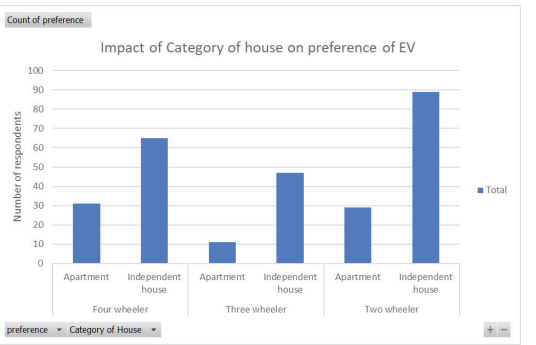
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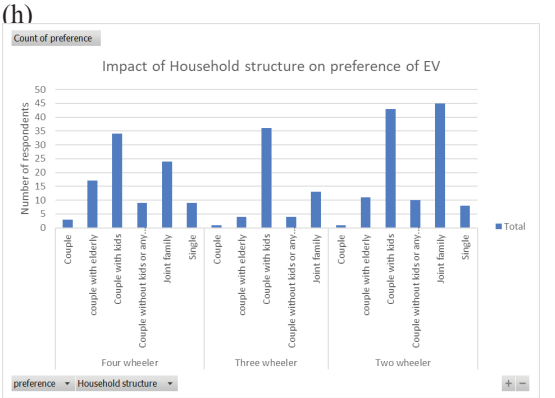
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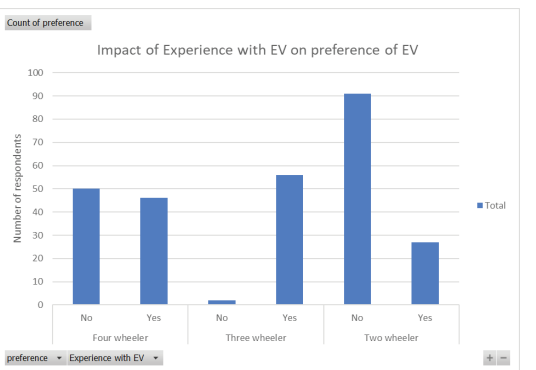
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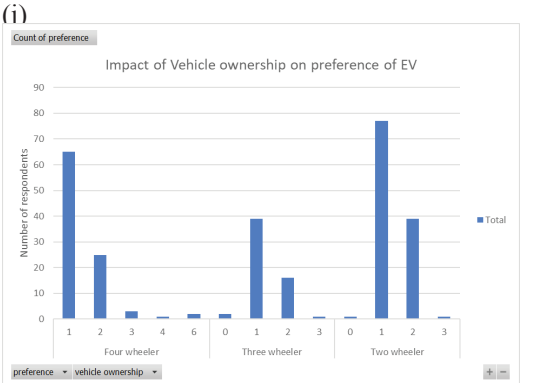
(h)



(i)



(j)



(k)

Figure 4 - Impact of different independent factors on preference of EV

Figure 4 shows that the trend for all two-wheelers, three-wheelers and four-wheelers is that the maximum number

of people willing to buy them is from the age group 25 to 44. The minimum is 45 and above. Since the trend is the same in all three categories, we can say that age doesn't influence the preference type; however, it affects the adoption intentions as more people are willing to buy belonging to the age group 25 to 34. Figure 4 (b) shows that the factor 'education' affects the dependent variable as the demand for three-wheelers decreases as the level of education increases. The preference for four-wheelers is maximum among "Postgraduate and above." For two-wheelers, it is maximum among "Graduate," and for three-wheelers, it is maximum among "10th and equivalent" as different trends. From Figure 4 (c), it is evident that the trend of preference in both the cases of males and females is the same. All the male respondents prefer the three-wheelers least and the two-wheelers most. It is the same in the case of females. Hence, gender does not impact the preference type of EVs.

Similarly, in the case of the factor "Category of house", people living in apartments are less likely to buy any EV than the respondents living in independent houses. Hence, this factor may affect the adoption intention of EVs but doesn't affect the preference for EV type. For "Vehicle ownership", the trend of EV preference is the same for all the categories. People with 1 existing vehicle have the highest buying response for all kinds of EVs, followed by the respondents having two already existing vehicles. This also shows that vehicle ownership might affect adoption, but here, it's not affecting preference for EV types.

The trend line for driving license availability and unavailability are different (Figure 4 (d)). On the one hand, people with driving licenses prefer four-wheelers the most, and those without the licenses prefer two-wheelers the most. This shows that this factor affects the EV type preference of the respondents. The same has been observed for factors like "Profession", "Type of house", "Household Structure", and "Experience with EV". The trends of EV type preference are different for different categories of these variables. Hence, it suggests that these factors might influence the EV type preference. To further check these factors' influence and significance, an MNL regression model is built in the next section.

Model Construction

MNL is a useful technique for evaluating data with categorical outcomes with more than two categories. It may be carried out using a variety of statistical software packages (e.g., R, Python, SPSS, SAS). We have used SPSS in this study.

In MNL, the reference category is one of the dependent variable categories. In relation to this reference category, the model calculates the chances of the other categories. The reference category was chosen randomly and has no bearing on the model's validity, although it may affect how the findings are interpreted. The model calculates each independent variable's estimated coefficients for each category of the dependent variable. These coefficients represent the log odds of belonging to a certain category compared to the reference category. By exponentiating these coefficients, we may derive the odds ratios, which indicate how the odds change with a one-unit change in the independent variable.

The study started by taking eleven independent variables. After removing all the significant variables (after five iterations), the first MNL model is shown in Table 3, and the final MNL model is shown in Table 4.

Table 3 - Likelihood Ratio Tests for all the variables in the first iteration

Likelihood Ratio Tests				
Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	194.31	0.000	0	
Age (A1)	204.69	10.384	8	0.239
Education (A2)	234.31	39.999	10	0.000**
Gender (A3)	194.38	0.071	2	0.965
Diving license holder (A4)	204.56	10.251	2	0.006**
Profession (A5)	240.18	45.869	10	0.000**
Ownership of House (A6)	200.21	5.897	2	0.052*
Type of House (A7)	201.99	7.680	4	0.107
Category of House (A8)	197.59	3.284	2	0.194
Household structure (A9)	209.50	15.187	12	0.231
Experienced an EV (A10)	228.71	34.397	2	0.000**
Vehicle ownership (A11)	203.49	9.177	10	0.515

*Significant at the level of 90% confidence

** Significant at the level of 95% confidence

Table 4 - Likelihood Ratio Tests for all the variables in the last iteration

Likelihood Ratio Tests				
Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	196.264	0.000	0	
Education (A2)	236.787	40.523	10	0.000**
Diving license holder (A4)	210.440	14.176	2	0.001**
Profession (A5)	273.430	77.166	10	0.000**
Ownership of House (A6)	201.421	5.157	2	0.076*
Type of House (A7)	204.386	8.122	4	0.087*
Household structure (A9)	217.839	21.575	12	0.043**
Experienced an EV (A10)	232.624	36.360	2	0.000**

*Significant at the level of 90% confidence

** Significant at the level of 95% confidence

The model fitting information is provided as shown in Table 5 and Table 6.

Table 5 - Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	550.67			
Final	196.26	354.410	42	0.000

Table 6 - Pseudo R –Square values

	Cox and Snell	Nagelkerke	McFadden
Pseudo R-Square	0.728	0.828	0.615

The final model shows a pseudo-R square (Nagelkerke) value of 0.828. The analysis results show:

- The factor "Category of House (A8)", whether the respondents live in a single-story house or a multi-story type, doesn't play any significant role in selecting the type of electric vehicle; however, the factor "Ownership of House (A6)" whether they own a house or are on rent as well as "Type of House (A7), whether they live in a MIG or HIG type house significantly affect whether they are likely to buy a Two-Wheeler, Three-Wheeler or a Four Wheeler electric vehicle.
- It is observed from the result that factors such as the profession of the respondents, possession of a driving license, number of vehicles owned by them and whether they already own an electric vehicle are significant factors.
- The analysis and results also show that the factors of Gender, Age, Category of the house (whether they are single-story or apartment type) and Vehicle ownership (how many vehicles they own) do not play any significant role.
- All the remaining factors are significant at 95% and 90%, as the p values are lower than 5% and 10%, respectively.
- In Table 3, it is observed that the factors "Household structure" and "Type of house" were not statistically significant. However, in Table 4, it is significant at 95% and 90% confidence intervals, respectively. This may be due to variables like "Ownership house", which is not significant but might influence these factors. Though we assume that all the independent factors don't influence each other, some smaller correlations may occur among the variables most of the time.
- As an advantage of step-wise MNL regression, we incorporated significant variables more accurately than simple MNL regression.
- The "test statistic" and p-value of all dependent variables will vary in each iteration.
- After removing an insignificant variable, the factor with a high 'p' value may have a lower and significant 'p' value.
- The results of our final model also match the inferences from the previous section of this paper (section 5.1).

Summary and Conclusion

EV adoption is rising in India, and barriers that might be hindering adoption have received plenty of attention in the literature. However, studies including socio-demographic factors as a whole impacting adoption are scarce. Most of the studies present take the likelihood of buying an EV into account, but considering the type of EV they are willing to buy lacks significance in recent studies.

The study area selected is New Delhi, where 518 data sets were collected at five different locations. A descriptive analysis of the socio-demographic factors, such as age, gender, experience in driving, types of household, etc., has been explained in section 3 of this paper. A total sample size of 518 people was collected for this study, but only 515 datasets were taken for analysis after clearing the data set for missing values. This study has taken the type of electric vehicle potential users prefer to buy as the dependent variable. This study shows how socio-

demographic factors are significant in determining the preference of EV types using the MNL model.

Factors such as gender, age, category of house, and household structure do not significantly influence the preferences for the type of electric vehicle. They show similar trends for two-wheelers, three-wheelers, and four-wheelers. However, they do affect the intention of purchasing Electric vehicles. It is visible that in both the cases of males and females, the preferences for EV types are the same. All the male respondents, as well as the female respondents, prefer the three-wheelers least and the two-wheelers most. Hence, we can conclude that "Gender" does not impact the preference type of EVs. This is the same in the case of factors "Age," "Category of the house," and "Vehicle ownership." For the rest of the factors, there are changes in preference of EV types for different categories within the respective factors. These inferences also align with the results of the MNL model.

These results and findings of this study can provide insights to the Government of India and the manufacturers to target their potential respondents for each type of EV (based on the wheelers). This can help them to form and push various schemes to help promote adoption in different segments of EVs. Since the classification of EVs and their preference trends, based on the characteristics of the potential buyers, are shown in this study, this can help to form custom-made schemes for increasing adoption among different segments of society (based on socio-demographic factors). This study has observed that the respondents who live in HIG and MIG housings are more inclined towards buying four wheelers and two wheelers whereas, respondents living in LIG housings have more inclination towards buying a three-wheeler. Hence, the government can run schemes to promote four and two-wheelers among people from medium and high-income groups and push three-wheelers among low-income groups. Similarly, it is observed that in the case of four-wheelers, respondents having kids or older people living with them are more likely to prefer them. Hence, EV manufacturers can advertise their four-wheelers as family-friendly cars designed with ergonomics to suit kids and older people.

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Impact of Digitalization on Small and Medium Enterprises: Challenges and Opportunities.

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Abstract

SMEs have a better chance of surviving in the twenty-first century by embracing digitization. The purpose of this paper is to examine the currently underlying digitalization among SEMs and to assess digitalization's impact on the performance of SMEs. The owners and managers of SMEs in Sunsari district are respondents to the study. A total response of 162 respondents was collected through interviews and standardized questionnaires. Responses were analyzed through regression analysis to examine relationships, and correlation analysis to gauge the degree of relationship between variables, using SPSS software.

The revealed result shows that the best indicators of business revenue are internet access and power backup. Digital skills and infrastructure have weak associations with revenue. Likewise, investment in infrastructure and digital skills can increase revenue. Overall, the model is statistically significant, suggesting a reasonably strong correlation between independent variables and dependent variables.

The study's results offer strong proof that digitization increases operational effectiveness and generates a sizable rise in revenue. Embracing digital methods and strategies has become essential for SMEs to stay competitive in today's rapidly evolving marketplace. In essence, the study underscores the importance of leveraging digitalization as a key driver for success in SMEs. Future studies could analyze the sector-specific effects of digitalization on the regional variation of SME enterprises in Nepal.

Keywords: *Digital Literacy, power back-up, business revenue, Digitalization, Internet assess*

Introduction

The world is becoming smaller because of the development of cutting-edge digital platforms. Digital tools play the predominant role in various sectors. As the world is venturing the fourth phase of Industrial Revolution (IR4.0), concern on digitalization in business processes is also rising (Sued,N.M.N, 2020). Similarly, digitalization has made a noteworthy contribution to the corporate world. Most people agree that small and medium-sized businesses are essential to any country's economic growth. Since many industries and businesses are under a lot of pressure to switch to digital operations, digital transformation is a major challenge for SMEs today (Shettima, M.et.al, 2020). The establishment of SMEs promotes high output and job possibilities, both of which aid in the growth of the country. To take advantage of opportunities and eliminate threats to their business, entrepreneurs should think about integrating digitization into SEMs.

In terms of the implications for policy, offering government assistance aimed at improving small business digitalization may have a synergistic effect, encouraging digitalization while also improving innovation performance (Radicic. D.et.al, 2023). As the supportive bodies of the nation, the government plays a vital role in empowering entrepreneurs by providing necessary assistances they need to overcome the digital competitive advantage.

For the least developed countries to overcome their existing challenges, digitization of business processes increases transaction efficiency, expands their client base, and lowers costs and effort (Saleh, M. A. K, et.al 2020). These days, digitalization and online distribution systems are used to promote goods and services, cutting down on the expense of pointless channels that highlight price reductions in developing nations. Accelerating the digitalization of domestic businesses and utilizing digital technology effectively in management will boost their profitability and competitiveness, which will ultimately lead to sustained growth (Shevtsova, H.et.al,2020). Smooth operation of home businesses is facilitated by the use of digital technologies. This change satisfies the needs and desires of the market, which propels the company's steady expansion. Comprehensive and successful digital transformation strategies meant to increase sales and awareness (Dangol. S, 2020). Business is always evolving in the modern knowledge-based economy, and SEMs are continuously challenged to come up with fresh, creative ways to adapt to the quick changes (Curraj,E.2018). Adapting the changes of environment may be the

opportunities for the SMEs.

SMEs' digital transformation is becoming increasingly well-known, indicating a crucial intersection in the worldwide effort to achieve sustainable development (Ozturk,I.et.al.2024). Implementing the digital tools in SMEs help to enhance the enterprises within the country which creates the job opportunity on one hand and allocation of resources in optimum way in next hand. By implementing digital technology, SEMs can increase their production and efficiency, giving them a competitive edge over their rivals (Saleem, H, et.al, 2021). SME owners can create a direct line of communication between buyers and suppliers and interact closely with other stakeholders by implementing digital technology platforms (Chatterjee,S. et.al, 2022).

The paper thus, examines the currently undergoing digitalization among SEMs and asses the digitalization impacts on performance of SMEs in Nepal. Further, the paper focuses to the business revenue of SEMs that may be impacted by digital infrastructure, digital literacy, internet access and power backup. Of the various mechanism of digitalization, only infrastructural factors are given emphasizes on the study. The study focuses on SMEs in the city area, ignoring those in rural areas. Additionally, it does not cover micro level enterprises and does not focus on digitalization promotion tools like (social media campaigns like Facebook, Instagram, YouTube, and others). Further research should focus on other various aspects of digitalization, such as digital financing, digitalization on supply chain and logistics, etc., in the sense of development of SMEs in the nation.

Literature Review

Nigerian SMEs are greatly impacted by digitalization, and they are stated to face several difficulties, including a lack of training in digital strategy, a lack of use of digital technology, and a lack of cybersecurity. The operation of SEMs is improved by digitization, which also boosts economic growth, reduces poverty, creates business opportunities, and increases employment chances (Shettima, M., 2020). The impact of digitization on innovation appears to vary depending on the organization. In SEMs that innovate without engaging in internal research and development, digital transformation has a good impact on the chance of innovation (whether it be process, product, or both) (Radicic. D. et.al.2020).

The relationship between digitalization and SEM performance was tempered by the availability of government support, suggesting that government initiatives—particularly microloans and fintech assistance—are crucial to optimizing the advantages of digitalization (Alsedrah, I. et.al,2023). The stability of a corporation can be severely impacted by information security issues. Implementing digital technologies is hampered by the high cost of hardware and software, a lack of infrastructure, and a failure to encourage the spread of digital technologies in the SMEs sector (H. Shevtsova,et. al,2020). The degree of digitization and the integration of digital technologies greatly improve corporate success in terms of employment and value-added growth. Process simplification, increased efficiency, and improved customer experience are key components of digitalization in SEMs, which will ultimately promote corporate expansion and development (Kádárová, J,et.al.2023).

There is no correlation between the digital transformation process and SEMs' dynamic capabilities. There is no substantial correlation between digital literacy and the digital transformation of SMEs, and digital literacy are negatively correlated with digital transformation (Civelek,M,et.al,2023). The economy's digitalization has produced a new business climate in which companies can conduct operations and provide services via digital platforms and online. Traditional models have been transformed into modern ones due to digital funding (Thathsarani,U.S,et.al,2022).

Theoretical framework

Although digital literacy has been a problem in the digital transition, SMEs are concerned about and interested in improving the digital literacy of their staff. The resources-based view (RBV) for SMEs may be a useful way to lessen the challenges (Civelek,M,et.al,2023). Companies can obtain a competitive edge by identifying and utilizing resources with the aid of the RBV model. An organization's internal resources are the main emphasis of the RBV model. The Technology Acceptance Model (TAM) and digital financing have a significant impact on the performance of SMEs. Financial inclusion and performance in SMEs are positively mediated by digital finance and TAM (Thathsarani,U.S.,et.al,2022). Paper focused on Resource-Based view (RBV), Technology Acceptance Model (TAM) and Theory and Planned Behavior (TPB). The concept suggests that investing in these areas can directly improve business performance by looking at how these aspects interact with business operations. Among the variables in the paper, business revenue is outcomes, infrastructure, power back up and internet access are based on the resources based view (RBV) and digital literacy is based on Technology acceptance model (TAM) as it shape perception about utility of digital technology and also based on theory planned behavior (TPB) as it influence attitude and intentions towards adopting digital technology.

Mathematical or statistical model to test hypothesis

$Y= \beta 0+ \beta_1 X1+ \beta_2 X2+ \beta_3 X3+ \beta_4 X4+ €$

Where,

X1=Infrastructure

X2= Digital Literacy

X3= Internet access

X4= Power backup

Y =Business revenue

$\beta 0$= intercept

$\beta_1, \beta_2, \beta_3$ and β_4 are coefficient.

ϵ = error term

Hypothesis

Ho: Digitalization has no significant impact on SMEs.

H1: Digitalization has significant impact on SMEs.

Conceptual Framework

Methodology

The relationship between business revenue and digitalization infrastructure is investigated using a qualitative study design. The quantitative approach is utilized to determine the influence of the factors. In order to gather responses, a series of structured questionnaires were created and distributed to the respondents via WhatsApp and email. A 5-point Likert scale was used to measure respondents' opinions in all of the closed-ended questions and interview. All 54 respondents' responses were gathered, and the study's goal was explained. To maintain anonymity, all answers were kept secret and confidential, and personal identifiers were eliminated. The respondents were the owner of small and medium-sized enterprises in Nepal's Sunsari district. The collected response was analyzed using descriptive statistics. The Pearson correlation coefficient is used to evaluate the direction and intensity of the linear association between the independent variables and the regression model was taken into consideration to examine the cause-and-effect relationship between dependent variables using SPSS software.

Table 1

Demographic Profile of the Respondent

Variables	Category	Frequency	Valid Percent
Gender	Male	145	90
	Female	17	10
Age Grouped	30-35	33	20
	35-40	87	54
	40-45	42	26
Business Types	Manufacturing	12	7
	Retailing	109	67
	Service	35	22
	Agriculture	6	4
Role in Business	Owner	123	76
	Manager	39	24

The table is used to understand the distribution of demographic table for a survey. The table displays survey results pertaining to demographics and business, classifying participants according to their age, gender, type of business, and position within the company. Survey was conducted with 162 responses as it is the sample size of this study. Among the respondents 90% was male and 10% was female respectively. According to the age distribution, 20% of respondents are between the ages of 30 and 35, 54% are between the ages of 35 and 40, and 26% are between the ages of 40 and 45. Retailing accounts for the biggest percentage of business kinds (67%) followed by service businesses (22%), manufacturing (7%), and agricultural (4%). Last but not least, 24% of respondents identify as managers and 76% as owners of businesses. This data gives a clear picture of the population that was surveyed and shows that male business owners, who are mostly between the ages of 35 and 40, dominate the retail industry.

Table: 3
Regression Analysis

Variables	Coefficient	P- value
Infrastructure	-.689	.230
Digital Skill	.081	.112
Internet Access	.010	.248
Power Backup	.183	.017
Business Revenue	.542	.000
Observation	162	
R square	.474	
Adjusted R square	.460	
F-statistics	35.350	

The findings of a multiple regression study, which looks at the relationship between several independent variables (Digital Skill, Internet Access, Infrastructure, and Power Backup) and the dependent variable (Business Revenue), are shown in the table. Given that the infrastructure coefficient is negative, which suggest that inadequate infrastructure will have a detrimental effect on the dependent variable. The dependent variable is slightly positively impacted by the improved digital proficiency. Better internet connectivity favorably affects the dependent variables since it has a substantial positive influence on SMEs' business revenue. Similarly,

the availability of power backup has a substantial beneficial impact on business revenue, indicating that it contributes to increased business revenue. Furthermore, approximately 47% of variance the business revenue is explained by (Infrastructure, Digital skill, Internet access and Power backup).

Table 4According to the ANOVA table, the F-statistic value of 35.350 indicates a high value, while the sig (p-value) of 0.000 indicates a value below 0.05. As a result, business revenue is significantly impacted by the independent variables (power backup, infrastructure, digital skill, and internet access) while taking together.

Discussion

There is a slight difference between the gender groups in terms of internet access because the p-value is closer to 0.05 (i.e., p=0.065), but there is no significant difference between the dependent and independent variables on the perception of gender. Similarly, SMEs owner and manager has the significances difference in perception of power backup as the p-value is 0.037. Likewise, the perception of Internet access is near to significance, indicating that there might be a slight variation but not enough to be statistically verified. Other variables Infrastructure and Digital skill are not significantly different. The model is statistically significant (p>0.05) because at least one dependent variable has a substantial impact on business revenue. The alternative hypothesis is accepted, and the null hypothesis is rejected since at least one dependent variable explain a significant portion of the variation in dependent variable.

Conclusion

Due to the era of digital transformation, it is being easier for the entrepreneurs to run their enterprises with the effective use of digitalization mechanism. The result of this paper shows that the best indicators of business revenue are Internet access and power backup. The expansion of SMEs is hampered by a lack of digital skills, to address this scenario, contemporary training programs and motivational materials are required (Shevtsova, H., 2020).

Revenue can also be increased by employees' digital skills, but this should be leveraged through various skill-development programs. Since infrastructure (computers, servers, and software) has a non-significant effect on business revenue, so infrastructure must be taken as consideration factors to increase the revenue of SMEs but, investing in infrastructure alone may not be enough, it should be paired with digital skills and technological advancements.

In a similar vein, spending money on internet connection and power backup can greatly enhance company performance. To boost economic growth, the Malaysian government has encouraged SMEs to adopt digitalization alongside larger corporations (Sued, N.M.N, 2020). The government can play a supportive role in infrastructure enhancement and the digital skills of young entrepreneurs, which will encourage new businesses to operate smoothly. The relationship between digitalization and SMEs' performance was mitigated by the availability of government support, suggesting that government initiatives—particularly microloans and fintech assistance—are crucial to optimizing the advantages of digitalization (Alsedrah, I, 2023). Government support like grants, subsidies, loans, flexible policies, etc on infrastructure and technology helps to increase the revenue of the SMEs in the nation. Digital skill and infrastructure, however, have no statistically significant impact on this model. Overall, the model is statistically significant and explains 47.4% of the variation in the dependent variable, suggesting a reasonably strong correlation between the independent and dependent variables. The total regression model is statistically significant, as indicated by the Anova table's F-statistics of 35.350 and p>0.05. This finding implies that internet access and power backup have a big influence on company profits.

Limitation

The study only looked at small and medium-sized businesses in cities; it didn't look at microbusinesses and SMEs in rural areas. Every facet of digitalization that affects SMEs cannot be explained by the factors utilized in this paper. SMEs and their management must constantly implement dynamic strategies since developing digitalization is a dynamic process. Therefore, future research should explore the geographic regions as well as emerging aspect that impact the SMEs. It will be more important than ever for organizations to comprehend how digitalization drives revenue as they continue to navigate the digital landscape.

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Prioritized ICT Adoption to Bridge the Technology Gap for Socioeconomic Improvement in Asian LDC s.

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Abstract

This research studies the complex reciprocity between socioeconomic challenges and prioritized ICT adoption in Asian Least Developed Countries (LDCs). Focusing on extreme poverty, unemployment, and slow economic growth, the study examines how these interconnected issues can be mitigated through enhanced access and utilization of ICT components, such as social media, internet connectivity, and mobile networks. While Information & Communication Technology(ICT) offer trans-formative potential, significant barriers, particularly financial constraints and inadequate infrastructure, hinder their widespread adoption in LDC s. This "Technology Gap" exacerbates existing socioeconomic disparities, hindering access to timely information, impeding economic growth, and limiting participation in the globalized knowledge economy. By analyzing parametric data and prioritizing inclusive ICT technology adoption, this research aims to explore pathways for poverty reduction, employment generation, and economic growth, ultimately contributing to sustainable development and mitigating socioeconomic vulnerabilities within these countries.

Keywords: *Least Developed Countries(LDC s), Digital Technology, GDP Per Capita PPP, Information and Communication Technology(ICT), Technology Gap, Multiple Linear Regression(MLR)*

Introduction

According to the website of UN Trade & Development, least developed countries in Asia are counted 8 countries like Afghanistan, Bangladesh, Cambodia, Lao People's Democratic Republic, Myanmar, Nepal, Timor-Leste and Yemen. These Least Developed countries are facing many socioeconomic challenges and they are failed to address such issues so that criteria set by UNO for LDC s are not fulfilled. Of course one of the main reason of backward development is due to their inability to adopt digital technologies. Likewise according to the UN-Department of Economic and Social Affairs Economic Analysis-Least Developed Countries (LDCs) are low-income nations characterized by severe structural obstacles to sustainable development, high vulnerability to economic and environmental shocks, and low levels of human development. Digital technology innovation has significantly enhanced financial access for low-income communities by overcoming traditional barriers through digital banking, e-payments, and alternative funding models (Wanof, 2023). If we consider the valuables like low level of income and low level of human development, it is mostly related with use of technology components like mobile network coverage,number of internet users and number of social media users. Least Developed Countries (LDCs) face intertwined challenges, including extreme poverty, underemployment, unequal access to healthcare and education, and low economic growth. Limited technology adoption and resource shortages exacerbate these issues,

perpetuating poverty cycles. Leveraging technology is key to breaking these barriers and driving development.

ICT usage increased significantly during the COVID-19 pandemic as a coping tool, fostering social connectedness and mitigating future anxiety through balanced and purposeful use (Lee et al. 2021).Due to social distancing measures and other safety protocols during the pandemic, physical meetings and gatherings were largely abandoned, forcing people to rely on alternative means of staying connected without physical presence.This is why ICT has become an ideal solution due to its adaptable and versatile nature. Following the website studysmarter.co.uk, digital technology encompasses devices, systems, and resources that create, store, and manage data, with information technology (IT) playing a key role in data processing and business operations. It plays a vital role in enhancing operational efficiency and improving customer experiences, utilizing tools like big data analytics for informed decision- making, e-commerce platforms for online sales, and enterprise resource planning (ERP) systems for streamlined business operations. Addressing socioeconomic challenges such as poverty, inequality, limited economic growth, inadequate education and healthcare, high unemployment, food insecurity, environmental degradation (including deforestation, soil erosion, and water scarcity), political instability, and the impacts of climate change requires comprehensive and innovative solutions. Challenges are further compounded by vast geographic diversity, cultural variations, linguistic differences, and underdeveloped infrastructure, alongside inequities in health and education systems. While multiple approaches may exist to tackle these issues, the efficient adoption of digital technology stands out as a particularly effective strategy. By leveraging digital tools, these complex problems can be addressed more

rapidly, efficiently, and systematically, contributing to sustainable socioeconomic development. Information and Communication Technology is one part of digital technology.

In his 1890 AD book 'The Principles of Economics', Alfred Marshall, the father of scientific economics, redefined economics as a study of everyday choices aimed at improving lives, emphasizing its connection to society and social welfare. Marshall's view of economics focuses on how people make everyday choices to improve their lives. Income, education, and social factors shape economic choices which depend on essential access like healthcare and education (Ross etc & all, 1995). This connection between how we live as individuals and the wider social and economic systems we're part of is what the term "socioeconomic" really means. It highlights how these two sides are always interacting and influencing each other and we can't alienate these two sector from each other; so it is socioeconomic. Socioeconomic accounting applies accounting principles to social sciences like sociology, political science, and economics, focusing on measuring and analyzing the social and economic impacts of activities (Mobley,1970).

ICT (Information and Communication Technology) refers to the technological infrastructure and tools that enable communication, information sharing, and innovation in organizational structures and work practices (Lee,2016). ICT serves as the base for transforming industries by supporting globalization, cultural shifts, and evolving economic demands, enabling new ways of working and meeting high- performance expectations.The impact of Information and Communication Technologies (ICT) on socioeconomic development is significant, given ICT's potential to influence GDP, employment, and quality of life which underscores the importance of ICT-driven socioeconomic development (Palvia P & all,2018) . This research aims to investigate the relationship between socioeconomic challenges and ICT components of digital technology, and analyze how the prioritized adoption of such tool can be leveraged to address and improve these challenges.

Literature Review

According to Rachmawati et al.(2021) explores that the COVID-19 pandemic significantly accelerated the use of ICT to support work-from-home (WfH) systems, which became essential for maintaining productivity and reshaping workplace dynamics in both government and private sectors. As per the article published 2018 by UN Chronicle shows Despite rapid technological advancements, LDCs face significant challenges in accessing and benefiting from these innovations due to limited investment in research and development, inadequate infrastructure, and a lack of skilled human capital. This report further says the digital divide hinders economic growth, exacerbates poverty, and limits participation in the globalized knowledge economy. Closing this gap requires concerted efforts to invest in education, improve digital infrastructure, and foster innovation ecosystems in LDCs, empowering them to harness the conversion potential of technology for sustainable development. The successful adoption scale up and sustainability of technology supported health and care program depends on addressing challenges across multiple domains including the technology users, organizations, societal context and their dynamic interaction over time (Greenhalgh, and all, 2017). So promote the various technology for the development and other purposes are so crucial in the current era.But LDC s are failed in many cases to adopt such technology due to different constraints. Microeconomics examines the factors influencing technology adoption, including financial returns, social learning, externalities, credit constraints, and individual decision-making, to understand barriers to technology diffusion and its impact on productivity and economic outcomes (Foster & Rosenzweig 2010). Due to the inability of adoption of ICT tool, LDC s are facing many socioeconomic challenges which is also termed as technological backwardness.

LDCs, home to 40% of the world's poor and , often face conflict. They have 13% of the global population but less than 1% of trade and investment as mentioned in one of the UN link- https://www.un.org/ohrlls/content/about-least-developed-countries. Internet access is limited to under 35% on LDC s till 2022 which is shown given below.

Year	World	Developed countries	Least Developed Countries (LDCs)
2005	13%	50%	3%
2006	15%	53%	4%
2007	17%	56%	5%
2008	19%	59%	6%
2009	21%	62%	7%
2010	24%	65%	8%
2011	27%	68%	9%
2012	29%	71%	10%
2013	32%	74%	12%
2014	35%	77%	14%
2015	38%	80%	16%
2016	41%	83%	18%

2017	44%	86%	20%
2018	47%	89%	22%
2019	50%	92%	24%
2020	53%	95%	26%
2021	56%	98%	28%
2022	59%	100%	30%

Table 1 Source: world economic forum -worldwide internet coverage 2023

Table 1 indicates that by the end of 2022, approximately 30% of the population in Least Developed Countries (LDCs) had internet access. This implies that 70% of the population in these regions remained unconnected, highlighting a significant digital divide. Increase in ICT adoption may significantly contribute four core area given in the diagram.

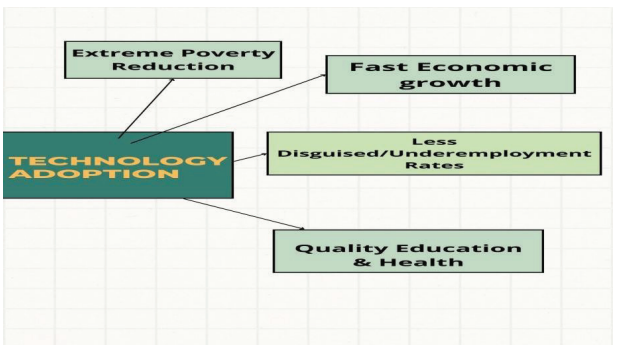


Figure 1 showing Direct Impact of Technology Adoption

Conceptual framework

This conceptual framework posits that the adoption of Information and Communication Technologies (ICTs) in Asian Least Developed Countries (LDCs) can significantly contribute to socio-economic development. It is structured around three key components: independent variables (mobile network coverage, internet subscriptions, social media users), mediating variables (education & information access, mobile banking, digital sector employment), and dependent variables (poverty reduction, unemployment rate, GDP per capita). The framework hypothesizes relationships between these variables, such as higher mobile network coverage leading to increased internet subscriptions and social media usage. These relationships are underpinned by theories like diffusion of innovation, social network theory, and human capital theory. Research methodology involves data collection through surveys, interviews, and secondary data analysis, followed by statistical and qualitative analysis. The framework acknowledges potential limitations, such as the complexity of interactions between mediating variables and the variability of their importance across different LDCs. By understanding the factors influencing ICT adoption and its impact on key development outcomes, this framework provides a roadmap for policymakers and development practitioners to leverage ICTs for inclusive growth and poverty reduction in Asian LDCs. Social network theory, which examines how individuals and groups are connected within a social structure, can be instrumental in understanding and facilitating ICT adoption in Less Developed Countries (LDCs) by identifying influential individuals and leveraging existing social ties to disseminate information and overcome barriers to technology access. By analyzing the social networks within LDCs, policymakers and development practitioners can strategically target key individuals and communities, utilizing social influence mechanisms to accelerate ICT adoption and maximize its potential for socioeconomic development. By strategically targeting key individuals and communities within the social network, policymakers can maximize the positive impact of ICT adoption on various aspects of development, such as education, healthcare, and economic growth.Likewise the theory of Diffusion of Innovation provides valuable insights for ICT adoption in LDCs by highlighting the importance of understanding factors like relative advantage and social influence. By strategically leveraging social networks and identifying key influences, policymakers can accelerate ICT adoption and maximize its impact on socioeconomic development.

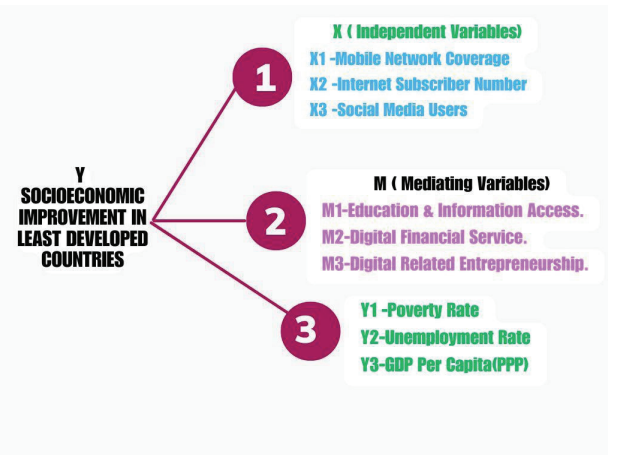


Figure 2

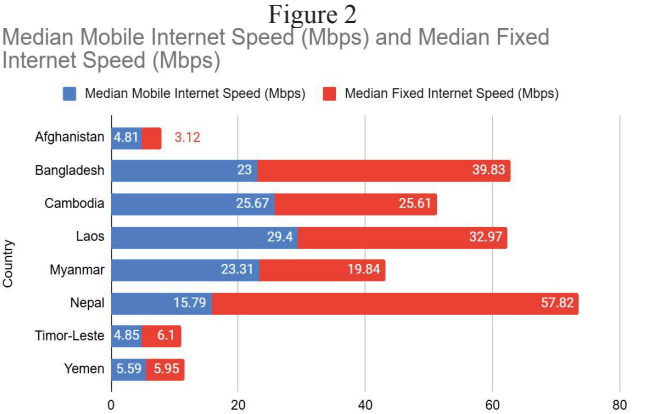


Fig. 3 Source: wearesocial.com

The data of Fig. 3 reveals that median mobile internet speeds in these LDCs are significantly below the threshold required for optimal performance in areas like mobile banking, smartphone adoption, and other mobile-dependent digital activities. Experts suggest that a minimum speed of 50 Mbps is necessary for effective digital functioning. However, the provided data demonstrates that all countries in this sample fall considerably short of this benchmark, indicating a significant constraint posed by poor mobile internet connectivity. Above data shows Laos is listed as highest in terms of Median Mobile Internet Speed(Mbps) with 29.4 and Nepal is listed as rank first having 52.82 Mbps in terms of Median fixed Internet Speed. LDC portal of UNO has already proposed four country for LDC graduation. These countries and date of proposed for LDC graduation are Nepal(2026), Lao PDR(2026), Bangladesh(2026) and Cambodia(2029). Above data shows proposed four countries have high Internet speed. Of course it also prove ICT progression has direct relationship with growth and prosperity.

Social Media as Components of ICT

[The percentage mention in Fig.(4) values are subject to change when presented in a pie chart. Multiplying the given percentage by 4.2 provides an approximate estimate.]

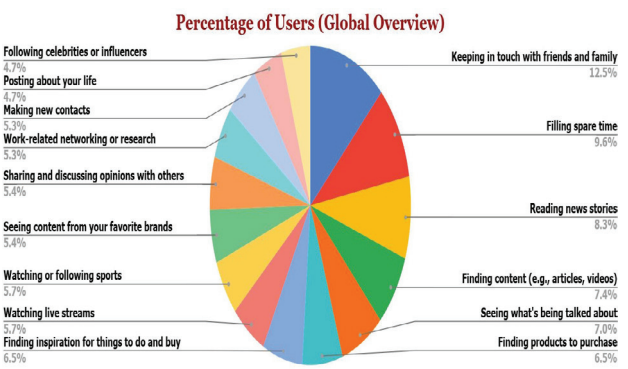


Fig 4 Source: https://datareportal.com/social-media-users-2024

Social media are web-based technologies that allow users to create, share, and exchange information, ideas, interests, and personal messages within virtual communities and networks(Carr & Hayes, 2015).The above pie chart indicates global social media usage, with keeping in touch with friends and family 51.5% as the top activity, followed by filling spare time 39% and "reading news stories" 34.4. Social media contributes socio-economic development by enhancing connectivity, fostering social cohesion, and spreading information for digital literacy. Social Media assists e- commerce, consumer awareness, and skill-building, especially in underserved areas, making it a key driver of connectivity, education, and economic growth (Brahm, & Dutta, 2020). Social media is emerging as a powerful tool in the era of modern ICT.

Research Methodology

This study uses a step-by-step method that starts with collecting numerical data from secondary sources like different websites and other published resources.This is followed by advice from ICT experts, well known economist, statistician to complete the research. For this research, different books, journal, News channel are used to explore and contextualize the quantitative findings I hope such practices & implying method gives a strong understanding of the research problem, covering both general trends and detailed viewpoints. This research follows Pearson correlation coefficients & Multiple Linear Regression Model to test the hypothesis. SPSS software,WPS office, Google google sheet are applied to process the data for findings.Multiple Liner regression Model is established by following way.

The dependent variable socio-economic improvement (Y) can be modeled as a function of the independent variables (X), mediating variables (M), and control/error terms (ε).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \gamma_1 M_1 + \gamma_2 M_2 + \gamma_3 M_3 + \varepsilon$$

Where

β0 = Constant (intercept term).

βi = Coefficients of the independent variables(i= 1,2,3)

γj = Coefficients of the mediating variables (j=1,2,,3)

Extended Specification with Interaction Terms

If interactions between variables are significant, interaction terms can be included:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \gamma_1 M_1 + \gamma_2 M_2 + \gamma_3 M_3 + \delta_1 (X_1 \cdot M_1) + \delta_2 (X_2 \cdot M_2) + \varepsilon$$

Where δ1 & δ2 are coefficients for interaction terms.

The dependent variable Y) could be decomposed into a composite index or analyzed separately by creating sub-models for each indicator:

$$Y_1 = \beta_0^{(1)} + \beta_1^{(1)} X_1 + \beta_2^{(1)} X_2 + \beta_3^{(1)} X_3 + \gamma_1^{(1)} M_1 + \varepsilon_1$$
$$Y_2 = \beta_0^{(2)} + \beta_1^{(2)} X_1 + \beta_2^{(2)} X_2 + \beta_3^{(2)} X_3 + \gamma_1^{(2)} M_1 + \varepsilon_2$$
$$Y_3 = \beta_0^{(3)} + \beta_1^{(3)} X_1 + \beta_2^{(3)} X_2 + \beta_3^{(3)} X_3 + \gamma_1^{(3)} M_1 + \varepsilon_3$$

Poverty Rate--- Unemployment Rate

GDP Per Capita (PPP) -

Research Problems and Gaps

T he research topic is broad and spans multiple sectors. There is limited research on technology adoption for addressing socioeconomic challenges, and some number of research was conducted only focusing on modern technology adoption in the name of leastdeveloped countries. Because of the broad research topic, finding accurate data to prove the hypothesis is much more complicated, along with interpreting and concluding

the results.This causes a lot of confusion and creates dilemmas about how to start the research, especially when needing to connect socioeconomic factors with technology adoption. The successful form of this research paper is attributable to the factors like sustained effort over an extended period, invaluable support from relevant specialists, and the use of related precise materials.

Results and Discussion

Various data of Asian LDCs upto end of 2023(1)

LDC	Total Population (in million)	Percentage of Population Covered by Mobile Network (2023)	Internet users (% in Total Population) 2023	Social Media Users in Total Population
Afganistan	42.8	64.6	20	8.6
Bangladesh	173.8	108	45	30.34
Cambodia	17.03	144.7	56.7	68.4
Lao PDR	3.75	88.5	66.15	48.8
Myanmar	54.78	117.4	44	33.8
Nepal	31.07	120.6	51	43.5
Timor-Leste	1.37	122	54	42.2
Yemen	34.83	59.8	18	10.3

Table 2

Source -Various website

Various data of Asian LDCs upto end of 2023(2)

LDC	Total Population (in million)	GDP Per Capita, PPP(Current International Dollar):	Poverty Rate %	Unemployme
Afganistan	42.8	2213.3	47.5	15.40
Bangladesh	173.8	9147.8	18.7	5.06
Cambodia	17.03	7425.5	17.8	0.24
Lao PDR	3.75	9,291.8	16.87	1.2
Myanmar	54.78	5953.4	49.7	2.84
Nepal	31.07	5393.6	20.27	10.68
Timor-	1.37	4,804.0	45.8	1.52

Table 3

Source -Various website

The data reveals a crucial point: low unemployment rates do not guarantee low poverty rates. A substantial portion of the population may be employed in underpaid or informal jobs that lack sufficient wages, benefits, and security to lift individuals and families out of poverty. Timor-Leste exemplifies this, with a mere 1.52% unemployment rate yet a staggering 45.8% poverty rate. This highlights the necessity of evaluating employment quality, not just quantity, to assess economic well-being. The UN's recognition of Nepal, Lao PDR, Bangladesh (by 2026), and Myanmar (by 2029) as developing countries indicates significant progress. This advancement is likely fueled by increased access to ICT, which fosters economic growth, improves education and healthcare, and enhances governance. These countries likely also exhibit higher GDP per capita (PPP) and improvements in other key development indicators.

Pearson Correlation Coefficients of Table (2) and Table(3)

Correlations

		Internet users (% in Total Population) 2023	Social Media users (% in Total Population) 2023	Mobile network coverage (% in Total Population) 2023
Internet users (% in Total Population) 2023	Pearson Correlation	1	.896**	.721*
	Sig. (2-tailed)		.003	.044
	N	8	8	8
Social Media users (% in Total Population) 2023	Pearson Correlation	.896**	1	.852**
	Sig. (2-tailed)	.003		.007
	N	8	8	8
Mobile network coverage (% in Total Population) 2023	Pearson Correlation	.721*	.852**	1
	Sig. (2-tailed)	.044	.007	
	N	8	8	8

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4

Table 4 shows Internet & Social Media's correlation is 0.896 which indicates regions with greater internet access exhibit significantly higher social media usage. This highlights internet connectivity's crucial role in fostering social media adoption, a platform with the potential to drive economic growth and social inclusion. Similarly Mobile Coverage & Internet's correlation '0.72' suggests mobile networks are a primary internet access point. Expanding mobile coverage, especially in remote and least developed areas can significantly enhance internet penetration and unlock further socio-economic development opportunities. Mobile Coverage & Social Media's correlation '0.852' indicates theimportant role of mobile networks in enabling social media access. Upgraded mobile coverage enables individuals and communities, particularly in remote areas, to engage with social media platforms, facilitating access to information and contributing to socio-economic advancement.

Multiple Linear Regression of Table (2) and Table(3)

🗁🗁🗁 Povert Rate as Independent Variable and dependent variables relation.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1916.550	3	638.850	2.024	.253[b]
	Residual	1262.694	4	315.673		
	Total	3179.244	7			

a. Dependent Variable: Poverty Rate of each country upto 2023

b. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

Table 5

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	76.418	34.365		2.224	.090	-18.994	171.830		
	Internet users (% in Total Population) 2023	-.785	.896	-.630	-.875	.431	-3.273	1.704	.191	5.223
	Social Media users (% in Total Population) 2023	-.191	1.022	-.177	-.186	.861	-3.029	2.648	.110	9.126
	Mobile network coverage (% in Total Population) 2023	.016	.438	.022	.037	.973	-1.200	1.231	.266	3.760

a. Dependent Variable: Poverty Rate of each country upto 2023

Table 6

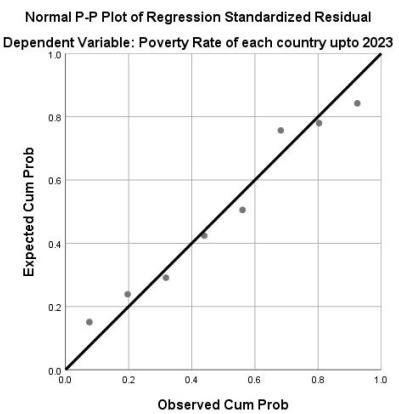


Figure 5

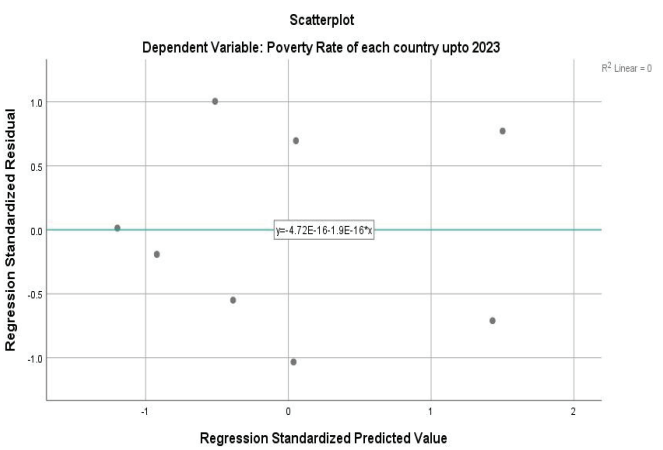


Fig. 6

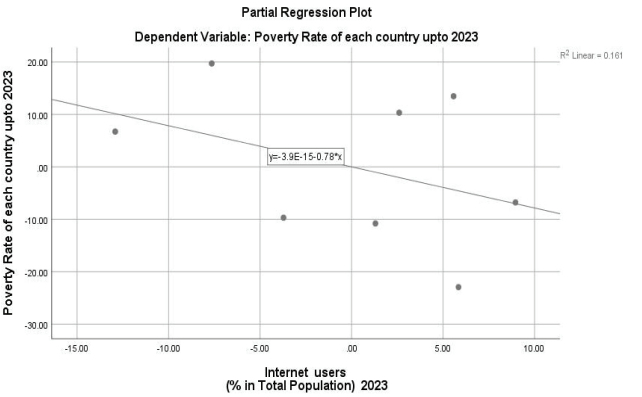


Fig.7

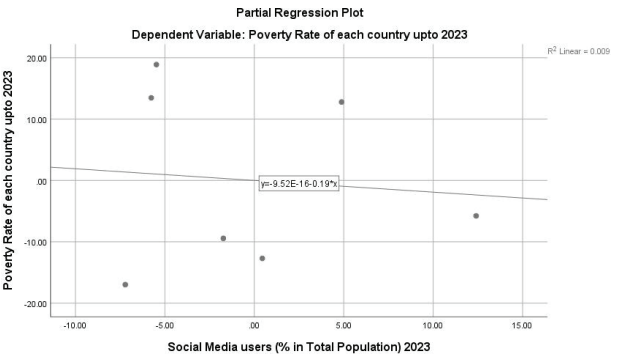


Fig.8

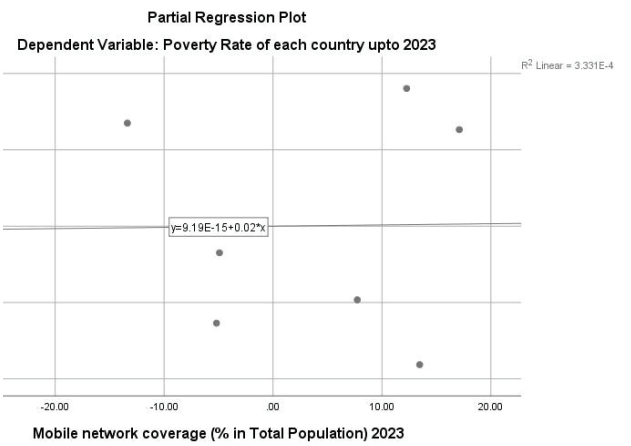


Fig.9Unemployment Rate as Independent Variable and dependent variables relation.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	258.653	3	86.218	5.756	.062[b]
	Residual	59.911	4	14.978		
	Total	318.565	7			

a. Dependent Variable: Unemployment rate of each country upto 2023

b. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

Table 7

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	26.381	7.485		3.524	.024	5.598	47.164		
	Internet users (% in Total Population) 2023	-.310	.195	-.787	-1.589	.187	-.852	.232	.191	5.223
	Social Media users (% in Total Population) 2023	.057	.223	.167	.256	.811	-.561	.675	.110	9.126
	Mobile network coverage (% in Total Population) 2023	-.076	.095	-.337	-.801	.468	-.341	.188	.266	3.760

a. Dependent Variable: Unemployment rate of each country upto 2023

Table 8

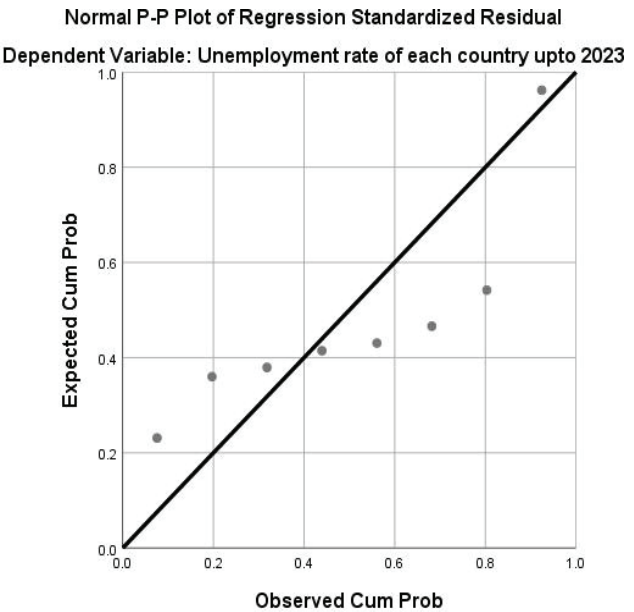


Fig.10

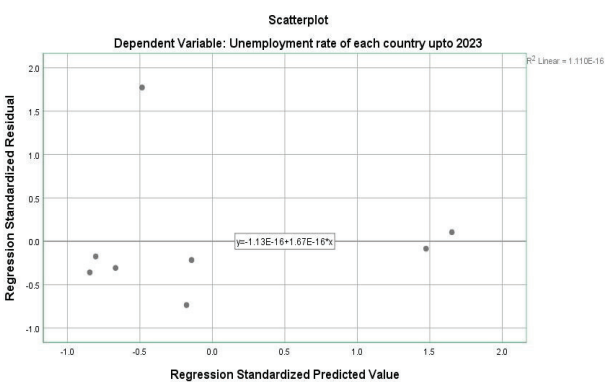


Fig.11

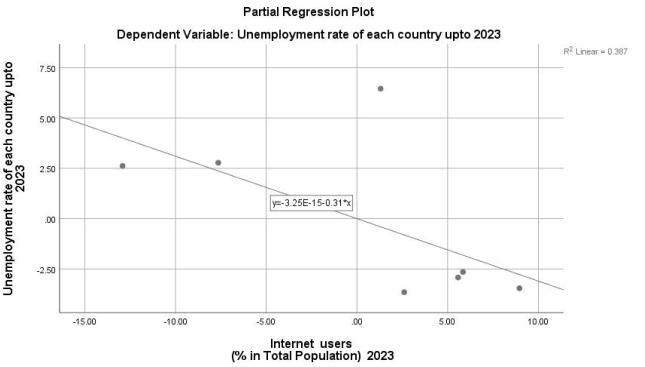


Fig.12

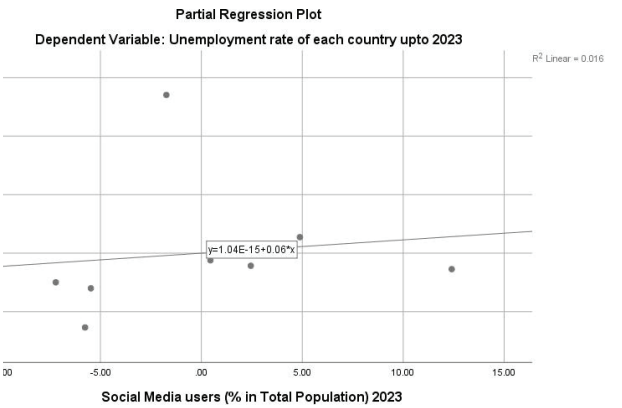


Fig.13

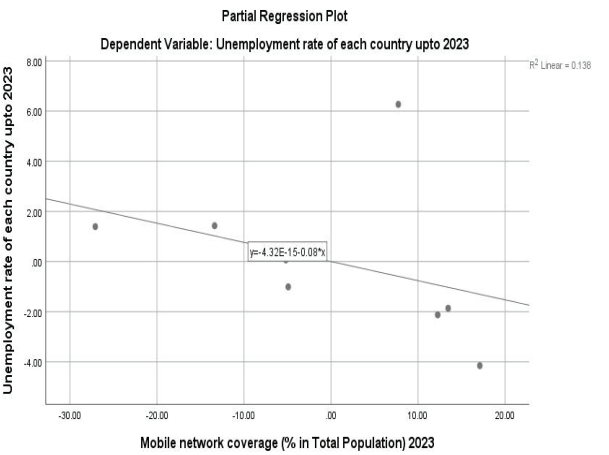


Fig.14

GDP per Capita PPP as Independent Variable and dependent variables relation.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29395195.94	3	9798398.646	2.238	.226[b]
	Residual	17516096.33	4	4379024.083		
	Total	46911292.27	7			

a. Dependent Variable: GDP Per Capita(PPP in Current International Dollar):

b. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

Table 9

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	994.247	4047.474		.246	.818	-10243.343	12231.836		
	Internet users (% in Total Population) 2023	146.656	105.551	.970	1.389	.237	-146.400	439.712	.191	5.223
	Social Media users (% in Total Population) 2023	-15.360	120.422	-.118	-.128	.905	-349.704	318.984	.110	9.126
	Mobile network coverage (% in Total Population) 2023	-9.943	51.562	-.114	-.193	.856	-153.102	133.216	.266	3.760

a. Dependent Variable: GDP Per Capita(PPP in Current International Dollar):

Table 10

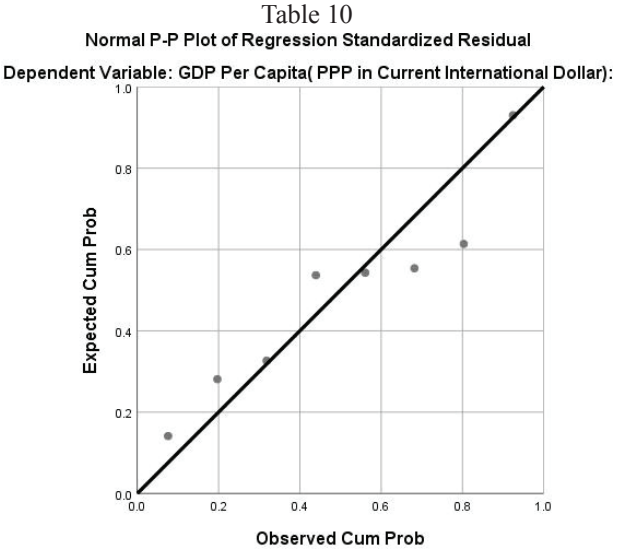


Fig.15

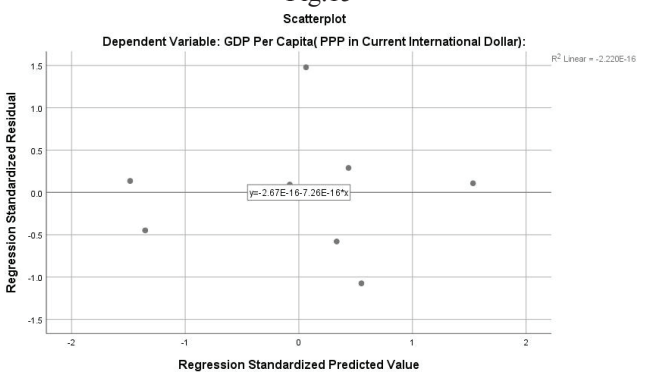


Fig.16

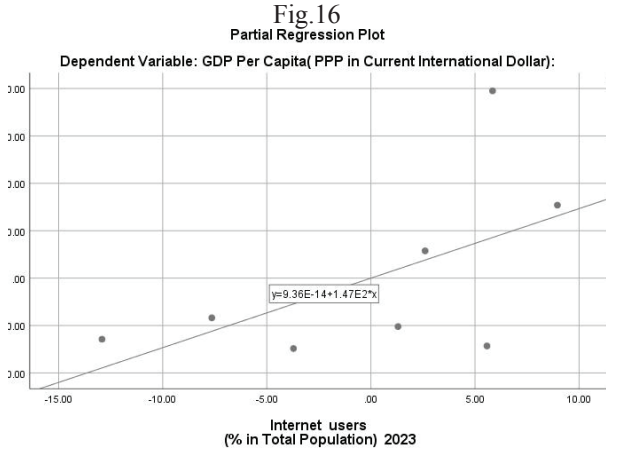


Fig.17

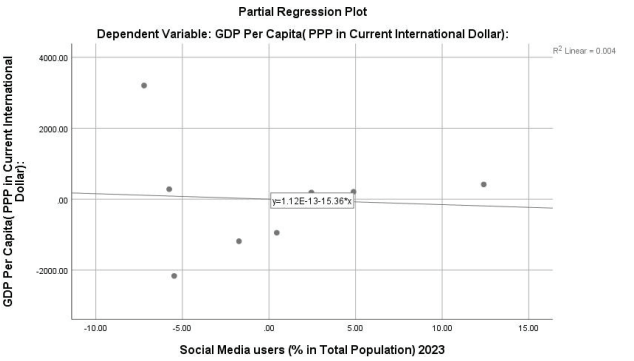


Fig.18

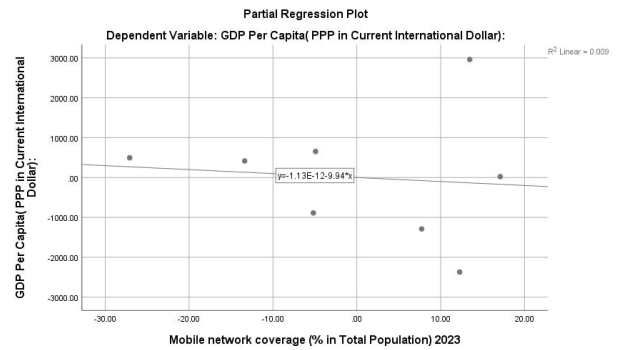


Fig.19

Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.776[a]	.603	.305	17.76720	.603	2.024	3	4	.253	1.336

a. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

b. Dependent Variable: Poverty Rate of each country upto 2023

Table-11

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.901[a]	.812	.671	3.87012	.812	5.756	3	4	.062	2.792

a. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

b. Dependent Variable: Unemployment rate of each country upto 2023

Table-12

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.792[a]	.627	.347	2092.61178	.627	2.238	3	4	.226	1.831

a. Predictors: (Constant), Mobile network coverage (% in Total Population) 2023, Internet users (% in Total Population) 2023, Social Media users (% in Total Population) 2023

b. Dependent Variable: GDP Per Capita(PPP in Current International Dollar):

Table-13

Overall Summary of Multiple Linear Regression result and its intrepretation.

Durbin Watson Test result in Table 11, Table 12 and Table 13 are 1.336, 2.792, 1.832. The statistical analysis indicates that the Durbin-Watson statistic falls within the range of 1 to 3, supporting the assumption of independence among data observations . Likewise, sig.F changes are accounted in the same table are .226, .253 and .062

respectively. F-test significance value (p-value) exceeds 0.05, suggesting that the regression model explains a significant proportion of the variance in the dependent variable and is statistically meaningful overall. Similarly R-square changes in the same table are .627, .603 and .812. The R-square change values are close to 1, highlighting substantial improvement in the model's ability to explain variance. Furthermore, both the R-square and Adjusted R-squared values are greater than zero, signifying a better model fit while accounting for complexity. The Standard Error of the Estimate (SEE) indicates that the model predicts the data with high accuracy. Among the predictors, GDP per capita demonstrates a higher magnitude of influence, underscoring its substantial contribution to the model. These findings collectively affirm the robustness and predictive validity of the regression model.

If we check the Fig. 7& Fig.8, it shows poverty rate can be reduced by increasing use of internet and social media use in propotion to population. Fig.9 shows mobile network coverage has constant relation with povert rate. It may be reason of individuals occupying multiple SIM number for different purpose which result mobile network coverage is more than 100% population. Fig.12 & Fig.14 shows Unemployment rate can be mitigated by increasing the internet users and mobile network coverage. Fig.17 shows increasing number of internet users significantly contribute to increase the GDP per Capita(PPP). Fig.5, Fig.10 & Fig.15, we can observe that dots on the PP plot are closely distributed along with 45° fitted line, not exactly line. This shows residuals are approximately distributed which normality assumption of Regression Standard Residual is satisfied and attainable. So data is qualified for Multiple Linear Regression Analysis. Fig.6, Fig. 11 & Fig.16 show Residual Pattern appear randomly distributed around zero, indicating no obvious violations of linearity or homoscedasticity assumptions. The extremely low R2R^2R2 value (~0) suggests the model does not effectively explain the variation in GDP per capita (PPP). So model is fit .

Finding and Implication

The findings reveal that increased mobile and internet penetration rate along with social media users significantly enhance economic participation, fostering economic inclusion and driving GDP growth by rerducing poverty rate and employment rate in Asian Least Developed Countries. However, a persistent Technology Gap also termed as Digital Divide remains, with significant disparities in prioritized ICT adopiton in LDC s underscoring the need for targeted policies. Improvement in socioeconomic condition is most vital outcome, as increase in ICT components such as internet users, social media users and mobile network coverage facilitate greater access to education, telehealth, digital financial services like E-commerce, networking, mobile banking and many other beneficial services thereby improving individual and community well-being. We can use such technology to make drasrtic improvements, especially in providing affordable healthcare, education, and financial services. It may be more possible if government and private sector work together because it eases to afford technology and create new and better ways together to use it. This could lead to the creation of cost effective, appropriate and unique technology designed for inclusive technology access.

Despite these significant outcome, several challenges hinder the widespread adoption and effective utilization of such ICT components. Inadequate rural infrastructure, high costs associated with internet services, limited digital literacy and lack of good governance policy are some major constraints that must be addressed. Least Developed Countries are unable to provide affordable healthcare, education, and financial services and there is discrimination like biased health and education services and high income and wealth inequality. Data shows still large portion of people are suffering from extreme poverty. So to lessen the negative effect of such problem and solve this problem constructively, we need new ideas and to work together to make this happen.

The null hypothesis (H0), which posits no significant relationship between ICT access (mobile networks, internet, and social media) and development in LDCs, is rejected. This conclusion is supported by evidence of significant correlations between these technologies, as indicated by an F-test significance value (p-value) greater than

0.05. However, the alternative hypothesis (H1), which suggests a direct causal link between ICT access metrics (mobile network coverage, internet users, social media users) and economic and social development outcomes (poverty rate, GDP, unemployment level), is only partially accepted. While the results establish relationships between technological access metrics, they cannot directly attribute these metrics to specific development outcomes due to limitations in the data available.

Reliability Test- Cronebach's Alpha

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.899	.933	3

Table 14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Internet users (% in Total Population) 2023	138.9425	2283.550	.821	.809	.880
Social Media users (% in Total Population) 2023	147.5562	1912.475	.930	.890	.768
Mobile network coverage (% in Total Population) 2023	80.0988	1295.647	.812	.734	.940

Table 15

The Cronbach's Alpha of .899 suggests a high level of internal consistency among the three items, implying that they effectively measure the same underlying construct. Furthermore, the Cronbach's Alpha Based on Standardized Items, which standardizes items before calculation, yielded a slightly higher value of .933. This increase likely stems from the standardization process accounting for differences in item variances, leading to a more robust reliability estimate. Similarly in Table 15, Internet users, Social media's users & Mobile network coverage's 'Cronbach's Alpha if Item Deleted' are .880, .768 & .940 . This suggests that the item is well- aligned with the construct being measured and contributes positively to the internal consistency.Test applied in this research is reliable.

Conclusion

The research concludes that increased mobile and internet penetration, along with social media usage, significantly enhances economic participation, driving GDP growth and reducing poverty and unemployment rates in Asian Least Developed Countries (LDCs). Prioritized modern technology adoption facilitates access to education, telehealth, e-commerce, mobile banking, and digital financial services, thereby improving individual and community well-being. Despite these benefits, a persistent technology gap, characterized by disparities in ICT adoption due to inadequate rural infrastructure, high internet costs, limited digital literacy, and weak governance.

Effective policies are essential to overcome these challenges. Governments and private sectors should collaborate to provide affordable healthcare, education, and financial services, leveraging technology for inclusive growth. Subsidizing for easy internet access, expanding rural mobile networks, and promoting digital skills training through public-private partnerships will be key strategies. Innovations must prioritize affordability and accessibility to meet the unique needs of underprivileged and underserved population. Furthermore, tough monitoring and evaluation mechanisms are necessary to assess socio-economic impacts, using metrics like employment, literacy, and healthcare access. Addressing such issues constructively requires new ideas and collaborative efforts to bridge the Technology Gap and prioritizing technology adoption is most crucial step. By focussing on this fact, this research tries to demonstrate that fostering socio-economic development in Least Developed Countries (LDCs) can be achieved through equitable access to Information and Communication Technology (ICT).

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The Role of AI in Protecting Digital Identity in Cybersecurity

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Abstract

Background: The integration of Artificial Intelligence (AI) into cybersecurity has revolutionized identity management, particularly in preventing Account Takeover (ATO) and enhancing overall digital security. Traditional methods often struggle to keep pace with the evolving tactics of cyber threats, necessitating advanced solutions to safeguard digital identities effectively.

Aim: This article aims to explore the transformative impact of AI on identity management within the cybersecurity domain, highlighting its benefits, challenges, and future prospects.

Methodology: The study synthesizes current literature and empirical findings on the role of AI in identity management, analyzing its application through machine learning, deep learning, and neural networks. It examines how AI enables real-time anomaly detection, proactive defense mechanisms, and enhances the resilience of identity protection systems.

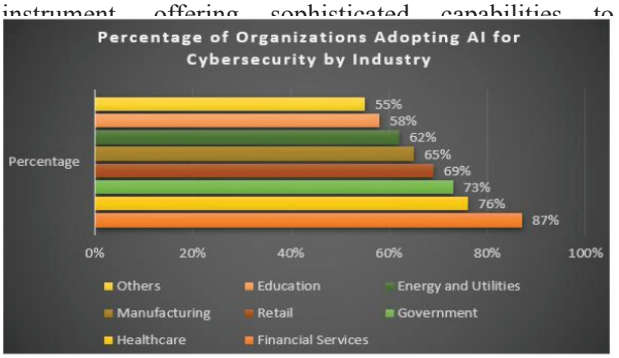
Results: AI-powered systems demonstrate significant advantages in adapting to evolving security threats, providing real-time analysis, and understanding contextual nuances of user behavior. They effectively mitigate risks associated with unauthorized access attempts, thereby safeguarding sensitive data and bolstering overall cybersecurity posture.

Findings: Key findings underscore AI's capability to continuously learn from emerging attack tactics, facilitate interpretability of security incidents, and foster collaborative frameworks between AI systems and human experts. Addressing challenges such as ethical considerations, biases in algorithms, and ensuring transparency remains crucial for ethical deployment and effective integration of AI in cybersecurity.

Keywords: *Cyber Security, Artificial Intelligence (AI), Data Protection, Threat Detection, Identity Management*

1. **Introduction**

The field of Cyber Security has seen a substantial transition with the introduction of Artificial Intelligence (AI), particularly in the vital areas of Account Takeover (ATO) prevention and Identity Management [1]. It might be difficult for traditional security measures to keep up with the more sophisticated attackers due to the constantly shifting landscape of cyber threats [2]. The field of artificial intelligence has evolved as a transformative instrument offering sophisticated capabilities to



Graph 1: Adoption of AI in Cybersecurity by Industry

2. **Literature Review**

Camacho (2024) outlined the applications of AI in cybersecurity, including threat detection, vulnerability assessment, incident response, and predictive analysis. Artificial intelligence (AI) systems quickly analyzed enormous amounts of data to find unusual patterns suggestive of possible security breaches by utilizing machine learning techniques. Furthermore, proactive defense mechanisms were made possible by AI-driven technology, giving organizations the ability to proactively minimize risks and protect sensitive information. But the use of AI in cybersecurity also brought up important privacy and ethical issues, so its application must be approached with balance. After conducting a thorough analysis, Camacho emphasized how cybersecurity frameworks must include artificial intelligence (AI) in order to successfully mitigate threats in the digital age.

Varney (2019) examined how artificial intelligence (AI) changed cybersecurity and safeguarded digital ecosystems, pointing out that AI performed better on cognitive tasks than humans, allowing for more complex attacks. The study made clear the necessity of continuing research to improve defenses against threats like malware and phishing that are enabled by AI. It also covered the unethical differences in AI application between the US and its enemies. Expert systems have been proposed as a way to use AI's ability to identify patterns for defense.

Chakraborty et al. (2023) talked about how the digital

era's technical advancements automated daily tasks but lacked adequate security. They emphasized how difficult it is becoming to secure connected devices and how sophisticated AI-driven cyber threats are becoming more prevalent. The authors looked at both traditional and sophisticated defense strategies against cyberattacks before offering some possible future uses for AI in cybersecurity.

Mohammed (2020) talked about how AI may be used to solve cybersecurity problems while highlighting the risks associated with the digital revolution, like data mining and exploitation. It emphasized the value of managing digital identities as well as the possibilities of block chain technology. In order to combat cybercrime, the report emphasized the necessity for more secure data storage techniques and the shortcomings of conventional systems. Lastly, it discussed how AI may help reduce cyberattacks and solve cybersecurity issues.

Ansari et al. (2022) explored the use of artificial intelligence (AI) in cybersecurity, emphasizing the technology's expanding impact on the sector. They observed that, as information technology becomes more prevalent in enterprises, cybersecurity is becoming more and more important in the technology sector. The study covered how artificial intelligence (AI) has greatly impacted cybersecurity and how this has resulted in the notable inclusion of machine learning in new cybersecurity-related technologies. In order to examine the overall effects of artificial intelligence on cybersecurity, the writers reviewed the literature, examining both the advantages and disadvantages of the technology.

3. **Ai In Identity Management**

The role of AI in securing digital identities

Artificial intelligence plays a crucial role in preserving the security of digital identities through the application of state-of-the-art techniques such as machine learning, deep learning, and neural networks. Artificial intelligence (AI) systems possess the capacity to scrutinize copious amounts of data, encompassing user behavior patterns, gadget fingerprints, and contextual details, with the aim of constructing a comprehensive comprehension of every individual's digital identity [6]. Artificial intelligence (AI) can detect anomalies or unauthorized access attempts quickly by establishing a typical user behavior, which can help detect potential security breaches promptly [7].

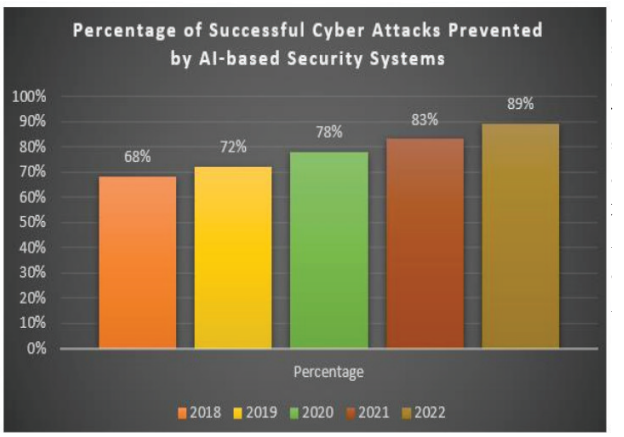
Understanding contextual nuances and user behavior

AI systems are very good at understanding the nuances and complexity of human behavior, which is essential for identity management to work. By examining user activities such as device usage, network activity, and login times, AI may get a thorough grasp of each user's unique behavioral signature [8]. AI can distinguish between legitimate user behaviors and suspect activity thanks to this contextual understanding, even in situations where the latter may resemble the former quite a bit .

Real-time anomaly detection

The capacity of AI to detect anomalies in real-time is one of its primary benefits for identity management. AI systems monitor user behavior continuously, contrasting it with known threat patterns and behavioral baselines [9]. AI has the ability to detect anomalies, such as an odd login location or an abrupt shift in user behavior, and to set off pre-established security protocols and generate notifications. Preventing unwanted access and lessening the effects of any security breaches require the capacity to detect in real time.

Proactive defense against unauthorized access attempts



Graph 2: Percentage of Successful Cyber Attacks Prevented by AI-based Security Systems

Recognizing patterns indicative of compromised accounts

The detection of patterns that indicate compromised accounts is a critical function of artificial intelligence, which aids in the prevention of Account Takeover (ATO). Large amounts of data, including login attempts, user behavior, and device information, can be analyzed by machine learning algorithms to find potentially suspicious activity [11]. AI, for example, can detect unusual login locations, sudden changes in a user's behavior, or multiple failed attempts at authentication, all of which could be signs of an account compromise. When these trends are identified in a timely manner, AI-powered systems can initiate alerts and quickly take corrective action, like freezing an account or adding further verification processes.

Employing multi-factor authentication

The effectiveness of multi-factor authentication (MFA) in preventing unwanted access is greatly increased by AI. Conventional MFA relies on inflexible guidelines and preset challenges that proficient attackers can easily circumvent. In contrast, MFA that is powered by AI dynamically modifies authentication difficulties according to environmental circumstances and the user's risk profile [12]. For instance, AI may request additional authentication information from the user, such as biometric data or a one-time password, if it detects a login attempt from an unknown device or location. Organizations can utilize risk-based authentication with AI, enabling the deployment of the appropriate level of security in response to the perceived threat level.

Continuous learning from evolving attack tactics

AI gives security systems the ability to predict changing attack strategies and react continuously, keeping them one step ahead of their enemies. Cybercriminals are constantly coming up with new techniques to launch ATO attacks, such as social engineering, credential stuffing, and phishing. Artificial intelligence (AI)-enabled systems can learn from changing strategies by analyzing past attack data, seeing new trends, and then updating their algorithms. Organizations are able to maintain a robust defense against attempts to obtain unauthorized access and respond to evolving risks thanks to this continuous learning process. AI can also detect any security flaws in the system and recommend improvements to make it more secure overall.

Enhancing the resilience of identity protection mechanisms

By providing an additional layer of security, artificial intelligence fortifies the resilience of identity protection systems. Passwords and security questions are examples of traditional identity protection techniques that are commonly vulnerable to social engineering and brute-force attacks. By applying cutting-edge methods like behavioral biometrics and user profiling, AI can improve these mechanisms. To create a unique behavioral signature, AI, for example, might examine a variety of inputs, including mouse movements, typing habits, and device interactions. Along with more traditional authentication techniques, this signature can be used to confirm the user's identity. By combining artificial intelligence (AI) with well-established identity protection protocols, businesses may create a strong, adaptable security framework that effectively thwarts efforts by unauthorized individuals to gain access.

ADVANTAGES OF AI IN IDENTITY MANAGEMENT

Table 1: Advantages of AI in Identity Management

Advantage	Description
Adaptability to evolving security tactics	AI algorithms can quickly learn and adapt to new security threats, ensuring that the system remains effective against the latest attack tactics.
Providing interpretable insights	AI-powered systems offer interpretable insights into security incidents, enabling security teams to understand the underlying causes and take appropriate actions.
Real-time analysis for efficient response	AI enables real-time analysis of identity-related data, facilitating efficient response mechanisms to security incidents and minimizing the potential impact.
Understanding contextual nuances	AI excels at understanding contextual nuances and learning from diverse cyber scenarios, enhancing its effectiveness in identifying and mitigating identity-related risks.
Proactive defense against emerging threats	AI enables a proactive defense against emerging threats by continuously monitoring user behavior and system activity, allowing organizations to take preventive measures.
Mitigating risks and safeguarding sensitive data	AI plays a crucial role in mitigating risks and safeguarding sensitive information by implementing robust access controls, monitoring mechanisms, and detecting anomalous activities.

Adaptability to evolving security tactics

Because AI is so flexible, it provides a huge advantage in identity management when it comes to adjusting to

evolving security strategies. Artificial intelligence (AI) has the capacity to pick up on changes in cybercrimes' tactics swiftly, as they are constantly evolving [13]. AI algorithms may automatically update their threat detection models by analyzing large volumes of data and spotting new trends, which keeps the security system up to date against the most modern dangers. To stay ahead of opponents and keep up a strong defense against identity-related attacks, one must be flexible.

Providing interpretable insights into security incidents

Identity management systems driven by artificial intelligence (AI) offer insightful information about security events, enabling security teams to comprehend the type and source of risks. AI is capable of producing in-depth reports and visualizations that offer thorough justifications for the choices it makes. These revelations may include the particular behavior. The information offered includes the precise patterns of behavior or abnormalities that set off an alarm, the sequence of events that preceded the incident, and the possible effects on the organizations. Security teams are capable of prioritizing response actions, making well-informed judgements, and successfully reducing risks [14].

Real-time analysis for efficient response mechanisms

AI makes it possible to analyses identity-related data quickly, which facilitates the development of efficient reaction plans for security events. AI is capable of identifying abnormalities and possible threats in real-time by utilizing its enormous data processing capabilities. Security teams may act quickly by blocking bogus login attempts, isolating affected accounts, or triggering incident response procedures thanks to this real-time analysis. AI is essential in decreasing the possible impact of identity-related attacks and helping organizations maintain the integrity of their systems by shortening the time lag between threat detection and reaction.

Understanding contextual nuances and learning from diverse cyber scenarios

AI exhibits a great capacity to learn from a variety of cyber scenarios and grasp the complex intricacies of identity management. AI has the capacity to generate comprehensive profiles of both common and uncommon actions by analyzing a variety of data points, including user behavior, device information, and network activity. AI can differentiate between legitimate user behaviors and possible dangers even in situations where the differences are subtle because to its contextual understanding [15]. Furthermore, AI continuously improves its algorithms and gains accuracy over time by learning from a variety of cyber scenarios it encounters. AI is a powerful tool for identifying and reducing identity-related hazards because of its ability to understand context and learn from experience.

Proactive defense against emerging threats

AI strengthens identity management's proactive defense against new threats [16]. AI can identify possible weaknesses and weak points in the security posture by continuously monitoring user behavior and system activity. Businesses that adopt a proactive approach may be able to patch security flaws before hackers can exploit them. AI can also assess the effectiveness of existing security measures and simulate different attack scenarios, which helps organizations find and fix weaknesses in their identity management systems. Organizations can keep ahead of adversaries and lower the likelihood of successful identity-related attacks by implementing a proactive approach with AI.

Mitigating risks and safeguarding sensitive information

In identity management, artificial intelligence (AI) is essential for reducing risks and safeguarding sensitive data. Artificial Intelligence successfully lowers the risk of unauthorized access, data breaches, and identity theft by accurate identification and quick reaction to possible threats. Strict access controls can be enforced with the use of AI-powered solutions, ensuring that only authorized users have access to sensitive resources. Furthermore, AI can keep an eye on user behavior and spot any potentially worrying activities, such unusual data access patterns or attempts to harvest private information. AI helps organizations protect their most important assets and maintain the security, dependability, and accessibility of sensitive data by notifying security staff in a timely manner and putting preventive steps in place.

4. CHALLENGES AND CONSIDERATIONS

Machine learning and deep learning algorithms are used by cybersecurity experts to perform tasks like intrusion detection, malware analysis, and anomaly identification. Every algorithm has pros and cons of its own, and the best approach relies on the particular security problem that needs to be solved. Here are a few instances of outcomes from various algorithms:

- **Support Vector Machines (SVM):** SVM is a popular intrusion detection technique that has proven to be effective at recognizing known attacks. For example, SVM was used in conjunction with ant colony networks in a study by Feng et al. to detect network invasions. Using the KDD Cup 1999 dataset, the study attained an outstanding accuracy rate of 96.75%.
- **Deep Learning:** Deep learning methods such as Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) have demonstrated promising outcomes in identifying intricate and unfamiliar attacks. Jiang et al.

demonstrated a multi-channel CNN in their work that was able to identify clever attacks with remarkable accuracy—99.98%—on the NSL-KDD dataset. CNN and RNN were combined to create a deep learning method for network intrusion detection by Shone et al. Their accuracy on the KDD Cup 1999 dataset was 97.85%.

- **Ensemble Methods:** Several learning techniques combined improve robustness and speed. Xin et al. integrated deep belief networks (DBN) and support vector machines (SVM) to efficiently detect intrusions. They achieved an amazing accuracy rate of 99.14% on the NSL-KDD dataset.
- **Transfer Learning:** Utilizing expertise from one field to improve performance in another. Transfer learning is effective in detecting new attack patterns, as demonstrated by Gu et al. who used it to find weaknesses in the supply chain of the machine learning model.
- **Sequential Models:** Because sequential models are so good at modeling sequential data, they have been used extensively to identify IoT-botnet attacks. One example of this is Long Short-Term Memory (LSTM) networks. On a customized dataset, the LSTM-based method suggested by Soe et al. effectively identified IoT-botnet attacks with an astounding accuracy of 99.23%.

These findings demonstrate how various algorithms perform differently in some cybersecurity tasks. It's crucial to recognize the difficulties and restrictions associated with any method, though. These include the need for large-scale datasets that have been annotated, the potential for adversarial attacks, and the models' interpretability. Taking into account the unique requirements and constraints of respective cybersecurity applications, researchers and practitioners should carefully evaluate the suitability of different algorithms.

Table 2: Challenges and Considerations in Implementing AI for Cybersecurity

Challenge/ Consideration	Description
Ensuring the ethical use of AI	Organizations must establish clear guidelines and protocols to govern the collection, storage, and analysis of data used by AI systems, ensuring alignment with ethical principles and individual privacy rights.
Addressing potential biases in AI algorithms	To mitigate biases, organizations must ensure that the training data is diverse, representative, and free from discriminatory patterns, and regularly audit and test AI algorithms for fairness .
Maintaining transparency and accountability	Organizations should strive for explainable AI, where the reasoning behind AI decisions is clearly articulated, and establish accountability mechanisms, such as regular audits and oversight committees, to ensure responsible use of AI systems.
Collaborating with human experts	Effective collaboration between AI systems and human experts is essential for achieving optimal results, leveraging the strengths of both artificial and human intelligence to develop a comprehensive approach to cybersecurity.

Ensuring the ethical use of AI in Cyber Security

As AI grows more common in cybersecurity, ethical use becomes harder. AI systems may analyze massive amounts of sensitive data, raising privacy and abuse concerns. Clear policies and processes are needed to regulate AI data collection, storage, and processing. AI systems must also be responsible, open, and just. To maintain trust and avoid unanticipated consequences, AI systems must prioritize person rights and respect the law and ethics.

Addressing potential biases in AI algorithms

AI biases must be addressed in cybersecurity. When AI systems learn algorithms from biased data in the training set, biases may be reinforced. An AI system trained on a dataset of attacks from a given demographic may become biased in identifying threats from that demographic. This can cause false positives and unjust profiling. To reduce preconceptions, organizations must prioritize diverse, representative training data without bias. Audits and testing must be done often to discover and fix bias-related issues.

Maintaining transparency and accountability

Accountability and transparency are essential when employing AI in cybersecurity. AI systems' complicated and confusing decision-making mechanisms might make decisions hard for stakeholders to understand. AI-powered security systems without transparency may lose trust and raise issues about their impartiality. To solve this problem, organizations should aim toward explainable AI, which explains AI judgments to humans. Additionally,

oversight committees and frequent audits can help ensure that AI systems are working as planned and meeting organizational and legal standards.

Collaborating with human experts for optimal results

AI in cybersecurity requires human involvement for optimum results. Despite their proficiency at processing huge volumes of data and spotting hidden patterns, AI algorithms are worse at contextual comprehension and intuition than humans. Analysts must understand the security environment, analyze AI algorithm outputs, and make informed recommendations. Collaboration between artificial and human intelligence can boost cybersecurity. Organizations must encourage cooperation and give training to integrate AI technology into security operations.

5. Future Directions

Continuous advancements in AI technologies for Cyber Security

AI technology is improving cybersecurity and driving innovation. AI algorithms should improve our ability to solve complicated cybersecurity problems. Deep learning methods like generative adversarial networks (GANs) can provide more varied and realistic datasets to help AI models recognize and respond to new threats [22]. Advances in sentiment analysis and natural language processing (NLP) may allow AI systems to better interpret unstructured data like social media and forum postings to identify security issues. Advancements in AI technologies are expected to defend organizations against cyber-attacks.

Integration of AI with other emerging technologies (e.g., block chain, quantum computing)

AI in cybersecurity may take an interesting turn when combined with block chain and quantum computers. These technologies enable organizations to build resilient systems that can handle today's complicated threat scenario. Block chain technology can securely log security issues and protect AI model training data. Quantum computing could improve traditional computer systems by helping AI algorithms detect and respond to threats faster. As AI and cybersecurity technologies advance, we may expect new and inventive uses.

Fostering interdisciplinary research and collaboration

Interdisciplinary research and collaboration are needed to maximize AI's cybersecurity potential. Cybersecurity is complex and requires knowledge in computer science, mathematics, psychology, and social science. Collaboration between scholars and practitioners from diverse fields can improve cybersecurity. This strategy considers complicated organizational-human connections that determine cyber risk. This may encompass interdisciplinary research centers and programs and opportunities for industry, government, and academia to collaborate and share knowledge. By combining stakeholders' perspectives and expertise, we can build a more secure digital future.

6. Conclusion

In conclusion, the integration of artificial intelligence (AI) into cybersecurity has brought about significant transformations in identity management and threat detection. AI-powered systems offer unparalleled capabilities in securing digital identities, detecting anomalies, and preventing unauthorized access attempts through advanced machine learning algorithms and real-time analysis. Moreover, AI enables proactive defense mechanisms, continuous learning from evolving attack tactics, and the enhancement of resilience in identity protection mechanisms. Despite these advantages, challenges such as ensuring ethical use, addressing biases in AI algorithms, maintaining transparency and accountability, and collaborating effectively with human experts must be carefully considered and addressed.

Looking ahead, the future of AI in cybersecurity holds immense potential for further advancements. Continuous improvements in AI technologies are expected to enhance our ability to address complex cybersecurity issues, while integration with other emerging technologies like block chain and quantum computing promises to create stronger and more resilient cybersecurity systems. Fostering interdisciplinary research and collaboration will be crucial in fully realizing AI's potential in cybersecurity, as it requires expertise from various fields to tackle the multidimensional nature of cyber risk effectively. By leveraging AI technologies and fostering collaboration across disciplines, we can pave the way for a more robust and secure digital future.

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Effect of Trade Unionism on Government School Teachers' Performance in Kathmandu

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Abstract

This research aimed to identify the need for trade unions and examine the impact of trade union functions (TUF) on teachers' perceived performance (TPP) in government schools within Kathmandu Valley. By utilizing a survey research design and quantitative approach, the responses were gathered using five-point Likert scale. Collected cross-sectional data were analyzed as frequencies, and relationship between variables was assessed applying statistical techniques using SPSS. The research employed purposive sampling to collect the data from members of teachers' unions with 148 (81 percent) valid responses. Results revealed that trade unions significantly contribute to the professional development of teachers, improve working conditions, and enhance workplace harmony. These factors collectively foster motivation, and increase productivity. The study highlights the vital role of trade unions in shaping a supportive environment that promotes teacher welfare, career advancement, and overall educational success. The study depicted a strong, positive, and statistically significant impact of trade union functions (TUF) on teachers' perceived performance (TPP) in government schools. Future research can access the effects of trade unionism on teachers' performance including private sector schools that could provide valuable comparative insights. Moreover, studies in different regions or across various educational levels including other predictor variables could provide deeper understanding of the issue.

Keywords: *Professional Development, Trade Unions, Teachers' Performance, Upskilling, Workplace Harmony*

Introduction

A trade union, also known as a labor union, aims to improve working conditions, wages, and benefits for their members through collective bargaining and other forms of advocacy (Doucouliagos, & Freeman, 2017). Trade union existence bears statistical and economical important influence on employee performance and organizational productiveness (Morikawa, 2010). Worker performance and overall productivity are mostly associated with good employee abilities, encouragement, and good management. Unions affect the approach in which organizations react to economic fluctuations. In times of recessions, companies with unions have a tendency to utilize non-permanent growth rather than reductions in salaries which is not the case in non-unionized businesses. In reminiscence, in recurrent upturns, companies with unions call back comparatively more workers and non-union companies end up recruiting new workers (Freeman & Medoff, 1981). A substantial body of research has examined the relationship between trade unions and firm performance. It generally has found a positive relationship between unions and productivity and a negative relationship between unions and financial performance (Addison & Hirsch, 1989; Belman, 1992). Gunderson (2005) posits that combined with the renowned rent-seeking behaviour of unions, they may possess a favourable effect on performance by enunciating worker's worries, enhancing labour/management relationship, adding morale, and reducing overturn. antecedent work has proposed that this impact might be larger in the public sector as a result of growing devotion and diminished exit tendency of public workers.

However, the exit/voice model is most commonly used to explain this paradox (Freeman & Medoff, 1981). It argued that the 'monopoly power' of unions leads to high union wages and restrictive work rules, both of which raise the costs of production and lower profit margins. The presence of unions, however, also lowers production costs by reducing turnover (exit) and providing incentives for employee effort through 'collective voice'. Thus, unionized workplaces may be at once more productive but

less profitable because employees share in productivity gains through higher wages. In the developed countries like U.S. firms, particularly high tech and entrepreneurial firms, have adopted much more flexible approaches to organizing work, such as 'high performance work systems' (Welbourne & Batt, 1994), which reduce status differences between workers and managers. Mutual gains and win-win approaches to bargaining (McKersie et al., 1965) have transformed union-management relationships in many instances, leading to greater cooperation and less zero-sum conflict.

Teachers are organized in union in the in the government schools to fulfill the common purpose of their professional development. Unities assume that everyone in a union is a member of a team with a common purpose (Provis, 1996). So, teachers' union is always committed to assist their members for professional development. Similarly, teachers are organized in the union for the social network which helps to formulate the social capital of the teachers. Unions endeavor to build social capital among their members (Coleman, 1988). However, building social capital is challenging but possibly worthwhile since dense social networks are correlated with union knowledge which in turn is correlated with increased union contribution in the building of social capital on their members (Johnson & Jarley, 2005). Moreover, social capital is the useful resource which is formulated with social relationship through network developed by the teachers' union among their members (Field, 2008). Therefore, teachers' union can play the crucial role for the professional development of their members through the social capital formation. McNicholas et al. (2020) found trade unions helpful as they reduce exploitation of workers and also counteract the firm's monopolistic strength. In another study (Nkirote & Kiiru 2018) it is posited that if union problems are solved harmoniously and rapidly, improved performance of workers can be achieved in organizations. Broadly, it's not common to keep a great relationship between the administration and employees in bigger associations. Hence, workers turn to create trade union when they feel that there is little or no real connection between them, and the administration and attention are not given to their worries.

In the context of Nepal, the Nepal National Teachers Association, Nepal Teachers Association, and Institutional Schools' Teachers' Union (ISTU) reached agreements with local governments to establish social dialogue mechanisms in the year 2022. Teachers' trade union has been highly active to protect right and duties of the teachers of government school in Kathmandu valley, but the studies on their roles are very rare. Since much prior research on unions and financial performance in developed countries, this paper decided to revisit the question of the need, and relationship between union functions and performance of government school teachers. In this paper, the prior literature on this topic have been reviewed, including theoretical frameworks and the empirical evidence on the union-performance relationship. Then, the quantitative study of unions and performance in government schools. In the final section, the paper discussed its findings with the prior literature and suggests avenues for future research.

Literature Review

Social Exchange Theory (SET)

Social Exchange Theory (SET) provides a foundational framework for understanding workplace behavior, focusing on reciprocal relationships and their influence on organizational dynamics (Cropanzano & Mitchell, 2005). Rooted in sociology and anthropology, Blau (1964) expanded its scope to include power dynamics and economic exchanges, while Homans (1958) framed it as "social behavior as exchange." The theory emphasizes that mutual benefits, such as those facilitated by trade unions, foster trust, enhance commitment, and improve productivity by aligning employee goals with organizational objectives (Cropanzano et al., 2017).

Social Exchange Theory (SET) explains how trade unions contribute to fostering positive workplace relationships by addressing teachers' needs for better wages, job security, and improved working conditions (Cropanzano & Mitchell, 2005; Blau, 1964). These reciprocal exchanges strengthen trust, motivation, and performance, aligning teacher goals with organizational objectives (Homans, 1969; Chernyak-Hai & Rabenu, 2018). By creating mutual benefits, unions encourage higher engagement and commitment (Lyons & Scott, 2012). Furthermore, SET's application to fairness and workplace justice highlights how trade unions support equitable treatment, promoting enhanced productivity and morale (Tepper & Taylor, 2003; Cropanzano et al., 2017).

Trade Union

A trade union, also known as a labor union, is an organization of workers formed to protect and promote their collective interests. trade unions play a crucial role in protecting and advancing the interests of workers (Doucouliagos & Freeman, 2017). Unions significantly influenced the twentieth-century framework of educational reform, founded on the principle of equal opportunity and a certain level of public trust in the state (Derouet & Normand, 2011). Unions contributed to coalitions for transformation, particularly in the context of post-war (Allen, 1990) or post-dictatorship agreements. They anticipated that they might simultaneously promote their members' interests and enhance social provision levels (Fuller et al., 2000).

In Greek public education, there are two principal teacher trade unions with substantial political influence and they

emerged as key social actors in the 1980s. They influenced policies regarding teacher and school evaluation while vehemently opposing quality-oriented reforms. When government policy rapidly shifted towards a desire for more formal evaluation, opposition from unions effectively prevented its implementation (Stamelos & Bartzakli, 2013). The dynamics between the state and unions were significantly disrupted during the conflicts of the 1990s regarding the establishment of quality assurance mechanisms and instruments (Stamelos et al., 2012), partly in reaction to an alleged inadequacy of "schools as social institutions (Zambeta, 2002). Unions resisted policy and discursive pressures, partially engaging with emerging assessment discourses (Stamelos et al., 2012). They provided formal endorsement for a teacher development paradigm wherein evaluation serves a supportive function grounded in professional conversation, devoid of repercussions on career progression or compensation increases. Governments rejected this stance as the foundation for a lasting resolution. Nonetheless, despite persistent conflicts, teacher unions maintained a significant influence in the selection of school advisers and, more broadly, in the governance of the Greek education system (OECD, 2018).

In the Nepalese context, Nepal National Teachers Association (NNTA) was founded in 1979, affiliating with the Communist Party of Nepal (Unified Marxist-Leninist). It has over 70,000 members and is a charter member of Education International (EI). Nepal Teachers Association (NTA) was established in 1950, Nepal's most influential teachers' association. It has over 85,000 members and is affiliated with the Nepali Congress. Unified All Nepal Teachers Association is also inexistence in Nepal and is linked to the Communist Party of Nepal (Maoist Centre).

Perceived Performance

Organizational performance refers to how well an organization achieves its market-oriented goals (Li, 2006). Effective performance measurement is crucial for management and decision-making, as highlighted by Deming's assertion that improvement is impossible without measurement. Traditional performance evaluation methods focused solely on financial measures have been criticized as inadequate, prompting a shift toward integrating both financial and non-financial metrics (Yeniyurt, 2003). The Institutional and Organizational Assessment Model (IOA) emphasizes that organizational performance is multidimensional, encompassing effectiveness, relevance, efficiency, and financial viability (Lamba & Choudhary, 2013). Effectiveness relates to achieving strategic objectives, while efficiency focuses on optimal resource utilization and timely service delivery (Kavoo & Kiruri, 2013). Non-financial metrics encourage innovation and long-term planning while reducing short-termism and manipulation (Bricknell, 2006). Performance ultimately reflects an organization's ability to sustain operations and achieve goals over both short and long-term horizons (Afiza et al., 2015).

The prior study evidenced that enhancing teacher quality has been a significant component of the global educational reform agenda, advocated by both national governments and international organizations for four decades (Ozga et al., 2011). This has been implemented through policy instruments such as results-based accountability, performance-related compensation, enhanced school evaluation and inspection measures, and formal mechanisms for assessing individual teachers' performance (Clarke & Ozga, 2011; Grimaldi et al., 2019). Reforms to governance instruments often produce escalating performative pressures and unrest among principal education stakeholders (Verger et al., 2019), and "raising quality" has consistently been a domain of conflict among policy actors (Veloso et al., 2013; Grimaldi et al., 2019).

Trade Union Function and Performance

According to Doucouliagos and Freeman (2017) trade unionism is an activity performing trade union functions like collective bargaining, legal assistance to their members, promoting workplace safety and health. By focusing on these areas, trade unions contribute to the overall well-being and productivity of the workforce. The studies (Gichaba, 2013) found that trade unions secure workers' rights, including collective bargaining agreements (CBAs), employee welfare, code discipline, and regulations, which improve job security and working conditions leading the better performance. Similarly, trade unions improve the welfare of members by negotiating higher earnings, better working conditions, and increased job tenure (Mwabu, 2007). Proper management of labor activities can harmonize workplace relations and improve organizational performance (Akhaukwa et al., 2013). Trade unions enhance workplace peace, harmony, and discipline and participate in decision-making, which contributes to increased productivity and organizational success (Morikawa, 2010). Study of Nkirote and Kiiru (2018) depicted that resolving union issues harmoniously and promptly leads to improved employee performance. During economic fluctuations, unionized companies tend to retain employees in downturns and rehire more effectively in upturns, enhancing stability and productivity (Freeman & Medoff, 1981).

However, governments and employers associate trade union activities with strikes, slow-downs, or work stoppages, especially in developing countries, which disrupt organizational productivity (Hyman, 2007). Similarly, employers allege that unions focus solely on workers' rights while neglecting their obligations, leading to low productivity and poor organizational performance (Compa, 2004). Labor conflicts, stemming from demands for better pay and working conditions, often lead to strikes,

lock-ups, and unrest, disrupting public university operations (Akhaukwa et al., 2013). Similarly, trade unions may exert monopolistic pressure to demand high salaries and engage in malpractices (Olson, 2009) as well as rent-seeking behavior (Gunderson, 2005) that might create inefficiencies and hinder overall performance. These extracted findings provide a comprehensive overview of no uniform impact of trade union functions on performance; hence the study has developed the following hypothesis.

H1: There is positive and significant relationship between trade union functions and teachers' performance.

Conceptual Framework

A conceptual framework provides a structured approach for understanding relationships between variables, guiding research design, data collection, and analysis. It aligns objectives with theoretical underpinnings and ensures focus and coherence (Miles & Huberman, 1994). In quantitative research, it helps define variables, construct hypotheses, and create reliable measurement tools (Creswell, 2014). Hence, from the empirical studies, the following framework has been proposed for this study.

Research Methods

The paper has utilized the quantitative approach and survey research design to analyze the cross-sectional data. To achieve its goals, the research used the descriptive and inferential statistical techniques for identifying the nature of the data and causal relationship between the predictor and response variable respectively.

Sampling Design and Data Collection

The research population is defined as members of teachers' unions in Kathmandu valley. Purposive sampling technique has been applied in this study with the expectation that findings will supply strong suggestive insights for understanding the need and impact of trade union functions for improvements in performance. Primary data was collected by distributing questionnaires to the teachers of government schools in Kathmandu valley with a considerable representation of the population. A total of 200 questionnaires were printed; 183 questionnaires were distributed to the teachers of government schools and, 166 questionnaires were returned back by the respondents. Out of them, 18 questionnaires were with incomplete information. Hence, 148 completely filled responses were used in the study for analysis.

Result and Discussion

Demographic Characteristics of Respondents

Demographic characteristics of respondents include the variables, gender, marital status, age, education and religion, which are presented in Table 1. The demographic variable shows that there are more female teachers (77) in comparison to male teachers (71). The number of married teachers is highest i.e. 98 (66.2 percent), the number of unmarried (single) teachers is second highest i.e. 45 (30.4 percent), widow and divorced are 3 (2 percent) and 2 (1.4 percent) respectively. Majority of the teachers are from age group 26-35 years i.e. 34 (23 percent), the teachers from age group 36-45 years and 46-55 years is equal i.e. 33 (22.3 percent), senior teacher with age above 55 are 26 in number (17.6 percent) and numbers of teachers below age 25 years are 22 (14.9 percent).

Table 1. Profile of respondents

Variables	Characteristics	Frequency	Percent
Gender	Male	71	48.0
	Female	77	52.0
	Total	**148**	**100.0**
Marital Status	Single	45	30.4
	Married	98	66.2
	Divorced	2	1.4
	Widow	3	2.0
	Total	**148**	**100.0**
Age	Below 25	22	14.9
	26-35	34	23.0
	36-45	33	22.3
	46-55	33	22.3
	Above 55	26	17.6
	Total	**148**	**100.0**
Education	Below 10+2	13	8.8
	10+2	53	35.8
	Bachelor	58	39.2
	Master's	22	14.9
	Above Master	2	1.4
	Total	**148**	**100.0**
Religion	Hinduism	102	68.9
	Buddhism	38	25.7
	Christianity	4	2.7
	Muslim	1	.7
	Others	3	2.0
	Total	**148**	**100.0**

Table 1 also shows that majority i.e. 58 persons (39.2 percent) of the teachers have bachelor's degree, 53 (35.8 percent) teachers have 10+2 level education, 53 (39.8 percent) teachers have below 10+2 level education, 22 (14.9 percent) teachers have master's degree and only 2 (1.4 percent) teachers are with M. Phil or Ph.D. level academic qualification. Majority of the respondents 102 (68.9 percent) are Hindus, 38 (25.7 percent) are Buddhist, 4 (2.7 percent) are Christian, 1 (0.7 percent) are Muslim and 3 (2 percent) are from other religious group.

Table 2. Teachers' perception on the need of trade union

SN	Items	SD%	D%	N%	A%	SA%
1	All teachers are represented collectively under a unified trade union structure.	0	4.1	5.4	55.4	35.1
2	Teachers secure social, political, and economic justice through collaborative efforts.	0	12.8	15.5	52.7	18.9
3	Members of unions receive support to enhance wages, reduce working hours, and improve workplace conditions.	1.4	6.1	24.3	50.7	17.6
4	Assistance is provided to unions for engaging in collective bargaining on behalf of teachers.	0	4.7	24.3	52.7	18.2
5	The trade unions play vital role in the promotion of teachers and productivity in the workplace.	.7	12.8	33.8	45.9	6.8
6	Traditions and institutions are safeguarded to protect the rights and freedoms of teachers while promoting their development.	.7	10.1	25.7	50.7	12.8

Table 2 shows that maximum teachers' perception toward trade unions activities is highly positive as majority of the respondent teachers agreed that 'all the teachers are represented collectively under a unified trade union structure' (52.4 percent). No one disagreed the statement 'teachers' secure social, political, and economic justice through collaborative efforts' which is agreed by 52.7 percent of the respondents. 50.7 percent respondents agreed that 'members of unions receive support to enhance wages, reduce working hours, and improve workplace conditions.' Affiliated unions are assisted to undertake collective bargaining on behalf of teachers, this statement also agreed by 52.7 percent respondent teachers. 45.9 percent respondent teachers agreed that the trade union play vital role in the promotion of teachers and productivity of the organization. The traditions and institutions are safeguarded to protect the rights and freedoms of teachers while promoting their development in workplace of the teachers also agreed by 50.7 percent of the respondents. Hence, it can be concluded that the existence of trade unions is very important for the promotion, betterment, growth of the teachers, and increased productivity in the government schools in Kathmandu valley.

Table 3. Teachers' trade union functions (TUF)

SN	Items	SD%	D%	N%	A%	SA%
1	Teachers are supported in achieving higher wages and improved working conditions.	1.4	12.8	12.8	52.0	20.9
2	The socio-economic standing of teachers is elevated.	5.4	20.9	21.6	50.7	1.4
3	Protections are ensured to safeguard teachers from victimization and injustices.	2.0	18.2	8.1	44.6	27.0
4	Welfare initiatives are implemented to boost teachers' morale.	6.1	19.6	13.5	59.5	1.4
5	Teachers experience increased self-confidence.	2.0	15.5	10.8	67.6	4.1
6	Enhanced opportunities for career advancement and personal growth are provided.	0	13.5	8.1	70.3	8.1

Table 3 shows that for enhanced opportunities for career advancement and personal growth, the trade union play significant role because the statement is agreed by majority (70.3 percent) of the respondent teachers. 67.6 percent of the respondents agreed that the trade union function is important for improved self confidence among teachers. The table also shows that trade union takes the adequate initiatives for teachers' welfare to boost their morale as 59.5 percent of the respondent agreed the statement. Trade unions activities certainly raise the teachers' socio-economic status because 50.7 percent of the respondent teachers agreed the statement. For the achievement of higher wage and better working condition also teachers trade union is necessary because majority (52 percent) of the respondent agree the statement.

Table 4. Teachers' perceived performance (TPP)

SN	Items	SD%	D%	N%	A%	SA%
1	Provides job security, reducing pressure and enhancing productivity and efficiency.	1.4	7.4	11.5	54.1	25.7
2	On-the-job incentives improve teachers' skills.	5.4	14.2	10.1	58.8	11.5
3	Job stability fosters higher dedication among teachers.	1.4	2.7	7.4	57.4	31.1
4	Promotes punctuality in work attendance.	1.4	6.8	4.7	57.4	29.7
5	Aligns teachers' objectives with organizational goals, leading to more effective management by objectives (MBO).	6.1	16.2	18.9	46.6	12.2
6	More effectively addresses students' needs.	4.1	13.5	8.8	52.7	20.9

Table 5 shows the respondents agreement to the items related to the perceived performance of them in the government schools in the presence of trade unions. Majority of the (58.8 percent) think that it helps to improve the teacher's skills. Similarly, the teachers agreed that fostering the higher dedication and promoting punctuality also will be improved (57.4 percent) leading to higher performance. The teachers as the members of trade unions will be able to more effectively address students' needs (52.7 percent). The response from teachers shows a cautious situation as well on aligning teachers' objectives with organizational goals (46.6 percent). This shows a warning bell to be more attentive for leading to more effective management by objectives (MBO) while joining as the member of trade union.

Table 5. Reliability test and correlation matrix

Variables	Items	Cronbach's Alpha	Mean	Std. Deviation	TUF	TPP
TUF	6	0.881	3.559	.757	1	
TPP	6	0.914	3.821	.774	.672**	1

Note: Correlation is significant at the 0.01 level (2-tailed). (TUF = Trade union function, TPP = Teachers perceived performance)

The table 5 depicts the reliability, descriptive statistics, and correlation metrics of two variables i.e. Trade Union Functions (TUF) and Teachers' Performance and Productivity (TPP). TUF is measured with 6 items and has a high reliability score (Cronbach's Alpha = 0.881), indicating internal consistency. Its mean is 3.5597 (SD = 0.75768), reflecting moderate agreement among respondents. In the same way, TPP also consists 6 items, achieving a higher reliability score (0.914) showing the internal consistency. Its mean is 3.8214 (SD = 0.77405), suggesting slightly higher agreement. The correlation between TUF and TPP is significant ($r = 0.672$, $p < 0.01$), indicating a strong positive relationship. This suggests that effective trade union functions are associated with improved teacher performance and productivity.

Table 6. Regression analysis

Predictor variable	Unstandardized Coefficients (B)	t-value	p-value
(Constant)	7.652	5.390	.000
Trade union function (TUF)	4.281	10.973	.000
$R = 0.672$; $R^2 = 0.452$; Adjusted $R^2 = 0.448$; Standard Error of the Estimate = 3.548; F – value = 120.407; p – value of F test = .000; Sig. level = 5%; Response variable: Teachers perceived performance (TPP)			
Model: TPP = 7.652 + 4.281 × TUF + e			

Table 6 shows the regression analysis of the predictor trade union function (TUF) on the response variable, teachers perceived performance (TPP). The R^2 value of 0.452 suggests that 45.2% of the variance in TPP can be explained by TUF. The ANOVA result shows the regression model is statistically significant ($F = 120.407$, $p < 0.001$), meaning that TUF significantly predicts TPP. As per the regression equation the unstandardized coefficient for TUF is 4.281, meaning that for each percentage increase in TUF, TPP increases by 4.281 percentage. The standardized coefficient (Beta) is 0.672, indicating a strong positive impact of TUF on TPP. The t-value for TUF is 10.973 ($p < 0.001$), which is highly significant. Hence, the hypothesis for the study has been accepted. The results of the analysis indicate a strong, positive, and statistically significant impact of Trade Union Function (TUF) on Teachers Perceived Performance (TPP) in government schools of Kathmandu valley. The regression model explains a significant portion of the variance in TPP, with TUF acting as a key predictor. The findings suggest that improvements in trade union functioning are likely to enhance teachers' perceptions of their performance.

Discussion

The major purpose of this research paper was to identify the need of trade union as well as to examine the influence of trade union functions (TUF) on teachers' perceived performance (TPP) in government schools of Kathmandu Valley. The study findings reveal that there is a need of trade union among teachers in government schools in Kathmandu Valley. The findings are consistent with prior research emphasizing the positive influence of trade unions on enhancing working conditions, job satisfaction, and productivity. Addison and Schnabel (2003) and

Morikawa (2010) highlighted unions' roles in fostering workplace harmony and improving employee well-being. Mwabu (2008) also demonstrated that unions secure higher wages and job security, which align with this study's findings. However, certain inconsistencies were observed. Gunderson (2005) and Olson (2009) argued that unions might hinder performance by engaging in rent-seeking behaviors or creating inefficiencies through strikes or monopolistic practices. Similarly, Akhaukwa et al. (2013) noted disruptions caused by labor conflicts, contrasting the current study's positive findings. These mixed results suggest that the impact of unions depends on the context, emphasizing the need for balanced trade union strategies to optimize organizational outcomes.

The study also examined the impact of trade union functions (TUF) on teachers' perceived performance (TPP) in government schools in Kathmandu Valley. The findings of this study reveal a strong, positive, and statistically significant impact of trade union functions (TUF) on teachers' perceived performance (TPP). The findings are consistent with prior research emphasizing the positive influence of trade unions on enhancing working conditions, job satisfaction, and productivity. These findings align with Doucouliagos and Freeman (2017), who emphasized the role of unions in promoting workplace safety, legal assistance, and collective bargaining, which collectively enhance employee well-being and productivity. Similarly, Schultz and Mwabu (2008) and Freeman and Medoff (1981) highlighted unions' contribution to job security, better working conditions, and employment stabilization during economic fluctuations. Addison and Schnabel (2003) and Morikawa (2010) also noted that trade unions facilitate workplace peace, harmony, and discipline, further supporting organizational success. Additionally, studies by Akhaukwa et al., (2013) and Nkirote and Kiiru (2018) confirmed that harmonious resolution of union issues positively affects employee performance.

Conversely, the findings challenge critiques from Gunderson (2005), Olson (2009), and Hyman (2007), who argued that unions could exhibit rent-seeking behavior, monopolistic tendencies, and strike actions, potentially disrupting productivity. Compa (2004) and Akhaukwa et al. (2013) highlighted labor conflicts arising from union demands, which can lead to unrest and inefficiencies. These mixed perspectives illustrate the dual impact of trade unions. While challenges exist, as noted by Gichaba (2013), this study supports the argument that effective union management and collaboration can mitigate disruptions and optimize teachers' performance in government schools within Kathmandu.

Conclusion

This study identified the need and examined the role of trade unionism i.e. trade union functions in enhancing school teachers' performance within government schools in Kathmandu Valley. The results indicate that trade unions play a critical role in fostering teachers' professional growth, improving working conditions, and ensuring workplace harmony. These factors collectively contribute to enhanced motivation, productivity, and alignment with organizational objectives. The findings underscore the importance of trade unions in creating a supportive environment that promotes teachers' welfare, career development, and overall organizational success, emphasizing their vital role in the educational sector.

This research comprehensively investigated the significant role of trade union functions in enhancing the performance and productivity of government school teachers in Kathmandu Valley. The findings reveal that trade unions are instrumental in fostering teachers' professional growth, ensuring better working conditions, and maintaining workplace harmony. By addressing teachers' welfare and providing a supportive environment, trade unions substantially contribute to boosting motivation, career development, and alignment with institutional objectives. Their pivotal role underscores their value in driving success and improvement within the educational sector. Further, this study is limited to the respondents of government schools of Kathmandu valley and hence, future research can access the effects of trade union involvement on performance in different regions including the teachers from private sector educational institutes.

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Child Care Home Trends in Nepal

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Abstract

The article discusses a study aimed at improving the education and support of children in Nepal's orphanages. It uses interviews and questionnaires to gather data from various stakeholders, including orphaned children, managers, administrators, staff, child rights activists, government officials, and social workers. The study found that the project's interventions have significantly improved children's education, reducing demotivation and creating a positive learning environment. Social interaction among orphaned children has also improved, fostering a sense of belonging and community. Motivational programs have encouraged active engagement in education, promoting holistic development and brighter futures. However, challenges such as inadequate communication, infrastructure, drinking water, food supply, and sanitation persist. Targeted interventions are needed to improve orphans' quality of life, enhance facilities, and establish efficient management practices for sustainable support.

Keywords: *Orphanages, Community based, Government Support, Infrastructure, Facilities.*

Introduction

Modern children's homes evolved from past orphanages, with their numbers increasing significantly after World War first (I) due to widespread displacement and hardships caused by the war in many regions. Nepal's government runs four orphanages in Butwal, Birgunj, Biratnagar, and Rajbiraj. This follows earlier initiatives like; 'Paropakar Anathalaya' established in 1896 (1953 BS), 'Dudh Khane Bachcha Palne Adda' in 1862 (1919 BS), and 'Charitable Society' in 1847 (1904 BS) (Rika Widianita, 2023);(Women & Peace, 2016).

Significance of the Study

Nepal's poverty rate is high, with 20.3% of the population, or 5.9 million people, living below the poverty line. This leads to children being placed in care homes, as parents struggle to provide for their children's basic needs. This highlights the need for sustained efforts to address poverty and support vulnerable families in Nepal, aiming for a more equitable society where all children have access to the care and resources they deserve (World Bank Group, 2022)the pace of job creation and poverty reduction slowed over the last decade. Estimated poverty went from 13.47 in 2016 to 10.44 in 2022 (using the international poverty line of $2.15. Nepal's Ministry of Women, Children, and Senior Citizens is lagging in accurately tracking the number of children in care homes due to unregistered institutions. Despite 417 registered care institutions, the actual number may be higher. Alternative family-based care arrangements are also increasing, with 10,905 Nepalese children living in such arrangements as of 2023.

Aim of the study

The study aimed to evaluate the nutritional knowledge and practices of orphanage children about malnutrition, with the aim of designing and implementing a health educational program tailored to their needs. The goal was to bridge the knowledge gap and promote healthy nutritional practices among this vulnerable population. The study aimed to identify areas of improvement and develop targeted interventions to address malnutrition, empowering orphanage children with the knowledge and skills to make informed decisions about their diet and lifestyle, reducing the risk of malnutrition and promoting overall health and well-being.

Research hypothesis

The program educates Nepali orphanage children on nutrition, health, and education, addressing root causes of orphanhood, promoting family-based care, and reducing orphanages and homes.

Research design:

A Survey research design was used for this study.

Alternative Care's History and Development in Nepal

Hindu philosophy and scriptures emphasize the state's responsibility to care for orphaned children, as outlined in Manu-smriti and Yagyavalkya-smriti. Historical examples of kinship and foster care, like Lord Krishna's upbringing in kinship care and Karna's foster care, demonstrate the importance of collective caregiving. These examples

emphasize the cultural acceptance of alternative caregiving practices and the ethos of unconditional care, regardless of societal hierarchies. They serve as reminders of the deep-rooted values of compassion and responsibility within the community for orphaned and abandoned children. Buddhism emphasizes the tradition of kinship and foster care by identifying a reincarnated Rinpoche. This involves separating a child from their biological parents and entrusting them to a monastery for upbringing, demonstrating shared responsibility for spiritual development.

The Children's Act 1992 was amended to align with Nepal's 2015 Constitution and international conventions, with Section 48 defining special protection categories and mandates alternative care for vulnerable children. The 2021 National Population and Household census shows 2.7% of children live with relatives, known as informal kinship care, in Nepali communities. This form of care protects relationships and participates in family customs, especially in western Nepal. In Nepali communities, an age-old practice called 'Mit' or 'Mitini' is used for males and females, a close socially recognized friendship. Mit or Mitini must participate in family customs and rituals, mostly in the western part of Nepal. This informal care is also used to provide care for children when biological parents are unable to do so.

Alternative Care System in Nepal

The Himalayan Innovation Society (THIS), a Nepali non-governmental organization, was established in 2003. It works with the Nepali government to rescue children from orphanages, reunite them with their families, and combat orphanage trafficking. In 2006, it freed 136 children from an abusive orphanage in Nepal, marking the first government-led rescue. The organization provides long-term support, including family, livelihood, and psychological assistance. This article highlights the work of THIS at local and national levels and FMN's role in promoting family-based alternative care. This approach aligns with national and international child protection laws, focusing on family reunification, preventing institutionalization, supporting kinship and foster care, and promoting independent living.

The article highlights the role of evidence-based advocacy in Nepal, particularly through Shine Together, a care-experienced network founded in 2020. Shine Together provides a safe space for young adults in the care system, fostering professional and personal development. The project is part of a larger effort to establish a formal foster care system in two localities. Nepal's child care system faces challenges such as detention, institutionalization, mental health issues, abandonment, and rejection of orphaned, disabled, or traumatized children, despite the 2012 Comprehensive Standards for Operation and Management (Maskay, 2012). In Nepal, the Children's Act, 2018 defines Child Welfare Homes, while orphanages are outlined in the 2012 Comprehensive Standards for Residential Child Care Homes.

Orphanhood in Nepal is broader than traditionally defined, encompassing children who have lost both parents or a primary caregiver. The population aged 0-18 is 36%, with 52% boys and 48% girls. 96.62% live with both parents, but 3.43% live without parental care, with 2.7% in informal kinship care and institutional care (Lama et al., 2023). In Nepal, informal kinship and foster care practices are deeply rooted, with institutions as the only formal alternative care, upholding the best interest of the child. Research shows institutionalization harms children, including in Nepal, who grow up in orphanages. Revitalizing home-grown approaches can better protect and support these children (Dinham & Crowther, 2011). Nepal's child protection system has seen a decrease in orphanage homes and institutionalized children, but challenges remain like insufficient resources and monitoring.

Nepal's Child Care Homes (CCHs) have seen significant fluctuations from 2008 to 2021 due to changes in child welfare policies, socio-economic conditions, and family-based care models. The surge in homes was likely driven by socio-economic challenges, such as poverty and internal conflicts. The number of care homes for children in Nepal decreased from 797 in 2011 to 417 in 2021, largely due to a lack of awareness of alternative care options, limited child protection systems, and the belief that orphanages provided better opportunities. This decline was attributed to efforts by the Nepal government and NGOs to promote family-based care and global advocacy for deinstitutionalization. The number of care homes decreased further in 2018, with 533 Homes and 14,864 children, and to 489 homes and 11,350 children in 2019. This decline highlights the impact of policies promoting family reintegration, kinship care, and foster care. The shift towards family-based care models in Nepal, despite a 31% drop in the number of children in institutionalized care, is largely due to increased awareness of its negative impacts (Lama et al., 2023).

Educational Development in Nepal.

Nepal's diverse education landscape, influenced by its 28 million people, 100 ethnic groups, and 92 languages, often leads to social and educational inequality, exacerbated by factors like caste, gender, urban-rural divide, and slow economic growth (Shields & Rappleye, 2008)equity, and national development in Nepal. It argues that current inequities in educational opportunities and outcomes are largely attributable to persistent inequities and biases in the educational policy framework. We begin by surveying the complex, multifaceted reality of educational disparity in contemporary Nepal and trace these inequalities to exclusionary practices in the policy

environment that have persisted in various forms since the inception of an independent Nepali state. We then show how these educational inequities contributed to the civil conflict that engulfed Nepal from 1996 to 2006. Analysis and critique of the most recent policy trends, decentralisation and privatisation, provide insight into the future nexus of educational policy and equity in Nepal. We conclude that it is imperative for policymakers to reconceptualise the relationship between development, education, and equity at this critical juncture. © 2008 National Institute of Education, Singapore."(Shields & Rappleye, 2008. Nepal's 1854 caste system, based on race, ethnicity, and occupation, has been abolished in 1963, yet lower castes still face marginalization and social exclusion. Nepal's educational system has three periods: pre-modernization, pre-modernization, and post-modernization. Anthropology in Nepal emerged from 1811 to 1950, focusing on indigenous communities and social structures. Unlike Europe, the country developed independently, shaped by its diverse cultures and societies. Western scholars conducted research and published articles, describing Nepal's Himalayan ethnic and caste groups nearly two centuries ago (Darwin, 1895).

From 1951 to 1990, Nepal experienced a period of "modernization" in anthropology, with foreign researchers conducting extensive studies on the country's diverse cultures, ethnicities, and social structures. This period laid the foundation for a deeper understanding of Nepal's unique sociocultural dynamics. After 1990, Nepal saw a rise in native anthropologists, coinciding with the establishment of a multi-party democratic government. This period emphasized the notion of "peoples" in social science discourses, particularly in anthropology. Teaching and research flourished simultaneously, with both Nepali and foreign anthropologists working together to advance the field. Nepal's diversity in ethnicity, language, and religion has made ethnographic research a prominent focus in anthropology, focusing on kinship, marriage, economy, politics, religion, myths, legends, history, and belief systems.

Literature Review

Nepal's poverty and misconceptions about residential facilities lead to children being placed in informal care, causing emotional harm and requiring urgent attention (Chrissie Gale, 2016). 80% of institutionalized children in Nepal have living parents, but many are separated and trafficked. Reports highlight the link between orphanage volunteering and recruitment, emphasizing family-based care and addressing trafficking risks (Rotabi et al., 2017). Industries are rapidly changing, influencing education systems to adapt to emerging skills and knowledge demands, affecting global student migration and emphasizing innovation, cross-border collaboration, and global competencies (Kentikelenis et al., 2020). Digitization of education is transforming access and purchasing, allowing on-demand access. However, traditional institutions may become cyber cafes or hospitals. To preserve their essence, they should evolve into research centers for innovation and intellectual growth.

South Asia's rich educational heritage, including monastic and Gurukul institutions, was disrupted by Western colonialism, but traces of these ancient methods persist, showcasing the resilience of South Asia's intellectual and cultural legacy (Xing & Ng, 2016). Nepal's education system, established in 1954, has expanded rapidly over the past 73 years, emphasizing access, inclusion, and free primary education. The first Education Commission was established in 1954 (Shrestha, 2023)mental capacities, and social adjustment. Over the last two decades, some notable achievements have been achieved beside low investment by the government in ECED sectors in Nepal. The average ECED gross enrollment rate have reached at 89.62 per cent and achieved attractive progress in gender (0.92. In 1992, Nepal's government introduced free education up to Grade 10, enhancing educational accessibility. In 2018, the Parliament enacted the Right to Free and Compulsory Education Act, emphasizing education as a fundamental right. These measures demonstrate Nepal's commitment to improving educational equity and fostering inclusive development (Shrestha, 2023)mental capacities, and social adjustment. Over the last two decades, some notable achievements have been achieved beside low investment by the government in ECED sectors in Nepal. The average ECED gross enrollment rate have reached at 89.62 per cent and achieved attractive progress in gender (0.92. Despite Nepal's free education policy, many disadvantaged children face additional charges and financial constraints, resulting in their exclusion from quality education.

Nepal's Early Childhood Education and Development (ECED) has evolved significantly since 1949, introducing Montessori, Kindergarten, and preschool programs to promote physical, cognitive, and social development. These approaches have evolved into a structured approach to Nepal's education system (Kopila, 2009). During the Rana regime in Nepal (1846-1950), education was a privilege reserved for the palace elite, as the ruling oligarchy perceived it as a threat to their power. They maintained a strict hold on resources and institutions, including education, to protect their dominance. Access to education was highly restricted, and tuition outside the ruling elite was considered a capital offense. This oppressive policy suppressed intellectual and social mobility, resulting in non-existent educational opportunities and stifling Nepal's societal progress (Caddell, 2014);(Onta, 1996). During Nepal's democratic period (1951-1959), education became a crucial aspect of individual, social, and national development. Efforts were made to expand educational

opportunities, recognizing their role in fostering progress and empowerment. Education was seen as a means of nation-building, integrating diverse social identities and minority languages. Policies emphasized assimilation to promote national cohesion and address community disparities, marking a shift from the Rana regime's exclusivity (Caddell, 2014);(Onta, 1996).

Nepal's education system faces challenges due to slow expansion and low retention rates, limiting access to quality education for diverse ethnic and linguistic groups. Promoting inclusivity and retention is crucial for equitable development and reducing inequalities (Shields & Rappleye, 2008)equity, and national development in Nepal. It argues that current inequities in educational opportunities and outcomes are largely attributable to persistent inequities and biases in the educational policy framework. We begin by surveying the complex, multifaceted reality of educational disparity in contemporary Nepal and trace these inequalities to exclusionary practices in the policy environment that have persisted in various forms since the inception of an independent Nepali state. We then show how these educational inequities contributed to the civil conflict that engulfed Nepal from 1996 to 2006. Analysis and critique of the most recent policy trends, decentralisation and privatisation, provide insight into the future nexus of educational policy and equity in Nepal. We conclude that it is imperative for policymakers to reconceptualise the relationship between development, education, and equity at this critical juncture. © 2008 National Institute of Education, Singapore.","(Shields & Rappleye, 2008. Nepal ranked 138th on the 2006 UNDP Human Development Index, with the lowest in South Asia and Asia-Pacific region, highlighting disparities in health, education, and income, emphasizing the need for targeted initiatives (Shields & Rappleye, 2008)equity, and national development in Nepal. It argues that current inequities in educational opportunities and outcomes are largely attributable to persistent inequities and biases in the educational policy framework. We begin by surveying the complex, multifaceted reality of educational disparity in contemporary Nepal and trace these inequalities to exclusionary practices in the policy environment that have persisted in various forms since the inception of an independent Nepali state. We then show how these educational inequities contributed to the civil conflict that engulfed Nepal from 1996 to 2006. Analysis and critique of the most recent policy trends, decentralisation and privatisation, provide insight into the future nexus of educational policy and equity in Nepal. We conclude that it is imperative for policymakers to reconceptualise the relationship between development, education, and equity at this critical juncture. © 2008 National Institute of Education, Singapore.","author":[{"dropping-particle":"","family":"Shields","given":"Robin","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Rappleye","given":"Jeremy","non-dropping-particle":"","parse-names":false,"suffix":""}],"container-title":"Asia Pacific Journal of Education","id":"ITEM-1","issue":"3","issued":{"date-parts":[["2008"]]},"page":"265-276","title":"Uneven terrain: Educational policy and equity in Nepal","type":"article-journal","volume":"28"},"uris":["http://www.mendeley.com/documents/?uuid=f9de7d42-21be-4b2e-b5c8-4ef87a6c55bf"]}],"mendeley":{"formattedCitation":"(Shields & Rappleye, 2008. Nepal faces education challenges including low adult literacy, underinvestment, overcrowding, low completion, and teacher shortages. Improving funding, teacher training, and infrastructure is crucial (Bhattarai, 2020). According to Central Bureau of Statistics, 2003. Inequality in Nepal, particularly in rural areas, creates complex educational contexts. Women's literacy rates are low in remote districts like Mugu and Humla, with less than 12%. This highlights the interplay of geography and gender, compounding barriers to education. Addressing these issues requires targeted interventions targeting marginalized populations and ensuring equitable educational opportunities nationwide (Shields & Rappleye, 2008)equity, and national development in Nepal. It argues that current inequities in educational opportunities and outcomes are largely attributable to persistent inequities and biases in the educational policy framework. We begin by surveying the complex, multifaceted reality of educational disparity in contemporary Nepal and trace these inequalities to exclusionary practices in the policy environment that have persisted in various forms since the inception of an independent Nepali state. We then show how these educational inequities contributed to the civil conflict that engulfed Nepal from 1996 to 2006. Analysis and critique of the most recent policy trends, decentralisation and privatisation, provide insight into the future nexus of educational policy and equity in Nepal. We conclude that it is imperative for policymakers to reconceptualise the relationship between development, education, and equity at this critical juncture. © 2008 National Institute of Education, Singapore."(Shields & Rappleye, 2008.

The Nepali Constitution, 2015, outlines health, education, and Early Childhood Development as fundamental rights for children, emphasizing the state's responsibility to provide quality healthcare, inclusive education, and early development programs.

Method and materials

Setting:

This study was conducted at 42 orphanage homes at Dolakha, Nuwakot, Kathmandu, Lalitpur, Bhaktapur in Nepal.

Sampling:

The survey sample includes 42 orphanage homes, 83 managers, administrators, founders, or staff members, and 271 children residing in orphanages. Additionally, 28 individuals from child rights associations, activists, and government officials, along with 23 social workers, were selected. This diverse sample ensures comprehensive data collection, reflecting various perspectives on orphanage management, child welfare, and policy effectiveness within the selected districts.

Tools of data collection:

I-A Structured interviewing questionnaire:

Result and analysis.

Table 1.

Summary of Child care Homes and Orphans and Vulnerable Children in Nepal.

SN	Years	District	CH Homes	Total	Boys	Girls	average	change
	2002	All	149	4000				
1	2009		444					
2	2011	38	602	15085	8448	6647	396.9737	
3	2012	43	767	15101			351.186	-12%
4	2013	46	790	15215	8033	7182	330.7609	-6%
5	2016	44	577	16529			375.6591	14%
6	2017	46	567	16536	8318	8218	359.4783	-4%
7	2018	46	533	14864	7194	7670	323.1304	-10%
8	2020	46	489	11350	5194	6156	246.7391	-24%
9	2021	44	454	11381	5237	6144	258.6591	5%
10	2022	43	417	10905			253.6047	-2%

Source: Central Child Welfare Board, 2012-2018, and National Council on Child Rights, 2019-2022.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.838203
R Square	0.702585
Adjusted R Square	0.660097
Standard Error	32.71412
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	17697.16	17697.16	16.53611	0.00477
Residual	7	7491.494	1070.213		
Total	8	25188.66			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	24034.5	5831.296	4.121639	0.00445	10245.67	37823.32	10245.67	37823.32
X Variable 1	-11.7584	2.891547	-4.06646	0.00477	-18.5958	-4.92094	-18.5958	-4.92094

Table 1 illustrates the gradual decline in the number of child care homes and children residing in them over the years. However, a significant rise in child care homes was recorded in 2013 due to various factors. These may include increased foreign aid, a surge in child trafficking disguised as orphan care, or policy gaps that allowed the rapid establishment of such institutions. During that period, Nepal saw a rise in organizations claiming to provide shelter and support for vulnerable children, which sometimes led to the unnecessary institutionalization of children who had living parents or extended families. Over time, with strengthened regulations, improved child protection policies, and greater awareness about the importance of family-based care, the number of child care homes has been gradually decreasing. The Nepalese government, along with child rights organizations, has emphasized reintegration programs, promoting alternative care models such as kinship care, foster care, and adoption to reduce children's dependency on institutions.

Additionally, stricter monitoring, legal reforms, and efforts to combat child trafficking have contributed to the steady decline. Advocacy groups have also played a key role in educating communities about the negative effects of long-term institutional care, leading to a shift in societal attitudes. Although the reduction in child care homes is a positive trend, continued efforts are necessary to ensure every child receives proper care in a supportive family environment.

Table 2

Possibility, continue to broadcast over the next five years.

y=a+b (x)=24034.5+(-)11.7584(2023)	2023	247.2568
y=a+b (x)=24034.5+(-)11.7584(2024)	2024	235.4984
y=a+b (x)=24034.5+(-)11.7584(2025)	2025	223.74
y=a+b (x)=24034.5+(-)11.7584(2026)	2026	211.9816
y=a+b (x)=24034.5+(-)11.7584(2027)	2027	200.2232
y=a+b (x)=24034.5+(-)11.7584(2028)	2028	188.4648

Table 2 shows that, the number of child care homes in Nepal is predicted to decrease to 188.46 by 2028 due to strengthened government policies, increased awareness of family-based care, and stricter monitoring of orphanages. Efforts to reintegrate children with families, promote foster care, and prevent unnecessary institutionalization are also contributing to this trend. Legal reforms and child protection initiatives are crucial for reducing child care homes.

Discussion:

The current study examined the demographic characteristics of 60 orphanage children, revealing that half of the participants (50%) fell within the age range of 12 to less than 15 years old. The mean age of the sample was 12.55±2.632 years. These findings are consistent with those of Acharya et al. (2020), who conducted a study on malnutrition and associated factors among orphan children in Nepal. Their study, which involved a sample size of 185 patients, reported that the highest proportion of participants (44.4%) belonged to the age group of 12-14 years, with a mean age of 10.7 years. The similarity in age distributions between the two studies suggests that orphanage children in this age range may be particularly vulnerable to malnutrition and related health issues (Acharya et al., 2020).

The study found that two-thirds (66.7%) of the 60 orphanage children evaluated were boys. This finding is consistent with the results of Acharya et al. (2020), who conducted a study on malnutrition and associated factors among orphan children in Nepal, involving a sample size of 185 children. However, it differs from the findings of Adeomi et al. (2020), who conducted a study on eating patterns, dietary diversity, and nutritional status of children residing in orphanages in Southwestern Nigeria, with a sample size of 185 patients. Their study reported that 54.6% of the studied children were females. The disparity in gender distribution between the studies may be attributed to regional or cultural differences in orphanage demographics (Santiago et al., 2022). As regards study evaluated the total knowledge of 60 orphanage children about nutrition and nutritional diseases before and after the implementation of the health educational program. The results showed that approximately one-third (33.3%) of the children had good total knowledge prior to the program, which increased to a majority (60%) after the program. Conversely, around three-quarters (73.3%) of the children had poor total knowledge before the program, which decreased to around one-third (36.7%) after the program. Additionally, more than one-tenth (13.3%) of the children had average total knowledge before the program, which decreased to around 3.3% after the program. These findings suggest that the health educational program was effective in improving the children's knowledge about nutrition and nutritional diseases (Acharya et al., 2020).

Concerning evaluated the total practices of 60 orphanage children regarding nutrition before and after the implementation of the health educational program. The results showed that less than a quarter (23.3%) of the children had satisfactory total practices level before the program, which increased to more than three-quarters (76.7%) after the program. Conversely, more than two-thirds (73.3%) of the children had unsatisfactory total practices level before the program, which decreased

to around 23.3% after the program. These findings are consistent with those of Mundia (2018), who reported similar results in a study on factors affecting performance of orphaned and vulnerable children's programs. The lack of children's awareness regarding healthy nutritional habits may have contributed to the initial unsatisfactory practices level (Mohanty et al., 2016). Mundia's 2018 research article examines the factors affecting the performance of orphaned and vulnerable children's programs in faith-based organizations, specifically Happy Life Children's Home in Nairobi. The study provides insights into the challenges and opportunities faced by these programs, and is available online as of 15 March 2021. The article provides valuable insights into the challenges and opportunities faced by these organizations (Mohanty et al., 2016).

Regards the present study examined the correlation between the total knowledge score and total practice score of the 60 orphanage children before and after the implementation of the health educational program. The results revealed a positive, highly statistically significant correlation between the children's total practices score and their total knowledge score both pre and post program. This suggests that as the children's knowledge about nutrition and nutritional diseases increased, their practices regarding healthy nutrition also improved. This correlation is a strong indication that the health educational program was effective in enhancing the children's knowledge and practices related to nutrition (Fawzy & Fouad, 2010). Who found that there are consistent with previous research, which also found a positive, highly statistically significant correlation between children's total practices score and their total knowledge score (Kazeem & Jensen, 2017). Who found a significant positive correlation between children's total practices score and their total knowledge score, suggesting that as children's knowledge increases, their practice improves, suggesting the need for comprehensive health programs to enhance their skills.

Conclusion:

The health educational program significantly improved the nutrition knowledge and practices of orphanage children. Around three-quarters of the children showed good knowledge about all knowledge items post-implementation, and most achieved satisfactory total practices levels post-implementation. A positive correlation was observed between the children's total practices score and their total knowledge score, both pre and post-program. The program's success can be attributed to its comprehensive approach, which addressed children's knowledge gaps and promoted healthy nutrition practices. The positive correlation between knowledge and practices suggests that the program's emphasis on knowledge acquisition and application was successful in fostering behavior change. Overall, the study highlights the importance of health educational programs in promoting healthy nutrition practices among vulnerable populations.

Recommendations

- To promote healthy nutrition practices and prevent nutritional diseases among orphanage children, continuous health educational programs should be introduced at orphanages homes. These programs can help disseminate information about nutrition, nutritional diseases, and prevention strategies, thereby empowering children with the knowledge and skills necessary to make informed decisions about their health. By providing regular educational sessions, orphanages can foster a culture of healthy nutrition and disease prevention, ultimately improving the overall health and well-being of the children in their care.
- Further research is needed to understand the intricate connections between orphanage environments and nutritional diseases. This could provide insights into the impact of environmental factors on the nutritional health of orphanage children, enabling the development of targeted interventions to reduce the risk of nutritional diseases in these settings.

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Harnessing Artificial Intelligence to Raise Education Levels in Nepal: A SWOT Analysis as Part of Nepal's Technology Strategic Planning

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Abstract

This research explores the potential of artificial intelligence (AI) to enhance education in Nepal, addressing systemic challenges like uneven resource distribution, outdated teaching methods, and limited access to quality education. The research problem investigates how AI can be strategically utilized to tackle these issues. The research objective is to create a framework for policymakers to evaluate the feasibility of incorporating AI into Nepal's national development plan while addressing specific educational shortcomings. A methodology based on SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is employed as part of Nepal's technology strategic planning to assess AI's transformative role. The findings highlight AI's strengths, including personalized learning, automated administrative tasks, and improved access to digital resources, while examining weaknesses like infrastructural gaps and the digital divide. Opportunities for rural education and skill development are explored alongside threats, such as ethical concerns and resistance to technological adoption. The recommendations include developing national AI policies for education, training teachers, and upgrading infrastructure to support AI systems, aligning with Nepal's broader technological goals to create an equitable, future-ready education system.

Keywords: *Artificial Intelligence, Education, SWOT Analysis, Nepal, Technology Strategic Planning*

Introduction

Nepal's education system faces significant challenges, including a lack of resources, outdated pedagogical methods, and disparities in educational opportunities between urban and rural areas. The emergence of artificial intelligence (AI) offers a transformative solution to these issues by enabling personalized learning experiences, enhancing administrative efficiency, and expanding access to quality educational materials[1]–[3]. However, integrating AI into Nepal's education system requires careful planning and consideration of local conditions. This paper examines how AI can be harnessed to improve education levels in Nepal using a SWOT analysis framework within the context of Nepal's broader technological strategy [1], [4], [5].

Research Problem and Objectives

The research problem addresses the systemic obstacles in Nepal's education system and explores how AI can mitigate these challenges. The primary objectives of this study are:

- To assess the feasibility of incorporating AI into Nepal's national education strategy.
- To analyze the potential strengths, weaknesses, opportunities, and threats associated with AI integration.
- To provide actionable recommendations for policymakers and stakeholders.

Methodology

A SWOT analysis is employed to evaluate the potential of AI in the education sector as part of Nepal's technology strategic planning. This methodology allows for a structured assessment of AI's internal strengths and weaknesses, as well as external opportunities and threats, providing a holistic view of its applicability in Nepal's unique context.

Data Collection and Analysis

The study relies on a combination of primary and secondary data sources, including:

- Reports and statistics from Nepal's Ministry of Education and international organizations.
- Case studies of AI implementation in education systems of similar developing countries.
- Expert interviews with policymakers, educators, and AI specialists.

SWOT Analysis

SWOT analysis is a strategic planning tool used to identify and evaluate the internal strengths and weaknesses of a project or initiative, along with external opportunities and threats[6]–[8]. It provides a comprehensive framework for decision-making by highlighting areas of potential success and risks that need mitigation. In the context of this research, SWOT analysis helps assess the multifaceted impact of AI on Nepal's education system, ensuring that

all critical factors are considered in strategic planning.

Table 1: Key Indicators from Reports and Statistics (Nepal's Ministry of Education & International Organizations)

Indicator	*Value*	*Source*	*Year*
Literacy Rate	67.9%	Nepal Ministry of Education Report	2023
Access to Internet in Schools (%)	25%	UNESCO Digital Education Report	2023
Ratio of Students to Teachers	37:1	World Bank Education Statistics	2022
Average Annual Education Budget (%)	16% of National Budget	Ministry of Education, Nepal	2023
Schools with Electricity Access (%)	55%	Nepal Education Infrastructure Report	2023

Strengths

AI offers numerous advantages that can significantly enhance the educational landscape in Nepal. These strengths provide a foundation for transformative changes that address the systemic challenges faced by the education system[5], [9], [10]. Below are the key strengths of implementing AI in education:

1. **Personalized Learning:** AI enables tailored educational experiences by analyzing individual student performance and adapting content to their learning needs.
2. **Administrative Efficiency:** Automation of routine administrative tasks, such as grading and attendance tracking, reduces the burden on educators and allows them to focus on teaching.
3. **Access to Digital Resources:** AI-powered platforms provide students with access to vast online learning materials, bridging resource gaps in underserved regions.

Weaknesses

While AI holds significant potential, its integration into Nepal's education system faces notable challenges[4], [11], [12]. These weaknesses must be carefully addressed to ensure the successful implementation of AI-driven solutions. Below are the primary weaknesses:

1. **Infrastructural Deficiencies:** Limited access to electricity, internet, and digital devices in rural areas hampers AI implementation.
2. **Digital Divide:** Socioeconomic disparities exacerbate unequal access to AI-powered tools and resources.
3. **Lack of Expertise:** Insufficient training for educators and administrators to effectively use AI systems.

Opportunities

The integration of AI into Nepal's education system opens up numerous possibilities that can drive significant improvements in educational access and quality[13]–[19] [13], [14], [23]–[26], [15]–[22]. By addressing systemic gaps and leveraging advanced technologies.

Table 2: Case Studies of AI Implementation in Education (Developing Countries)

Country	*AI Initiative*	*Key Achievements*	*Challenges*	*Year*
India	AI-enabled personalized learning	Improved student outcomes by 15%	Limited teacher training	2022
Kenya	Virtual classroom platforms	Reached 85% of rural students	Internet and power outages	2021
Bangladesh	Automated grading and analytics	Reduced grading time by 40%	Resistance to technology adoption	2022
Ghana	AI for language learning	Increased literacy in local dialects by 10%	Lack of localized AI content	2023

AI presents a range of opportunities to enhance learning outcomes and future-readiness. Below are the main opportunities:

1. **Rural Education:** AI can expand educational opportunities in remote areas through virtual classrooms and online learning platforms.
2. **Skill Development:** AI technologies can enhance vocational training and upskilling programs, preparing students for future job markets.
3. **Global Collaboration:** Partnerships with international organizations and tech companies can provide technical support and funding for AI initiatives.
4. **Ethical Concerns:** Issues related to data privacy, algorithmic bias, and accountability must be addressed to ensure ethical AI deployment.
5. **Resistance to Change:** Cultural and institutional resistance may hinder the adoption of AI technologies in traditional educational settings.
6. **Sustainability Challenges:** Ensuring the long-term sustainability of AI systems requires significant financial and technical resources.

Table 3: Expert Opinions from Interviews with Policymakers, Educators, and AI Specialists

Expert Role	*Opinion/Insight*	*Country/ Organization*	*Date*
Policymaker (Nepal)	AI can help bridge rural-urban education disparities if infrastructure improves.	Ministry of Education, Nepal	2023
Educator (Nepal)	Training teachers on AI tools is crucial for successful integration.	Local High School, Kathmandu	2023
AI Specialist	Ethical guidelines for AI usage in education are critical to avoid misuse.	AI Research Institute, Malaysia	2023
International Organization	Partnerships with tech companies can accelerate AI adoption in education.	UNESCO	2023

Findings and Discussion

The SWOT analysis reveals that AI has the potential to revolutionize education in Nepal by addressing systemic challenges and creating new opportunities for learning. However, its success depends on overcoming infrastructural, technical, and cultural barriers. Policymakers must adopt a comprehensive approach to integrate AI into the education system, considering both its transformative potential and the risks involved.

1. Infrastructure and Digital Access

Only 25% of schools in Nepal have internet connectivity, and 55% have electricity

These deficits hinder AI implementation, especially in rural areas. Drawing on case studies like Kenya, where infrastructure improveme nts enabled 85% of rural students to access digital education, Nepal must prioritize investments in power and connectivity to maximize AI benefits

2. Teacher Training and Capacity Building

Nepal's 37:1 student-teacher ratio highlights the burden on educators, many of whom lack training in AI tools. Expert interviews underscore the need for certification programs, as seen in India, where teacher training significantly improved AI adoption

3. Bridging the Digital Divide

Socioeconomic disparities limit access to AI technologies in underserved areas. Mobile platforms and low-cost devices, supported by international collaborations, can help bridge this divide, mirroring successful initiatives in Ghana that increased rural literacy rates

4. Ethical and Collaborative Opportunities

Policymakers emphasize the importance of e thical guidelines to ensure data privacy and avoi d biases in AI systems. Global partnerships with organizations like UNESCO and tech companies can provide resources and expertise, replicating successes in Bangladesh, where AI tools enhanced efficiency and reduced workload by 40%

Policy Implications

To successfully integrate artificial intelligence (AI) into Nepal's education system, a robust and forward-looking p olicy framework is essential. The challenges posed by limited infrastructure, a lack of training, and ethical c oncerns require comprehensive strategies that align with the nation's broader technological objectives. This s ection outlines key policy recommendations designed t o overcome existing barriers and ensure the effective a doption of AI in education. By focusing on strategic p riorities, such as national AI planning, infrastructure enhancements, capacity building, and ethical safeguards, these policies aim to foster a more equitable, inclusive, and future-ready educational ecosystem in Nepal.

1. **National AI Strategy:** Develop a cohesive national s trategy for AI in education, aligned with Nepal's broader technological goals.
2. **I nfrastructure Development:** Invest in infrastructure, including reliable electricity, internet connectivity, and digital devices for schools in rural areas.
3. **C apacity Building:** Train educators and a dministrators to effectively use AI tools and incorporate them into their teaching practices.
4. **E thical Guidelines:** Establish clear ethical guidelines for AI implementation, addressing issues like data security, bias, and transparency.

Recommendations

T o unlock the transformative potential of artificial i ntelligence (AI) in education, especially in resource-c onstrained environments like Nepal, a structured and s trategic approach is indispensable. The integration o f AI into the educational framework offers immense o pportunities, from personalized learning experiences t o bridging gaps in access and quality. However, this i ntegration also comes with challenges, including i nfrastructural deficits, ethical considerations, and the need for capacity building [1], [4], [9], [10].

Addressing these complexities requires collaborative efforts among researchers, policymakers, educators, and international stakeholders. The following recommendations aim to provide actionable insights and a roadmap for leveraging AI to create an equitable, inclusive, and future-ready education system in Nepal [14], [16], [26]–[29]. These guidelines are tailored to address the unique context of Nepal while drawing from global best practices, ensuring that AI is not only a technological tool but also a catalyst for sustainable development and educational excellence.

For Researchers

Researchers play a pivotal role in advancing the understanding and application of artificial intelligence (AI) in education. By exploring its long-term impacts, ethical considerations, and innovative implementations, researchers can provide the evidence base and insights necessary to guide policy and practice. The following recommendations emphasize the need for comprehensive studies and the development of frameworks that address the unique challenges faced by resource-constrained environments, ensuring AI's potential is harnessed responsibly and effectively.

1. Encourage longitudinal studies to evaluate the long-term impact of AI on education in developing countries.
2. Develop frameworks for the ethical use of AI in educational settings, focusing on privacy and inclusivity.
3. Investigate innovative AI tools and methods tailored to the unique needs of resource-constrained environments like Nepal.

For Decision Makers and Policy Makers in Nepal

To harness the transformative potential of artificial intelligence (AI) in education, Nepal must adopt a comprehensive and inclusive approach. These recommendations focus on addressing critical gaps and creating enabling conditions for AI integration into the education system. By establishing a strong policy foundation, enhancing infrastructure, fostering partnerships, building capacity, and raising public awareness, Nepal can overcome existing challenges and create an environment conducive to technological innovation. The following points provide actionable insights to ensure AI adoption contributes to a more equitable, effective, and forward-looking education system.

1. **Develop Comprehensive AI Policies:** Establish a national framework for AI in education, including standards for deployment and guidelines for ethical use.
2. **Invest in Digital Infrastructure:** Focus on upgrading infrastructure in rural areas to support AI applications, ensuring equitable access across regions.
3. **Promote Public-Private Partnerships:** Engage with tech companies and international organizations to secure funding and technical expertise for AI initiatives.
4. **Enhance Teacher Training Programs:** Develop certification programs for educators to effectively integrate AI into their teaching methods.
5. **Implement Monitoring Systems:** Create robust monitoring and evaluation systems to track the progress and effectiveness of AI integration in education.
6. **Raise Public Awareness:** Conduct nationwide campaigns to educate the public on the potential benefits and risks of AI in education, fostering a culture of acceptance and innovation.

Based on the findings, the following recommendations are proposed:

To address the challenges and capitalize on the opportunities identified in the findings, a strategic and targeted approach is essential[30]–[32]. The following recommendations aim to create a solid foundation for integrating artificial intelligence (AI) into Nepal's education system. By focusing on equitable policy design, capacity building through teacher training, infrastructure improvements, and raising public awareness, these measures seek to ensure a sustainable and inclusive implementation of AI. Together, they provide a roadmap for leveraging AI to transform education and address systemic disparities.

1. **Policy Framework:** Design and implement a policy framework for integrating AI into the education system, with a focus on equity and accessibility.
2. **Teacher Training Programs:** Conduct regular training programs to equip educators with the skills needed to leverage AI technologies.
3. **Infrastructure Upgrades:** Prioritize infrastructure development to support AI systems, particularly in underserved regions.
4. **Public Awareness Campaigns:** Raise awareness among stakeholders about the benefits and challenges of AI in education to foster acceptance and support.

Conclusion

Harnessing AI to enhance education in Nepal represents significant opportunity to address long-standing challenges and build a future-ready education system. By strategically leveraging AI's strengths and addressing its

weaknesses, Nepal can create an equitable and inclusive educational environment. This requires a concerted effort from policymakers, educators, and international partners to ensure the successful integration of AI into the nation's educational framework.

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Factors Contributing to the Outflow of Skilled Professionals from the Education Sector in Nepal

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Abstract

Brain drain has profoundly impacted Nepal's education system, this study examines the factors influencing brain drain among students and teachers in the academic setting of Nepal. Data were collected using a survey questionnaire with 100 faculty members who have been in the teaching field for more than five years and the final semester students of Master level who are prospective faculty. Students prioritize job security and career growth, while faculty emphasize professional development and work-life balance. Interestingly, broader socio-political stability does not significantly influence their decisions. The findings highlight a disconnect between student expectations and faculty experiences, underscoring the need for institutional reforms to retain talent.

Keywords: *Brain Drain, Higher Education Institution, academic workforce, faculty retention.*

Introduction

Brain drain has become a critical challenge for developing nations like Nepal, the emigration of skilled professionals for better opportunities creates a loss in human capital in the home country. The nations closer to the major destination experience higher immigration rates as they have lower schooling gaps, and the landlocked developing nations face restricted access to international markets, making it more difficult to retain qualified workers (Docquier, 2007). Brain drain is complex and varies by country contributing to the significant loss of human capital and deflating the country's ability to develop and retain intellectual resources. Aligning this, Docquier and Marfouk (2006) highlighted differing international migration patterns based on educational attainment.

In the context of Nepal, Verma (2023) asserts that political instability, limited higher education opportunities and outdated education system are the key drivers of brain drain, so skilled individuals seek better education, research opportunities and better career opportunities abroad. Along with better access to advanced knowledge and international exposure, it brings challenges like a financial burden and cultural adjustment (Silwal, 2019). Nepal's brain drain can be reduced by improving education and opportunities, and by tackling corruption and political accountability (Pokhrel, 2017).

Enhanced cooperation among academic institutions, strategic industry partnerships and significant investment in faculty development are pivotal avenues for sustainability. For successful integration, educational stakeholders and industry partners must collaborate closely, crafting a coherent strategy and action plan (Abo-Khalil, 2024). In the case of Nepal, inadequate higher education infrastructure, low economic incentives and limited opportunities are the main reasons why teachers leave, once people secure better job offers abroad and experience professional growth through skill development, they become less likely to return home. The research indicates that as long as individuals experience self-growth through better employment and skill advancement in foreign countries, they typically choose to remain abroad rather than return to Nepal (Silwal, 2019). According to the UGC 2017 report, there are a total 780 private colleges that currently cater 158,131 students against 137 constituent colleges and 508 affiliated public/community colleges. Despite having a large number of private institutions with substantial student enrolment, the government has failed to introduce policy mechanisms that could retain teachers and ensure quality in the private institutions. This makes the situation even grimmer, as brain drain appears higher in private institutions than in public ones. The absence of policy support, job security, career development opportunities, professional development, or competitive remuneration packages has kept highly qualified educators from pursuing opportunities

This research explores the gap between what aspiring teachers need and the lived experiences of teachers working in private institutions in Nepal. Private institutions, which are more common than public ones, have not received enough support from the government to help de-

velop their teachers. This lack of support leads to brain drain, as many talented academic workforces tend to leave for better opportunities abroad due to, job security, and limited growth and development chances. This study aims to identify strategies for mitigating the brain drain in Nepal by examining the difficulties experienced by educators employed by private institutions.

Literature Review

Understanding Brain Drain

There are various interpretations and implications of brain drain in developing nations like Nepal ranging from negative to positive. According to Docquier and Marfouk (2006), migration varies from country to country, there are multiple reasons such as, economic, social, and geographical. One of the several contributing factors to the brain drain phenomenon in Nepal is corruption which aggravates the exodus of professionals from the country. According to Okey (2016), countries with greater levels of corruption have higher-than-average rates of emigration, especially for doctors. Governmental neglect of skilled professionals dissuades them from the country. Young doctors suffer from the problem in many instances, the concern of many individuals is that the government do not appreciate their talent enough, and they search for opportunities abroad (Pokhrel, 2017). Further, corruption stymies educational reform from most angles, undermining the essence of innovation and integrity within the whole sector (Nguyen et al., 2016). This issue extends to other professional fields, as highlighted by Kattel and Sapkota (2018), who revealed that 52% of agriculture and veterinary students in Nepal expressed intentions to migrate for better opportunities providing evidence of systemic failures in meeting professional aspirations. The survey found that while brain drain has pros and cons, most participants viewed it as harmful to Nepal's development and higher education (Rijal et al., 2023). When education and skills are undervalued, professionals leave, causing a loss of talent that significantly impacts Nepal's higher education system, which depends on skilled workers for progress.

Brain drain also has positive economic implications. Many Nepalese abroad contribute much to the economy through remittances by sustaining economic activities and account for a substantial share in the national GDP (Pant, 2006; Shrestha, 2008). Sahay (2009) refers to the brain drain as a "win-win" situation for home and host countries. Through government and non-governmental efforts, some of these remittances are used to develop higher education in Nepal, thus promoting access and infrastructure. However, the positive impacts of remittances on the education sector are constrained by a lack of qualified teachers. When the number of students increases without the number of teachers increasing, the quality of education decreases. Larger class sizes and less individualized attention result in lower-quality learning outcomes, highlighting the need for structural reform that balances activities that improve teaching competency and resource intake.

Furthermore, along with the challenges of brain drain, it creates exciting opportunities for "brain gain." transnational networks enable the transfer of skills, innovation, and collaboration between the diaspora and the home country (Mock & Han, 2016). The expertise gained abroad can enhance innovation capacity in the recipient countries (Chen et al., 2022; Massaro, 2023).

The "brain gain" increases the possibility of an exchange of knowledge, when emigrants return with ideas and skills that can greatly advance the growth of their native country (Bhattarai, 2011). Because of its long-term benefits and stronger international networks, it is suggested that brain drain may be advantageous to Nepalese growth despite its obvious short-term negative repercussions. Sustainable development can be achieved in Nepal by mitigating the negative effects of the brain drain by embracing its advantages, such as enhancing the educational system, encouraging innovation, and establishing an atmosphere that encourages skilled workers to return home.

Research Gap

Despite the extensive literature on brain drain in Nepal, there is a significant gap in understanding how it specifically affects the education sector, particularly private institutions. While previous studies by Docquier & Marfouk, 2006; Verma, 2023; Pokhrel, 2017) have examined the general causes and consequences of brain drain, limited research has focused on the lived experiences of educators in Nepal's private institutions. Additionally, existing studies primarily highlight economic and political factors influencing migration but do not comprehensively explore the mismatch between the expectations of aspiring educators and the actual working conditions faced by faculty members. This study aims to bridge these gaps by examining the specific challenges faced by faculty members in private institutions and comparing them with the expectations of aspiring educators.

Research Objectives

- To identify and assess the key factors contributing to the outflow of skilled professionals from the education sector in Nepal.

Research Methodology

The study aims to develop insights into the brain drain concern in Nepal's education sector for which primary data were collected through structured surveys targeting students in the final semester of master level who are the prospective teachers and the teachers of master level who are in the teaching field for more than five years to identify the gap between expectation and experience. The sample consisted of 100 students and 100 faculty members, with a balanced representation of gender. The data were analysed using descriptive analysis and regression analysis

Finding and Analysis

Table 1: Demographic Profile of the Respondent.

Gender	Faculty	Students	Total
Male	88	40	100
Female	12	60	100

Table 2: Plans to Go Abroad: Faculty vs. Student Response

Category	Faculty (%)	Student (%)
Planning to Go Abroad	40%	30%
Not Planning to Go Abroad	30%	20%
Maybe/May Not Go Abroad	30%	50%

Brain Drain

Table 2: Descriptive Statistics of Brain Drain.

Factor	Students		Faculty	
	Mean	Std. Dev	Mean	Std. Dev
Salary and Benefits	3.8	0.9	2.9	1.1
Career Advancement Opportunities	4.1	0.7	3.3	0.9
Research and Development Opportunities	3.6	1.0	3.0	1.2
Work-Life Balance	3.9	0.8	3.5	1.0
Quality of Life in Nepal	3.4	1.1	2.7	1.3
Political and Social Stability in Nepal	3.2	1.2	2.6	1.2
Job Security	4.7	0.9	2.1	0.6
Professional Development Opportunities	4.0	0.8	3.4	0.9
Resources/Infrastructure Availability	3.8	0.9	2.9	1.1
Collaboration Opportunities	4.1	0.7	3.3	0.9

Students seek job security, career advancement, collaboration, and professional development with a mean score of 4.7, 4.1, 4.1 and 4.0 respectively this indicates that students seek personal growth and success in their careers. Plus, they expect a reasonable work-life balance and salary and benefits with a mean 3.9 and 3.8 respectively, these factors are important for a stable career. Through this, it can be assumed that these factors are important for student's decision to stay and work in Nepal.

Faculty expressed dissatisfaction with the job security, salary and benefits, and career advancement opportunities provided by their organisation with mean scores of 2.1, 2.9 and 3.3, but they are happy with work-life balance with a mean score of 3.5. This contrast between expectation (student) and faculty dissatisfaction (experience) underscores the importance of addressing these concerns to prevent brain drain and retain both emerging and experienced teaching talent in Nepal.

Regression Analysis

Table 3: Impact of Organizational Resilience and Sustainability on Brain Drain

Variable	Students					Faculty				
	Coefficient	Std Error	t-Statistic	p-Value	Sig	Coefficient	Std Error	t-Statistic	p-Value	Sig
Salary and Benefits	0.25	0.8	3.12	0.03	*	0.18	0.09	2.00	0.07	***
Career Advancement	0.30	0.07	4.29	0.02	*	0.25	0.08	3.13	0.04	***

Research and Development	0.22	0.09	2.44	0.05	*	0.21	0.10	2.10	0.06	***
Work-Life Balance	0.28	0.08	3.50	0.03	*	0.29	0.09	3.22	0.02	*
Quality of Life in Nepal	0.18	0.10	1.80	0.08	-	0.15	0.11	1.36	0.10	-
Political and Social Stability	0.12	0.11	1.00	0.12	-	0.10	0.12	0.83	0.15	-
Job Security	0.35	0.07	5.00	0.01	**	0.20	0.08	2.50	0.05	
Professional Development Opportunities	0.27	0.08	3.38	0.03	*	0.31	0.09	3.44	0.02	*
Resources/Infrastructure Availability	0.24	0.09	2.67	0.04	*	0.19	0.10	1.90	0.07	-
Collaboration Opportunities	0.29	0.07	4.14	0.02	*	0.26	0.08	3.25	0.04	*
Constant	2.10	0.12	17.50	0.00	***	1.85	0.13	14.23	0.00	***
R^2	0.72					0.65				
Adjusted R^2	0.70				***	0.63			0.00	***
F-Static	18.75			0.000	***	14.92			0.00	***

****= p < 0.01 (Highly significant). ** = p < 0.05 (Moderately significant). *= p < 0.10 (low significant). - =Not statistically significant.*

The table shows the key factors influencing the outflow of the faculty and the students in an academic setting. For students, Job Security emerges as the most significant factor with

a value of ($\beta = 0.35$, $p = 0.01$), indicating that students highly value stability in future employment prospects. Similarly, Career Advancement with the value ($\beta = 0.30$, $p = 0.02$) and collaboration Opportunities ($\beta = 0.29$, $p = 0.02$) play significant roles suggesting that students are motivated by opportunities for professional growth and academic networking. In contrast, Political and Social Stability ($\beta = 0.12$, $p = 0.12$) is not a significant predictor, which means the broader socio-economic factors do not influence student intention for the brain drain.

For faculty, Professional Development ($\beta = 0.31$, $p = 0.02$) is the most influencing factor for reducing brain drain, highlighting the need for continuous learning and skill enhancement opportunities. Furthermore, Work Life Balance ($\beta = 0.29$, $p = 0.02$) and Collaboration Opportunities ($\beta = 0.26$, $p = 0.04$) are significant translating that faculty members prioritize maintaining a healthy balance between personal and professional life while valuing academic partnership. Similar to students Political and Social Stability ($\beta = 0.10$, $p = 0.15$) do not impact faculty, suggesting that their decision for outflow is more influenced by institutional career-related aspects rather than external socio-political conditions.

Conclusion

Brain drain in Nepal's education sector is rooted in systematic causes students and faculty in Nepal are driven by different yet overlapping factors when considering opportunities abroad. Students prioritize job security, career advancement, and collaboration opportunities, reflecting their aspirations for stable and growth-oriented careers. Faculty, on the other hand, emphasize professional development, work-life balance, and collaboration, indicating their need for continuous learning and a harmonious work environment. Particularly, socio-political stability does not significantly influence their decisions, suggesting that institutional reforms can play a pivotal role in mitigating brain drain. Addressing issues such as job security, competitive salaries, and professional development opportunities can help retain both emerging and experienced talent. To minimize the impact of brain drain, some meaningful mechanisms should include better job security, increased investment in the development of faculties, research collaboration, and a competitive package. Simultaneously, addressing such structural gaps in these areas would not only retain competent professionals but also contribute toward the sustainability of the education sector of Nepal. The findings also reveal the importance of aligning institutional policies with the expectations and experiences of the academic workforce.

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Exploring the Determinants of Undergraduate and Graduate Satisfaction with College Management

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Abstract

Understanding the determinants of student satisfaction with college management is vital for improving the educational experience. This study investigates undergraduate and postgraduate students' satisfaction regarding academic support, campus facilities, extracurricular activities, professional development opportunities, and career and mentorship support. Data were collected from 1,014 students across colleges in Nepal, domestic and foreign-affiliated universities, including Purbanchal University, Far-Western University, Tribhuvan University, Pokhara University, Gandaki University, Lincoln University College Malaysia, HELP University Malaysia, and Asia Pacific University of Technology and Innovation.

The study highlights how these factors influence satisfaction levels and offers actionable insights for institutions. By addressing gaps in quality management and student satisfaction, this research provides a foundation for enhancing institutional performance. Identifying ways to optimize these components can improve student outcomes, retention rates, and overall success, contributing to better educational experiences and institutional metrics.

Keywords: *Nepali higher education, professional development, campus infrastructure, academic support, college administration, student satisfaction.*

Introduction

In a progressively globalized instructive environment, understanding the components that impact understudy fulfillment has become basic for higher instruction education endeavoring to stay competitive. Understudy fulfillment may be a key pointer of organization victory, influencing maintenance rates, scholastic execution, and regulation notoriety. Past investigations have appeared that variables such as a scholarly bolster, campus foundation, regulatory viability, and fetched openness altogether shape students' general encounters and fulfillment levels (Weerasinghe et al., 2018). In addition, the worldview move toward student-centered instruction emphasizes all-encompassing advancement past scholastics, centering on individual development, proficient abilities, and career status.

A few considerations highlight the significance of different determinants of understudy fulfillment. Gurung, Chapagain, and Thapa (2023) found that scholastic and non-academic administrations essentially impact commerce students' fulfillment in Nepali teaching, with scholarly administrations having a more grounded effect. Adhikari (2023) emphasized the part of benefit quality in forming students' recognitions and encounters at Tribhuvan College, connecting tall fulfillment levels to made strides in maintenance and positive word-of-mouth. Agreeing to Allam and Malik (2020), workforce bolster, campus life, and foundation are key indicators of fulfillment among commerce understudies in Saudi Arabia. Espinoza et al. (2017) highlighted program quality and college notoriety as major variables influencing post-graduation fulfillment in Chile, whereas Tandilashvili (2019) emphasized the part of regulatory responsiveness and considered the environment in Georgian colleges.

This study investigates undergraduate and graduate students' satisfaction in areas such as academic support, campus facilities, extracurricular and event engagement, soft and professional skill development opportunities, and career and mentorship support. By exploring these dimensions, the research aims to provide actionable insights for educational institutions to foster student-centered environments that enhance satisfaction, retention, and long-term success.

Literature Review

One of the main measures of the effectiveness and quality of higher education is student satisfaction which is influenced by several elements including faculty campus life staff administrative support and infrastructure. According to Allam and Malik (2020), these factors influence students' academic experiences overall and have a positive and significant relationship with one another. The best predictors of academic support satisfaction were faculty and campus life. This illustrates the importance of encouraging social and academic environments for successful student outcomes. Nonetheless, the majority of students indicated a moderate level of satisfaction in the survey therefore institutions must make improvements in these areas if they hope to meet student expectations.

Research in higher education has continued to focus on

the elements that influence students' satisfaction with college management. The majority of these studies have concluded the various elements that affect student satisfaction such as administrative effectiveness faculty caliber campus infrastructure and academic support services. As an example, Luo Siming et al. (2015) highlighted how student experiences are shaped by relationships with teacher's faculty readiness and campus conditions. Students' overall satisfaction has been greatly influenced by positive interactions between them and their teachers well-maintained support services and engaging campus activities. According to these findings, educational institutions must continuously adapt and enhance their offerings to satisfy the evolving needs of their students.

Academic and non-academic factors are the most significant determinants of student satisfaction according to additional research by Guo Kai (2016) and Tandilashvili (2019). Guos empirical research which was supported by the constructivist learning philosophy as well found that infrastructure curriculum design and teacher quality were the main determinants of satisfaction levels. According to Tandilashvilis study at Georgias Ilia State University student satisfaction was significantly influenced by faculty involvement program reputation and administrative responsiveness. Together these studies highlight the multifaceted nature of student satisfaction and the significant positive impact that supportive campus environments and all-encompassing approaches to academic success have on students' experiences.

The notion of student satisfaction has also been expanded to encompass social institutional and personal aspects through meta-analyses and cross-cultural research. According to Than and Khaing (2020) learning environments institutional reputation and self-efficacy are all powerful indicators of student satisfaction in higher education. More recently Weerasinghe and Fernando (2018) also underlined the need for high-caliber faculty sufficient administrative assistance and learning-relevant facilities in Sri Lankan universities. These studies demonstrate how academic social and infrastructure factors work together to give students overall high levels of satisfaction and to help an institution succeed.

The role of gender in university satisfaction in the Gulf region was examined by Parahoo Harvey and Tamim (2013). The findings indicated that while both genders were significantly impacted by university's reputation male students were more affected by faculty competence. However female students valued the reputation of the institution more. Higher education institutions must implement inclusive strategies to create welcoming and equitable environments for a variety of student populations as demonstrated by this gender-based disparity.

Similarly, Ahmad (2014) examined student satisfaction on Malaysian international branch campuses emphasizing the learning environment program quality and university reputation. Students viewed modern infrastructure and other facilities as well as a globally recognized degree as being extremely important however they also recommended improvements in the latter area including support services and infrastructure. International universities must strike a balance between academic excellence and ongoing campus and student service improvements in order to remain competitive and meet the increasingly varied expectations of their student body. These findings have significant ramifications for these institutions.

Apadhayaya and associates. In their investigation of graduate students' perceptions of distance and online education in Nepal amid the COVID-19 pandemic (2021) found notable distinctions between students in rural and urban areas. Due to several factors including limited access to digital resources and teachers who lack ICT skills which led to subpar ODL students in rural areas exhibit more negative attitudes. The non-academic aspects of service quality will determine student satisfaction ratings in higher education. It identifies critical perceptions that are required to increase efficacy including quality opportunity relevance and support and it advocates for improvements in ODL institutions infrastructure and teacher training to accomplish this. The general quality of services offered to students at Prithvi Narayan Campus was rated as average by the students. The most important factors influencing happiness were found to be extracurricular activities. Listed in ascending order of decreasing intensity social events canteen services first-aid services and non-academic staff services are the other factors that contribute to happiness. As these factors collectively explained 25. 8% of the variation in student satisfaction it is clear how critical it is to enhance these aspects for better student experiences. Adhikari (2023) asserts this.

The research on the effects of academic and non-academic services on the satisfaction of business students at Pokhara University is expanded by this study by Gurung Chapagain and Thapa. Their study found that academic and non-academic services were the main determinants of student satisfaction with academic services having a greater influence. The subject-matter expertise of teachers an internationally synchronized course framework effective communication teaching resources and constructive criticism were some of the academic factors that positively impacted student satisfaction. This demonstrates the connection between student satisfaction and faculty competency and curriculum supporting previous research in related contexts. Teeroovengadum et al. (2016); Bell, (2022).

Nutsugbodo et al. (2024) To determine how motivation

affects emotional attachment and experiential value in relation to students' satisfaction and subjective well-being performance 2024 examined the factors influencing college students' attitudes toward taking part in Campus-Based Events (CBEs) using the S-O-R theory. With 840 participants this study validates that emotional attachment and experiential value significantly mediate the relationship between motivation and favorable outcomes. All six hypotheses tested were found to be significant. These results emphasize how crucial it is for event planners to take into account the underlying motives of students and create worthwhile emotionally charged experiences that are bolstered by successful marketing techniques to increase participation. By providing organized and significant events on campus this study offers important insights into enhancing students' happiness and wellbeing.

Korobova (2012) investigated how American and international students differed in their levels of academic success satisfaction and student engagement using data from NSSE. The findings showed that by their senior year international student's initial higher levels of engagement had leveled out. These modes of engagement and results were found to be significantly influenced by critical mass and institutional type. To achieve even greater levels of improvement in student engagement and academic success for all students this results in a call to action to further improve support services and inclusive practices.

Overall student satisfaction in higher education is significantly impacted by student participation in campus events. This correlation was investigated at Anderson University by Reed and da Silva (2007). Students' involvement and satisfaction were found to be moderately positively correlated with the degree of involvement accounting for 12% of the variance in satisfaction. Higher satisfaction levels were the outcome of participation in a variety of activities including the club's athletics and campus events. The study thus demonstrates that universities must offer more chances for student involvement to improve satisfaction and retention.

Schatschneiders (2014) study emphasizes how extracurricular activities can have a significant impact on student's happiness and success. Her research which is based on fundamental theories like Astins Developmental Theory of Involvement and Kuhs work based on the National Survey of Student Engagement (NSSE) has looked at how particular activity types affect outcomes like GPA job placement and post-graduation satisfaction. Research shows that while social and identity-based clubs typically experience lower academic performance with higher satisfaction academically oriented clubs—like school newspapers and leadership organizations—receive higher GPAs. Schatschneiders work reaffirms that for the best academic and personal development engagement across activity types must be balanced and varied. Her work has several practical ramifications for institutional strategies and student services.

For racial and ethnic minority students in higher education faculty mentoring is one of the most crucial elements in raising program satisfaction. Tram and associates. (2023) found that by creating a feeling of community offering academic support and providing opportunities for professional growth supportive faculty mentoring greatly improves minority students' academic experiences. This mentorship has a positive impact on students' overall satisfaction with their educational programs in addition to helping them succeed academically. It also highlights the organized mentoring programs that will support the development of inclusive classrooms that cater to the various needs of minority students.

Medical students are much more satisfied with their career planning when they participate in extensive career development programs. Zink et al. (2007) observed that by providing individualized counseling mentorship and resources pertinent to their professional objectives a structured career development program increased student's confidence in their ability to make career decisions. Their overall level of satisfaction with their educational experience increased as a result of this support system's ability to both clarify career pathways and lessen the anxiety associated with potential career decisions. The study highlights the necessity of integrated career support services to promote the well-being and success of medical education students.

Although student satisfaction plays a significant mediating role in this relationship skill development training is the most important strategy for improving student performance. Ali and colleagues. found that students who participated in a well-designed skill development program expressed greater levels of satisfaction which had a direct impact on their academic achievement and practical skills Ali et al. (2024). According to the study students' engagement and results are greatly increased when training programs are in line with their career goals and offer practical learning opportunities. These results highlight the role that skills development initiatives play in promoting academic success and satisfaction.

Methodology

Undergraduate and graduate students' satisfaction with academic assistance, campus amenities and infrastructure, extracurricular activities, professional development opportunities, and career and mentoring support is examined in this study using a quantitative research methodology. Information was gathered from a sample of 1,104 students who were enrolled in colleges throughout Nepal, affiliated with both domestic and international universities like Asia Pacific University of

Technology and Innovation, Lincoln University College Malaysia, HELP University Malaysia, Tribhuvan University, Pokhara University, Gandaki University, Purbanchal University, and Far-Western University. A 4-point Likert scale, from "Not Important" to "Extremely Important," was used in a standardized survey to gauge student opinions and satisfaction.

The research paper, therefore, attempts to depict the impact of these factors on student satisfaction and also provides handy recommendations for improvement within an organization. The responses were selected by the stratified random method so that representatives from different demographic backgrounds and various academic programs were represented. SPSS is used for data analysis to study the relationship between the independent factors with the dependent variable, which is student happiness. It also applies descriptive statistics, correlation analysis, and multiple regression analysis. This will help to better educational experiences and results, and improve institutional performance and retention by mending prevailing gaps regarding quality management and satisfaction.

Hypothesis

H1: Academic support has a significant positive impact on undergraduate and graduate satisfaction with college management.

H2: Campus infrastructure and facilities are positively associated with undergraduate and graduate satisfaction with college management.

H3: Engagement in extracurricular activities and campus events significantly enhances undergraduate and graduate satisfaction with college management.

H4: Opportunities for soft and professional skills development positively influence undergraduate and graduate satisfaction with college management.

H5: Career and Mentorship Support positively influences undergraduate and graduate satisfaction with college management.

Research Gap

- Extracurricular and Event Engagement
- Professional Development Opportunities
- Career and Mentorship Support

Conceptual Framework

Data Analysis and Findings

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.939a	0.882	0.881	0.48853
a Predictors: (Constant), Career_ Mentorship_Support,				
Infrastructure, Academic_Support,				
Extracurricular_Event_Engagement,				
Soft_Professional_Skills_Develop-ment_Opportunities				

Table: 1

The regression model's overall performance is shown in the Model Summary table. The dependent variable (Undergraduate/ Graduate Satisfaction with College Management) and the predictors (Career Mentorship Support, Infrastructure, Academic Support, Extracurricular Event Engagement, and Soft Professional Skills Development Opportunities) have a robust positive correlation, as indicated by the R-value (0.939). The model's predictors account for 88.2% of the variance in student satisfaction with college administration, according to the R Square value of 0.882. Because it considers the number of predictors, the Adjusted R Square (0.881) is a more trustworthy metric for models with several predictors. The precision of the model is indicated by the Standard Error of the Estimate (0.48853), which shows the average separation between the observed values and the regression line.

ANOVAa						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	1782.905	5	356.581	1494.07	<.001b
	Residual	239.619	1004	0.239		
	Total	2022.524	1009			
a Dependent Variable: Undergraduate_Graduate_Satisfaction_with_College_Management						
b Predictors: (Constant), Career_Mentorship_Support, Infrastructure, Academic_Support,						
Extracurricular_Event_Management, Soft_Professional_Skills_Development_Opportunities.						

The regression model's overall significance is assessed in the ANOVA table. With a significance level (Sig.) of less than 0.001 and a very high F-statistic value (1494.068), the regression model demonstrates that the predictors taken together have a statistically significant effect on the dependent variable. How much of the variance in student satisfaction can be explained by the regression model (1782.905) as opposed to the unexplained variation (239.619) is shown by the Sum of Squares and Mean Squares values. For regression (5), the number of predictors is represented by the degrees of freedom (df), the sample size less the number of predictors, and the constant is represented by the residual (1004).

Coefficients a						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	2.317	0.115		20.092	<.001
	Academic Support	-0.013	0.012	-0.016	-1.101	0.271
	Infrastructure	-0.008	0.012	-0.009	-0.621	0.535
	Extracurricular and Event Engagement	0.058	0.014	0.067	4.156	<.001
	Soft and Professional Skills Opportunities	0.104	0.016	0.122	6.471	<.001
	Career and Mentorship	0.651	0.017	0.804	38.181	<.001
a Dependent Variable:						
Undergraduate and Graduate Satisfaction with College Management						

Table: 3

The relative impact of different factors on undergraduate and graduate satisfaction with college administration is shown in the coefficients table. With the greatest standardized coefficient (Beta = 0.804) and a statistically significant result ($p < 0.001$), Career Mentorship is the predictor that has the strongest positive influence and is the most important factor affecting satisfaction. Although its influence is relatively less, Soft Professional Skills Development also has a significant positive contribution (Beta = 0.122, $p < 0.001$), followed by Extracurricular Event Engagement (Beta = 0.067, $p < 0.001$).

However, there are no discernible effects of Academic Support (Beta = -0.016, $p = 0.271$) or Infrastructure (Beta = -0.009, $p = 0.535$) on satisfaction, indicating that these characteristics might not be essential in this particular situation. When all predictors are held constant, the baseline level of satisfaction is represented by the constant ($B = 2.317$, $p < 0.001$). Overall, the results highlight the value of developing soft professional skills and career mentoring in raising student satisfaction with college administration.

Correlations						
	Academic Support	Infrastructure	Extracurricular and Event Engagement	Soft and professional skills	Career and Mentorship	Satisfaction
Academic Support	1	.588**	.457**	.563**	.603**	.562**
Infrastructure	.588**	1	.545**	.568**	.591**	.562**
Extracurricular and Event Engagement	.457**	.545**	1	.651**	.720**	.713**
Soft and professional skills	.563**	.568**	.651**	1	.801**	.795**
Career and Mentorship	.603**	.591**	.720**	.801**	1	.934**
Satisfaction	.562**	.562**	.713**	.795**	.934**	1
** Correlation is significant at the 0.01 level (2-tailed).						

Table: 4

The associations between the predictors and undergraduate/graduate satisfaction with college administration are shown in the correlations table. Career Mentorship Support has the strongest positive connection with satisfaction ($r = 0.934$, $p < 0.01$) among the predictors, suggesting that it is a significant factor in determining contentment. Opportunities for the Development of Soft Professional Skills also show a substantial positive association ($r = 0.795$, $p < 0.01$), highlighting its important role. While academic support and infrastructure both have modest associations with satisfaction ($r = 0.562$, $p < 0.01$ each), extracurricular event engagement has a relatively significant correlation ($r = 0.713$, $p < 0.01$), indicating that these elements have less of an impact. Strong correlations between Career Mentorship Support and Soft Professional Skills Development Opportunities ($r = 0.801$, $p < 0.01$) and between Career Mentorship Support and Extracurricular Event Engagement ($r = 0.720$, $p < 0.01$) are also among the significant intercorrelations among the predictors. These results demonstrate how crucial mentorship and chances for skill development are in promoting student satisfaction, even while infrastructure, extracurricular activities, and academic assistance all play complementary roles.

Conclusion

This study focuses on the main determinants of undergraduate and graduate satisfaction with college management and identifies Career and Mentorship Support and Soft and Professional Skills Development Opportunities as the most influential. Career and Mentorship Support turned out to be the strongest predictor, proving that personal mentorship may become a game-changing factor in students' experiences and building trust in institutional management. Correspondingly, soft and professional skills development initiatives prepare students to face real-life challenges and thus contribute to their overall satisfaction.

With extra-curricular and event engagement playing a meaningful role in the vibrancy of campus life, support for academic and infrastructure insights seemed to carry less weight in this study, thus far suggesting that student satisfaction depends more on personal growth opportunities and direct engagement with career and professional aspirations.

These findings point out that mentoring programs, skill-building initiatives, and engaging extracurricular activities need to be hardwired into the core educational mission of every institution.

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Understanding the Physical and Mental Health in Buddhism

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Abstract

This research article explores to understand the physical and mental health according to Buddhism. It shows the relation the body, mind and health and how the physical body and mental phenomenon are interconnected. Health is the total wellbeing of the both physical and mental body. Sufferings like illness, diseases, pain, etc. are categorized into eight different aspects in Buddhism. sufferings of lack of wellbeing due to karma and its fruits (vikapa). Training the mind on catubrhamavihara, practice of triple jewels without any confusion, doing wholesome karma, taking right food, right medicine, compassionate health- attendant support to release from suffering. Buddhism basically focuses to cure psychological health because the origin of all types of suffering starts from the mind. The article highlighted the use of Buddhist teachings for the wellness of human beings and that has positive influence to the nature and begins. The article is written based on original evidence from Pali Sutras and published secondary sources.

Keywords: *physical health, mental health, suffering, chatubrhamavihara*

Introduction

Buddhism occupies a diverse field of study in society and the world. It has been closely associated with curing all types of mental and physical suffering of all sentient beings. We can find the numbers of teachings in the Vinaya and Sutra Pitaka on how to balance the psychological or mental and physical health of monastic and lay followers. These sutras and Vinaya cover far and wide the area from physical science to spirituality. In the context of health, the Buddha is taken as a doctor, his teachings as medicine, and the monastic followers as health attendants for the cessation of physical and mental suffering. The Buddha knows the problem (the cause of illness-sufferings) and provides the right medicine. Through the holistic approach, the Buddha focuses on the health of the entire animate and inanimate beings because cessation of sufferings is the main objective of Buddhism.

Concerning human health, both physical and psychological illness, the Buddha has prescribed both the curative and preventive aspect of treatment. The psychological aspect of life is more important than the physical aspect because one can experience the physical suffering through the psychological phenomenon. The whole system of organs and their functions appears to be flesh, blood, bones, and a combination of sense organs, systems, and psychological phenomena. These are interdependent, so illness in physical or in emotional form. The purpose of this article is to explore the understanding of physical and mental health for holistic well-being and how these two aspects are interrelated with each other. The article is based on the original source from Buddhist canons and secondary literature available.

Body, Mind, and Health

The two major constituents of the sentient beings are mind (*nāma)* and matter (*rūpa)*. *Rūpa* is the material world that has form or physique. The four fundamental elements in Buddhism are solidity (*prithivi dhatu*) that gives the foundational support to other elements like the body, skin, flesh, bone, teeth, etc. *Apo Dhatu* (liquidity), characteristics of cohesion are water, urine, mucus, sweat, saliva, and tears. *Tejo Dhatu* (warmth) maintains the temperature of the body. *Vayo Dhatu* (air) pushes or moves other aggregate matter. These four elements have the qualities of attractive and repulsive forces, energy, and relative motion. The material world in Buddhism is the combination of these four elements in *ākāsa,* space.[1] The mind and brain are different things. The brain is the physical object that has mass, weight, and structure, while the mind is the non-physical phenomenon of cognition, recognition, and analyzing and memorizing and storing aspects of our brain.[2] However, the mind and matter originate interdependently. Therefore, the mind and the matter are mutual causes of the origination.

1 Y. Karunadasa (1967), *Buddhist Analysis of Matter,* Verginia: Department of Affairs, p. 15.

2 Patricia Churchland (2002). Brain-wise: studies in neurophilosophy. Cambridge: Massachusetts Institute of Technology, p. 10

The mind incorporates the formless aggregates of *vedanā, saññā, sansakāra,* and *vijñān.* Its function is to perceive, cognize, analyze and store information. The mind is on the brain and spread on the whole body through thousands of veins. It is a major subject of learning and practicing in Buddhism. It is understood by *manas or mano* (mental power or mental faculty)*, citta* (mind or thought)*,* and *viññāṇa* (consciousness faculty) [3] . The mind links the previous life to the new life after the physical death. Because the physical body is as a seat of mind. So, if physical body dies, the mind escape from its seat and search for new seat or gets liberation. Therefore, the physical body of being decays, dies, and further unites into the corresponding elements but the consciousness or mental body never vanishes until it gets liberation. It revolves into the six realms on the basis of its karma and experience corresponding sufferings. [4]

Concerning human health, In the Anguttara Nikaya, the Buddha said there are two types of diseases: diseases of the body (kaya) and diseases of the mind. Visuddhi Magga, a text of Aśvaghosa, explains that the *kāya* includes both the physical and mental body or whole mass of in-breathing and out-breathing in includes *vedanā, saññā, sansakāra,* and *vijñān*. The Buddha emphasizes that a monk can be free from physical diseases in a period of time. However, it's hard to find a person free from mental illness even for a single moment. Free from mental illness is the state of mind that destroyed *āsavas* (āshrava in Sanskrit).[5] *Āsava* is the seed of rebirth, so it carries the mental illness: greed, expectation of honor, fame, and effort from earlier lives to next lives.[6] The diseases of a body can be cured from time He emphasizes that a monk can be free from diseases of the body for one year to even a hundred years. The trained physician can cure the physical illness of the body. However, it's hard to find a single person who can admit freedom from mental diseases even for a single moment.[7]

In a philosophical aspect, there are eight types of suffering in Buddhism.[8] These are birth (jātiduḥkha), sickness (*vyādhiduḥkha*), aging (jarāduḥkha), death (maraṇaduḥkha), suffering being separated from beloved (priyaviprayogaduḥkha), association of unwanted person or events (*apriyasaṃprayogaduḥkha*), suffering not getting what one wants (*yad api icchayā paryeṣamāṇo na labhate tad api duḥkham),* and suffering inheriting in the five aggregates (*saṃkṣepeṇa pañcopādānaskandhaduḥkham*. [9] These sufferings are of both mental and physical origin and originate from either ignorance or craving. Some of these illnesses or suffering transfer from the earlier life to future lives. Being physically and mentally healthy is a great asset. In the Dhammapada, the Buddha said, **'***ārogya paramā lābhā'* (Health is the greatest gift).[10]

The Gilana Sutta in the Samyukta Nikaya elaborates on the condition of physical suffering without the mental suffering. According to the sutra, Ven. Anuruddha was staying in Dark Forest (Savatthi) having pain, illness, and disease. A group of monks came to him and asked, "What are you dwelling (mentally) in so that the pains that have arisen in the body do not occupy or remain in the mind?" Venerable Aniruddha said he had been shaping his mind into four frames so that the suffering of his body does not invade or remain in the mind.

These four frames are:

- Remain focused on the body in an ardent, alert, and mindful
- Remain focused on feelings in and of themselves, mind in and of itself
- Remain focused on mental qualities in and of themselves.
- Putting aside greed putting aside greed and distress with reference to the world. When I dwell with my mind well-established in these four frames of reference, the pains that have arisen in the body do not invade or remain in the mind."[11]

Buddha was conscious about the health of his disciples. According to Vinaya rule, monastic people should remain on bare feet, with one-time meal collecting by alms and limited clothing. Therefore, he allows monks to keep an

3 Suwanda H.J. Sugunasiri. (2014). "Triune mind in Buddhism." Nalanda Collage Buddhist Studies, Canadian Journal of Buddhist Studies No. 10

4 Ghimire, C.K (2021), "The Mind and its Procedure in Buddhism", NUTA JOURNAL, 8 (1 & 2), DOI: 10.3126/nutaj.v8i1-2.44037, 42-49).

5 Piyadasi, Thera (2018), The Ancient Path, Kandy: Buddhist Publication Society, p.44

6 https://obo.genaud.net/dhamma-inaya/pts/an/04_fours/an04.157.wood.

7 (Anguttaranikaya, Catukka Nipāta, Indriya Vagga, Sutta 157, translated from Pali by F. L. Woodword, Pali Text Society, https://obo.genaud.net/dhamma-vinaya/pts/an/04_fours/an04.157.wood.pts.htm.

8 Narada Thera (1977) The Buddha and his Teachings, Malaysia: Buddhist Missionary Society, p. 76

9 Gethin, Rupert (1998), Foundations of Buddhism, Oxford University Press, p. 59

10 K Sri, Dhammananda (1992), Dhammapada, Malaysia: Sasana Abhiwurdhi Wardhana, p. 204

11 SN, Sutra 52, Gilana Sutta: Illness, translated from the Pali by Thanissaro Bhikkhu, 1997

Ointment-Box into a group of six monks. In early days, monks used to carry such box made up of gold and silver. Therefore, people criticized on it, saying monks enjoy the pleasure of the senses. Hearing this criticism, the Buddha restricted monks to have luxurious box. He allows the box made up of bone, ivory, horn, reed, bamboo, a piece of stick, crystal, copper, and conch shell. He allowed the lid to be tied with thread to protect the box from dust.

Karma and Suffering

Karma or action (kamma in Pali) is the action (physical or mental) driven by *cetanā.* The fruits of karma if *karmaphala* or karma *vipāka* appeared in the samsara, six realms when it gets maturation. The Buddha said, "*intension (cetanā), I tell you is kamma. One does kamma by way of body speech and mind. In the cycle of dependent origination of the kamma, the first karma arises from mano saṅkhāra on the basis of its gati (existence) than lead to vaci (speech) and kaya saṅkhāra.*[12] There are ten wholesome and ten unwholesome actions performed by body, speech and mind. The three unwholesome actions by body are; killing (*pānatipāta*), taking what is not given (*adinnādāna*) and (*kāmesu micchācārā*), the four *vaci saṅkhāra* are; lying (*mûsāvādā*), slandering (*pisunāvādā*), harsh speech (*parusāvādā*) and frivolous talk (*sampappalāpā*) and the three action by mind are; greed (*abhijjā*), ill will or hatred (*vyāpāda*) and wrong view (*micchā dittthi*). The ten wholesome actions are the reciprocal of the unwholesome karma. These are abstaining from killing, stealing, sexual misconduct, lying, divisive speech, harsh words, frivolous words, greed, anger, and ignorance.[13] Suffering occurs when the action of the body, speech and mind matured. The heaviness of suffering directly related to the heaviness karma one has done.[14]

Psychological Suffering

Suffering is the first Noble Truth of the Buddha. It is one of the three marks of existence: *anitya, dukkha,* and *anātma.* The worldly beings have to experience suffering, as it is unavoidable natural occurrences. Suffering arises depending upon the impression of the physical and mental activities known karma. Knowing suffering means knowing one's own self and existing situation.

D**ukkha**

The word *dukha* in Pali is generally translated as suffering in English. Suffering incorporates physical pain, stress, unease, unsatisfactory experiences, diseases, discomfort, sorrow, and misery. Various types of sufferings can be categorized into three sections: the suffering of suffering (*dukkha-dukkha*), the sufferings of change (*viparinama dukkha),* and the suffering of existence (*sankhara dukkha*). Physical and emotional discomfort and pain are suffering of suffering. For example, suffering of birth (*jātiduḥkha*), aging (*jarāduḥkha*), sickness (vyādhiduḥkha), and death (*maraṇaduḥkha*).[15] Mahanama, a Buddhist follower from Kapilvastu, said all human beings, including his family members—father, mother, children, and wife—and outside these are subject to death. He said the five strings of human sensual pleasures are less valued than the refined pleasure of spirituality. The mind should be raised above the Deva of the Thirty-three heavens and Great Kings, Brahma worlds. Mahanama's said cessation of self-identity is the happiness, and the notion of self is the root of suffering.[16]

Except *arhat*, all beings in the world have *āsavas,* afflicted mind, the root cause of suffering. Such mind analyzes and perceive falsely the information supplies by six senses. Afflicted mind biases in instructing action to be accomplish. These biases are due to sensual pleasure (*kāma āsava)*, bias in existence (*bhava āsava*), the bias of views (*dristi āsava),* and ignorance (*avijja āsava*). Concerning the mind-only philosophy, what a person thinks or does is due to his mind. Mind is a torchbearer to show the path ahead. Therefore, the feeling of suffering originates in the mind, or the root of the psychological aspect of suffering is mind. So, cessation of suffering should start from the mind than physical suffering. The Buddha said he taught to recognize stress, the cause of the origination of stress, and how the root of stress can be removed to acquire a stress-free mind.

Mind Experience the Happiness

Training the mind to remove the three poisons is the first step to remove any types of suffering to get happiness. This statement was given by the Buddha in Jeta's Grove in the monastery offered by Anathapindika. Once Anathapindika was in pain due to severe illness. Ven. Sariputta, with Ananda, came to Anathapindika's place and said,

"I trust you are getting better, householder? I trust you are comfortable? I trust that your pains are decreasing and not increasing? I trust that there are signs of their

12 Peter Harvey (2000), Introduction to Buddhist Ethics, Cambridge University Press, p. 65

13 Narada Thera (1988), The Buddha and His Teachings,Malaysia: Buddhist Missionnary Society, p. 348

14 Ibid, p. 379

15 Piyadasi, Thera (2018), The Ancient Path, Kandy: Buddhist Publication Society, p.

16 SN, Gilana Sutta: Ill 55.54, translated from the Pali by Thanissaro Bhikkhu. Access to Insight (BCBS Edition), 30 November, 2013, http://www.accesstoinsight.org/tipitaka/sn/sn55/sn55.054.than.html.

lessening, and not of their increasing?" [17]

Anathapindika replied that he was not getting better; he felt as if a strong man had been slicing his head with a sharp sword, his stomach was paining as if an expert butcher or his apprentice were to carve up the stomach cavity of an ox with a sharp butcher's knife, and his body was getting burning as if two strong men, seizing a weaker man with their arms, were to roast and broil him over a pit of hot embers. He added his severe pains were increasing, not lessening. There are signs of their increasing, and not of their lessening. Then Sariputra advised one should train their mind that clinging to the sense organs: eye, ear, nose, tongue, body and their subjects, form, sound, smell, taste, and tactile sensation, respectively are the source of suffering. Vijñana produced by these sense organs in association with their respective subjects are eye-consciousness, ear-consciousness, nose-consciousness, tongue-consciousness, body-consciousness, and mind consciousness. Therefore, one should train its mind that these sciences are dependent, so do not have any independent on feeling, perception, volition and consciousness. [18] So, one should not cling to all of these mental aspects. One should train one's mind not to cling to the feelings those born by the contact of sense organs, not to cling with the five aggregates because they do not have self-existence, so they are void. Anathapindika realized the teachings given above so he sheds tears. [19]

Another point to experience happiness is to realize aging is natural phenomenon; one has a limit of age. This perishable body is subject to illness and ultimately it dies. The chain of birth and passing away and rearising continue until final liberation, ultimate happiness. One should realize "I am not the only one subject to aging who has not gone beyond aging". During the life, separation from all that is dear is natural. When the one often reflects on these various types of suffering and realize the path, sticks with that path, develops and cultivates wisdom the fetters are abandoned, and the obsessions destroyed. Then only, the practitioner reflects and realize that he is the owner of his action. What he/she is now is due to his/her action.

Health Service to the Patient

Regarding the treatment of the patient, the Buddha in the Anguttara Nikaya prescribes the three types of health services that should be provided to a sick person. These are,

- Right food
- Right medicine
- Compassionate caretaker (Aswoghosa, 2065, 9)

Right Food

The life of a monk is an example of moderate consumption and high spiritual yields. Before ordination as a monastic member, one has to determine the four nisrayas: *pindiyolapabhojanam* (begging food), *pamsakulacivaram* (wearing gathered from crematorium), *brikshyaamulasenasanam* (spending the night under the shadow of a tree), and *putimuttabhesajjam* (using urine of a cow as medicine) are the four determinations a monk to be must take an oath before having Bhikshu ordination. [20] Therefore, a monk should commit using cow urine, natural elements, or herbs for health management.

The Buddha said food is the cause of life (*sabbesattā āhārikā),* and hunger is a great illness (*jighachchha paramā rogā*). [21] Keeping this philosophy in practice, the Buddha consciously prescribe the quantity, quality, time-table of having food and cooking and food-serving procedure. Concerning the quantity of food, the Buddha instructed to monastic followers that one should stop eating before the accessing the requirement of 4-5 lumps *(chattāro pancha ālope udakaṁ pive*). Eating too full stomach is harmful to health.[22]

Buddhist Bhikshu and Bhikshuni have one meal in a day before the noon. These days, having light breakfast in the morning and meals before noon is in practice. Even if they take morning and day time meal, the duration of eating and fasting similar to intermittent fasting. The medical science probably unknowingly is prescribing like monastic method of eating and fasting. Doing so reduce obesity, improve heart health, maintain blood pressure, reduce diabetes and cholesterol, and improve brain health. Fasting also helps to reduce the risk of neurological disorders: Alzheimer's, Parkinson's, and stroke, and reduce the probability of cancer. Fasting also helps to maintain insulin, reduce aging, and clean out the dead cells of the body as well.[23]

The Buddha advised his disciples to maintain personal hygiene, like bathing, washing, brushing teeth and cloth-

17 Nanamoli (trans, 2015), Majjhima Nikaya, USA; Wisdom Publication, Anathapindika Sutta, p. 1109-1113

18 Anathapindikovada Sutta: Instructions to Anathapindika translated from the Pali by Thanissaro Bhikkhu 2003, https://www.accesstoinsight.org/tipitaka/mn/mn.143.than.html

19 Upajjhatthana Sutta: Subjects for Contemplation" (AN 5.57), translated from the Pali by Thanissaro Bhikkhu. Access to Insight (BCBS Edition), 30 November 2013, http://www.accesstoinsight.org/tipitaka/an/an05/an05.057.than.html

20 Ghimire, C. Kala (2081), Civara (Nepali Bhikshu tatha Anagarikaharule lagaune Vastra) Kathmandu: Vajra Book Shop, p. 4

21 Sanskrityana, Rahula, (1935), Vinaya-Pitaka, Saranath: Mahabodhi Society, p. 218

22 Ibid, p. 229

23 https://www.medicalnewstoday.com/articles/323605#oxidative-stress-and-inflammatio

ing. The Buddha allowed eight *angula* (length equivalent to the two-times breath of the breath of the four fingers).[24] He made rules for washing the clothes and taking a bath.

Rules on eating, especially types of food in Buddhism, are a matter of controversy in the general public. The philosophy of *ahimsa,* meaning the respect of others' lives, symbolizes that Buddhist followers should be vegetarian. The public generally does not think that monks are not involved in the process of food production, so they have to eat whatever they receive in an alms bowl. Buddhist followers are permitted to eat the meat passed through the three-fold rule (*tri-kotiparisuddha*: Mamuddisya kritam, samukha dristam, and alapika meat) is allowed to eat.[25]

The Buddha was very conscious about illness caused by drinking dirty water. Because monastic member needs to travel village to village to receive alms. Sometimes have need to go far in the next villages for teaching. Therefore, they have to drink water from different sources. Keeping this compulsion in mind, the Buddha obliged monks to have a water strainer, a piece of cloth as a water filter. Not only this, but Water Stainer is one of the eight requirements of a monastic member.

Compassionate Caretaker

Caretaker to a patient should be benevolence, refraining from harmful treatment, respecting the lives of each individual and self-governing ethics. He/she should emphasis on the four sublime states of the mind: loving-kindness, compassion, equanimity, kindness and empathy. We can practice a stanza of the Dhammapada (Stanza, 183) as medical ethics.

Not to do any evil,

To cultivate what is good

To purify one's mind

This is the teaching of the Buddhas.[26]

The health-care practitioner has a lot to learn from Buddha's teachings and practice those in behavior. Such behavior aid to fulfill the role as a physician and wholesome lives.

Buddha's teachings on the medical ethics and compassionate care to patients can be related as taking refuge in the Three Jewels. the Buddha, the spiritual guide or qualified physician; the Dharma (the practice or faultless medicine given by the physician); and the Sangha (the community as medical attendant, caretaker, or nurse).[27] "Nursing the sick was much praised by the Buddha. Caring to sick person is presenting own self the welfare of others. Realizing the pain of other into own self. This is why attending to the sick has been praised by the Buddha. Service to the suffering beings is a great virtue.[28]

A spiritual leader in Buddhism directs individual in overcoming negative state of the mind and developing positive attitude like a physician takes care of the individual by giving them medical treatment to overcome their physical and mental illnesses. Spiritual as well as physician both support individuals to be happy by the eradication of sufferings. The teaching of the Buddha (dhamma) is taken as medicine by applying these in one's own life to liberate the beings from suffering. The analogy of Buddhas' teaching is medicine that works only if the patient takes it according to the instructions provided by the physician. The sangha in medical terms is those who are involved in caring for the patients. They personally connect with patients for the rule of taking medicine, following with the proper diet, mental and physical exercise.

A person who is diseased, in pain, and severely ill should be reassured by another discerning lay follower with the following four reassurances: one must assure and respect the worthiness of the Buddha, his qualities, and his wisdom, who can tame all in his path. The second point is that one should be reassured by the teachings given by the Buddha (Dhamma) because the Dhamma is well-expounded by the Buddha to be seen here and now, timeless, inviting verification, pertinent, and to be realized by the wise for themselves. The third aspect of assurance is the confidence in the Sangha. The true disciples of the Buddha are worthy of gifts, hospitality, offerings, respect, and the incomparable field of merit for the world. The fourth assurance is one should have virtues that are appealing to the noble ones.[29] Everything animate or inanimate in this world is dependent on each other. Human beings are interwoven with many nonmedical factors, such as economics, education, socio-cultural aspects, and morality. Without the proper management of these various aspects, the wholeness of health is impossible. A health-care practitioner should practice the perfections and *brahmaviharas* (boundless loving-kindness, compassion, appreciative

24 Sanskrityana, Rahula, (1935), Vinaya-Pitaka, Saranath: Mahabodhi Society, p. 218

25 Vajracharya, D. B. (Trans. 2001), Majjima Nikaya, Lalitpur: Bir Purna Pustakalaya, P.367

26 K Sri, Dhammananda (1992), Dhammapada, Malaysia: Sasana Abhiwurdhi Wardhana, p. 388

27 Anathapindikovada Sutta: Instructions to Anathapindika translated from the Pali by Thanissaro Bhikkhu 2003, https://www.accesstoinsight.org/tipitaka/mn/mn.143.than.html

28 Anathapindikovada Sutta: Instructions to Anathapindika translated from the Pali by Thanissaro Bhikkhu 2003, https://www.accesstoinsight.org/tipitaka/mn/mn.143.than.html

29 Thanissaro Bhikkhu (trans. 2011), Samyukta Nikaya 55.54, Gilana Sutta: Ill

joy, and equanimity). Health practitioners need to develop such characters during the health service delivery.

Girimananda Sutra describes about the method of curing diseases. During this process the attendant should convince the illness on the subjects are impermanence, *anatta*, foulness *(asubha),* disadvantage (danger), abandonment, detachment, cessation, contemplation of distaste for the whole world, contemplation of impermanence of all component things, and mindfulness of in-breathing and out-breathing. If the patient realize that the matter (visible objects) is impermanent; feeling or sensation is impermanent; perception is impermanent; formations are impermanent; consciousness is impermanent, having learned contemplations from the Blessed One, his affliction immediately cured and the person is recovered from psychological illness. [30]

Conclusion

The *Samsara*, the six realms (*preta, narka, tiryaka, manusya,* and *deva)* is the place of physical and psychological or mental sufferings. Being born on these sufferings is due to the fruit of actions performed by body, speech, and mind. The Buddha emphasize that 'Health is the highest gain' because complete health is possible after the breaking the chain of life and death. Sufferings in Buddhism are categorized into eight aspects: originated from elemental imbalance in the body, natural causes, which are the out-of-control actions of human beings, and *samskara* (mental cause). Because body and mind are interrelated, so illness in one affects the health of the other. Understanding the nature of sufferings and practicing ways to have wellness gain happiness. Right food, training the mind, believing the triple jewels, ethical life, self-respect and respect of the others, right medicine, and compassionate care help to have a healthy life. In the Anguttara Nikaya, there are three types of patients: those who are not able to obtain nourishment, proper medicine, and adequate nursing; he won't recover from illness. The second type of patient is that one can live only if he obtains these three things. The third type of patient is the one who is sure to recover if a short instruction is provided on the methods. These treatment plans are for the ultimate happiness and completely free from sufferings.

30 Girimananda Sutta: Discourse to Girimananda Thera" (AN 10.60), translated from the Pali by Piyadassi Thera. Access to Insight (BCBS Edition), 30 November 2013, http://www.accesstoinsight.org/tipitaka/an/an10/an10.060.piya.html.

30th International Conference on IT Applications and Management Theme: Entrepreneurship and Spirituality in the age of Digital Innovation

Hosted and Supported by
Korea Data Strategy Society, Korea Internet e-Commerce Association,
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Nepal
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FUTURE of ASIA

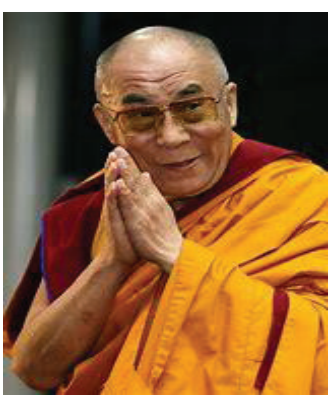
"Entrepreneurship and Spirituality"

Professor Dr Kanes K Rajah
Executive Director
CEPD London, UK

Entrepreneurship and Spirituality

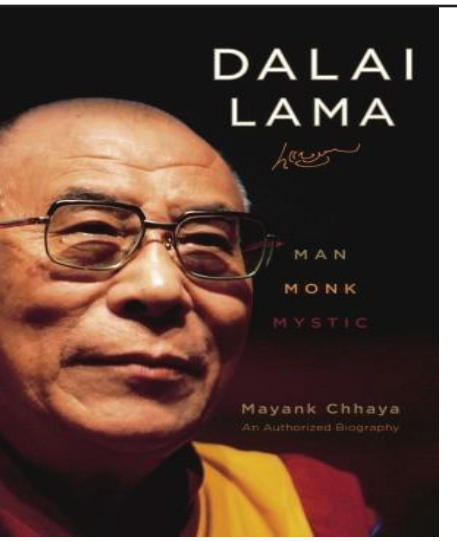
We need the questions as much as we need the answers….
e.g. Who is more spiritual… Elon Musk or the Dalai Lama?





Who is more entrepreneurial…
Elon Musk or the Dalai Lama?





Entrepreneurship and Spirituality AGENDA

The focus will be on the important questions, ideas and perceptions that are facing us:

1. What is entrepreneurship about and who is it for
2. What is spirituality about and who is it for?
3. Is entrepreneurship and spirituality the same?
4. How are we connected to the world of opportunity, outcomes and faith?

Definitions

Entrepreneurship:
- **Wanting growth,**
- **thinking strategically, and**
- **using innovation**

Spirituality:

- **Find purpose and meaning**
- **Restore hope and optimism**
- **Find a sense of community and support**

Spirituality vs. Religion

Spirituality

1. Can be practiced individually
2. Doesn't have to adhere to a specific set of rules
3. Often focuses on a personal journey of discovering what is meaningful in life

Religion

1. Often practiced in a community
2. Usually based on a specific set of rules and customs
3. Often focuses on the belief in deities or gods, religious texts, and tradition

CHAORDIC ORGANISATIONS
Living with change

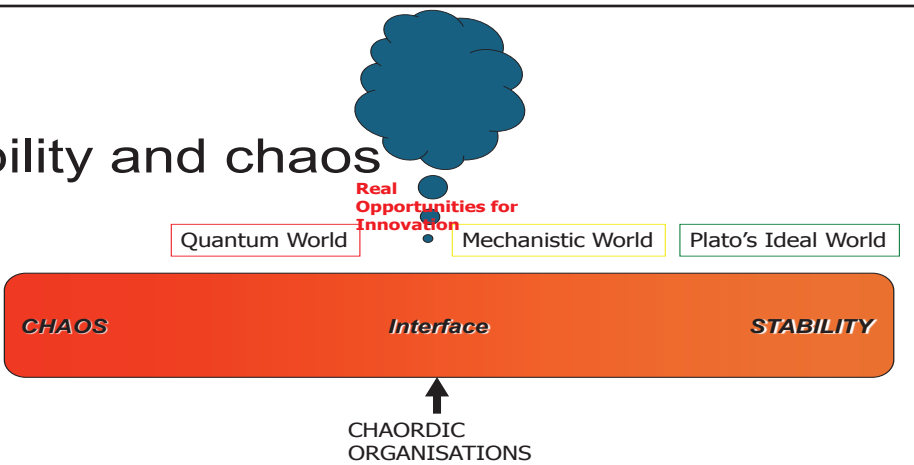
- SOCIOLOGICAL
- TECHNOLOGY (& Digital)
- ENVIRONMENTAL
- ECONOMIC
- POLITICS

Chaordic Organisations

(Dee Hock, 1999)

At its core, a **chaordic organization** seeks to strike a delicate balance between chaos and order, harnessing the inherent strengths of each to foster innovation, adaptability, and sustainable growth.

Stability and chaos



Dalai Lama and Musk……



Change



Change

Connections



Change

Connections

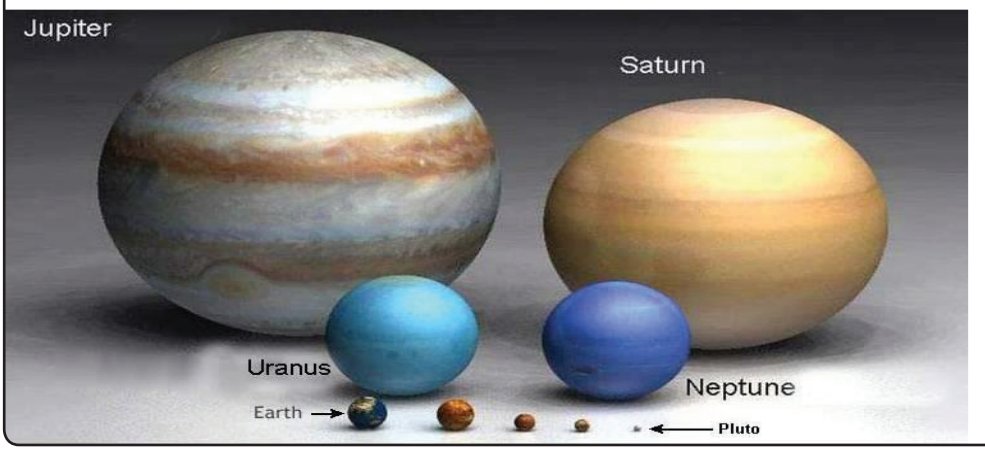
Interconnections



We try to
ignore the
interconnections



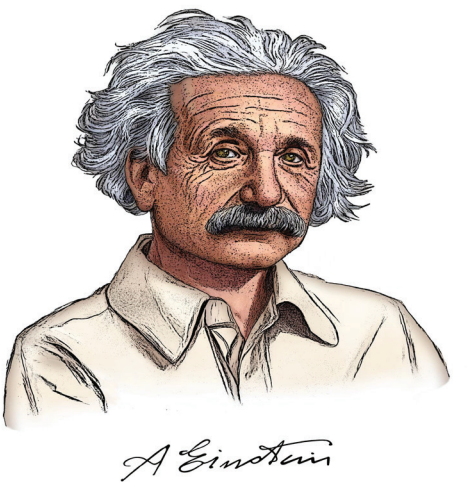
EMBRACING CHANGE:



Do we end with…

And where he took
us with relativity…….?

E=mc2



A Einstein

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THANK YOU

FUTURE of ASIA

"Entrepreneurship and Spirituality"

Professor Dr Kanes K Rajah
Executive Director
CEPD London, UK

Spirituality and Entrepreneurship

February 13, 2025

30th International Conference on IT Applications and Management

By
Prof Santosh Rangnekar
Professor (HAG)
Department of Management Studies
Indian Institute of Technology-Roorkee
India



GITA Answers:

"You must try to **manage yourself**."

चञ्चलं हि मनः कृष्ण प्रमाथि बलवद्दृढम् ।
तस्याहं निग्रहं मन्ये वायोरिव सुदुष्करम् ॥ 34॥

"Mind is very restless, forceful and strong, O Krishna, it is more difficult to control the mind than to control the wind..."

- Arjun to Sri Krishna
(chapter 6, verse 34)

Knowledge of the Self and Interpersonal Relations: Lessons from Bhagvad GITA

योगः कर्मसु कौशलम् ।
समत्वम् योग उच्यते ।।

(Excellence at work through self-development with devotion and without attachment)

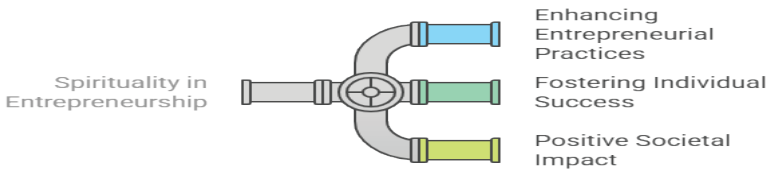
You have always every right to carry on your work but absolutely no right to get attached to the fruits of your Karma.

Practising this particular skill in every step of Karma is 'Karma Yoga' according to Gita.

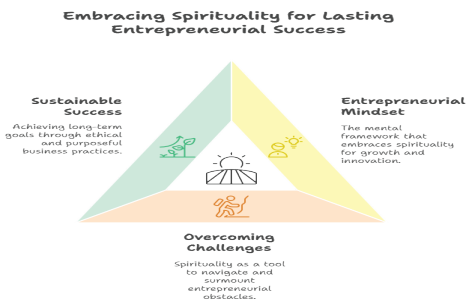
Otherwise, Karma will turn into ordinary grade.

Introduction

Unveiling the Spiritual Dimension in Entrepreneurship



- Today, the intersection of spirituality and entrepreneurship has garnered increasing attention.
- Spiritual principles can enhance entrepreneurial practices, fostering not only individual success but also a broader positive impact on society.
- Spirituality is increasingly recognized as a vital component in shaping entrepreneurial behavior and motivation

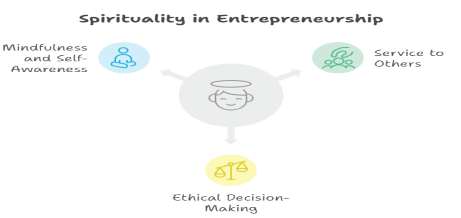


Introduction

- **Entrepreneurship** is traditionally seen as an economic endeavor.
- However, the **role of spirituality** in entrepreneurship is gaining recognition.
- Spirituality **transcends self-interest**, embedding purpose and ethics in business.
- This keynote explores how spirituality shapes **entrepreneurial mindset, challenges, and sustainable success**.

Spirituality in Business Context

- Moves beyond material gains toward **value-driven, sustainable entrepreneurship**.
- Entrepreneurs with strong spirituality prioritize:
  - **Service to others** (social entrepreneurship)
  - **Ethical decision-making**
  - **Mindfulness and self-awareness**



FACTORS OF SPIRITUAL WELLBEING

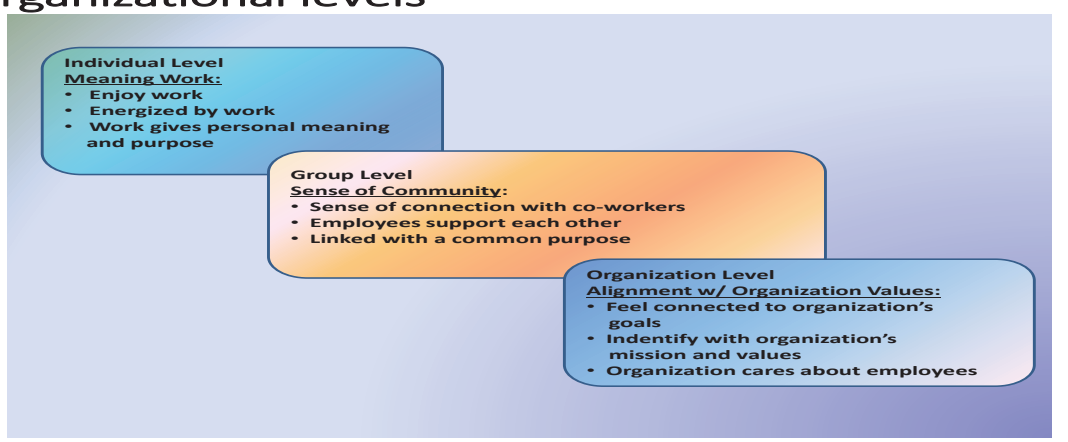
1. DEVOTION
2. SATISFACTION
3. SELF AWARE NESS
4. ETHICAL VALUES AND VISION
5. SOCIAL AWARE NESS/ACTIVENESS
6. POSITIVE ATTITUDE
7. LOVE & AFFECTION
8. BELIEF IN EXISTENCE OF UNIVERSAL / SUPERNATURAL POWER



Key Spiritual Components in Entrepreneurship

- **Purpose-driven vision** – Business as a calling, not just profit-making.
- **Integrity & ethics** – Upholding moral values in decision-making.
- **Resilience** – Spirituality fosters perseverance through challenges.
- **Compassion & humanity** – Treating employees, customers, and stakeholders with dignity.
- **Community orientation** – Entrepreneurship as a tool for societal transformation.

Conceptualizing Spirituality and Entrepreneurship and workplace: Individual, group and organizational levels



How would you describe your Enterprise?

- What's it really like to work here?
- How are employees valued?
- What skills does the company value?
- Do you know what is expected of you?
- How do people for different departments interact?
- Are there opportunities for training and education?
- How do people get promoted?
- What behaviors get rewarded?
- How effectively does the company communicate to its employees?

Why Spirituality Now?

- It helps to counterbalance the pressures and stress of a turbulent pace of life and caters to the increased need for involvement and connection
- Job demands have made the workplace dominant in many people's lives; yet they continue to question the meaning of work
- People feel the need to integrate personal life values with one's professional life
- An increasing number of people are finding that the pursuit of more material acquisitions leaves them unfulfilled

SEE EXHIBIT 16-5

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16-11



1. Compassion :

A deep awareness of and sympathy for others (Twigg and Parayitam 2006) and a wish to relieve their suffering (Farlex 2007).

2. Mindfulness :

A state of inner consciousness in which one is aware of one's thoughts and actions moment by movement. By being aware of their thoughts and actions in the present, people are better able to control their emotions and behaviors (Baer, Smith and Allen 2004).

3. Meaningful work

It is defined as one's experience that his/her work is a significant and meaningful part to his/her life. One feels that work has meaning for him/her beyond the material rewards (Duchon & Plowman 2005)

4. Transcendence

Describes a mystical experience dimension as "a positive state of energy or vitality, a sense of perfection, transcendence, and experience of joy and bliss" (Kinjerski & Skrypnek 2006)

12

Characteristics of a Spiritual Organization

- Concerned with helping people develop and reach their full potential
- Directly addresses problems created by work–life conflicts
- Four characteristics of spiritual organizations:
  1. Strong sense of purpose
  2. Trust and respect
  3. Humanistic work practices
  4. Toleration of employee expression



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SPIRITUAL LEADERSHIP
Qualities for an Entrepreneur

INTRINSIC MOTIVATION THROUGH
VISION, HOPE/FAITH and ALTRUISTIC VALUES

Hope/Faith (Effort)
- Endurance
- Perseverance
- Do What It Takes
- Stretch Goals
- Expectation of Reward
- Victory

Vision (Performance)
- Broad appeal to key Stakeholders
- Defines the Destination and Journey
- Reflects High Ideals
- Encourages Hope/Faith
- Establishes a Standard of Excellence

Altruistic Values (Reward)
- Forgiveness
- Integrity
- Honesty
- Courage
- Humility
- Kindness
- Empathy/Compassion
- Patience
- Trust/Loyalty

Spiritual Well-being

- Self-acceptance- feeling positive about one's good qualities, accepting bad qualities
- Positive relations with others- satisfying human relationships characterized by giving and receiving
- Autonomy- ability to make important decisions independently from others
- Environmental mastery- feeling competence and control when managing one's everyday affairs and surrounding context
- Purpose in life- sense of direction and belief that life has meaning
- Personal growth- notion of continued improvement over time

Challenge as a Driver of Entrepreneurial Growth

Encourages Innovation	Enhances Adaptability	Builds Resilience
• Challenges pushes entrepreneurs to think creatively and find unique solutions. • Necessity drives new ideas and innovative business models.	• Facing obstacles forces entrepreneurs to adapt quickly. • Help them stay agile in dynamic work environment.	• Overcoming challenges strengthens mental ability. • Entrepreneurs learns persevere through setbacks.

Spirituality as a Coping Mechanism



- Provides **inner resilience and mental clarity**.
- Reduces stress through **mindfulness, meditation, and purpose-driven work**.
- Creates a **strong ethical foundation** that prevents moral compromises.
- Encourages **long-term thinking over short-term profit maximization**.

Entrepreneurs Who Embody Spirituality

Anita Roddick
Built a sustainable, ethical business rooted in activism.

Blake Mycoskie
"One for One" model integrates charity into business.

Satya Nadella
Emphasizes empathy, mindfulness, and servant leadership.



"Business shapes the world. It is capable of changing society in almost any way you can imagine."

Dame Anita Roddick
FOUNDER OF THE BODY SHOP

Anita Roddick — The Body Shop

Ethical Entrepreneurship & Activism

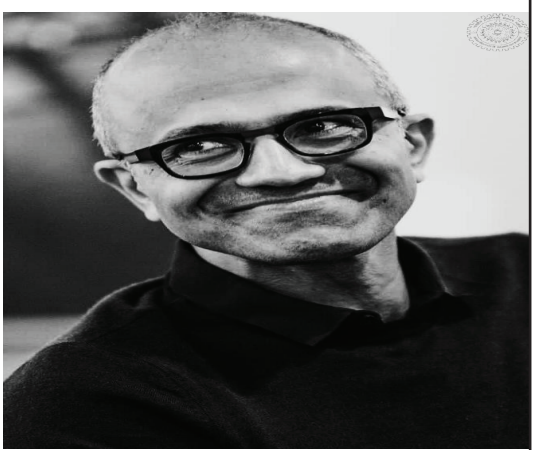
- **Key Highlights:**
- **Founded The Body Shop (1976)** with a mission to create cruelty-free, natural beauty products.
- **Advocated for ethical sourcing**, fair trade, and environmental sustainability.
- Pioneered **corporate activism**, supporting human rights and environmental causes.
- **Spiritual Approach:**
  - Business as a **force for good** rather than just profit.
  - Integrated **social values** into corporate strategy.
  - Inspired a new wave of **conscious consumerism**.

https://www.thebodyshop.in/our-story?srsltid=AfmBOorwl2BabP3fpFaFXAtCdt4n2pvRnQE6azd0poah9wP4xL2sUaMt

Satya Nadella — Microsoft

Empathy, Mindfulness & Leadership

- **Key Highlights:**
- Became **CEO of Microsoft (2014)**, transforming its culture.
- Advocates for **growth mindset, empathy, and mindfulness in leadership**.
- Prioritized **employee well-being and diversity**.
- **Spiritual Approach:**
  - Shifted Microsoft from a **competitive mindset to a collaborative, purpose-driven organization**.
  - Introduced **mindfulness and emotional intelligence** into corporate leadership.
  - Encouraged a **culture of innovation, humility, and inclusivity**.



Research Paper

frontiers | Frontiers in Education

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Hariharasudan A.

Should spirituality be included in entrepreneurship education program curriculum to boost students' entrepreneurial intention?

Sutarto Hadi[1]*, Ersis Warmansyah Abbas[2] and Ismi Rajiani[2]

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Spirituality is now becoming popular because of the physical and mental advantages it brings to entrepreneurship. Regardless of its more philosophical measurement, changes owing to spirituality have been distinguished in people's mental and standards of conduct. This investigation aims to examine the qualities related to university students, looking to explicitly comprehend the separate individual qualities or the psychological and cognitive inclinations. Tested on a sample of 300 students, Structural Equation Modeling results exhibit that those who participate in spiritual rituals tend to reinforce the mental and psychological credits connected with an entrepreneurial intention. Since entrepreneurial behavior is a priority to boost economic growth, spirituality should be coordinated as a mandatory subject in general instruction from primary school onward. The results of this exploration could be a model for the Indonesian government as they attempt to search for the best model for Entrepreneurship Education Program (EEP).

KEYWORDS
spirituality, entrepreneurship, psychological, cognitive, university

https://doi.org/10.3389/feduc.2022.977089

Research Paper

frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 23 December 2022
DOI 10.3389/fpsyg.2022.1082578

The role of spiritual mindset and gender in small business entrepreneurial success

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Introduction: Spirituality can be understood as a capital based on individual capabilities created by the application of intrinsic spiritual values, in order to use and develop human potential. The literature points out that spiritual capital increasingly influences and motivates entrepreneurs.

Methods: In this paper, we investigate whether spirituality has a mediating role between psychological resilience, optimism and entrepreneurial success, and verify the gender differences. Our hypotheses are quantitatively tested on a sample of 233 micro and small Portuguese business owners during the pandemic crisis.

Results: The main findings highlight that, while optimism and psychological resilience present a positive and significant relationship with entrepreneurial success in both genders, spirituality only impacts female entrepreneurial success.

Discussion: Our study theoretically and empirically shows that the psychological resources and spirituality can be incorporated into new or existing programs designed to provide entrepreneurs with information on coping skills and how to engage in positive reorientation and reappraisal. In so doing, it improves the knowledge of the importance of psychological resources for the micro and small business' recoverability during the pandemic, which is deeply rooted in the entrepreneurial ability to excel during adversity.

KEYWORDS

entrepreneur, small business, spirituality, pandemic (COVID-19), Portugal

https://doi.org/10.3389/fpsyg.2022.1082578

Research Paper

frontiers | Frontiers in Psychology

ORIGINAL RESEARCH
published: 06 June 2022
doi: 10.3389/fpsyg.2022.900852

The Impact of Entrepreneurial Spirituality on Business Performance: Based on the Survey of Private Enterprise Executives in Fujian China

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[1] Zhangzhou City College, Zhangzhou, China, [2] School of Economics, Fujian Normal University, Fuzhou, China

Entrepreneurship is the main engine of economic development. This paper aims to explore the impact of high executives' entrepreneurial spirituality (ES) on the business performance in China under the background of "mass entrepreneurship and innovation." By analyzing the relevant literature of entrepreneurship, the connotation and elements of ES are determined. According to the relevant research, we design the questionnaire of ES and business performance. The questionnaire was distributed to 100 private enterprise entrepreneurs by equidistant sampling, and 74 valid questionnaires were recovered. According to the questionnaire, responsibility has the highest score, followed by innovation, proactiveness, and risk-taking. The ES of women is slightly higher than that of men. The entrepreneurs with higher education also have higher score in ES. After analyzing the impact of different elements of ES on enterprise performance using structural equation modeling (SEM) and regression equation model, it is found that: (1) ES has a positive impact on enterprise performance. (2) Different factors of ES have different effects on business performance, and innovation and proactiveness play the greatest role. (3) There is an inverted U-shaped relationship between innovation, risk-taking, and business performance.

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Research Paper

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The relative importance of spirituality in entrepreneurship development among graduates of Nigerian tertiary institutions

Kenneth Chukwujioke Agbim*, Godday Oriemgbe Oriarewo & Nafisa Ijie

Business Administration Department, College of Management Sciences, University of Agriculture, Makurdi, Nigeria

ABSTRACT: *Man is a spiritual being that needs to be spiritually nurtured so as to optimally tap and harness his potentials in a work or vocation. Work or vocation is a calling when the spiritual man finds meaning and purpose in it. Since the spiritual man can actualize this calling through entrepreneurship, this study was designed to examine the relative importance of the dimensions of spirituality in entrepreneurship development. The study adopted a survey research method and purposive sampling technique. Data for the study were generated via questionnaires and analyzed using multiple regression. The results show that: vision affects entrepreneurial intentions, capabilities and success significantly and positively; hope/faith is significantly and positively related to entrepreneurial networking and capabilities; altruistic love is significantly and positively related to entrepreneurial networking, capabilities and success; meaning/calling has a significant positive relationship with entrepreneurial capabilities; and there is a significantly positive relationship between membership and entrepreneurial success. The study therefore recommends the teaching and practice of spirituality values among students undergoing entrepreneurship development programmes in Nigeria.*

Keywords: *Workplace spirituality, Spiritual leadership, Spirituality, Entrepreneurship development, Nigerian tertiary institutions.*

Entrepreneurship

Entrepreneurs Feel Closer to God Than the Rest of Us Do

by Mitchell J. Neubert

From the Magazine (October 2013)

HARVARD BUSINESS REVIEW

- **Baylor University study** by **Mitchell J. Neubert** examined faith and entrepreneurship.
- **Entrepreneurs pray more often** and believe in a **responsive God**.
- **Faith may boost risk-taking confidence** and resilience in business.
- Entrepreneurs often **seek congregations** that support business and offer **social capital**.
- **Spiritual capital enhances innovation, revenues, and employee engagement**.
- Religious beliefs influence **entrepreneurs and entrepreneurial employees** in organizations.
- Businesses may benefit by **leveraging spirituality while ensuring inclusivity**.

https://hbr.org/2013/10/entrepreneurs-feel-closer-to-god-than-the-rest-of-us-do

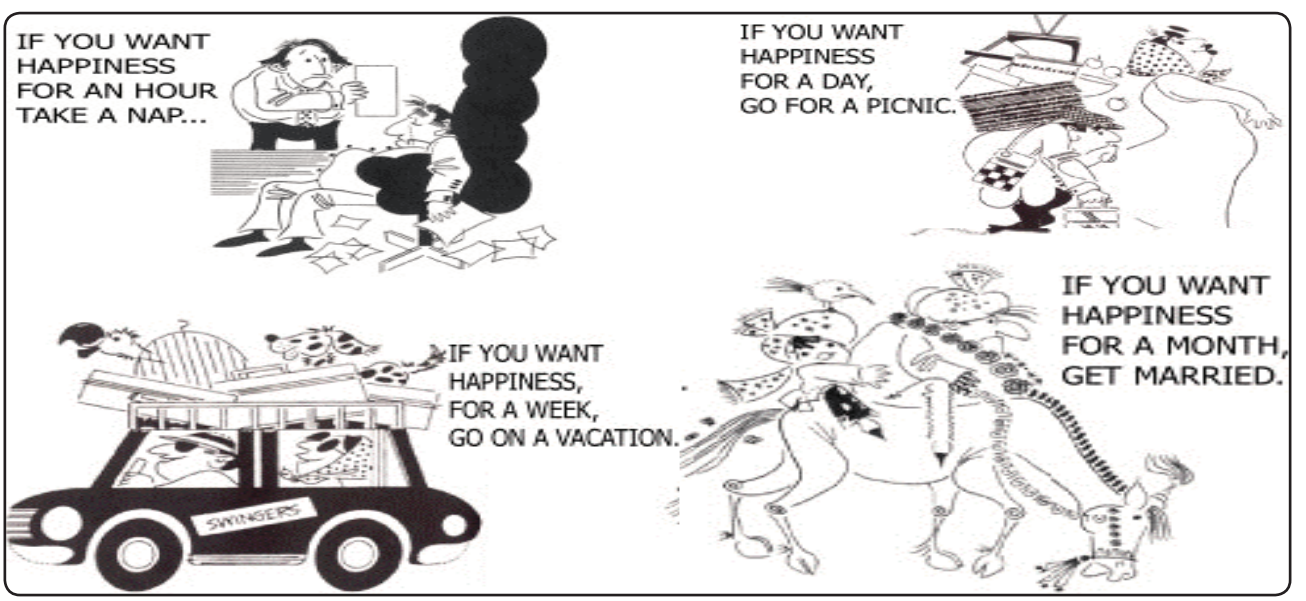
Key Takeaways

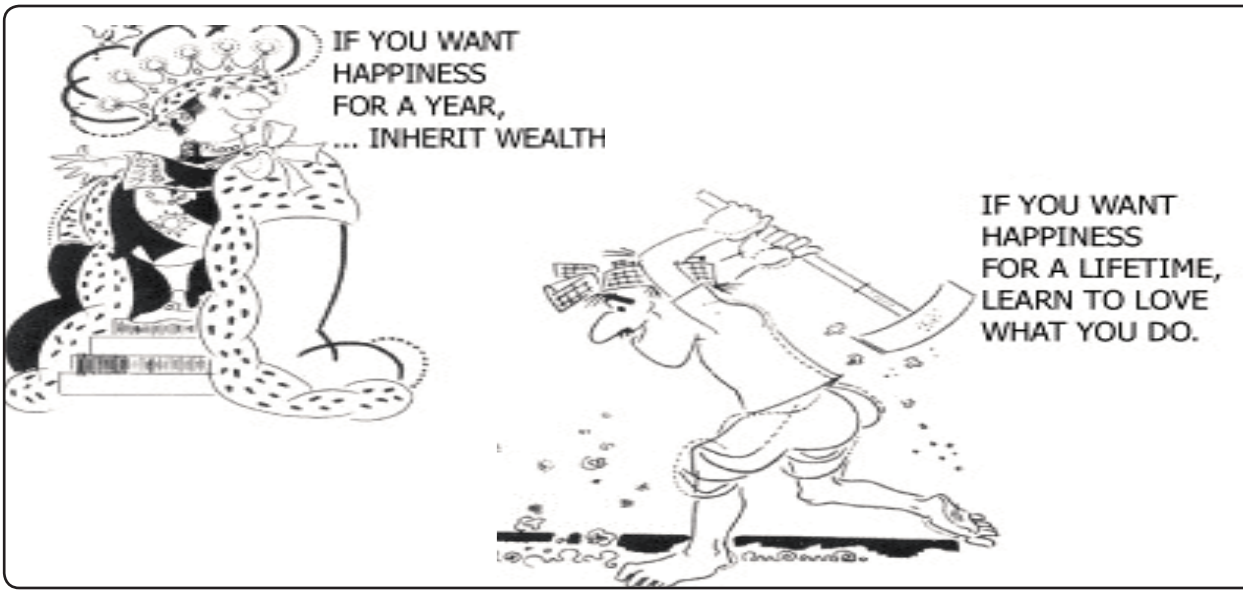
Entrepreneurship is not just economic; it is a spiritual journey.

Success requires a balance of material and spiritual growth.

Spiritual entrepreneurs drive social impact and long-term sustainability.

Future research should explore the intersection of spirituality & business strategy.





Thank you

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Bridging the Gap: A Systematic Literature Review on Performance Appraisal Interviews Using the PRISMA Framework

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Abstract

This paper presents a comprehensive systematic review of performance appraisal interviews (PAIs) across diverse organizational contexts using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. Analyzing 31 studies from JSTOR, Wiley Online Library, and ResearchGate, it identifies recurring challenges, practices, and strategies in PAIs. A critical research gap is highlighted: the scarcity of studies addressing PAIs in Nepal. The findings emphasize transparency, participatory methods, digital tools, and cultural adaptability. This paper proposes tailored frameworks to modernize Nepali institutions' practices.

Kewords: *Appraisal, PAI, PRISMA, AI-driven Assessments*

Introduction

Performance appraisal interviews (PAIs) play a crucial role in aligning employee objectives with organizational goals. Globally, PAIs enhance performance, engagement, and job satisfaction. However, inconsistencies in feedback mechanisms, limited employee participation, and cultural insensitivity are recurring issues. In Nepal, these challenges are magnified due to the lack of empirical research and digital adoption. This paper addresses these gaps by examining global practices and contextualizing them for Nepalese institutions.

Methodology

The PRISMA framework was applied to ensure a structured and transparent review process. The methodology included:

- **Search Strategy:** Articles were sourced using keywords such as 'performance appraisal interviews' and 'feedback systems.'
- **Screening:** Out of 50 articles, 31 were deemed relevant after assessing eligibility.
- **Eligibility Criteria:** Studies focusing on empirical and non-empirical evidence and organizational implications were included.
- **Data Extraction**: Themes, methodologies, and recommendations were analyzed for relevance to the research objectives.

Literature Review on Performance Appraisal Systems

Performance appraisal systems are a critical aspect of human resource management, serving as a tool for evaluating employee performance, providing feedback, and driving organizational success. The literature on performance appraisal spans various contexts, including public and private sectors, technological advancements, and participatory approaches.

Performance Appraisal in Different Sectors

Studies indicate that performance appraisal systems differ across sectors. Mishra (2020) explores the appraisal system in Nepal, emphasizing challenges in implementation. Similarly, Mainali (2019) examines Nepalese civil service appraisals, highlighting inefficiencies and the need for reform. Padhaya et al. (2021) discuss the effectiveness of performance appraisal systems in Nepalese universities, underscoring their role in academic excellence. Ghimire (2018) focuses on public sector practices, identifying gaps in transparency and consistency.

In technology start-ups, Feás, Bastida, and Calvo (2022) highlight the dynamic nature of appraisal processes, emphasizing continuous feedback mechanisms. Brown (2023) explores the digital transformation of performance appraisals, advocating for AI-driven assessments that enhance objectivity and efficiency.

Effectiveness of Performance Appraisal Interviews

Performance appraisal interviews play a crucial role in employee evaluation. Pälli and Lehtinen (2020) discuss how aligning objectives during interviews enhances appraisal effectiveness. Bowden and Sandlund (2021) examine knowledge exchange in interviews, suggesting that

structured discussions contribute to employee development. Klein and Snell (2019) investigate the impact of interview processes on appraisal outcomes, emphasizing the role of context.

Allinson (2018) evaluates training programs for performance appraisal interviewing, revealing a positive correlation between interviewer training and appraisal effectiveness. Werber et al. (2021) propose the AcqDemo feedback process, advocating for structured feedback mechanisms to enhance employee performance.

Feedback and Employee Participation

Employee participation in performance appraisals has been widely studied. Roberts (2017) underscores the importance of participation in fostering employee engagement and satisfaction. Sharma (2019) introduces participatory approaches to appraisals, highlighting collaborative goal-setting. Adams (2022) explores multi-source feedback, revealing its impact on comprehensive performance evaluation.

Collins (2020) investigates feedback practices in SMEs, demonstrating their influence on employee motivation. Tan and Hall (2018) discuss the role of feedback in academic settings, suggesting parallels with corporate performance appraisals.

Challenges and Future Directions

Despite advancements, performance appraisal systems face challenges. Meyer (2016) addresses the "feedback enigma," suggesting structured methodologies to improve acceptance. Inderrieden, Keaveny, and Allen (2019) identify predictors of employee satisfaction with appraisals, emphasizing procedural justice. Taylor et al. (2021) discuss due process in performance appraisals, proposing a justice-oriented framework.

Nathan, Mohrman Jr., and Milliman (2018) examine interpersonal relations in appraisal interviews, revealing their impact on employee satisfaction. Greller (2017) discusses subordinate participation, emphasizing its role in shaping perceptions of fairness.

The literature highlights the evolving nature of performance appraisal systems, with increasing emphasis on digital transformation, participatory approaches, and structured feedback mechanisms. Future research should focus on integrating AI-driven assessments, addressing biases, and enhancing employee engagement in the appraisal process.

Discussions

The findings underscore a global shift towards participatory and technology-driven appraisal systems. However, in Nepal, traditional, rigid systems persist. Key gaps include limited use of AI-driven tools, inadequate cultural adaptations, and lack of empirical studies.

The analysis of the reviewed literature highlights several key themes in performance appraisal systems. One significant finding is the growing importance of participatory appraisal processes. Studies by Roberts (2017) and Sharma (2019) suggest that involving employees in goal-setting and feedback discussions enhances engagement and motivation, leading to improved job performance. Similarly, Adams (2022) supports the effectiveness of multi-source feedback in reducing biases and providing a comprehensive evaluation.

Another critical aspect is the technological transformation of performance appraisals. Brown (2023) emphasizes the role of AI and digital tools in improving the efficiency and accuracy of performance assessments. These advancements address challenges such as subjectivity and inconsistency, which have been persistent issues in traditional appraisal methods (Mishra, 2020; Mainali, 2019).

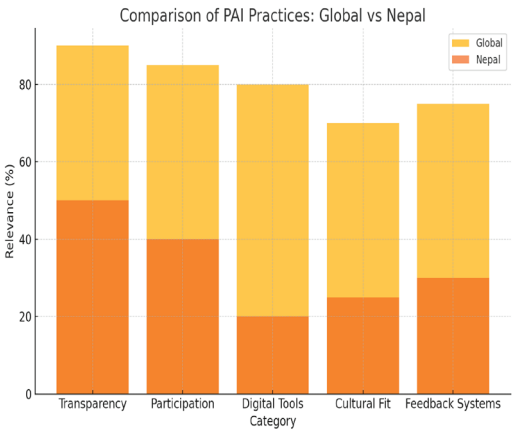
The effectiveness of performance appraisal interviews is influenced by the quality of feedback and interviewer training. Studies by Pälli and Lehtinen (2020) and Bowden and Sandlund (2021) indicate that well-structured interviews facilitate meaningful discussions and knowledge exchange. Allinson (2018) further supports this claim, demonstrating that interviewer training significantly improves the reliability of performance evaluations.

Despite these improvements, challenges remain. Meyer (2016) identifies resistance to feedback as a major barrier to effective appraisals. Employees often perceive feedback negatively, leading to lower acceptance and motivation. Inderrieden, Keaveny, and Allen (2019) highlight the need for procedural justice in appraisal systems, ensuring transparency and fairness in evaluations. Additionally, Nathan, Mohrman Jr., and Milliman (2018) emphasize the role of interpersonal relations in shaping employee perceptions of appraisal interviews.

Results and Analysis

The review revealed seven key themes in PAIs, including transparency, participatory approaches, digital innovations, cultural alignment, multi-source feedback, developmental focus, and Nepal-specific challenges.

Figure 1: Comparison of Global and Nepalese Performance Appraisal Interview Practices



Findings

Participatory Performance Appraisals: Research consistently shows that involving employees in the appraisal process increases engagement, satisfaction, and performance. Employees respond positively to participatory appraisals where they have a say in goal-setting and feedback mechanisms (Roberts, 2017; Sharma, 2019).

Technology and AI in Appraisals: The integration of digital tools and AI is reshaping performance appraisal methods, improving objectivity and efficiency. However, these technologies must be carefully implemented to ensure fairness and avoid algorithmic biases (Brown, 2023).

Feedback Quality and Interviewer Training: The success of performance appraisal interviews depends on structured discussions and interviewer expertise. Effective training for managers conducting appraisals leads to improved communication and more meaningful feedback (Pälli & Lehtinen, 2020; Allinson, 2018).

Challenges in Feedback Acceptance: Resistance to feedback remains a key obstacle. Employees often struggle with receiving critical feedback, which can impact their motivation and performance. Organizations must focus on creating a feedback culture that emphasizes growth and development (Meyer, 2016).

Procedural Justice and Transparency: The perceived fairness of performance appraisals significantly influences employee satisfaction. Transparent evaluation criteria and consistent implementation help in building trust in the system (Inderrieden et al., 2019; Nathan et al., 2018).

Implications for Nepal

The findings of this study have several implications for performance appraisal systems in Nepal. The adoption of globally recognized practices, such as 360-degree feedback and digital platforms, can significantly enhance Nepalese appraisal systems. Tailored frameworks should incorporate cultural sensitivities and focus on developmental outcomes.

Need for Participatory Appraisals

Given that participatory approaches enhance employee engagement (Roberts, 2017; Sharma, 2019), Nepalese organizations, particularly in the public sector, should adopt more inclusive appraisal methods. Encouraging employee involvement in goal-setting and feedback discussions can lead to increased motivation and job satisfaction.

Technological Advancements in Appraisals

The integration of AI-driven performance appraisal tools, as discussed by Brown (2023), presents an opportunity for Nepalese companies to modernize their HR processes. However, due to limited digital infrastructure and technological adaptation in many Nepalese organizations, gradual implementation and training programs are necessary.

Addressing Challenges in Feedback Acceptance

Meyer (2016) highlights resistance to feedback as a critical challenge. In Nepal, hierarchical organizational structures often discourage open discussions. To mitigate this, organizations should foster a culture that normalizes constructive feedback and continuous improvement.

Ensuring Procedural Justice

Transparency and fairness in performance appraisals are crucial for employee trust (Inderrieden et al., 2019; Nathan et al., 2018). Nepalese organizations, particularly in the public sector, should work towards establishing clear and objective evaluation criteria to minimize biases and favoritism.

Training and Development for Effective Appraisals

Many organizations in Nepal still rely on traditional, informal appraisal methods. Training HR personnel and managers in structured performance evaluation techniques, as emphasized by Allinson (2018), can improve the quality of appraisals and ensure meaningful feedback is provided to employees.

Conclusion

Performance appraisal interviews are vital for aligning organizational and individual objectives. While global innovations provide valuable insights, Nepalese institutions require tailored solutions to address local challenges. Future research should focus on implementing participatory and digital tools to modernize practices.

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Application of Deep Learning Algorithms and Genetic Programming for Forecasting Stock Prices in Nepal: A Comparative Study

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Abstract

As the Developers and software engineers entering into stock market with new strategies like machine learning models, it has shown great potential for stock price prediction. How ever, other potential alternatives, like GP, is less explored in this space. This paper aims to validate the accuracy of the existing Deep learning algorithms and compare their effectiveness with the Gene Programming in forecasting the stock price in Nepal. Here, stock data from 2014 to 2024 and implements the DL and GP to forecast the stock prices of 29 stocks from 15 sec tors within NEPSE. The performance metrics are evaluated in terms of accuracy and resistance to volatility. The result shows that GP consistently outperforms the DL algorithms across all performance metrics, which was further validated by the Man-Whittney U test. The findings further show possibility of integrating advanced forecasting methods like GP and GRU (or LSTM) into financial decision-making can enhance investment strategies.

Keywords: *Data Strategies and Data-driven Innovations, Deep Learning (DL), Gene Programming (GP), Nepal Stock Market, Price Prediction*

Introduction

Predicting the stock market was previously captivating to investors and stock traders. They typically relied upon traditional tools and techniques such as fundamental and technical analyses (Wellington Garikai, 2015), which are still in use. However, developers and software engineers have recently entered this space with various strategies and approaches like ML and DL. Compared to traditional and manual methods, these approaches allow the analysis of stock trends autonomously, accurately and reliably. Various DL algorithms like LSTM and GRU show the potential to uncover patterns in stock price trends over time. (Khanal & Shakya, 2016).

As evidenced by the rise in AI and ML-focused companies, Nepal is also slowly paving the way for modern forecasting methods to be used. Previous studies primarily focused on traditional statistical models like ARIMA and GARCH (Gaire, 2019) for analyzing the Nepal Stock Exchange (NEPSE) index.

Nepal has a volatile stock market and algorithms need to capture the dynamic nature of stock price movements influenced by numerous external factors, including political events and economic shifts (Khanal & Shakya, 2016). While investors are still not confident with using Deep Learning techniques in their day-to-day stock decisions, there has been a lot of research on this sector regarding its implementation and accuracy.

Besides DL algorithms, GP also shows great potential in stock price prediction on a global scale. While little to no research has been done in Nepal Stock market regarding its utilization, this evolutionary algorithm is able to model relationships within data offering unique advantages like automatic feature selection and interpretability compared to the DL algorithms. While GP is mainly used for gene expression profiling and has been widely used to characterize cellular states in response to various disease conditions and genetic perturbations, it also shows potential to be used in the prediction space. It can capture a relationship in the raw data and stock prediction with more than 99% (Yifei Chen, 2016) accuracy, which is helpful for a volatile market like Nepal.

Alghieth (Alghieth, 2016) explored a GEP-FAMR approach in comparison to Neural and Fuzzy methods, addressing challenges like overfitting, algorithmic black-boxing, and data snooping. This study revealed GEP's exceptional accuracy in short-term forecasting, with a performance rate of 95.99%, compared to 88.23% for Genetic Programming (GP) in medium-term predictions. The results underscored GEP's capability to produce sim-

ple, algebraic expressions, making it an efficient alternative for financial forecasting.

Another Researcher implements this advanced algorithm into the Stock market showing the potential to predict and find the relationship between the input factors and the prediction close to 100% (Bin, WeiZhang, & Wang, 2019). Although it has been researched on a global scale, its implementation in the Nepal Stock market is not yet explored.

This research aims to validate the accuracy of the existing four popular DL algorithms (RNN, LSTM, GRU and CNN) and compare their effectiveness with the GP in forecasting the stock price in Nepal.

Literature Review

Deep Learning Algorithms in Nepal Stock Market

Gaire (2019) provided foundational insights by analyzing various concepts of time series analysis, such as the autoregressive model, moving average, and seasonal effects in the NEPSE stock index. The study identified that SARIMA was the best model for forecasting daily NEPSE index values, and EARCH was best for capturing market volatility caused by positive and negative shocks. It strongly indicated that the NEPSE index trends depended on the prior index values and some random factors. Investors and policymakers could utilize this for making stock-related decisions (Gaire, 2019).

Deep learning models such as LSTM and GRU have expanded on these insights using a hybrid approach. Shahi et al. (2020) incorporated the financial news sentiments into these models. This study revealed that LSTM with News sentiments achieved superior performance MAE of 17.7 and R^2 of 0.979 compared to GRU with News Sentiment with MAE of 24.5 and R^2 of 0.967 (Shahi, Ashish, Neupane, & Guo, 2020).

Saud and Shakya (2020) conducted a case study on the banking sector of NEPSE which provided further insights into the prediction capabilities of LSTM and GRU models. The research found GRU to outperform LSTM with slightly lower average MAPEs. Here, GRU had a MAPE of 4.74 for NIB and 4.71 for NABIL compared to 5.58 for NIB and 5.06 NABIL for LSTM. GRU's predicting accuracy was attributed to its fewer parameters, faster training and ability to perform better even with moderate data sizes. Additionally, optimal look-back periods were identified for both models where LSTM was less than 5 for and 5–10 for GRU, showing the ineffectiveness of higher look-back periods for improving prediction accuracy (Saud & Shakya, 2020).

Lal et al. (2022) proposed another hybrid model proposed by for predicting stock prices, combining CNN and BRGU in sequence over short-term (next day), mid-term (15 days), and long-term (30 days) horizons. The BRGU-BCNN model outperformed other algorithms (such as LSTM, GRU, BLSTM, and BGRU) in prediction accuracy with the lowest MAPE (Lal & Timalsina, 2022). The model first used CNN to extract features using stock close prices as input, while BGRU learned and predicted based on these features.

In a comparative study between three ML algorithms (BPNN, LSTM and GRU) by Gurung et al. (2024) to predict the future stock price trends, the study found that LSTM had the best forecast accuracy. LSTM's advanced memory capabilities allow it to achieve remarkable accuracy, reportedly averaging 98%, and to maintain consistent performance across diverse feature sets. GRU, a streamlined alternative to LSTM, offers efficiency and performs well in specific contexts but shows inconsistency with different datasets (Gurung, Prabin, & Sujan, 2024).

Genetic Programming: A Promising Alternative

Genetic programming (GP) has emerged as a compelling alternative to traditional stock price forecasting methods. Several studies have shown its effectiveness in capturing complex market dynamics in different global stock markets and improving forecasting accuracy, but it has not been implemented in the Nepali market so far. Although GP has been successfully applied elsewhere, its use in the context of the Nepal Stock Exchange (NEPSE) is unexplored, which is an exciting area for research and development.

Tsai et. al (2017) carried out a significant study using the application of GP for stock movement forecasting on the Taiwan Stock Exchange (Tsai & Hong, 2017). The researchers created an artificial intelligence system named GPLAB to predict stock price movements over different time frames using GP for that purpose. The findings demonstrated that GP could predict stock price trends better and more accurately than traditional statistical methods. The contributions of this study indicate that GP is a robust tool for financial prediction.

Another study by Abraham et al. (2022) combined GA and Random Forests for better stock trend forecasting (Abraham, et al., 2022). This research focused mainly on GA but highlighted the importance of feature selection, which is an important part of GP methodology. It shows that optimizing input variables has an enormous impact on the prediction outcome. The integrated GP can provide better forecasting models than when combined with other machine learning techniques.

Kaboudan (1998) used GP and compare stock returns to traditional forecasting methods (Kaboudan, 1998). This study determines that GP can offer competitive performance in forecasting stock returns and maintains competitive performance for different market conditions and data features, revealing itself to be resilient to the volatile behavior of the financial market.

Also, Garcia-Almanza and Tsang (2021) combined GP with chance discovery techniques for stock price forecasting (Garcia-Almanza & Tsang, 2006). They found that combining these approaches could increase the potential to find hidden patterns and relationships in financial data and thereby increase prediction accuracy. The synergy of other analytical methods and GP shows the versatility of GP in the financial market.

Lastly, Sha (2024) presented the hybrid model of GA and LSTM networks for time series stock price forecasting (Sha, 2024). The researchers stressed that GA could optimize LSTM parameters to improve predictive performance. This integration shows that GP has the flexibility to use deep learning models for financial forecasting with the potential for further improvement.

Research Gaps

The collective study highlights that the deep learning models, especially LSTM, GRU and CNN-BGRU have the potential to capture the market dynamics and even make improved forecast ing in the NEPSE stock market. However, genetic program ming also shows a promising alternative to forecasting stock prices, since it allows adaptive modeling optimization to find complex patterns in financial data. In terms of Nepal Stock Market, there are two research gaps:

- **GP implementation in Nepal Stock Market**: The NEPSE market has been substantially studied with the use of DL Algorithms, but the implementation and performance of the GP have yet to be implemented in the Nepal Stock Market.
- **Sector Coverage of Research**: No existing research has included the forecasting for all the stock of all the sectors in the Nepal Stock Market. Previous research generally uses single stock or use 1-2 sectors for forecasting.

Methodology

The conceptual framework outlines the relationship between input data, predictive models, and output in stock price fore casting. The framework shows how input data are processed and used to train predictive models to provide accuracy metrics and actionable insights for managers for decision-making.

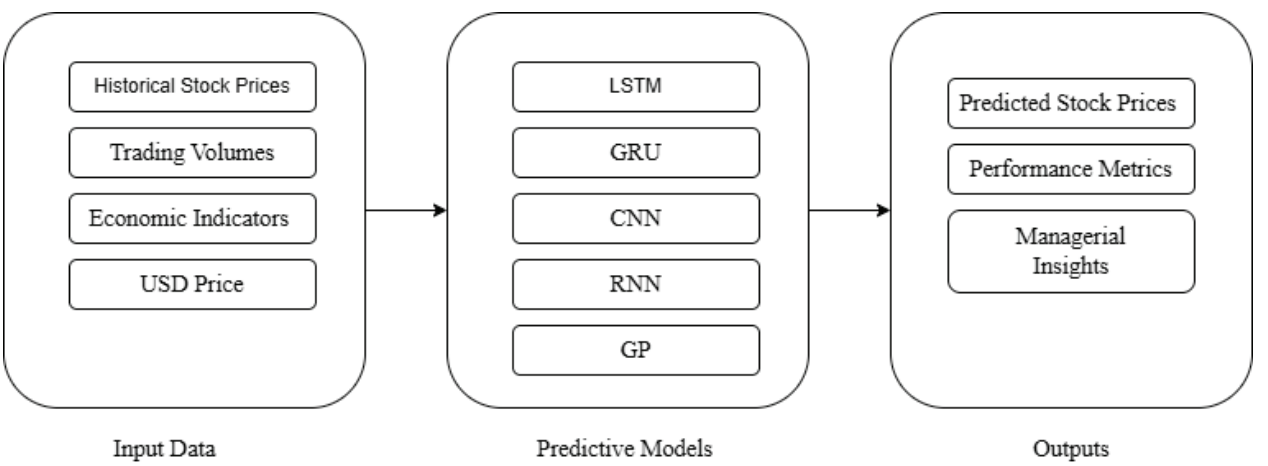


Figure 1: Conceptual Framework

Data collection

The stocks with at least 500 daily records are selected with at least 2 years of active trading history to capture market trends. The stocks suspended or delisted are not selected for training. Stocks are then clustered into 15 sectors with 10% stock from each sector to ensure diversity and representativeness. After collection criteria, A total of 29 stocks are selected. Historical stock prices and Today's opening price are sourced from the Merolagani website, and the historical USD price is taken from NRB's official website from 2014 to 2024. The Historical stock prices include the previous day's stock data (LTP, Percentage Change, High Price, Low Price, Opening Price, Previous Closing Price, turnover).

Tools & frameworks

The deep learning models—LSTM, GRU CNN, and RNN were implemented using TensorFlow, Keras, scikit-learn. Genetic programming was implemented using the gplearn library. Pandas library are used for pre-processing the data.

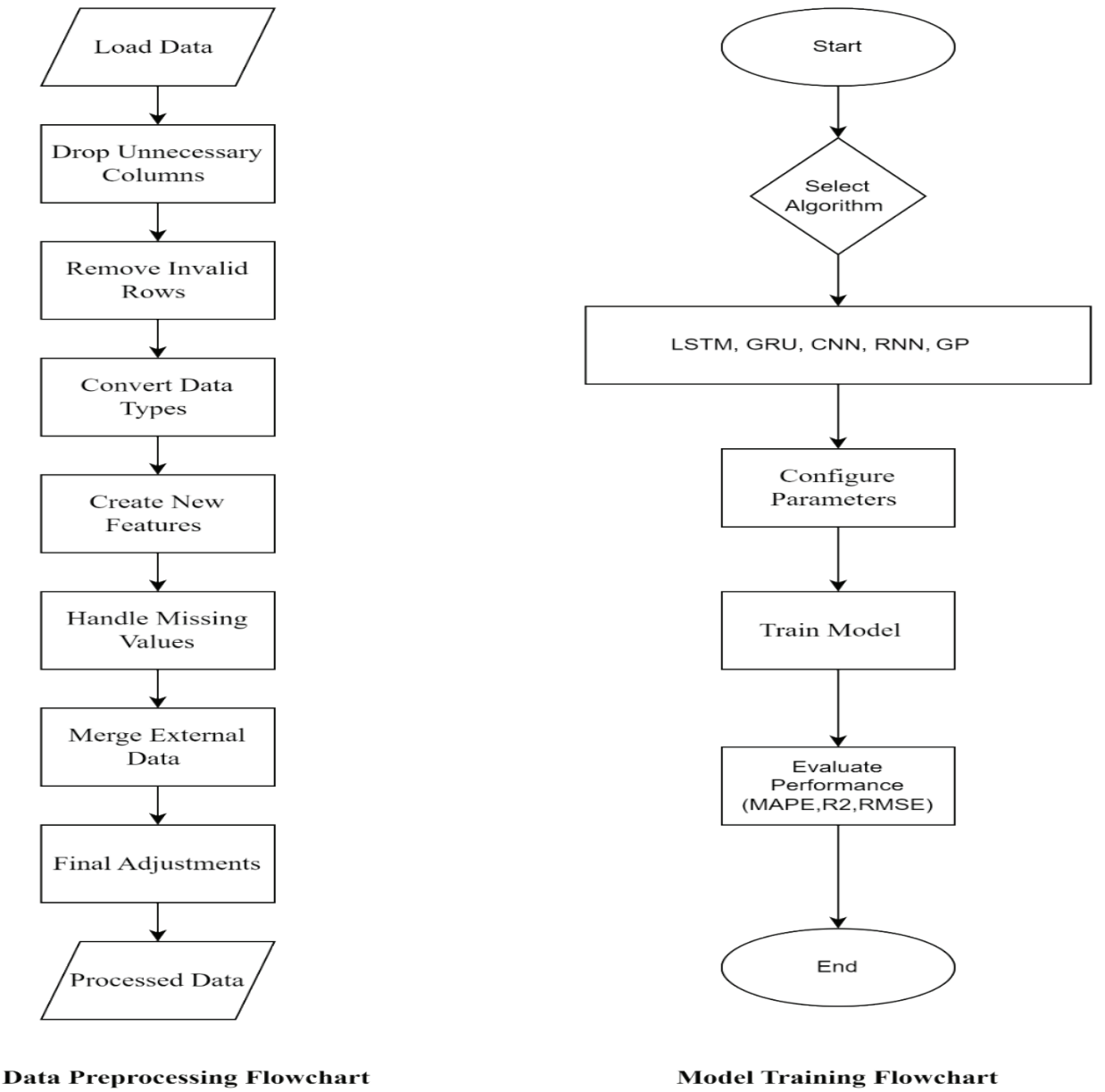


Figure 2: Data Preprocessing and Model Training Flowchart

Scipy library is used to perform Man-Whittney U test. This statistical significance test is conducted to validate if performance differences between the DL models and GP were statistically significant. matplotlib and seaborn are used to Create visualizations like bar charts, line graphs, and heat maps.

Model training & validation

Given stock price is a time series data, sequence of the data is more important than the individual records for finding sequence. The data is group into sequence of ten days and split into ordered dataset for training and testing. The data is then split into 80% training data and 20% testing data. Finally, training is done for each model using the following parameters shown in figure below:

Model	Layers	Hidden Units	Dropout	Optimizer	Loss Function	Metrics	Output Layer
LSTM	LSTM (100 units, return sequences)	250	2	Adam (lr=0.001)	MSE	MSE,MAE	1 unit (Dense)
	Dropout						
	LSTM (100 units, return sequences)						
	Dropout						
	LSTM (50 units)						
RNN	SimpleRNN (100 units, return sequences)	250	2	Adam (lr=0.001)	MSE	MSE,MAE	1 unit (Dense)
	Dropout						
	SimpleRNN (100 units, return sequences)						
	Dropout						
	SimpleRNN (50 units)						
GRU	GRU (100 units, return sequences)	250	2	Adam (lr=0.001)	MSE	MSE,MAE	1 unit (Dense)
	Dropout						
	GRU (100 units, return sequences)						
	Dropout						
	GRU (50 units)						
CNN	Conv1D (3 filters, 100 kernel size, ReLU)	200	2	Adam (lr=0.001)	MSE	MSE,MAE	1 unit (Dense)
	Dropout						
	Conv1D (3 filters, 100 kernel size, ReLU)						
	Dropout						
	Flatten						

Figure 3: Deep Learning Parameters

Category	Field	Value	Details
Population Configuration	Population Size	Initially: 3,500	Ensures diverse initial candidates.
		Increased to: 5,000	For Hydropower, Life Insurance, and Trading sectors.
	Generations	Initially: 35	Number of generations for optimization.
		Increased to: 50	Applied to Hydropower, Life Insurance, and Trading sectors.
	Stopping Criteria	Fitness score < 0.001	Indicates the target accuracy for terminating the evolutionary process.
Operator Probabilities	Crossover Probability	0.7 (70%)	Chance of exchanging genetic material between two parents to generate offspring.
	Subtree Mutation Probability	0.1 (10%)	Replaces a randomly chosen subtree to diversify the population.
	Hoist Mutation Probability	0.05 (5%)	Alters a single point within the expression to introduce variation.
	Point Mutation Probability	0.1 (10%)	Changes a single point in the expression to enhance variability.
Model Settings	Verbose Mode	2	Gives detailed feedback during each training generation.
	Parsimony Coefficient	0.001	Encourages simpler and more interpretable solutions.
	Random State	42	Fixes the random seed for reproducible results.
Optimization Details	Default Loss Function	MSE	Main loss function for evaluating the model.
	Evaluation Metrics	MSE, MAE	Metrics for measuring performance and accuracy.

Figure 4: Genetic Programming Training Parameters

Error Evaluation

Performance metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R^2 are used to evaluate model accuracy and reliability.

Results and Analysis

The key performance metrics calculated for each algorithm and selected stocks. All further analysis uses these values.

Average Performance of Algorithms

The following table summarizes the performance metrics of various predictive models used for forecasting stock prices, specifically focusing on Root Mean Square Error (RMSE), Coefficient of Determination R^2 and Mean Absolute Percentage Error (MAPE):

Algorithm	RMSE	R^2	MAPE
CNN	52.86093	0.669396	0.055188
GRU	40.3325	0.843351	0.035889
LSTM	43.29142	0.741601	0.040696
GP	26.79209	0.986501	0.020011
RNN	56.58934	0.613057	0.053737

Table 1: Average performance of Models

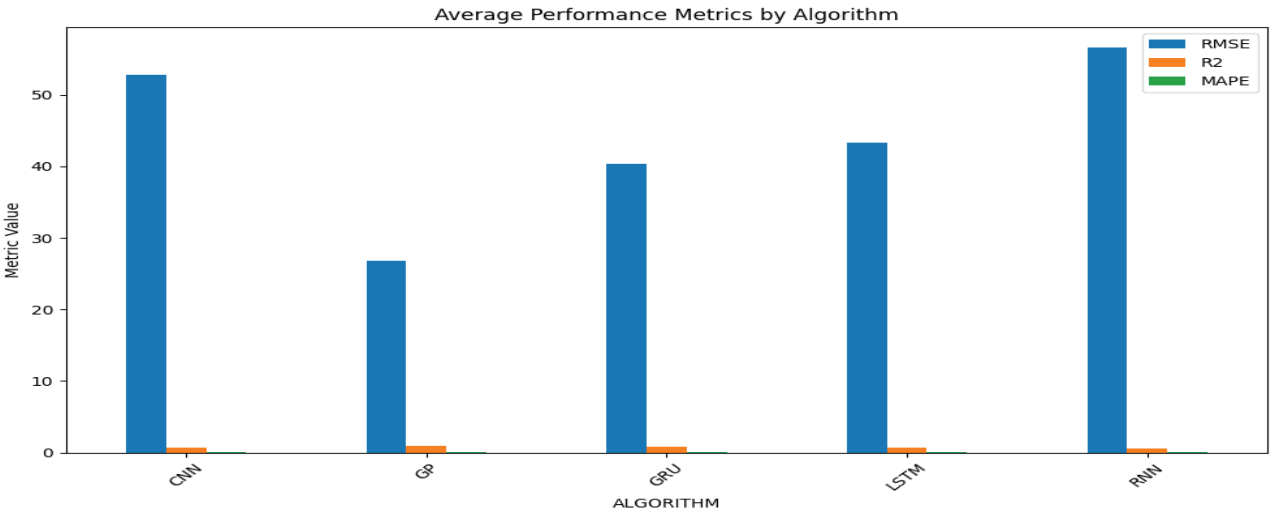


Figure 5: Average Performance of Models

RMSE is utilized to measure the predictive precision of the models. GP with the lowest RMSE of 26.79209, made the best precision among the models. CNN and RNN recorded the highest RMSE with 52.86093 and 56.58934, respectively. GRU, with an RMSE of 40.3325, outperformed LSTM with 43.29142. The results establish GP as the best performer in terms of predictive precision.

Mean Absolute Percentage Error (MAPE) is utilized to measure the Explanatory Power of the models. GP with the lowest MAPE of 0.020011, had the highest reliability among the models. CNN and RNN demonstrated the weakest reliability among the proposed models, with MAPEs of 0.055188 and 0.053737, respectively. Compared to them, GRU and LSTM showed better reliability with MAPEs of 0.035889 and 0.040696, respectively. These results reinforce GP's dominance.

The coefficient of Determination (R^2) is utilized to measure the Explanatory Power of the models. GP had an impressive R^2 value of 0.986501, demonstrating its ability to model the nonlinear relationships inherent in the stock price data effectively. GRU achieving an R^2 of 0.843351, performed better compared to LSTM with an R^2 of 0.741601. CNN and RNN constantly underperformed regarding R^2 with values of 0.669396 and 0.613057, respectively. The results suggest that GP is best to capture the underlying trends in the data.

Sector-Wise Performance of Algorithms

Sector	CNN	GRU	LSTM	GP	RNN
Commercial	0.076199	0.033893	0.026524	0.016186	0.082466
Corporate	0.023119	0.020526	0.026715	0.005159	0.028813
Development	0.032206	0.03057	0.028207	0.021359	0.02755
Finance	0.058287	0.035026	0.037034	0.028645	0.046538
Hotels	0.080586	0.069064	0.046164	0.022833	0.096847
Hydro	0.096139	0.048604	0.045708	0.026944	0.054604
Investment	0.039965	0.035909	0.083309	0.022814	0.027374
Life	0.043601	0.024198	0.035934	0.017283	0.031858
Manufacturing	0.07413	0.049019	0.02839	0.028335	0.062982
Microfinance	0.057455	0.037865	0.050562	0.02002	0.052724
Mutual	0.030863	0.025791	0.026593	0.013481	0.042575
Non-Life	0.031687	0.025778	0.026664	0.018166	0.055713
Others	0.025975	0.01865	0.015653	0.012513	0.017888
Promotor Share	0.060055	0.045797	0.083191	0.016557	0.096618
Trading	0.047783	0.024994	0.023902	0.023639	0.027676

Table 2: Average MAPE by Sector and Algorithm

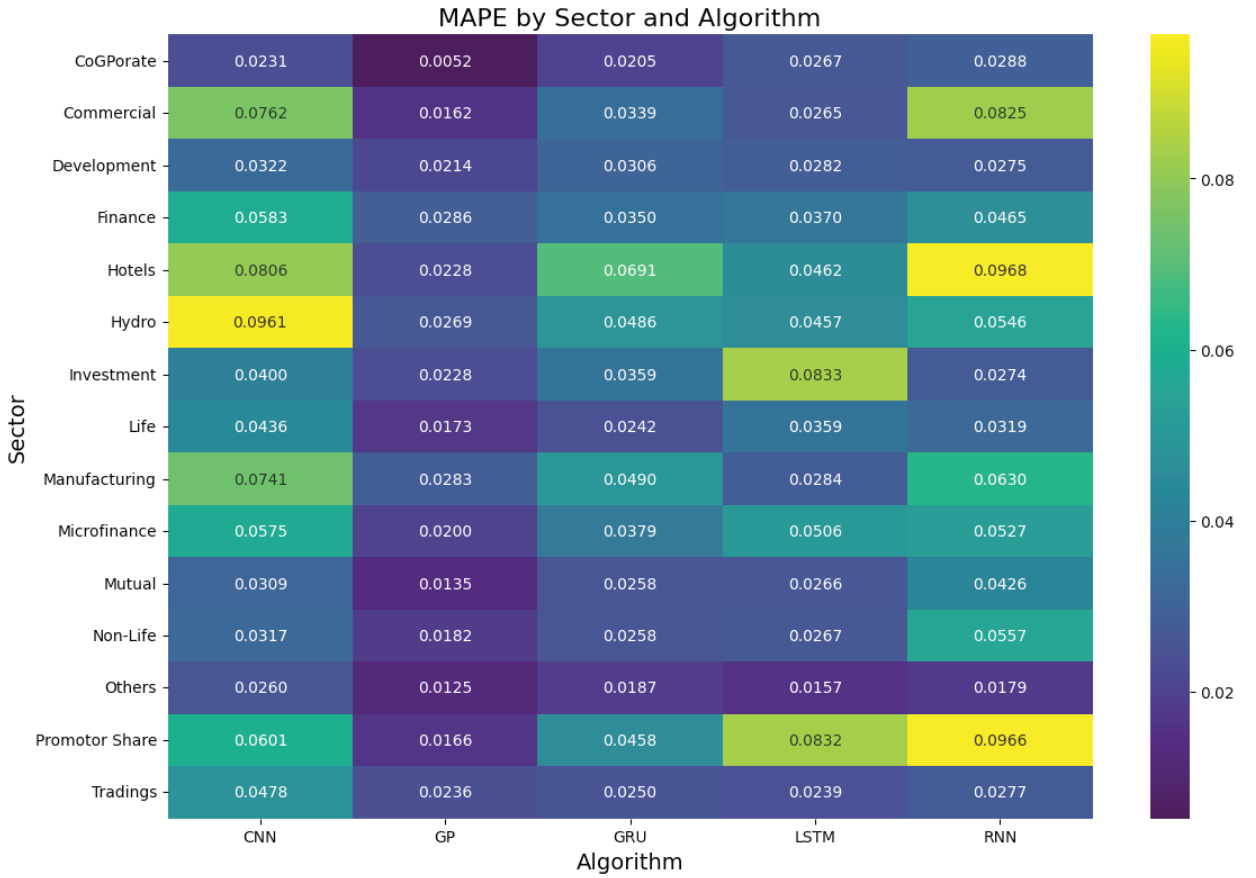


Figure 6: Average Performance Heatmap of RMSE by Sector

Sector	**CNN**	**GRU**	**LSTM**	**GP**	**RNN**
Commercial	17.66914	8.67438	7.768389	7.595164	16.56948
Corporate	33.43946	30.06581	37.61912	9.223811	42.1825
Development	14.90847	12.88132	12.201	9.172713	12.71905
Finance	32.89567	22.50048	23.92575	11.44708	35.00547
Hotels	42.11312	35.43748	26.20658	10.30089	48.38004
Hydro	22.29144	12.87918	12.36446	7.861193	12.84378
Investment	13.18769	9.59307	19.49829	8.066049	8.984804
Life	36.51294	20.3566	28.63498	23.19873	25.22591
Manufacturing	44.75966	32.20896	23.07588	36.69978	37.65114
Microfinance	58.34402	38.81454	54.51559	20.1604	56.98531
Mutual	0.392638	0.300572	0.319771	0.150687	0.542157
Non-Life	24.3952	19.90804	21.37139	12.8992	52.65496
Others	27.47287	22.24099	19.93986	19.08984	22.66352
Promotor Share	211.4256	189.9414	202.5874	123.4405	285.7103
Trading	237.3051	141.8558	138.0582	118.0091	142.2212

Table 3: Average Performance Table of RMSE by Sector

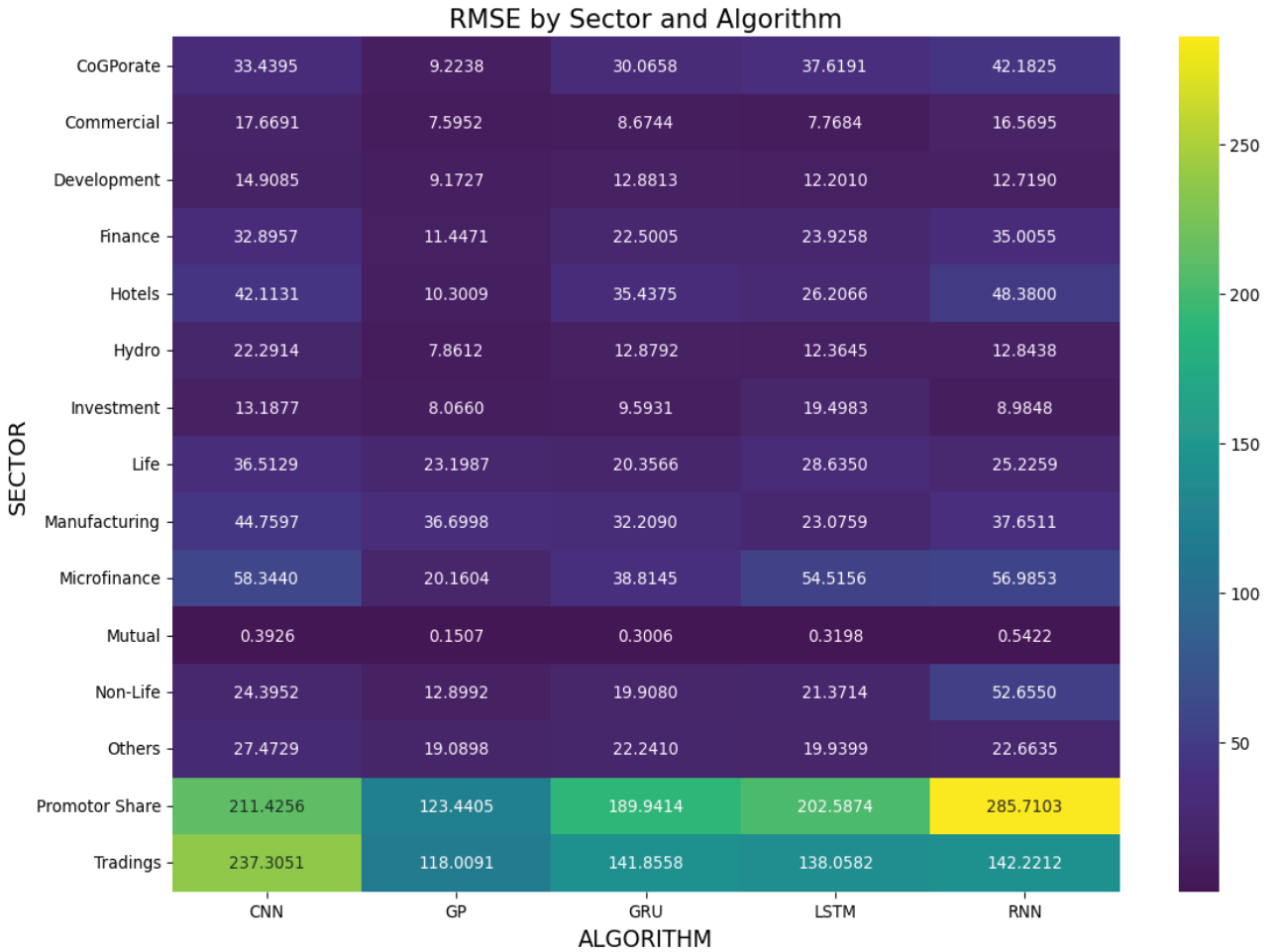


Figure 7: Average Performance Heatmap of RMSE by Sector

Sector	CNN	GRU	LSTM	GP	RNN
Commercial	0.488278	0.879276	0.901024	0.994511	0.570646
Corporate	0.409222	0.522414	0.252308	0.979539	0.059908
Development	0.816779	0.847988	0.866843	0.991816	0.857827
Finance	0.88709	0.952568	0.947071	0.990911	0.871621
Hotels	0.838814	0.885865	0.937581	0.991142	0.787272
Hydro	0.52779	0.863544	0.875101	0.990964	0.866461
Investment	0.852223	0.921804	0.676956	0.990775	0.931406
Life	0.786925	0.933771	0.868952	0.996891	0.898297
Manufacturing	0.382128	0.680053	0.835774	0.991532	0.562799
Microfinance	0.791603	0.898433	0.787858	0.983253	0.786551
Mutual	0.728214	0.843009	0.820446	0.965637	0.487108
Non-Life	0.85664	0.904528	0.889977	0.987773	0.332122
Others	0.796711	0.866766	0.89291	0.993942	0.861656
Promotor Share	0.420302	0.687575	-0.09237	0.977721	-0.26645
Trading	0.509669	0.824786	0.834041	0.9925	0.823882

Table 4: Average R^2 by Sector and Algorithm

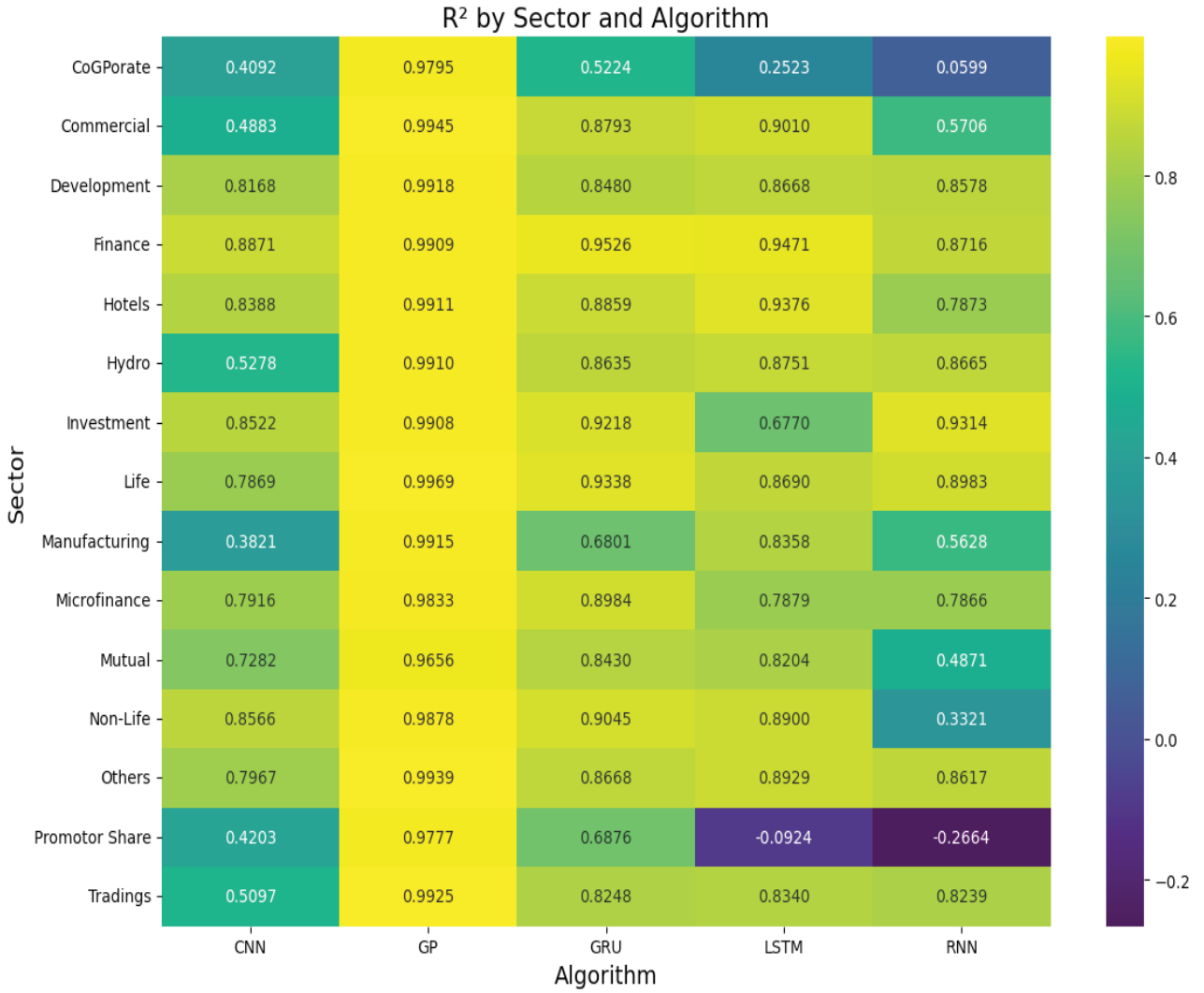


Figure 8: Average Performance Heatmap of R2 by Sector

The performance varies across sectors in NEPSE, evident by average performance metrics values. However, GP consistently outperformed other models across nearly all sectors. GP showed low RMSE in some sectors, highlighting its robustness in sectors such as Commercial Banks (7.595), Development Banks (9.172) and the Corporate (9.223) sector. Additionally, a lower MAPE value of 0.02 and high average R^2 of 0.986 reflect its exceptional reliability and explanatory power for variance in stock price in most sectors.

Other models, namely CNN and RNN, show less consistency in comparison. For instance, CNN had the highest RMSE in hotels (42.11) and manufacturing (44.75), showing lower accuracy in those sectors. The RNN model also had high RMSE values, especially for the Promotor Share (285.71) and Trading (237.30) Sectors. It suggests CNN and RNN models have difficulty in handling complex stock data. Although GRU and LSTM models showed reasonable performance in some sectors, such as Commercial and Life, they still lagged behind GP in terms of both RMSE and R^2.

Overall, GP's superior performance across various sectors—reflected by low RMSE, low MAPE, and high R^2—demonstrates its effectiveness in stock price forecasting for the Nepalese market. Its consistent results highlight its potential to enhance investment strategies and improve decision-making processes for investors and analysts in NEPSE.

Statistical Validation

For statistical validation, the Mann-Whitney U Test is used.

Hypothesis for Mann-Whitney U Tests

Null Hypothesis (H□): There is no significant difference between GP and the deep learning models regarding performance metrics.

Alternative Hypothesis (H□): GP performs better (i.e., lower RMSE, lower MAPE, and higher R^2) than the deep learning models.

The significance Threshold(α) is **0.05**. If the p-value is less than 0.05, we will reject the null hypothesis, indicating that GP performs better than the deep learning models.

Metric	Comparison	P-Value	Conclusion
RMSE	LSTM vs GP	0.013411308	Reject H□ (p < 0.05)
RMSE	GRU vs. GP	0.035779443	Reject H□ (p < 0.05)
RMSE	CNN vs. GP	0.000391578	Reject H□ (p < 0.05)
RMSE	RNN vs GP	0.00268741	Reject H□ (p < 0.05)
MAPE	LSTM vs GP	1.46952E-07	Reject H□ (p < 0.05)
MAPE	GRU vs. GP	3.98395E-07	Reject H□ (p < 0.05)
MAPE	CNN vs. GP	8.94E-10	Reject H□ (p < 0.05)
MAPE	RNN vs GP	3.43162E-09	Reject H□ (p < 0.05)
R^2	LSTM vs GP	8.8796E-11	Reject H□ (p < 0.05)
R^2	GRU vs. GP	1.81735E-10	Reject H□ (p < 0.05)
R^2	CNN vs. GP	7.22101E-11	Reject H□ (p < 0.05)
R^2	RNN vs GP	7.22101E-11	Reject H□ (p < 0.05)

Table 5: U Test Based on RMSE, MAPE, and R^2

For all the performance metrics comparisons, the p-values are below the threshold of 0.05, so we reject the null hypothesis and accept the alternative hypothesis that GP performs better than DL models in terms of performance metrics RMSE, MAPE and R2 values as shown in table.

Summary of Key Findings

This study aimed to evaluate and compare the effectiveness of various forecasting models, specifically Deep Learning algorithms (LSTM, GRU, CNN, RNN) and Genetic Programming (GP), in predicting stock prices within the context of Nepal's financial market.

GP demonstrated significantly higher accuracy in stock price predictions than all deep learning models tested. It achieved the lowest Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE), along with a near-perfect R^2 score greater than 0.98. This indicates that GP can effectively capture complex relationships within stock price data.

Among the deep learning models, GRU and LSTM outperformed CNN and RNN in terms of prediction accuracy, making them suitable for stock price forecasting in Nepal. Their simpler architecture allows for efficient training while maintaining competitive performance.

The implementation faced challenges related to data quality, such as missing values and inconsistencies in stock market data. Additionally, computational constraints associated with training deep learning models highlighted the need for sufficient resources to utilize these advanced techniques effectively.

The findings suggest that integrating advanced forecasting methods like GP and GRU (or LSTM) into financial decision-making can enhance investment strategies and risk management practices. Accurate predictions enable better-informed decisions regarding portfolio adjustments and market positioning.

Discussion and Recommendations

In the international market, the GP algorithm shows a promising performance. However, due to no research in the Nepalese Stock Market, this study can work as a benchmark for future researchers on implementing the GP method in the NEPSE market. During the research, utilizing the NEPSE market data from the year 2014 to 2024, the findings indicate that the use of Genetic Programming made the best predictions in comparison to other Deep Learning Algorithms.

While using any third-party tools or techniques, investors need to test and validate each tool and technique in depth to make financial decisions. There are several key areas that need to be explored before using it for real trading.

While this research implemented the GP algorithms using limited input variables, integrating macroeconomic indicators like sentiment analysis from news articles, forums, or social media trends could further improve the model performance.

Future research can also focus on exploring hybrid models by combining the strength of GP and specific DL algorithms like GRU and LSTM, which performed best among the proposed DL algorithms. While, the research showed great results on short-term predictions, further study on long-term forecasting is needed to understand the accuracy of the model in the long run.

During the implementation of these models, several challenges were encountered, as outlined below:

Data Quality Issues

The quality of stock market data from Nepal can be inconsistent due to missing values or incorrect entries. Handling missing values required careful preprocessing to ensure that the models were trained on clean data without introducing biases.

Additionally, external factors such as political events or economic shifts that influence stock prices are not always captured in the dataset, limiting the predictive power of the models.

Computational Constraints:

Training deep learning models like LSTM and GRU requires significant computational resources, especially when dealing with large datasets or tuning hyperparameters like batch size or learning rate.

GP is computationally expensive due to its evolutionary algorithm nature, which involves multiple generations of model evolution and optimization.

Model Interpretability:

While GP provides interpretable mathematical expressions that can help explain stock price movements, deep learning models like LSTM and GRU function as black-box models, making it difficult for financial analysts to understand how predictions are made.

Conclusion

This analysis highlights the exceptional performance of Genetic Programming (GP) in predicting stock prices. GP outperforms traditional deep learning models like LSTM, GRU, CNN, and RNN in terms of predictive accuracy and model reliability. While GP is the most robust model overall, LSTM remains a reliable option in specific sectors such as Manufacturing and Life Insurance, where its performance is relatively comparable to GP. However, GP's consistent accuracy across all sectors and performance metrics, especially RMSE and MAPE, positions it as the most reliable and effective tool for stock price prediction in Nepal's financial market.

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Policy Provision and Teacher Motivation in Tribhuvan University

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Abstract

This study examines the influence of policy provision on teacher motivation within Tribhuvan University. Utilizing a descriptive, cross-sectional research design, data were collected through a structured job satisfaction survey administered to faculty members from selected campuses. The survey focused specifically on policy-related aspects such as salary, leave facilities, in-service promotion, retirement pension, college management systems, and campus chief leadership. Reliability analysis indicated acceptable internal consistency for the policy provision measures, underscoring the robustness of the instrument. Findings reveal that while policies regarding leave, promotion, and retirement pension generally contribute to positive motivational outcomes, salary policies remain a significant source of dissatisfaction among teachers. These results are consistent with Hergberg's (1968) motivation theory, which categorizes policy provisions as hygiene factors that can prevent dissatisfaction if adequately addressed. The study highlights the need for a comprehensive policy framework that not only mitigates negative perceptions but also actively supports teacher motivation. Improving these policy dimensions is essential for fostering an engaging and supportive work environment, which in turn can enhance overall educational outcomes.

Keywords: *Policy Provision, Teacher Motivation, Job Satisfaction, Hergberg's Theory, Educational Policy*

Introduction

Teacher motivation is a critical factor that influences the overall performance and effectiveness of educational institutions, including universities. In the context of Tribhuvan University, understanding what drives teacher motivation becomes essential for ensuring high-quality education and improving institutional performance. Various theories on motivation shed light on how teachers' enthusiasm, dedication, and professional commitment can be shaped by internal and external factors.

William James, an influential philosopher and psychologist, made significant contributions to the study of motivation by exploring the instinctual, emotional, and goal-oriented aspects of human behavior. His instinct theory proposed that individuals are driven by innate biological tendencies that direct their actions toward specific goals (James, 1890). Additionally, James emphasized the role of emotions in motivating individuals to achieve personal aspirations, which can have implications for teachers, who are often motivated by their desire to see students succeed and fulfill their own professional goals.

Abraham Maslow, known for his needs-based theory of motivation, argued that human motivation is hierarchical, starting from basic physiological needs and progressing to higher-level psychological needs such as esteem and self-actualization (Maslow, 1943). In the academic context, teachers may be motivated by different levels of needs, including financial security, professional growth, recognition, and the desire to achieve their fullest potential as educators. For instance, Maslow's hierarchy suggests that if teachers' basic needs like salary, job security, and safe working conditions are not met, they may struggle to focus on higher-level goals such as professional development or student success.

Similarly, Herzberg's Two-Factor Theory highlights the importance of both motivators (e.g., achievement, recognition, responsibility) and hygiene factors (e.g., salary, working conditions, policies) in determining job satisfaction (Herzberg, 1968). This theory is highly relevant to understanding teacher motivation at Tribhuvan University, where policy provisions, working conditions, and support systems significantly affect teachers' job satisfaction and commitment. For example, ineffective policies or inadequate support structures may lead to dissatisfaction, while opportunities for professional growth and recognition can serve as strong motivators.

Policy provisions within an institution play a crucial role in shaping teacher motivation. Sinclair (2008) emphasized that teacher motivation involves understanding what attracts individuals to the teaching profession, how long

they remain committed to it, and how engaged they are throughout their careers. Policies regarding pay scales, promotions, job security, and opportunities for professional development can either encourage or demotivate teachers, depending on how well they align with teachers' needs and expectations.

In the context of Tribhuvan University, there have been instances of teacher demotivation, as evidenced by low participation in institutional activities, frequent absenteeism, and reluctance to engage in professional development programs. These issues highlight the need to critically assess the university's policies and their effectiveness in fostering a positive and motivating work environment for teachers. When teachers feel unsupported or undervalued, their motivation declines, leading to poor job performance, increased turnover, and higher costs for recruiting and training new faculty members.

Therefore, it is crucial for Tribhuvan University to implement policies that address teacher needs and foster a motivating environment. By ensuring adequate compensation, job security, opportunities for growth, and recognition, the university can enhance teacher motivation, ultimately leading to better student outcomes and improved institutional performance. Addressing these motivational challenges through effective policy provisions is essential to maintaining a high standard of education and a committed faculty at Tribhuvan University.

Teacher motivation is a critical factor influencing educational quality, and various studies have examined its relationship with policy provisions in Nepal. Khanal and Phyak (2021) identified that policy-related factors such as salary and benefits, leave facilities, promotion opportunities, training, pensions, and freedom to form trade unions significantly impact teacher motivation in Nepal. Similarly, Acharya (2024) explored the gap between policy intentions and implementation in science teachers' professional development at Tribhuvan University, highlighting the need for bridging this gap to enhance teacher motivation. Neupane (2024) examined professional development at Tribhuvan University, emphasizing the importance of academic degrees, research opportunities, and professional growth initiatives in motivating teachers. Pageni (2021) focused on female university teachers, discussing how motivation and professional identity are influenced by gender perspectives and the challenges they face in higher education. Lamichhane (2019) investigated factors affecting the quality of work life among faculty members at Tribhuvan University, finding that autonomy, fair compensation, and a supportive work environment are crucial for teacher motivation.

Problem Statement

The motivation of teachers is crucial to ensuring high-quality education, particularly at institutions like Tribhuvan University. When teachers are demotivated, it often shows in several ways: a reluctance to engage in university activities, irregular attendance, frequent absences, missed deadlines, and disengagement from professional development opportunities. These signs of low motivation can lead to uninspired teaching methods, poor collaboration with colleagues, and even conflict within departments. At Tribhuvan University, this demotivation not only affects the quality of instruction but also contributes to a less productive academic environment and diminished student performance.

A university's success largely depends on the motivation and commitment of its faculty. When teachers are dissatisfied, their ability to engage students and deliver effective instruction weakens, resulting in long-term negative impacts on both student outcomes and the institution's overall academic standards. Moreover, the costs of constantly recruiting and training new staff can increase due to high turnover rates caused by teacher dissatisfaction. Addressing the core issues related to teacher motivation, particularly in relation to policy provisions at Tribhuvan University, is essential for fostering a positive learning environment and improving academic achievement across the institution.

Research Question

I. Does the policy provision impact to the teacher motivation?

Objectives of the study

To assess the policy provision impact and the teacher motivation.

Statement of hypotheses

Alternative Hypothesis (H1) :- There would be significant relationship between policy provision and the impact of teacher motivation.

Research Design

The research design for this study is descriptive and cross-sectional. The descriptive nature of the study stems from the fact that it focuses on providing an overview of the "Policy Provision" variable, without manipulating any data. The data is collected through a survey, which allows for a systematic description of the study population. The study is cross-sectional, meaning data is collected at a single point in time, providing a snapshot of the current situation regarding the policy provision in the institutions under study.

Sample and Sampling

The study sample consists of participants from three institutions: Padmakanya Campus, Shankar Dev Campus, and NATHM College. A convenience sampling method was utilized to select the sample. This method was chosen due to its practicality and the availability of participants. This non-probability sampling technique ensures that the research can be conducted efficiently within the available timeframe and resources.

Research Tools

The primary tool for data collection is a Job Satisfaction Survey Questionnaire developed by Butler (2007) and later adapted by Khanal and Phyak (2021). The questionnaire is designed to measure the various factors affecting job satisfaction among faculty members and this article focus on "Policy Provision" . The tool contains 29 items across four dimensions: Policy Provision, Teacher-Related Factors, Student-Related Factors, and Socio-Cultural Factors. For the specific analysis of "Policy Provision," 6 items are included, designed to capture faculty perceptions of the policies governing their work environment.

Reliability Analysis

Reliability analysis was conducted to ensure the consistency and stability of the measurement tool. The reliability of the "Policy Provision" dimension was assessed using Cronbach's Alpha, which yielded a value of 0.660. This indicates that the measurement of the "Policy Provision" variable is relatively reliable, with an acceptable level of internal consistency. The 6 items designed to measure "Policy Provision" are considered dependable for analyzing faculty perceptions of the policies in place at the selected institutions.

Table 1

Descriptive Analysis

Item	Not Motivating	Motivating	Highly Motivating
1. Are you satisfied with Salary?	157	67	76
2. Are you satisfied with your leave facility?	90	37	73
3. Are you happy with in-service promotion?	108	162	30
4. Does retirement pension drive you to teach happily?	69	88	43
5. Are you satisfied with the college management system?	76	150	74
6. Are you satisfied with current campus chief leadership?	76	150	74

From the table 2 we can conclude that

Salary: A relatively high number of respondents (157) reported that salary is not a motivating factor, while 67 found it moderately motivating and 76 found it highly motivating. This suggests that salary policies may be a concern for many teachers.

Leave Facility: The leave facility appears somewhat more favorable, with fewer respondents (90) indicating that it is not motivating compared to those who are highly motivated (73). However, 37 respondents reported it as merely motivating.

In-Service Promotion: In-service promotion seems to be viewed positively overall, with 162 respondents indicating that it is motivating, though 108 did not find it motivating and only 30 rated it as highly motivating.

Retirement Pension: The retirement pension policy receives mixed responses, with 69 teachers indicating it is not motivating, 88 finding it motivating, and 43 considering it highly motivating.

College Management System: A majority of teachers view the college management system positively, with 150 respondents reporting it as motivating and 74 as highly motivating, while 76 do not find it motivating.

Campus Chief Leadership: The responses for campus chief leadership mirror those for the management system (76 not motivating, 150 motivating, and 74 highly motivating), indicating similar perceptions regarding leadership policies.

Table 2

Inferential Analysis (ANOVA Table)

Regression and Residual	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.07	4	1.77	16.38	.000[b]
Residual	31.86	295	.108		
Total	38.94	299			

The table 2 shows the following information between policy provision and motivation.

The findings derived from the analysis of the data illustrate the statistical significance and effectiveness of the regression model utilized in this study. The Total sum of squares (TSS) was computed to be 38.94, accompanied by 299 degrees of freedom (df), with 4 attributed to regression and 295 to residual. The Sum of squares due to regression (SSR) amounted to 7.07, resulting in a Mean square for regression (MSR) of 1.77, calculated as SSR divided by the degrees of freedom for regression. Conversely, the Sum of squares due to error or residual (SSE) was found to be 31.86, with a corresponding Mean square for error or residual (MSE) of 0.10, calculated as SSE divided by the degrees of freedom for error/residual. The F-statistic, boasting a value of 16.38 (calculated as MSR divided by MSE), underscores the statistical significance of the regression model as a whole. The significance level (Sig.) was less than .001 ($p < .001$), further affirming the model's statistical significance at the .001 level. In summary, these results indicate that the regression model effectively explains a substantial portion of the variance within the dependent variable, as evidenced by the highly significant F-statistic ($F(4, 295) = 16.38$ $p < .001$). Additionally, the SSR of 7.07 is smaller than the SSE of 31.86, confirming the model's effectiveness when compared to a null model.

Discussion and conclusion

This study reveals that policy-related factors are a critical component influencing teacher motivation. Focusing specifically on aspects such as salary, leave facilities, in-service promotion, retirement pension, college management systems, and campus chief leadership, we see clear evidence that these institutional policies directly affect how teachers feel about their work.

According to Hergberg's (1968) theory of motivation, policies—categorized as hygiene factors—serve to prevent dissatisfaction among employees. In our research, salary emerged as a particularly sensitive issue, with a notable number of teachers expressing dissatisfaction. This suggests that when compensation policies fall short of expectations, they can significantly dampen teacher morale. On the other hand, policies regarding leave facilities, in-service promotion, and retirement pensions generally received more positive responses, indicating that well-structured policies in these areas contribute to a more encouraging work environment.

The findings imply that while favorable policies in areas such as leave and promotion can bolster motivation, addressing salary concerns is essential for creating a truly supportive workplace. A fair and transparent policy framework not only reduces dissatisfaction but also lays the foundation for a motivated teaching staff. Ultimately, by refining these policy provisions, educational institutions can nurture an environment where teachers feel valued and empowered—an outcome that is likely to translate into improved student learning experiences and overall educational success.

This discussion underscores the importance of a comprehensive approach to policy provision. By paying close attention to the nuanced ways in which different policy

elements influence motivation, schools and colleges can better support their teachers and foster a culture of continuous professional growth and commitment.

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