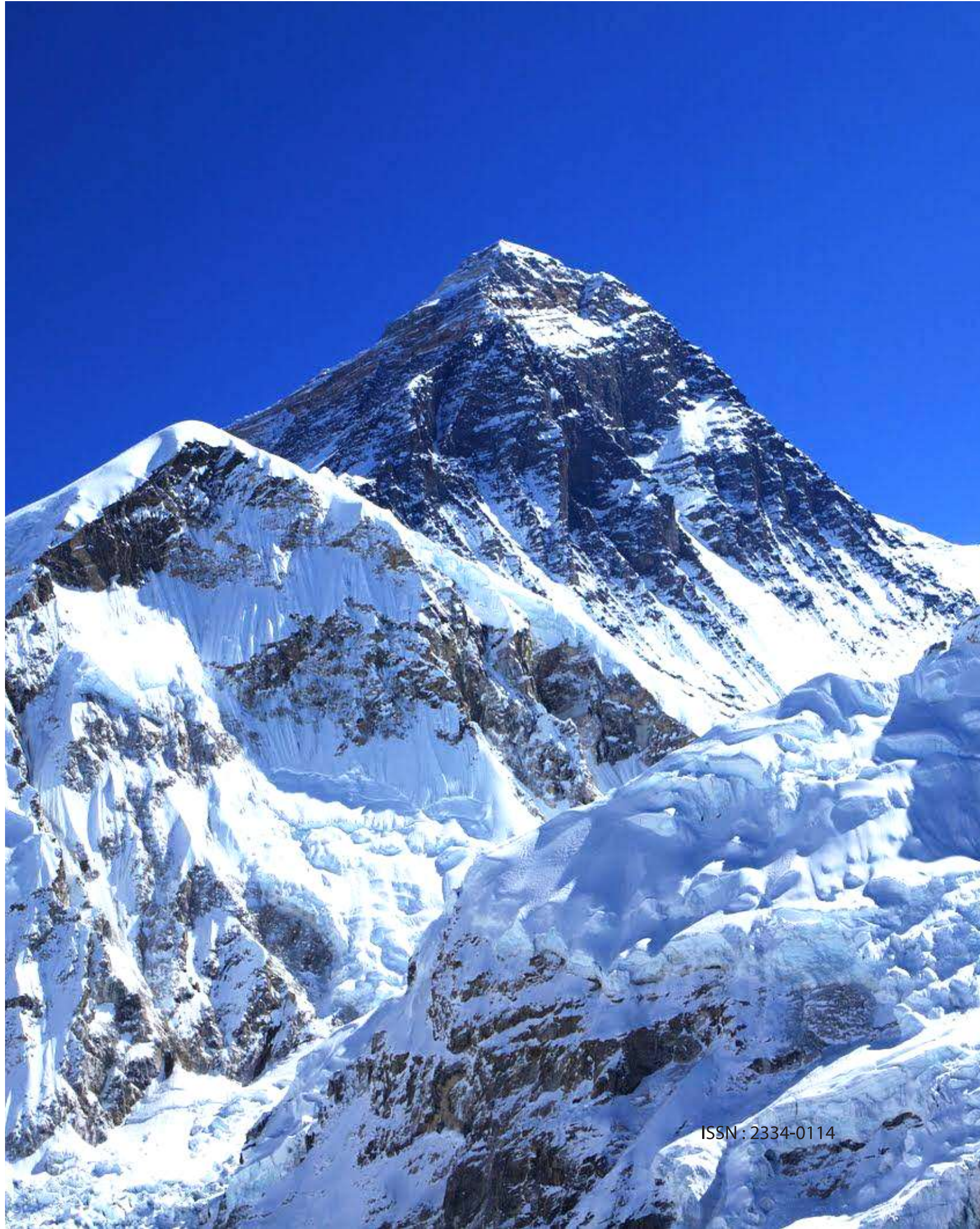




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27th International Conference on **IT Applications and Management**

International Collaboration in the Data-centered World

August 31, 2023~September 2, 2023



(ITAMS)
International ITAM Society

KDSs
Korea Data Strategy Society

27th International Conference on IT Applications and Management

THEME: INTERNATIONAL COLLABORATION IN THE DATA-CENTERED WORLD

Hosted by Korea Data Strategy Society, Korea Chamber of Commerce

August 31, 2023~September 2,2023

Venue: Korea Chamber of Commerce, Seoul, Korea

Sponsored by Ministry of Science, Technology and Information Communication,
Kore Data Agency, Tmax Software, en-Core Company, Exem Company

Compiled by

Sateesh Kumar Ojha (Lincoln U., Malaysia)

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Letter from the Chairman of IITAMS On ITAM-27, Seoul



The development and spread of data-centered intelligence is unprecedented. Academic communities as well as field managers, experts in practice are all busy to figure the best way to use recent advances in technology such as Chat GPT and analyze the impact of such large language models and data-incentive generative technologies. People are experiencing the dawn of changes in daily cultural life, educational and business life as well as socio-political life. Such a historical transformation should accompany, require, or even enforce changes in culture, social systems and norms, and legislation.

Global big tech companies in leading countries are equipped with massive investment resources, technical pools as well as huge amount of data to improve the level of intelligence of their technology and service. On the other hand, companies in the rest of the world are struggling to figure out the best way to improve efficiency of business processes and customer services with limited resources. Among all, the more important resource is becoming the data, especially data with good quality in term of amount, trustworthiness, diversity in usage domain and also in user context, appropriate level of processing transparency and protection, protection not only from fraud and hacking but also from autocratic power. In this regard we also observe the increasing importance of collaboration, collaboration among organizations within and across industries and also countries.

In previous conferences we have dealt with Technology-based coordination and collaboration among groups of people. In ITAM-27, we specifically want to focus on collaboration, which is data-centered. Data-centered collaboration has at least dual facets; a collaboration with data, which is enabled or enhanced by way of using and sharing data and a collaboration for data, where organizations help to secure improved quality data for the sake of sharpening skills, technology, and the quality of services. By way of converting fragmented data into an integrated, federated, or connected resources, we will be able to prepare a better education, better environment, better ecologically sustainable, less warm, clearer air, more humanistic future for our next generation. We need more mutual international understanding, mutual respect, and mutual collaboration as most of these missions involves problems in global scale, rather than domestic. At least we need to try hard to find a better way for a data-centered international collaboration.

ITAM-27 in Seoul will surely be a platform to share knowledge, experience and perspectives of participants, who performed research on business and social issues. I appreciate the hosting group as well as all the chairs, board members, delegates, sponsors, and supporting staffs for their devotion to this event.

A handwritten signature in black ink that reads "Namjae Cho". The script is fluid and cursive, with the first name and last name clearly distinguishable.

Namjae Cho

Chairman, International ITAM Society
Professor of Hanyang University, Seoul, Korea

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The International Conference on IT Applications and Management (ITAM) is an international forum which is designed to facilitate the exchange of ideas, knowledge and advances in research and for discussion of the state of the art application and management of information technologies. Submissions of high quality papers are invited for peer review.

The main theme of the 27th ITAM conference (ITAM-27) is “**International Collaboration in the Data-centered World**” This theme covers the technology-related business collaboration across countries and across industries, which is expected to transform all industries from agriculture to manufacturing and services. Changes in the work, life, business and infrastructure are expected to open up new opportunities as well as challenges. An affiliated pre-conference symposium on “The Future of Asia” deals with international collaboration issues in education, management and culture. The conference will be held in parallel with a forum on the international collaboration in the management of the governance and sharing of data. Post conference-day events will include visits to cultural and industrial locations.

CFP: Topics for the submission include:

- Cases in International Data Collaboration
- Data Strategies and Data-driven Innovations
- Virtual International Collaboration
- Digital Twins in Production and Consumption
- Data Analytics and Business Informatics
- Management of Data Quality, Security and Privacy
- Managing Trust in Intelligent Technology Systems
- Creativity, Innovation and Technology Entrepreneurship
- Smart Connected Products and the Reformation of Business Relationships
- Design Thinking for Value Creation
- Digital Transformation of Industries and Social Infrastructure
- Digital Transformation of Tourism, Education, Commerce and Healthcare
- Management of Intelligence Technology
- Business Governance, Family Business and Entrepreneurship Succession
- Business Co-creation and Marketing in the age of Hyper Connectivity
- Paralleling Digital transformation with Business Sustainability and Resilience
- Culture, Knowledge and Geo-Technological Transformation
- Meta-verse and Hyper Connectivity
- Social and Psychological Identities of the Multiverse Life
- Humanity Value in the Age of Technology Abundance

Submissions:

Prospective authors should submit 6-10 pages of manuscript electronically. Submitted papers should follow ITAM paper format consistent to APA standard. Submission: njcho@hanyang.ac.kr, kdbs@kdbs.or.kr
Submission guidelines are at: <http://www.kdbs.or.kr>, <http://itamsociety.org>

Selected papers will be considered in a special issue of affiliated journals.

- Journal of IT Applications and Management (KCI listed).
- Asia Journal of Information and Communication (Korean Government publication)

Important Dates:

July 31, 2023	Extended Abstract Due
August 10, 2023	Camera-ready Paper Due
August 31~Sept. 2, 2023	Conference, ITAM-27 Seoul, Korea

Registration Fee

Participants	Registration
All Participants	USD 200
Students and Accompanies	USD 100

Table of Contents

1.	Critical success factors for academic international collaboration <i>Yanki Hartijasti</i>	1
2.	Strategic data collaboration: cases in thailand <i>Thanachart Ritbumroong</i>	6
3.	Information infrastructure and generativity of knowledge creation: Unpacking the process of recontextualization <i>Akarapat Charoenpanich</i>	7
4.	Platform user groups, organizational resources and firm performance <i>Yi-Fen Huang</i>	15
5.	Factors affecting the acceptance of cloud accounting software of accounting firm partners <i>Anchalee Maneethapho, Aranya Narklor</i>	20
6.	Empirical exploration of ridesharing app enablers and inhibitors: Understanding the role of the two-factor theory <i>Jihwan, Yum, DBA</i>	24
7.	Factors affecting the acceptance of mobile accounting applications Through cloud computing technology <i>Songkran Youngnoi, Aranya Narklor</i>	25
8.	Factors that drive the adoption of smart factory solutions by SMEs <i>Namjae Cho, Soo Mi Moon</i>	29
9.	Analyzing the effects of anthropomorphism in NPCs applied by GPT Technology on user satisfaction and loyalty: focused on flow and SOR theories <i>Namjae Cho, Zhilan Cao and Giseob Yu</i>	39
10.	Impact of usefulness and value of facility AI platform service on organization Performance based on is success model <i>Byongkoo Lee and Taesoo Moon</i>	46
11.	A comparative study of the effects of consumer innovativeness, self-esteem, And need for cognition on online activity before and after COVID-19 <i>Myung Gwan Lee, SangHyeok Park and SeungHee Oh</i>	51
12.	Bridging the gap: a comparative study on social media activities among avid and casual gamers <i>Buraj Patrakosola</i>	61
13.	Analyzing the impact of reviews trust on product and corporate trust: Focused on the trust transfer theory <i>Namjae Cho, Xiaochen Li and Giseob Yu</i>	71
14.	An empirical study on effective use and design of business dashboards: The role of affordances and representation fidelity <i>Thanachart Ritbumroong and Sakuna Srianomai</i>	81
15.	The role of information and technology in adding value to the city <i>Milan Panta, Sateesh Kumar Ojha</i>	82
16.	How transparency impacts trust in AI? Refining the relationship between transparency and trust in AI <i>Changhyun Lee and Kyungjin Cha</i>	86
17.	Cryptocurrencies a bear or bull: A critique of the CBDC (Central Bank Digital Currency) <i>Supriya Kumari, Pragya Singh and Shraddha Dwivedi</i>	96
18.	Scope of e-learning in developing country as two-way resolution: Earning and learning opportunities <i>Sateesh Kumar Ojha</i>	106

19. Perceived congruent factors affecting customer value co-creation: The cases of small hotels in Eastern Thailand	
Kornthong Tesprasit, Mongkolchai Wiriyapinit, Uthai Tanlamai, Krerk Piromsopa	114
20. Analysis of the effect of FIBER model factors on successor's willingness to succeed: Using absorptive capacity as mediating variable	
Namjae Cho, Jeonghun Lim and Giseob Yu	120
21. E-Tourism: A systematic review, bibliometric analysis, and future trends	
Satish Chandra Ojha, Teena Bharti	125
22. Strategic importance of supply chain management in small and medium Enterprises with reference to Nepal	
Suman Bhattarai	130
23. Electric scooter purchase intentions: the influence of environmental concern, Price consciousness, and social norms	
Yann-Jy Yang and Chih-Chien Wang	135
24. Price prediction models development and pattern analysis for Korea allowance Unit and renewable energy certificate	
Kim, Deok-Hyun and Jeong, Dae-Yu	146
25. The influence of perceived value and perceived risk on green purchase decision: a moderated mediation Effect of perceived consumer effectiveness, environmental knowledge and green trust	
Ava Shrestha	153
26. Treatment of waste water and reclamation of desert with regular application	
Rajan Raj Pandey	165
27. Measure for redefining traditional homestays making people able to sustain their lives in the technological advance era of Nepal	
Sujan Lamichane	175
28. Planfulness ability as a Mediator of the Relationship between Learning from Supervisor and Readiness for Change: Empirical Evidence from India	
Mohit Pahwaa	179
29. Factors affecting determination of stock price and current scenario of stock price in Nepal.	
Hari Kumar Karki	198
30. Analyzing of opinions of stakeholders and the model developed by laureates Dybvig and diamond regarding financial and liquidity crises	
Rajan Sing Bhandari, Sateesh Kumar Ojha	207
31. Factor influencing employee turnover in construction industries concerning Nepalese construction companies	
Sudhakar Sharma	213
32. Influence of pharmaceutical marketing on prescription pattern of physicians of Kathmandu valley	
Malati Basnet, Sateesh Kumar Ojha	219
33. Parental Participation in children's teaching learning process of institutional schools in Kathmandu	
Yashodham Tripathi & Sateesh Kumar Ojha	228
34. Study on the owner driven approach for the reconstruction of damaged houses; a case study of Nepal earthquake response 2015	
Bishnu Gotame and Sateesh Kumar Ojha	235
35. Orphanage operating practices in Nepal: An evaluative study	
Janak Kumar Poudel	240
Key note speech	
General Commerce Intelligence: Glocally Federated NLP-Based Engine for Privacy-Preserving and Sustainable Personalized Services of Multi-Merchants	
Kyoung Jun Lee, Baek Jeong, Z Suhyeon KimZ, Yaedam Kim\ Dongju Park	

27th International Conference on IT Applications and Management

THEME: INTERNATIONAL COLLABORATION IN THE DATA-CENTERED WORLD

August 31 ~ September 2, 2023

Venue: Hoseo University, Graduate School of Venture; Korea Chamber of Commerce, Seoul, Korea

Hosted and Supported by Korea Data Strategy Society, Korea Data Agency, Hoseo University, Korea Chamber of Commerce

Host: Korea Data Strategy Society, Korea Chamber of Commerce

Venue: Korea Chamber of Commerce, Seoul, Korea

Sponsored by Ministry of Science, Technology and Information Communication,
Korea Data Agency, Tmax Software, en-Core Company, Exem Company

[PROGRAM]

Conference Inauguration Plenary Session (August 31, 2023, THURSDAY)

Time	ITAM-27 Conference and Data-Centered International Collaboration Forum Program
08:15~09:00	Registration
09:00~10:30	Plenary Inauguration Session
09:00~10:40	Opening Announcement - Jeong Hoon Lee (Chair of Org. Committee, Hansung U., Korea) Welcoming Remarks - Hye Jung Yun. (President, Korea Data Agency) Greeting - Jung Seung Lee (President of KDSS, Hoseo U., Korea) - Namjae Cho (Chairman, International ITAM Society, Hanyang U. Korea) Keynote Speech : Speaker1: Kyoung Jun Lee (Kyung Hee U., Korea) Theme: Distributed Data Use for Internationally Distributed Learning Speaker2: Yoshiki Matsui (The Open U. of Japan and Yokohama Nat'l U., Japan) Theme: Issues and Challenges in Data Collection and Use in International Context: cases and experiences Speaker3: Jung Hyun Lee (Korea Data Agency, Korea) Theme: Government Data Policy and K-Data Introduction

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Korea Data Strategy Society

Parallel Technical Sessions (August 31, 2023, THURSDAY)

Time	Track A	Track B	Track C
Session 1 11:00~12:40	Session A1 Data-centered International Collaboration Forum Chair: Kyungjin Cha (Hanyang U., Korea))	Session B1 Utilization of Data and Technology for Industrial Application Chair: Aranya Narklor (Dhurakij Pundit U., Thailand)	Session C1 Data, Technology and Sustainability Chair: Pragya Singh (Indian Institute of Information Technology Allahabad, India)
	A1.1 Key Success Factors of International academic and data Collaboration Yanki Hartijasti (U. of Indonesia, Indonesia) A1.2 Strategic Data Collaboration: Cases in Thailand Thanachart Ritbumroong (NIDA, Thailand) A1.3 International Marketing and Brand Development of Data and Digital Service Business Jeong Hoon Lee (Hansung U., Korea), Sang Yeon Song (Dongduk Women's U., Korea) A1.4 Information Infrastructure and Generativity of Knowledge Creation: Unpacking the Process of Recontextualization Akarapat Charoenpanich (NIDA, Thailand) A1.5 Platform user groups, organizational resources, and firm performance Yi-Fen Huang (Da-Yeh U., Taiwan)	B1.1 Factors Affecting the Acceptance of Cloud Software of Accounting Firm Partners Anchalee Maneethapho, Aranya Narklor (Dhurakij Pundit U., Thailand) B1.2 Empirical exploration of ridesharing app enablers and inhibitors: Understanding the role of the two-factor theory Jihwan, Yum (Hanyang Cyber U., Korea), Jungkun Park, Eunpyo Hong (Hanyang U., Korea) B1.3 Factors Affecting the Acceptance of Mobile Accounting Applications Through Cloud Computing Technology Songkran Youngnoi, Aranya Narklor (Dhurakij Pundit U., Thailand) B1.4 Adoption of Smart Factory Solutions by SMEs Companies Soo Mi Moon, Namjae Cho (Hanyang U., Korea) B1.5 Analyzing the Effects of Anthropomorphism in NPCs Applied by GPT Technology on User Satisfaction and Loyalty Zhilan Cao, Namjae Cho, (Hanyang U., Korea) Giseob Yu (Kyungpook National U., Korea)	C1.1 Electric Scooter Purchase Intentions: The Influence of Environmental Concern, Price Consciousness, and Social Norms Yann-Jy Yang (National Central U., Taiwan) Chih-Chien Wang (Da-Yeh U., National Taipei U., Taiwan) C1.2 Price Prediction Models Development and Pattern Analysis for Korea Allowance Unit and Renewable Energy Certificate Kim, Deok-Hyun, Jeong, Dae-Yul (Gyeongsang National U., Korea) C1.3 The Influence of Perceived Value and Perceived Risk on Green Purchase Decision: A Moderated Mediation Effect of Perceived Consumer Effectiveness, Environmental Knowledge and Green Trust Ava Shrestha (Lincoln U. Col., Malaysia) C1.4 Treatment of Waste Water and Reclamation of Desert with Regular Application Rajan Raj Pandey (Lincoln U. Col., Malaysia) C1.5 Measure for redefining traditional homestays making people able to sustain their lives in the technologically advanced era of Nepal Sujan Lamichhane (Lincoln U. Col., Malaysia)
12:40~14:00	Lunch Break		

Session 2 14:00~15:40	Session A2: (Korean Language Session) Data-centered Collaboration Forum Chair: Jeong Hoon Lee (Hansung U., Korea)	Session B2 Data and Technology: Assessment for Public Services Chair: Tae Soo Moon (Dongguk U., Korea)	Session C2: Innovation and Change Management in Practice Chair: Sateesh Kumar Ojha (Lincoln U. Col., Malaysia)
	A2.1 Current Status and Future Issues of Korean Data and IT Companies doing Business in Japanese Market Sang Jun Kim (Kindai University, Japan)	B2.1 Impact of Usefulness and Value of Facility AI Platform Service on Organization Performance based on IS Success Model Byonkoo Lee (ING Gloval, Korea) Tae Soo Moon (Dongguk U., Korea)	C2.1 Planfulness ability as a Mediator of the Relationship between Learning from Supervisor and Readiness for Change: Empirical Evidence from India Mohit Pahwa (NMIMS U., India), Santosh Rangnekar (Indian Institute of Technology, Roorkee, India)
	A2.2 Data-Centered International Collaboration and Data Governance Myeong Gil Choi (Chung Ang U., Korea)	B2.2 A Comparative Study of the Effects of Consumer Innovation, Self-esteem, and Cognitive Needs on Online Activity before and after COVID-19 Myung Gwan Lee, SangHyeok Park, SeungHee Oh (Gyeongsang National U., Korea)	C2.2 Factors affecting the determination of the price of a stock and the current scenario of the stock price in Nepal Hari Kumar Karki (Lincoln U. Col., Malaysia)
	Industry Presentations and Panel Discussion on International Data Collaboration: Issues and Strategies for Data Collection and Utilization	B2.3 How Transparency Impacts Trust in AI? Refining the Relationship Between Transparency and Trust in AI Changhyun Lee, Kyungjin Cha (Hanyang U., Korea)	C2.3 Perceived Congruent Factors Affecting the model developed by Laureates Dybvig and Diamond regarding financial and liquidity crises Rajan Singh Bhandari (Lincoln U. Col., Malaysia)
		B2.4 Cryptocurrencies a bear or bull: A critique of the CBDC (Central Bank Digital Currency) Supriya Kumari, Pragya Singh (Indian Institute of Information Technology Allahabad, India)	C2.4 Factor influencing employee turnover in Construction Industries Concerning Nepalese construction companies Sudhakar Sharma (Purbanchal U., Nepal)
		B2.5 Scope of e-learning in developing country as two-way resolution: Earning and Learning opportunities for enhancing occupations Sateesh Kumar Ojha (Lincoln U. Col., Malaysia)	C2.5 Influence of pharmaceutical marketing on the prescription pattern of physicians of Kathmandu valley Malati Basnet, Sateesh Kumar Ojha (Lincoln U. Col., Malaysia)
15:40~16:00	Coffee Break		

Session 3 16:00~17:20	Session A3: Data and Technology Abundant Society Chair: Sakuna Srianomai (King Mongkut's Institute of Technology, Thailand)	Session B3 Digital Technology and Entrepreneurship Chair: Satish Chandra Ojha (HBTU Kanpur, India)	Session C3: Innovation and Social Change Chair: Santosh Rangnekar (IIT, Roorkee, India)
	A3.1 Bridging the Gap: A Comparative Study on Social Media Activities Among Avid and Casual Gamers Buraj Patrakosol (Chulalongkorn U., Thailand)	B3.1 Customer Value Co-Cre- ation: The Cases of Small Hotels in Eastern Thailand Kornthong Tesprasit, Mongkolchai Wiriya- pinit, Uthai Tanlamai, Kerk Piromsopa (Chulalongkorn U., Thailand)	C3.1 Socio-economic analysis of mar- ginalized groups in Nepal Pushpa Raj Guragain, Dipendra Singh Sunar (Nepal Electricity Authority, Nepal)
	A3.2 Analyzing the Impact of Reviews on Product and Corporate Trust Xiaochen Li, Namjae Cho (Hanyang U., Korea) Giseob Yu (Kyungpook National U., Korea)	B3.2 Analysis of the Effect of FIBER Model Factors on Suc- cessor's Willingness to Succeed: Using Absorptive Capacity as Mediating Variable Jeonghun Lim, Namjae Cho (Hanyang U., Korea) Giseob Yu (Kyungpook Nat'l U., Korea)	C3.2 Parental Participation in chil- dren's teaching-learning process of institutional schools in Kathmandu Yasodham Tripathi (City Education Foundation, Kathmandu, Nepal) Sateesh Kumar Ojha (Lincoln U. Col., Malaysia)
	A3.3 An empirical study on effective use and design of business dashboards: The role of affordances and rep- resentation fidelity Thanacha- rt Ritbumroong (NIDA, Thailand) Sakuna Srianomai (King Mongkut's Inst. of Tech., Thailand)	B3.3 E-Tourism: A systematic review, bibliometric analysis, and future trends Satish Chandra Ojha (HBTU Kanpur, India), Teena Bhar- ti (IIM Bodh Gaya, India)	C3.3 Study on the owner-driven approach for the reconstruction of damaged houses, a case study of Ne- pal earthquake response 2015 Bishnu Gautam (Lincoln U. Col., Malaysia)
	A3.4 The role of information and technology on the adding values to city Milan Pant (Lin- coln U. Col., Malaysia)	B3.4 The strategic importance of supply chain management in Small and medium enterprises Concerning Nepal Suman Bhattarai (Lincoln U. Col., Malaysia)	C3.4 Performance of Orphanage Operating in Nepal: An Evaluative Study Janak Kumar Poudel (Lincoln U. Col., Malaysia)
17:20~17:50	Valedictory Session Valedictory Remark: Namjae Cho (Chairman, International ITAM Society, Hanyang U. Korea) Formal Announcement of invitation to ITAM-28		
18:00~	Data Safety Zone of Korea Data Agency visit		

Post-Congress Industrials Visit and Cultural Activities (September 1 & 2)

Time	Events
September 1, FRIDAY 09:00~18:00	09:00~10:00 Move by Chartered bus from Korea Chamber of Commerce to Exem 10:00~14:00 Company Visit 1: Exem 14:00~16:00 Move by Chartered bus from Exem to Tmax 16:00~17:00 Company Visit 2: Tmax Software 17:00~18:00 Move back to Korea Chamber of Commerce *Lunch and Dinner will be provided. The bus contains Max 45 persons and moves punctual.
September 2, SATURDAY 07:00~20:00	07:00~16:00 Optional Cultural Tour to DMZ of Korea (extra payment required) (The visit will include military facilities, UN area, and sensitive area visits. Pre-reporting of passport number and personal information is required. All visitors need to hold passport. Lunch included) Can accept 40 persons only, first come first serve basis. NOTE: The tour bus leaves in front of the Korea Chamber of Commerce 07:00 flat. 16:00~20:00 Future of Asia meeting and Farewell Dinner



International ITAM Society



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Critical Success Factors for Academic International Collaboration

Yanki Hartijasti

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Abstract

The implementation of international collaborations has not had a positive impact on university rankings in several developing countries. Therefore, it is necessary to explore what challenges are faced in international collaboration and what are the critical success factors needed to overcome these challenges. It is revealed that the human factor is the most important factor in sustaining international collaboration.

Keywords

International Collaboration, Leadership Commitment, Researchers' Communication Skills, University Rankings

Introduction

In an era defined by Industry 5.0, characterized by the fusion of physical and digital worlds, universities across the world are actively leveraging international collaborations to transform themselves into world-class educational institutions. In recent decades, the rate of international partnerships between universities has been growing rapidly because it is beneficial to all stakeholders. For universities, it has attracted student applicants from across the globe due to the availability of international exchange programs. Students participating in exchange or dual degree programs have had the opportunities for research collaborations, generating innovative research findings, and contributing significantly to the advancement of knowledge in various fields. Likewise, international collaboration in the field of research among foreign academics and researchers has made the exchange of academic ideas easier to organize and disseminate [2].

This climate of establishing international collaboration among universities has produced several benefits. For example, QS data [30] reports that one in five world scientific works is co-written internationally. Furthermore, UNESCO Science Report shows that the rate of international scientific collaboration rose from 22% to 24% of scientific publications between 2015 and 2019, with wide variations among countries [39]. This condition occurs because the global researcher pool grew almost three times faster than the global population over 2014-2018.

Furthermore, the increasing trend toward international collaboration in academic research has proven to have a positive impact on the quality and quantity of research papers produced [2]. Therefore, universities across the world are trying their best to take advantage of these

collaboration opportunities by forming global partnerships and fostering relationships with other institutions.

Other data shows that the density of researchers has grown most rapidly in low-income countries (+36%), they account for 0.2% of the global researcher pool (and 12.4% of global population). Consequently, they remain largely recipients of foreign scientific expertise and technology as eight out of ten countries still allocate less than 1% of GDP to research [39].

Consequently, university rankings are used as a reference for deciding international collaboration between universities and providing independent insight to prospective students about the university they wish to apply for. The ranking shows a prestigious achievement for higher educational institutions and countries because it is included in the world's top as measured by various indicators based on rating agencies that refer to the quality of higher education services to be able to produce human resources and innovation [30].

There are several different world university rankings available, of which the best-known and most-used include (1) Quacquarelli Symonds (QS), (2) Times Higher Education (THE), and (3) Academic Ranking of World Universities (ARWU) – commonly known as the Shanghai Ranking [13]. This article refers to the QS World University Rankings (WUR) which was unveiled in 2004 and has grown to become the world's most popular source of comparative data on university performance. QS WUR assesses universities using six performance indicators, namely academic reputation (40%), employer reputation (10%), student-faculty ratio (20%), research citations per faculty member (20%), proportion of international faculty (5%) and proportion of international students (5%).

Taking the example of university rankings in Indonesia

from the international QS World University Rankings, three universities in Indonesia have been included in the Top 500 World Class Universities (WCU) since 2010, namely: Universitas Indonesia (UI), Universitas Gadjah Mada (UGM), and Institut Teknologi Bandung (ITB). The ranking illustrates the reputation of the three universities in the quality of education services. In 2010, these three universities have been included in the Top 500 World University Ranking (WUR), and in 2022 their performance has become the Top 300 best universities in the world until today (see Table 1).

Table 1. QS World University Ranking: Indonesia 2010-2024

TOP 3	2024	2023	2022	2021	2020	2019	2018	2017	2015	2013	2010
UI	237	248	290	305	296	292	277	325	310	309	236
UGM	263	231	254	254	320	391	401-	501-	551-	501-	321
ITB	281	235	303	313	331	359	410	550	600	550	401-
							331	401-	461-	461-	450
								410	470	470	

Note: UI=Univ. Indonesia; UGM=Univ. Gadjah Mada; ITB=Institut Teknologi Bandung [40]

Of the 4,231 universities in Indonesia as of the end of March 2023, only 16 are listed in the 2023 WUR and 26 in 2024 because it is not easy to be nominated into the world university ranking. Universities must fulfill several more criterias as a mandatory requirement to get regular international rankings, such as: (1) the quality of research in the forms of productivity, citations, and awards obtained; (2) implementation of the learning process (including ratio of lecturers to students); (3) employability of university graduates; (4) internationalization which is represented by the proportion of foreign students to staff, as well as student mobility; (5) campus facilities such as sport facilities, IT, laboratories, libraries, and health facilities; (6) commitment to implementing online or distance learning; (7) creating the latest innovations for the world of education; (8) organizing art and cultural performances for cultural appreciation; (9) inclusivity in the form of scholarships, gender balance, and access for persons with disabilities; and (10) various disciplines of specialization and accreditation [14]. From these criteria, it appears that one of the indicators is international collaboration with industry and university partners around the world, which is expected to increase research collaboration and global visibility.

Based on the QS World University Rankings, not many universities in developing countries are included in this university ranking. Accordingly, the purpose of this article is to explore what challenges are often faced in international collaboration and what are the critical success factors needed to overcome these challenges. For this reason, international collaboration and its benefits as well as challenges and critical success factors are presented in this article.

International collaboration

International collaboration refers to partnerships and joint initiatives between universities and academic institutions

in different countries. International collaborations among researchers and universities have increased and are almost mandatory for institutions that seek global visibility in science and technology [24] as a gateway to a world-class university. Institutions are also encouraging their faculty to engage in collaborative research [9] to increase the number of international publications by researchers in reputable scientific journals.

The key internationalization issues for universities also involve balancing student mobility flows, making mobility a real possibility for all students through improved access strategies, as well as guaranteeing the fair and equal treatment of international students because it is a main area in representing and promoting students' social, economic, and cultural interests [29].

Therefore, international collaboration can enhance research capabilities, facilitate faculty and student exchange programs, open doors to funding opportunities, and provide platforms for joint research and innovation projects. This collaboration may involve a variety of activities, including student and faculty exchange programs, joint research projects, sharing of knowledge and resources, and collaborative teaching and learning endeavors. Examples of several types of partnerships and alliances among universities takes in many forms, such as international branch campuses, online programs, franchised foreign academic degrees, and independent institutions that are modeled after foreign universities, dual or joint degree programs with foreign partners, etc. [4]

Challenges of international collaboration

In implementing international collaboration, there are several challenges that are more often faced by partner universities in developing countries.

One of the biggest challenges in international collaboration among universities is the lack of coordination and alignment of goals and priorities. It is possible that research agendas, strategic plans, and institutional priorities may not align with those of their international partners. This is because each university may have its own approaches to research, teaching, and decision-making, which can create challenges in working together [3]. This condition occurred several years ago where collaboration has not always achieved its original goals, and often failed [35]. Building good relationships with established international institutions takes time because it requires mutual trust [26].

Second, unreadiness to change mindset and mentality. All university stakeholders should have an open mind and be willing to challenge their own worldview [42]. But often commitment from university top management is low [20], there is still resistance to the use of ICT [1], and faculty's

resistance to international partnerships [3] due to limited experience and fear and feelings of inadequacy in writing research results in scientific journals of international repute. Not to mention the existence of excessive competition among the institutions.

Third, the lack of resources and infrastructure can hinder their ability to collaborate effectively with international partners. Universities in developing countries often face significant challenges in terms of (1) limited access to published literatures which makes them unprepared to participate in international conferences [25] and produce limited research – in terms of quantity and impact because they often work in isolated environments and have little interaction with policy makers [23;37]; and (3) limited funds to invest in research projects and travel costs.

Fourth, language and cultural barriers may exacerbate the challenges faced by universities in developing countries [42]. Limited proficiency in English, which is often the dominant language of international collaboration, can hinder effective communication and understanding between collaborating partners [3] and may damage and distort relationships [16]. Cultural barriers, such as varying working styles and academic practices, can also create challenges in coordinating and aligning efforts in collaborative projects.

Critical success factors of international collaboration

There are several critical success factors that have been carried out by world-class universities not only in developed countries but also developing countries to overcome the challenges.

First and foremost, clear goals and expectations are crucial for successful international collaboration [15]. Universities must know what strengths (knowledge, facilities, equipment) they have and what qualities university partners must have for the project to be successful. This includes establishing mutually beneficial outcomes, defining the scope of collaboration, and aligning strategic priorities. Universities must engage in open and transparent discussions, negotiate agreements, and develop a comprehensive collaboration framework to ensure that all parties work towards a shared vision.

Second, strong teamwork and constant communication between both parties is another critical success factor in international collaboration. The reasons are (1) the frequency of communication is very important for creating shared understanding [27] through various channels, such as email, regular meetings, or face-to-face communication [11;22] and (2) good personal relations as the basis for enabling the important relationship between industry and the university [7;12] including regular interaction at management and operational levels, continuous feedback, exchanging information and updating partners about new incidents or activities [41]. Language barriers

and cultural differences must be overcome by finding a suitable ‘language’ for both partners, as international collaborations are often influenced by the use of different diction and styles in academic and business settings [6; 19]. In addition, it is important to understand and accept cultural differences [7;36].

Third, financial support for conducting research is an important factor because it acts as a motivation in carrying out research projects. To overcome funding constraints, extensive funding has been introduced by government agencies and private companies, together with government liaison organizations to encourage such collaborative activities [20]. Without research grant incentives, the level of interaction will be much lower [28]. Therefore, universities must acknowledge the contributions of faculty, researchers, and students involved in international collaborations. This includes providing incentives for collaboration, such as funding opportunities, promotion criteria that value international collaboration, and rewards for successful collaborative outcomes. Recognizing the achievements of international collaborations motivates individuals and institutions to continue engaging in fruitful collaborations.

This last factor is necessary for international collaboration to proceed according to plan. Leader commitment and support can facilitate collaboration on all levels [5]. Such leadership should invest time and effort in establishing personal connections and developing professional networks with their international partners. Regular face-to-face meetings, joint workshops, and collaborative research visits can help foster strong relationships based on mutual respect and understanding. Leadership like this is needed because it can create smooth internal coordination between faculties at the university in planning, initiating, and implementing international cooperation [3]. In addition, this leadership can send positive signals to build trust and carry out honest communication and has a strong role model effect [7]. By creating this trusting relationship, it enables effective decision making, conflict resolution, and knowledge sharing.

Human factor as a the most critical success factor of international collaboration

Several studies in different countries have found that the human factor is the most important factor in sustaining international collaboration. Studies in Malaysia reveal that critical success factors focus on the attitudes and characteristics of people involved in international collaboration [20]. For example, the commitment and leadership skills of researchers who must have strong social and communication skills and be willing to work hard, collaborate, and foster continuous communication between researchers at both universities and countries. While the results of Fernandes et al. [17] found a more complete human factor, namely senior management

commitment, effective communication, stakeholder involvement, good leadership, clear and realistic goals, mutual trust and respect, teamwork and clear roles and responsibilities.

Likewise, the relationship factors between people involved in collaboration are important, especially treating partners fairly, communicating openly and honestly, and promptly informing partners about the latest developments to build trust [7], commitment to promises made. [34], transparency and honesty regarding intellectual property rights (IPR) goals and policies [10;33]. And to get the best output factor from international collaboration, it is necessary to have clarity about the main points between partners, such as having clear goals, planning as realistically as possible, agreeing on responsibilities, determining the extent of each partner's contribution, setting roles from the start [7; 18], and clarifying expectations [7] related to IPR policies [36]. Consequently, it is important to spend sufficient time to understand partners' interests, discuss goals and vision, negotiate them [8;31], and use concrete agreements and contract protection [21] to protect all parties.

In closing, this article explores what challenges are faced in international collaboration, especially in developing countries and what are the critical success factors needed to overcome these challenges. The challenges that are usually faced by universities in developing countries are: (1) the lack of coordination and alignment of goals and priorities; (2) unreadiness to change mindset and mentality; (3) the lack of resources and infrastructure; and (4) language and cultural barriers. These challenges can be overcome with the following critical success factors: (1) clear goals and expectations; (2) strong teamwork and constant communication; (3) financial support for conducting research; and (4) leader commitment and support.

It can be concluded that the role of humans, especially leaders and researchers, in international collaborations is very important. This conclusion can be used as a reference for building and maintaining a successful international collaboration while still linking it to local contexts and priorities.

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Strategic Data Collaboration: Cases in Thailand

Thanachart Ritbumroong, Ph.D.



Information Infrastructure and Generativity of Knowledge Creation: Unpacking the Process of Recontextualization

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Abstract

Once data is created, it is decontextualized from its original context and made portable to other contexts. For that piece of data to be useful, it needs to be recontextualized and transformed into knowledge within that new context. This paper examines and unpacks the process of recontextualization. Before data can be collected or created, a database schema and classification system need to be constructed, which will emerge as an information infrastructure once standardized and deployed to collect or create data across space and time. This paper examines the linkages between information infrastructure, data, recontextualization, and knowledge creation, as well as the role that digital technology plays in mediating these relationships. In turn, it postulates how information infrastructure allows for generativity in terms of knowledge creation and how that intensifies when the process is digitized. The empirical context of this paper is an economic research department in a major commercial bank in Thailand. Studying knowledge creation in the discipline of economics is highly relevant for this project because economists have always created knowledge from data, and it is evident that this field of study is gaining prominence. Some have pointed out that methodologies deployed by economists are imperializing other fields of social studies, establishing the status of being the mainstream approach to knowledge creation, especially in the age of the data revolution.

Keywords

Information infrastructure, digital technology, generativity, recontextualization, knowledge creation, and economics

Introduction

We are living in the age of the data revolution. As digital technology infiltrates our everyday life, a massive amount of data has been created (Zuboff, 1989). According to Shollo et al. (2022), data can be used to create value in three ways: (1) knowledge creation, (2) task augmentation, and (3) building automated systems. This paper specifically deals with knowledge creation. Arguably, once data is created, it is decontextualized from its original context, making it portable, and it needs to be recontextualized back into context to create value (Aaltonen et al., 2021). This paper attempts to unpack the process through which this recontextualization happens, whereby seemingly disparate pieces of data objects are turned into knowledge, and it poses one key research question: how is data being used to create knowledge?

Furthermore, this paper investigates how information infrastructure preconditions the creation of knowledge through data. Lastly, this paper views information infrastructure as a kind of digital infrastructure since the process involved in the production of data is increasingly digitized. Thus, (digital) information infrastructure ought

to be generative as well. With that in mind, the paper investigates how digitization enhances the generativity of knowledge creation.

The empirical context of this paper is an economic research department where the author worked for 3 years between 2009 and 2011. The classification system is a part of all information infrastructure (Bowker and Star, 2000), and it is vital for the operation of economics as a discipline that analyzes the economy. For example, the creation of important economic figures such as gross national products and inflation rates requires a huge infrastructural apparatus, whereby what to include and not to include in the calculation must be defined from the outset.

The paper is divided into 6 parts. Firstly, relevant literature is discussed to set the stage for empirical analysis. Secondly, the empirical context is described. Thirdly, the deployed methodologies are discussed. Fourthly, results from the analysis are presented. Fifth is a discussion session. Sixth is discussion of the contribution of paper. Finally, the paper closes with concluding remarks, alongside a discussion of future research directions.

Literature review

Classification systems are essential components of any information infrastructure (Bowker and Star, 2000). Before reality can be quantified, agreements need to be made on how to measure different aspects of reality (Espeland and Sauder, 2007). Bowker and Star (2007) view classifications that have been standardized and become part of the information infrastructure as boundary objects or “those objects that both inhabit several communities of practice and satisfy the informational requirement of each of them ... travel across borders and maintain some sort of constant identity ... [yet] can be tailored to meet needs to any one community”.

Census, which is widely deployed by economists for economic analysis, is the outcome of a huge information infrastructure. Classification is a part of the story, but it is not everything. There is more to the information infrastructure that creates census than just the classification system. Of course, the types of jobs each individual does would require classification to be encoded, but there are also other pieces of data connected to an individual, such as income, expenditure, and location, which are connected and organized into a data object through a database schema.

Alaimo and Kallinikos (2022) introduce the concept of data objects. As digital technology infiltrates everyday life, most data objects are digital in nature. Data objects are distinct from other digital objects such as software objects. While software is very different from data, the former is more complicated. On the other hand, a data object is an object because it has some sort of schema whereby disparate sets of information are tied together. An illustration of this is a user profile on Twitter retrieved from APIs, where different information or attributes of the user, such as id, name, screen_name, location, url, and description, are stored together in one place.

According to Alaimo and Kallinikos (2022), data objects fulfill the process of making knowledge and are “the basic cognitive units, the elemental reality cuts ... without which other more inclusive perceptions and knowledge management operations would be virtually impossible.” Census, which is often the object of analysis performed by economists, is the culmination of a huge amount of data objects, each of which is tied to an individual within a country.

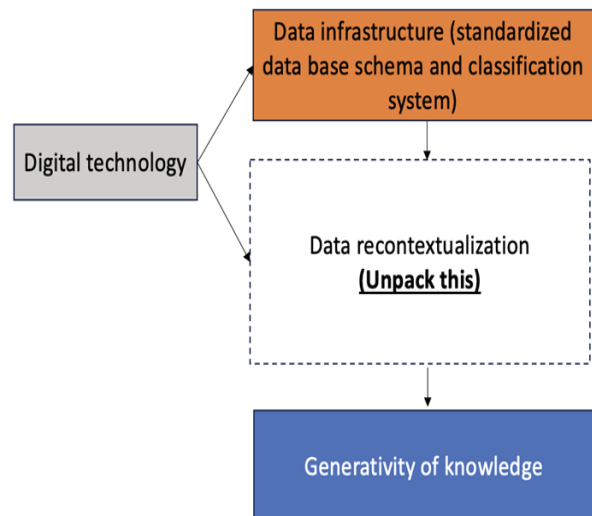
Furthermore, it can be argued that there are data objects at different levels of granularity. Taking census as an example, in the pre-digital era, common data objects being circulated (non-digital at that time) were possibly mere tables containing aggregate information regarding the population (e.g., the number of people of different age and gender categories) compiled from individual- and micro-level datasets. However, actual individual-level data objects were possibly off-limits for analysis because

digital technology was required to perform that task. It is even reported that processing the census was done by hand back in the 19th century (US Census Bureau, 2023).

With increasing digitization, data objects accessible to researchers become more granular. Now, individual-level data is made available for researchers to analyze. Sorting and reorganizing a huge amount of individual-level data objects contained within a census becomes possible with digital tools. This is reminiscent of the modularization of software and hardware, where a whole system is decomposed into smaller elements or modules tied together through interfaces with digitalization (Baldwin and Clark, 2000).

Figure 1 sets the stage for empirical investigation. Data infrastructure entails the standardization of data schema and classification systems deployed to collect data across space and time. Once data is collected, it needs to be recontextualized to create knowledge. This process also involves digital technology, which may perhaps make the process of knowledge creation more generative as it allows for the analysis of more granular data objects (Zittrain, 2008). The aim of this paper is to unpack the process of data recontextualization.

Figure 1: Setting the stage for empirical investigation



Empirical context: Economic research department for a major commercial bank

The author worked at an economic research department for a major commercial bank in Thailand for 3 years between 2009 and 2011. The motto of the department is to create “insightful economic and business intelligence for effective decision making,” and the team does that by analyzing data. The context of the department is to provide “insightful economic and business intelligence”

to both internal and external clients of the commercial bank. The former consists of other departments within the commercial bank, and the latter includes corporate clients, both small and large, that borrow from and engage in other businesses with the commercial bank.

The department constantly creates numerous knowledge objects in the form of research reports. One of these reports is called “Insight,” and the department aims to produce it monthly, providing valuable knowledge extracted from data to clients. The report covers a wide range of topics, from the economic forecast of Thailand, which needs constant updating, to more timeless topics about Thailand, such as emerging problems related to aging society, urbanization, and skill mismatch with the labor force.

Arguably, studying knowledge creation in the field of economics is highly relevant to this topic, as the empirical investigation methods used by economists are predominantly quantitative. According to Andrade et al. (2023), knowledge can be created through five approaches: deductive, inductive, abductive, design, and conceptual. Arguably, economists create knowledge using the conceptual approach, utilizing mathematics to construct economic theories, the deductive approach, testing hypotheses derived from theory on data, and the inductive approach, performing data exploration. Henceforth, data is central to the operation of economists.

Furthermore, it appears that economic methodologies are being detached from the subject domain of the economy and are being applied to broad areas of social life outside the realm of the economy. This is referred to as “economics imperialism” (Fine and Milonakis, 2009). Moreover, some prominent economists have claimed that econometrics, a method of empirical investigation used by economists, is the “original data science” (Angrist and Pischke, 2014). Hence, there is a real chance for economic methodologies to emerge as the prominent way of knowledge creation in the age of the data revolution.

Methodological approach: archival studies and autoethnography

I will apply a mixed qualitative research method in this paper. I worked at the economic research department for 3 years between 2009 and 2011. During my time at the department, 22 “Insight” reports were written, which are considered the most important knowledge objects created by the department. I will reflect upon them to better understand how knowledge in the reports is being created by mining my memories; henceforth, I will engage in a

genre of research called autoethnography (Poulos, 2010). Figure 2 reports a word cloud of titles of the 22 “Insight” reports, which demonstrates the kind of knowledge being created in the reports to some extent. It shows that the reports are very much about Thailand, the Thai economy, and Thai businesses, covering a variety of subjects ranging from changes in consumer demand, energy consumption, and real estate business, to problems in industrial estates such as Mat Ta Phut, and to macroeconomic policies such as free trade agreements.

Figure 2: Word cloud of the titles of the 22 “Insight” reports



Furthermore, the dataset from the National Statistical Office (NSO) of Thailand will also be analyzed. NSO uses data infrastructure (database schema and classification system) imported from elsewhere to collect data from Thailand. This set of data is extensively used by the economic research department. Once the collected data is compiled, part of it is sent back to numerous international organizations so that they can be made comparable with data from other countries.

Finding

NSO and information infrastructure

There are numerous datasets (which are the culmination of a massive amount of individual-level data objects) being created by the NSO. This includes population and housing census, agricultural census, business and industrial census, social survey, economic survey, ICT survey, and surveys of natural resources and the environmental sector. One of the most widely used surveys by the economic research department is the household socio-economic survey (SES). This is partly because it has consumption data, which can easily be made relatable to businesses and serve the clients of the commercial bank, where the research department is embedded.

Once the NSO collects data for any surveys, the

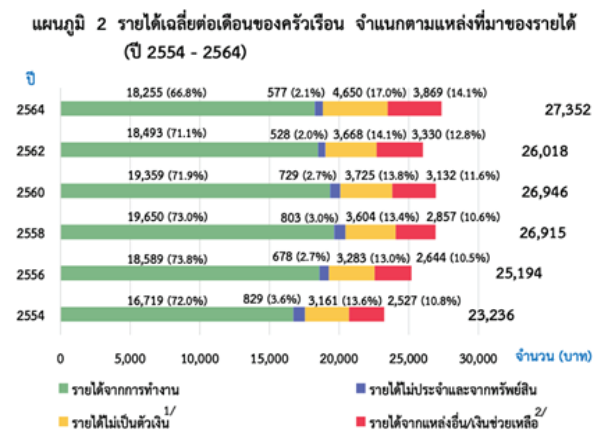
data is compiled into many tables. These tables are less granular data objects compared to individual-level data. Figure 3 depicts a word cloud of the names of tables for SES in 2021. “Percentage of households,” “socioeconomic class,” and “region” figure prominently in the figure, demonstrating that the focus of the survey is on households, that the classification system is crucial for the construction of information infrastructure as each household would need to be placed in a specific socioeconomic class, and that the breakdown of data by region is deemed important to be reported by the NSO. In the pre-digital era, micro-level data was off-limits for researchers, but nowadays, it has become common for it to be deployed for analysis utilizing digital tools.

Figure 3: Word count of the title of numerous tables compiled from “raw data” reported in SES in 2021



Furthermore, information infrastructure that is being used to create data is relatively stable through time, which is ought to be an important characteristic of information infrastructure (Bowker and Star, 2000). This enables creation of certain data series which are comparable across time. Figure 4 demonstrates that for average household income broken down of origin of income and note that the year is written in B.E.

Figure 4: Data collected by NSO can be traced through time (SES, 2021)



Note: Green bar is income from working, blue bar is income from asset, yellow bar is non-monetary income, and red bar is other sources of income such as transferred income

Process of recontextualization, generativity of knowledge, and digital technology

This part investigates the “Insight” reports produced by the economic research department in detail. It appears that the “Insight” reports are filled with data visualization, with textual narratives interspersed between them. These visualizations can be seen as disparate knowledge objects that are organized and arranged together into a more elaborate knowledge object, which is the “Insight” report. Knowledge created by information infrastructure is highly generative. For example, the SES acts as the core pillar for the creation of at least 5 reports that have been written at the economic research department. Figure 5 takes a brief look at those reports. There are many figures created among the five reports, ranging from 11 figures to 25 figures. This also demonstrates that SES data can be used to explore a wide range of issues, including consumer demographics, real estate business, income inequality, urbanization, and retail businesses.

Figure 5: Detail of the five reports that leverages heavily on SES

Date of issue	Name of report	Number of figures	Domain
April 2010	Thailand’s changing consumer demographics and what they mean	25	Consumer demo-graphics
July 2010	How will changing preferences affect the property landscape?	21	Real estate business
Aug-Sep 2010	Growth, inequality and opportunity in Thailand	11	Income inequality

Dec 2010 – Jan 2011	Looking beyond Bangkok: The Urban Consumer and Urbanization in Thailand	14	Urbanization
May-June 2011	How will the retail landscape change?	11	Retail businesses

Before visualization can be created, data manipulation, which can be painstakingly difficult, needs to be performed, and this may also involve modeling. Take, for example, the report entitled “Thailand’s changing consumer demographics and what they mean,” published in April 2010. The dataset would need to be enriched, and households would need to be classified into different categories, such as “living alone,” “married without kids,” “married with kids,” “single parents,” “non-nuclear family,” and “other.” This classification does not come preexisting with the SES data and needs to be created by the research department. This entails a painstaking task of counting different types of members within each household (e.g., head of the household, partner of the head of the household, children of the head of the household), which can then be used as input for the classification.

The enriched data is then used to model the proportion of different types of households into the future by combining SES data from the NSO with population projection data from the National Economic and Social Development Board (NESDB). However, it is important to note that combining data objects of different types is not always possible, as each data object would need to be placed in the same “pigeon hole.” In the case of NSO data and that of NESDB, they can be combined because there are some meaningful “pigeon holes” that overlap within the two data sets, and that is the demographic characteristics of people (i.e., age, gender, and location).

Self-reinforcing growth of information, whereby new information is being created out of existing information (Kallinikos, 2006), is also being observed. The “Insight” report entitled “How will changing preferences affect the housing landscape,” published in July 2010, builds on the consumer demographic model created in the previous report discussing consumer demographics, using the demographic model to project the demand of households into the future.

With the publication of the consumer demographic report in April 2010, the economic research department has witnessed firsthand the power of being able to analyze highly granular data objects at the individual level. The generativity of knowledge has been unleashed, and the individual-level data objects stored in the raw data files of SES are used to write at least 5 reports on a variety of topics regarding the Thai economy and businesses. Arguably, this is made possible only with the digitizing of data records with digital tools made available to perform analysis of granular digital data objects.

Discussion

Unpacking process of recontextualization

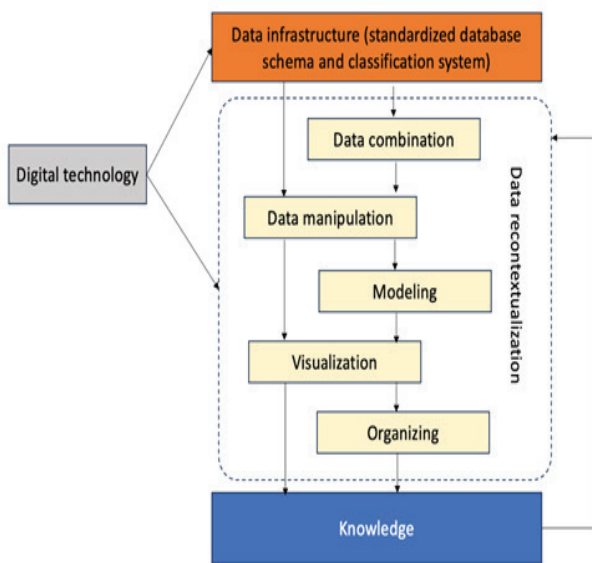
Once data is created, it is decontextualized from its original context and made portable to other contexts. In these new contexts, it needs to be recontextualized to become meaningful knowledge, and this paper attempts to unpack this recontextualization process. It is found that the key operations include data combination, data manipulation, modeling, visualization, and organizing visualized images. It is important to note that data combination is not an easy task, as different data objects would need to have a similar and meaningful “pigeon hole” for the data to be combined.

Furthermore, there is a feedback loop from knowledge to data recontextualization, making the process of knowledge creation from data generative. Such a knowledge creation process becomes an iterative process, reminiscent of the iterative process required to create value proposition from data discussed by Gunther et al. (2022). Created knowledge can be used as a basis for the creation of new knowledge. As the economic research department delves deep into writing the consumer demographic report using individual-level data objects stored in SES, more opportunities to use data are spotted due to the highly granular nature of the data. This leads to subsequent reports on a variety of topics using the same dataset. Furthermore, it is also important to note that unveiling highly granular data objects is only made possible with digital technology, as it allows data to be sorted and retrieved in seemingly unlimited ways (Weinberger, 2007).

Bowker (1996) emphasizes the significance of an ‘open past’ in the context of International Classification of Disease (ICD) for tracking historical instances of diseases,

like AIDS. In the past, AIDS recognition as a disease was slow, and older statistics based on ICD hindered the ability to identify earlier AIDS cases, as deaths were often attributed to various opportunistic infections. However, advancements in digital technology now allow the aggregation of multiple data objects (e.g., hospital records) to reclassify the cause of death. Modern medical classifications, like SNOMED (Système de Nomenclature Medicate), enable this ‘open past’ approach, where patient-related data can be reanalyzed and the cause of death reclassified. Arguably, this ability of digital technology reflects generative process of knowledge creation as demonstrated by the economic research department.

Figure 6: Process of recontextualization



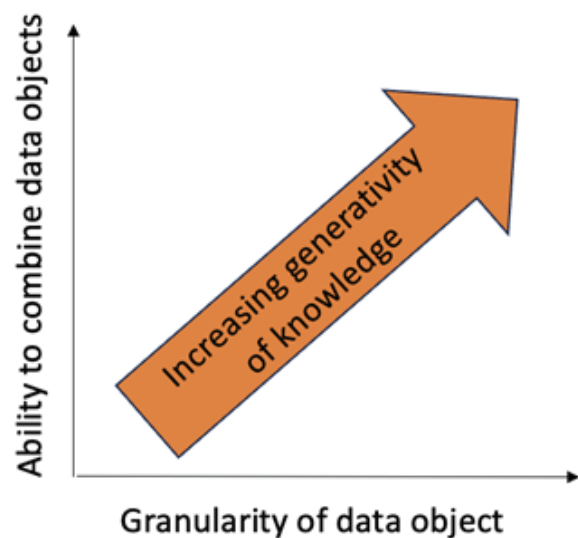
Data revolution and generativity of knowledge

The (digital) data revolution leads to the creation of highly granular data objects to be analyzed (take the profile of Twitter users as an example), while digital tools and technologies make the analysis of highly granular data objects possible. The more granular the data, the more generative the process of knowledge creation, as demonstrated by the case study of the economic research department laid out above. Furthermore, the infiltration of digital technology into everyday life has culminated in the creation of highly diverse data objects (Swanson, 2021), which can be combined and brought to bear upon one another to create new knowledge.

Although it is important to note that not all data objects can

be meaningfully combined, as there may not be “pigeon holes” that overlap in meaningful ways, the emergence of diverse datasets from near and far creates more opportunities to create knowledge through recombination of data objects, resulting in what Alaimo and Kallinikos (2022) called “organization decentered.” The generativity of knowledge is enhanced by digital technology because it increases access to more granular data objects, and the chance to be able to combine datasets to create new knowledge increases with the emergence of highly diverse data objects from both nearby and distant sources.

Figure 7: Trajectory of generativity of knowledge creation



Digital infrastructure and (digital) information infrastructure

Modern digital information infrastructure is indeed digital and digital infrastructure ought to be generative. Tilson et al. (2010) demonstrates that generativity in digital infrastructure is the result of the paradox of change (stability vs. flexibility) and paradox of control (centralization vs. decentralization). One also sees these two paradoxes in information infrastructure that enables generativity in knowledge to be created. Database schema and classification system embedded into information infrastructure ought to be highly stable. Yet, variety kinds of knowledge can be created by information

infrastructure, and this is especially true for analysis of highly granular data objects, which is made possible by digital technology. While organizations like the NSO hold the control over information infrastructure, the process of knowledge creation is highly decentralized. The economic research department in a commercial bank documented in the case study above is just one of among many users who analyze data objects created by the NSO.

What is being loss?

It can be observed that economists subscribe to and hold on to positivist paradigm to the level of unquestionable doubt. There is no philosophy or epistemology being taught economic students. Analysis of data objects are inherently quantitative which suit economists very well. With data revolution, quantitative methodologies because increasingly popular at the expense of qualitative techniques. What is being loss? Analysis of qualitative differences are as important as quantitative differences, and these become increasingly salient in the current time at which technology is evolving quickly. One needs to question all the time regarding the newness of the phenomenon and the distinctive characteristics of the latest technology. Analysis of qualitative differences regarding technology are more important than ever. Alas, learning how to veil the analysis of data objects do not teach one to theorize the essential characteristics of things around us (Kallinikos, 2004).

The importance of context

Not all data are created equal. Some set of data is more suitable to be recontextualized into a particular context than another. For example, as in the case of the economic research department being investigated in this paper, it is relatively easy for data from SES survey to be recontextualized into the context of a commercial bank because the data contains expenditure attribute which can be used to guide the direction of the clients of the banks, the important one, of which are corporate clients. Again, if one were to have access to SES survey from countries other than Thailand, it is highly unlikely to be relevant to commercial banks in Thailand as well, because it is the data about other countries.

Theoretical and managerial contributions of this paper

The theoretical contribution of this paper is three-fold. Firstly, it discusses how the creation of knowledge

turns out to be a highly generative process once the relationship between information infrastructure, data, recontextualization, and knowledge creation is mediated by digital technology. Arguably, the feedback loop from knowledge creation to even more knowledge creation has always happened (aka “standing on the shoulders of giants”), but that has intensified with the infiltration of digital technology into everyday life, enabling the creation of highly granular data objects and the ability to perform analysis on them.

Secondly, (digital) information infrastructure has been linked to digital infrastructure (Tilson et al., 2010), and generativity presupposes the paradox of change and the paradox of control. This is indeed the case of how (digital) information infrastructure enables the generativity of knowledge creation. The database scheme and classification systems that NSO use to collect data are relatively stable over time with a highly centralized process of data collection, leaving the process of data analysis decentralized.

Thirdly, the nature of knowledge created in the age of the data revolution is different from that of the past. Data objects created by information infrastructure are highly conducive to the creation of knowledge through quantitative methodologies. Nonetheless, it is important to stress that the analysis of qualitative differences remains important in the age of big data. Alas, it may become less popular and less understood as the majority of researchers are more geared toward quantitative research. Investigating the essential characteristics of things around us is more important than ever with rapid technological development.

Besides, this paper also has managerial implications, which are also three-fold. Firstly, it unpacks the process of recontextualization of data to create knowledge into five main data operations: data combination, data manipulation, modeling, visualization, and organization of visualized images. Secondly, it points out that combining different kinds of data objects to create new knowledge is not a straightforward task. One needs to find similar and meaningful “pigeonholes” within the two data objects for them to be combined in a meaningful way within a given context. Lastly, it demonstrates that some datasets are easier to be meaningfully recontextualized than others, as is the case with the SES survey for the research economic department, as it can be more easily imported and contextualized meaningfully.

Conclusion and future research direction

The process of knowledge creation has always been generative; however, the generativity of knowledge creation has intensified with digital technology. More granular data objects are being produced, enabling diverse sets of questions to be addressed. Furthermore, the widespread use of digital technology allows diverse data objects to converge, resulting in the creation of knowledge. (Digital) information infrastructure can indeed be viewed as a kind of digital infrastructure; therefore, it is subject to the paradox of change and the paradox of control. The database scheme and classification systems used to create data objects remain relatively stable over time, and the process of data collection is centralized. However, a diverse set of actors can participate in the creation of knowledge using data objects produced by information infrastructure in a decentralized manner.

The case study in this paper focuses primarily on the analysis of traditional data objects. Nevertheless, there are also “alternative data” sources that have gained popularity recently, such as credit card transactions, social media contents, product reviews, and satellite imagery. It would be interesting to compare the recontextualization process of “alternative data” to that of traditional data objects produced by the national statistical office. What are the differences between them, and how do these differences impact the process of recontextualization? Exploring this area could be a fruitful direction into the future.

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Platform User Groups, Organizational Resources and Firm Performance

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Abstract

Today, platform business models are transforming entire economies. As network externality plays a vital role in the growth of platforms, companies utilize organizational resources to support their process of network value-capturing. This study, based on the perspective of network effect and resource-based view, focuses on discovering the interactions between platform user groups' diversity, organizational resources, and platform firms' performance. A longitudinal dataset of 1,163 cases from 291 U.S. publicly traded platform companies is collected to test our hypotheses. The findings indicate that the relationship between platform user groups and firm performance is inverse U-shaped. In addition, R&D and marketing resources have heterogeneous moderating effects on the curvilinear relationship. The results contribute to the platform strategy literature by revealing the essential role of network design and extending the boundary of the resource-based view to the context of the platform operation.

Keywords

platform, user group, organizational resources, firm performance.

Introduction

Multi-sided platforms linking a few groups of users may face obstacles preventing users from finding each other (Evans & Gawer, 2016). Platform firms need to connect different types of users to reach a mass scale for subsequently creating a cycle of network effect (Staykova and Damsgaard, 2015). The network externalities are key to the growth of platforms, which refers to the phenomenon that the broader user groups participating in the platform trigger a self-reinforcing cycle of market potential (Evans & Gawer, 2016). Although the extant literature on platform strategy has intensely agreed with the vital role of network externality on platform success (Reuver et al., 2018), two research gaps remain. First, researchers have provided rich insights on mechanisms regarding how to design and govern platforms to facilitate an external ecosystem (Tiwana et al., 2010). Scholars have evidenced that a larger user scale brings network effect (Ondrus et al., 2015; Zeng et al., 2019), however, there is a limited understanding of whether and how the configuration of the network impacts platform firms' performance consequences. Therefore, we argue that the number of user groups could be critical in determining the platform firm's competitive advantages.

Second, based on the resource-based view, utilization of unique resources brings a firm's sustained competitive

advantages and creates superior performance against rivals (Barney, 2017). Current platform literature still lacks an understanding of how platform firms leverage their endogenous resources to capture the value that relies on exogenous interactions (Zeng et al., 2019). In the process of developing a platform network, we argue that different organizational resources offer distinct benefits that moderate the value co-creation and capturing process. Consequently, this study aims to investigate the relationships between platform user connections and organizational resources on firm performance. We ask the following questions: How do platforms' user-group diversity impact firm performance? What type of organizational resources can facilitate or impede a firm's gaining from a diversified pool of user groups?

Literature and hypotheses

Platform user-groups and firm performance

A multi-sided platform is specifically referred to as an organization that creates value by facilitating interactions among multiple types of participants (Boudreau & Jeppesen, 2015; Reuver et al., 2018). The value of the platforms depends on the number of users in a different user group (Zeng et al., 2019), i.e., more buyers or users attract more sellers or complementors. The challenge for platform companies is to create conditions that generate

network effects to achieve a critical mass (Staykova & Damsgaard, 2015), protect incumbents from competition (Karhu & Ritala, 2020), and lead to firm performance.

Few-sided platforms would need to provide lean functionalities in the business to encourage users to join and interact on their platforms. For two-sided platforms, examples such as exchange platforms that provide brokerage services for buyers and sellers (e.g., E-commerce marketplaces eBay), transaction platforms that link merchants and buyers (e.g., payment service PayPal, MasterCard, and Visa), and software platforms that mediate applications developers and users (e.g., video games platform Sony PlayStation and Xbox, and Apple's iPhone operating system) (Schmalensee and Evans, 2007). Three-sided platforms have one additional user group which often include content providers, users/searchers, and advertisers (Yablonsky, 2019). Examples are the search platform Google, and the advertising-supported media YouTube. Through creating a network of relationships among several user groups (e.g. producers, retailers, distributors, consumers, and complementors), few-sided platforms benefit from the cross-sided network effects which occur when the value of products or services depends on the number of other users (Yablonsky, 2019).

Multi-sided platforms with more-sided user groups in the ecosystem contain several firms and other institutions that work together to create and sustain new markets and new products (Teece, 2012). As the number of user groups increases, platform companies operating a multi-sided ecosystem requires tremendous management work to communicate, coordinate, and negotiate the potential conflict of interests among divergent user groups. The cost of coordinating a number of stakeholder groups with divergent demands is likely to damage the profitability of platform companies (Staykova and Damsgaard, 2015). As a result, in this study, we argue that the platform strategy with fewer user groups can aid the company in capturing value via network externality and keep operating costs low, thus the number of user-group will positively impact firm performance. In contrast, a platform strategy toward building a more complex user-network ecosystem would experience high technological investments as well as heavy coordinating costs, which may exceed the benefits generated from network externality. Accordingly, for a platform company with a more divergent user portfolio, we expect the number of user groups to negatively influence firm performance. Thus, we propose a curvilinear hypothesis as follows:

Hypotheses 1: The relationship between platform user groups and firm performance is inverse U-shaped. The slope is positive at a low number of platform user groups and negative at a high number of platform user groups.

The moderating role of organizational resources

The strategic choice of platform firms is influenced by resource availability. According to the resource-based view, a firm's sustained competitive advantages

against rivals can be created by utilizing heterogeneous resources (Barney, 2017). In the process of platform firms building their ecosystem and coordinating with external stakeholders, organizational resources and capabilities are evidenced to play a critical role (i.e., Cenamor et al., 2019; Liu et al., 2020; Sedera et al., 2016; Tan et al., 2015). The advantages of an organization's resources in marketing and R&D may play distinct contingent roles in moderating the relationship between platform user groups connection and firm performance.

For two- and three sides platforms link different user groups and enable value creation by providing digital systems (Zeng et al., 2019), their primary goal is focused on the strategy of getting big fast to achieve a critical mass of users (Staykova & Damsgaard, 2015). The strategy is associated with aggressive customer acquisition by subsidizing one or even each side of a platform (Wan et al., 2017), as well as internationalization entry to acquire customers that are not yet targeted (Zeng et al., 2019). In this situation, marketing resource is essential in understanding the divergent demand of global customers and promoting the brand and driving traffics to the platform (Boudreau & Jeppesen, 2015), and R&D investment is concentrated on the initial establishment of platform infrastructure. Hence, for platforms with few user groups, marketing resources aid platform firms' value-capturing activities.

When platforms grow to compete on an ecosystem level, significant spending in technology development and market exploration will be needed. Thus, with rich marketing capability, platforms can promote their activities of user acquisition from multi-discipline global markets (Schreieck et al., 2016). However, the investment in developing new disruptive innovations generally takes years to mature, thus probably harming current firm performance. Consequently, for a platform ecosystem with numerous user groups, marketing resources could be beneficial while R&D resources might impede platform firms make a profit. In sum, we suggest that R&D resources play a negative moderating role in impacting the relationship between user groups' connection and firm performance. Too much R&D expenditure weakens the ability of a platform company to gain value. Conversely, marketing capability is advantageous to multiple-sided platforms, in helping platforms companies to satisfy global users in multiple markets to perform better. Hence, we propose the following hypothesis:

Hypotheses 2a: R&D capability negatively moderates the relationship between platform user groups and firm performance.

Hypotheses 2b: Marketing capability positively moderates the relationship between platform user-group and firm performance.

Methodology

Data collection and sample

The sample of this study is drawn from the population of

publicly traded U.S. platform companies or platform-based entities published on COMPUSTAT between 2013 and 2018. Following prior studies (Koufteros, Vonderembse, & Jayaram, 2005; Lee, Hsiao, Chen, & Guo, 2020), we choose four main industry categories of two-digit SIC code as the population, including Manufacturing (SIC 20 to 39), Retail Trade (SIC 52 to 59), Finance, Insurance, & Real Estate (SIC 60 to 67), and Services (SIC 70 to 89). The final sample in this study consists of 288 individual corporations globally and 1,163 firm-year observations.

Data was collected from the COMPUSTAT database and of the sample firms' official websites and annual reports. The COMPUSTAT database contains comprehensive details on business activities and financial performance. By incorporating both financial data and platform connection of each focal firm, we are able to construct a comprehensive panel dataset.

Measures

Dependent variable. The dependent variable, *Firm performance*, is measured as return on assets (ROA), the ratio of operating profit to assets.

Independent variables. The independent variable, *platform user groups*, is operationalized as the number of user groups connected by the focal platform. Following prior research, a user group is defined as a set of people with the same interests and goals (Forsyth, 1999). In addition to the two distinctive user groups (i.e., buyers and sellers) of traditional two-sided platforms (Eisenmann, Parker, & Van Alstyne, 2006), we also identify other user groups such as advertisers, complementors, and collaborators.

Moderating variables. Two dimensions construct organizational resources: *R&D resources and marketing resources*. R&D resources are the ratio of R&D expenditure to total assets (Delios & Beamish, 1999). Marketing resources are operationalized as marketing expenditure divided by total assets (Fang, Palmatier, & Grewal, 2011).

Control variables. First, we utilize the initial two-digit of SIC codes to control the industrial influences and year dummies to control for unobserved time effects. Second, firm size is determined every year as the logarithm of the total number of employees. Lastly, we control for financial leverage, which is long-term debt divided by stockholders' equity (Black, Hashimzade, & Myles, 2012).

3. Analysis

This study adopts a one-year time lag between the measures to avoid potential endogeneity (Boulding & Staelin, 1995; Fang, Palmatier, & Grewal, 2011). In other words, data related to the independent, moderating, and control variables are collected in a given year t ; and data regarding firm performance is measured by using data lagged one year ($t+1$). Then, the hierarchical multiple regression analysis was used to examine the hypotheses.

Results

Table 1 means, standard deviations, and correlations ^a

	Variable	Mean	Standard deviation	1	2	3	4	5	6	7	8	9	10
1	ROA	-0.103	0.208	1									
2	User groups	2.613	0.789	0.449	1								
3	User groups SQ	7.451	4.899	0.449	1.000	1							
4	Firm size	6.097	2.438	0.388	0.335	0.335	1						
5	Financial leverage	1.933	7.344	-0.068	0.063	0.063	-0.077	1					
6	Capital intensity	0.257	1.935	-0.244	-0.126	-0.126	-0.114	0.259	1				
7	R&D capability	0.231	0.698	-0.442	-0.356	-0.356	-0.439	0.017	0.179	1			
8	Marketing capability	0.049	0.113	0.156	0.222	0.222	0.072	-0.116	-0.085	-0.037	1		
9	Absorbed slack	1.675	7.645	-0.377	-0.246	-0.246	-0.318	0.052	0.277	0.387	0.051	1	
10	Unabsorbed slack	4.056	11.785	0.137	0.076	0.076	0.110	0.051	-0.021	-0.191	0.058	-0.170	1

^a N = 1,163 (two-tailed test). Correlations with absolute value reater than 0.08 are significant at $p < 0.01$, and those greater than 0.10 are significant at $p < 0.001$.

Table 2 Results of O.L.S. regression model of firm performance ^a

DV= ROA; N= 1,163 obs.	Model 1			Model 2			Model 3		
Parameter	estimate		Std. error	estimate		Std. error	estimate		Std. error
(Constant)	-15.801	*	6.662	-16.552	*	6.437	-16.006	*	6.422
Industrial effect (SIC 2-digit)	Included			Included			Included		
Year effect	Included			Included			Included		
Financial leverage	-0.001		0.001	-0.001	†	0.001	-0.001	†	0.001
Capital intensity	-0.006	*	0.003	-0.006	*	0.003	-0.006	*	0.003
R&D capability	-0.011		0.008	-0.011		0.008	-1.38	*	0.582
Marketing capability	0.067		0.05	0.038		0.048	2.871	**	1.031
Absorbed slack	0.001		0.001	0.0004		0.001	0.001		0.001
Unabsorbed slack	0.0002		0.001	0.0004		0.001	0.0004		0.001
Platform user groups				0.360	***	0.047	0.367	***	0.071
Platform user groups S.Q.				-0.050	***	0.008	-0.047	***	0.012
Platform user groups × R&D capability							1.138	*	0.483
Platform user groups S.Q. × R&D capability							-0.227	*	0.096
Platform user groups × Marketing capability							-2.052	**	0.764
Platform user groups S.Q. × Marketing capability							0.335	**	0.129
Adjusted R^2	0.161			0.224			0.230		
F -value	25.701	***		31.485	***		24.179	***	
^a *** significant at 0.001, ** significant at 0.01, * significant at 0.05, † significant at 0.1. All two-tailed tests.									

Discussion and conclusion

In this study, we focus on the feature of platform networks, the variety of connections with user-group, to explore how platform network design influences firm performance, and how companies can support the complex interactions among user groups via strategically deploying their organizational resources. Our findings indicate that the number of platform user groups influences firm performance in an inverse U-shaped way. And different aspects of organizational resources (i.e., marketing and R&D resources) have heterogeneous moderating effects on the curvilinear relationship.

Theoretical contributions

To the platform strategy literature, the findings of this study are novel and insightful in several ways. First, our study provides empirical evidence in linking platform user groups with firm performance, which offers new knowledge to the research line of platform design (Tiwana et al., 2010), and fills the research gap of value capture within the platform ecosystem (Schreieck et al., 2017). Our findings reveal a curvilinear relationship between the variety of connected user groups and platform firm performance. The new knowledge of not only the size but the variety of a platform's network matters in influencing performance outcome echoes the concept of alliance network diversity (Goerzen and Beamish, 2005), which has been proven that the diversity of networks has a curvilinear effect on firm performance (Jiang et al., 2010). Second, this study extends the boundary of the resource-based view to the context of platform strategy. Our results confirm organizational resources are also a source of competitive advantage in operating digital platforms. The investigation of what and how organizational resources influence platform firms' performance is scarce. Most scholars in the platform strategy field consider only the dependency of platform firms on their external user network, ignoring the fact that most platform companies are constrained by limited resources (Leong et al., 2016; Muzellec et al., 2015; Liu et al., 2020). Our research can provide an overall perspective on resource utilization in implementing platform strategies.

Third, our hypotheses are examined by a longitudinal cross-sector dataset collected from the U.S. platform companies, that can provide more generality than other studies that adopt a case analysis method (e.g., Schreieck et al., 2016; Staykova and Damsgaard, 2015). Furthermore, our sample firms are listed platform companies that are large, which are more capable of obtaining rich organizational resources to support platform growth, thus are more suitable for testing the effects of organizational capabilities and resources than the previous study that use SMEs as a sample.

Managerial implications

Our study is promising because we identify scenarios illustrating how the diversity of platform networks can match with distinct organizational resources to gain a better performance. Our findings provide a contingent perspective during the growth of platform networks by clarifying the distinct moderating role of organizational resources. According to our result, marketing resources could positively support a platform firm's success by acquiring more user groups, while R&D resources are not critical, even redundant resources in the process of external network value capturing. Our results thereby offer platform managers clear guidance on strategic resource allocation. For platform managers who run a multi-sided

platform, obtaining loose organizational resources for marketing campaigns can benefit firm performance the most.

Limitations and future research

Our study has several limitations that may offer some suggestions for future research. First, the sample for this study is drawn from the population of publicly traded U.S. platform companies published on COMPUSTAT in several industry categories, i.e., Manufacturing, Retail Trade, Finance, Insurance & Real Estate, and Services. We choose these industries as the population because previous platform studies have proven their validity (Koufteros, Vonderembse, & Jayaram, 2005; Lee, Hsiao, Chen, & Guo, 2020), future research can extend the research sample to other industries and countries. Second, in this study, we only examine marketing and R&D resources. However, there are still some other resources that might influence a firm's value capturing from platform strategy. Future research is suggested to explore the moderating effect of other resources, or capabilities, such as digital platform capability and network capability (Cenamor et al., 2019), and capabilities at the ecosystem level (Venkatraman et al., 2014).

Factors Affecting the Acceptance of Cloud Accounting Software of Accounting Firm Partners

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Abstract

Cloud accounting software is an accounting program accessible via the Internet, which processes data on the system of the software provider. It is a program that gathers, processes, and links data from all business processes on the same database. Cloud accounting software serves as a tool for accounting firms and small and medium-sized enterprises (SMEs) to collaborate on shared data. Due to the widespread impact of the COVID-19 pandemic, resulting in the implementation of the “New Normal” lifestyle, accounting firms need to adapt their work processes to be continuous, rapid, and efficient. One of the crucial issues in implementing cloud accounting software is the acceptance by its users as it can determine the success or failure of its adoption within an organization. This study aims to explore factors affecting the acceptance of cloud accounting software among accounting firm partners. It seeks to present the users’ perspectives and requirements that influence them to realize the importance of the software and lead to their acceptance, which could impact the success of its implementation in their operations. The research adopted an exploratory research approach, using the Technology Acceptance Model (TAM) as a framework. Data were collected from 405 sets of questionnaires, and the respondents were management and operation staff of accounting firm partners. The findings revealed that the users’ technology literacy led to the perceived usefulness and the perceived ease of use of cloud accounting software. Additionally, technology credibility was another significant factor influencing the acceptance and application of the software.

Keywords

Cloud accounting software, accounting firm partner, software provider, technology literacy, technology credibility, technology acceptance model

Introduction

The current digital technology is undergoing rapid and transformative changes, not merely serving functions as in the past but integrating with various aspects of economic activities, production processes, trade, services, governmental operations, and also global interactions that are increasingly interconnected without borders. For Thailand, there is great potential to innovate and benefit from digital technology, both the development of digital infrastructure systems and the use of digital technology for business purposes. This encourages the private sector to recognize the importance and necessity of learning and improving business practices by utilizing digital technology to its fullest potential, especially for small and medium enterprises (SMEs), as well as startup

business. This can be seen as a step towards the digital era for Thailand. In this context, SMEs and startups need accounting firms to take care of proper accounting practices in accordance with regulations and rules to ensure sustainable business in the future. These accounting firms serve as service businesses that are contracted to handle accounting tasks, with accountants working within the accounting firms (Department of Business Development, 2015). Apart from these, accountants must perform their duties according to accounting standards and Generally Accepted Accounting Principles (GAAP) (www.tf.ac.or.th). Accountants also need to adapt and seek new knowledge to keep up with the changes in the digital era. By incorporating accounting technology, they can increase efficiency and effectiveness in their work,

allowing accountants to operate with technology and paperless processes. Therefore, cloud accounting software plays a crucial role in recording business transactions in real-time and keeping track of accounting entries anytime and anywhere. This is suitable for conducting business in the current era of intense competition across all industries, where data-driven decisions are essential and time-sensitive.

Software providers

Software providers are developers of cloud accounting software who distribute and offer services for such software. They enable customization of the cloud accounting software according to the customers' needs, for example, through Application Programming Interface (API) with Point of Sale (POS) systems or Application Programming Interface (API) with online platforms, such as LAZADA and Shopee (www.flowaccount.com). In addition, software providers must offer good after-sale services, and their personnel must be knowledgeable in cloud accounting software and proficient in utilizing various functions of the program. They also need to provide guidance and troubleshooting assistance to customers using cloud accounting software. Currently, cloud accounting software is a tool that aids the operations of accounting firms and SME entrepreneurs, allowing them to work through shared data. For instance, when SME entrepreneurs issue receipts through the cloud accounting software, the accounting firm will receive the same data, enabling real-time accounting recording. This enables SME entrepreneurs to utilize the information obtained from the cloud accounting software for timely business analysis. For example, they can use data from dashboards to monitor daily cash flows of their business (www.peak.com).

Accounting firm partners

Accounting firm partners are business associates between accounting firms and cloud accounting software providers, in an unofficial and non-legally binding manner (Nawarat Na Ayutthaya, 1997). However, accounting firms are privileged to use the cloud accounting software (free of charge) to support their accounting services for clients. The COVID-19 pandemic situation has significantly impacted the adoption of a New Normal life, such as working from home, and accounting firms must adapt their work formats to maintain continuous and efficient customer service. Accounting firm partners have used cloud accounting software to enhance operational capabilities and create added value in their service offerings. Nevertheless, a crucial issue when implementing cloud accounting software is how to ensure acceptance and usage by users, both in the operational and managerial

sides, which can determine the success or failure of integrating the software within an organization (Kong Rung Chok, 2006). Therefore, this research aims to study the factors affecting the acceptance of cloud accounting software among accounting firm partners. The objectives are to identify the factors affecting users' acceptance of cloud accounting software within the organizations of the accounting firm partners, and to provide insights for cloud accounting software providers to enhance and tailor their software more effectively in order to meet their users' needs and achieve greater success.

Technology acceptance model

Technology Acceptance Model (TAM), proposed by Davis (1985), is a model created to explain users' behavior towards technology. It assesses the level of users' perception towards the use of technology. TAM can be explained by two factors: Perceived Usefulness and Perceived Ease of Use. Perceived Usefulness represents an individual's perception that using the technology will enhance their performance, and Perceived Ease of Use refers to an individual's belief that using the technology requires minimal effort as it is easy to use with straightforward processes. Venkatesh and Davis (2000) presented Technology Acceptance Model 2 (TAM 2) by incorporating additional external factors, namely Social Influence and Technology Characteristics, to support the perceived usefulness factor. This, in turn, leads to behavioral intention and actual use of technology. Social Influence comprises two factors, Subjective Norm, which represents an individual's perception of the opinions of influential people in their surrounding social group and influences an individual's decision to use or not use the technology (Fishbein & Ajzen, 1975), and Image, which refers to an individual's perception of the need to use the technology to maintain a positive and trustworthy image in society (Moore & Benbasat, 1991). Technology Characteristics includes three factors, Job Relevance, which reflects an individual's acceptance that using the technology can enhance their work efficiency, Output Quality, which indicates an individual's perception that the technology can effectively perform tasks as intended (Venkatesh & Davis, 2000), and Result Demonstrability, which signifies an individual's belief that the results obtained from the technology are tangible and observable, and they can be communicated in a straightforward manner (Moore & Benbasat, 1991). Additionally, there are moderator variables for the subjective norm factor, Experience, which refers to an individual's awareness of expertise gained through actions or observations, and Voluntariness, which refers to an individual's awareness of using technology without any coercion (Venkatesh

& Davis, 2000). Over time, computers and various information systems have been increasingly adapted within organizations. The technology acceptance of users has garnered broad interest. Venkatesh and Bala (2008) developed Technology Acceptance Model (TAM 3) to explore new variables for Perceived Ease of Use. The model identifies factors in two groups, Anchors which includes Technology Self-Efficacy (Compeau & Higgins, 1995), Perception of External Control (Venkatesh, Morris, Davis, & Davis, 2003), Technology Anxiety (Venkatesh, 2000), and Technology Playfulness (Webster & Martocchio, 1992), and Adjustment, which consists of Perceived enjoyment and Objective Usability (Venkatesh, 2000). In sum, user willingness is crucial for technology acceptance and usage, resulting in organizational benefits. The value of cloud accounting software could stem from efficient usage. Even if there is some level of compulsion, if users believe that technology can enhance work efficiency, they are more likely to have the intention to use and accept the software. In this study, the researchers have

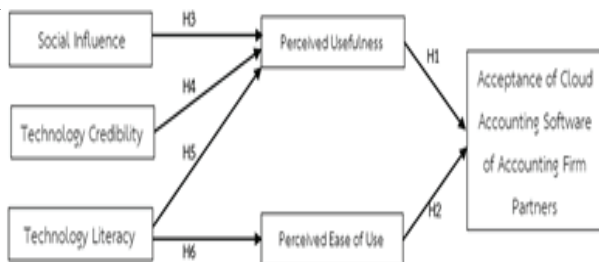


Figure 1. Conceptual Framework adapted from Technology Acceptance Model TAM
Davis (1989), Venkatesh & Davis (2000) and Venkatesh & Bala (2008)

Data and method

This study is exploratory research. Data was collected online through 405 sets of questionnaires. The respondents consisted of management and operational staff from accounting firm partners who utilized FlowAccount Cloud Accounting Software and PEAK Cloud Accounting Software. The questionnaire comprised 5 sections with a total of 37 questions, utilizing a 7-Likert Scale. The questionnaire's reliability was assessed using the Item Objective Index (IOC) by three experts. A pilot testing was conducted to establish reliability, and each question achieved a Cronbach's Alpha value of more than 0.9.

Results summary and discussion

The researchers utilized the Statistical Package for the Social Sciences (SPSS) software to analyze the data obtained from 405 sets of responses. The analysis employed descriptive statistics, including mean and standard deviation, to explain each variable's aspects. The details are illustrated as follows:

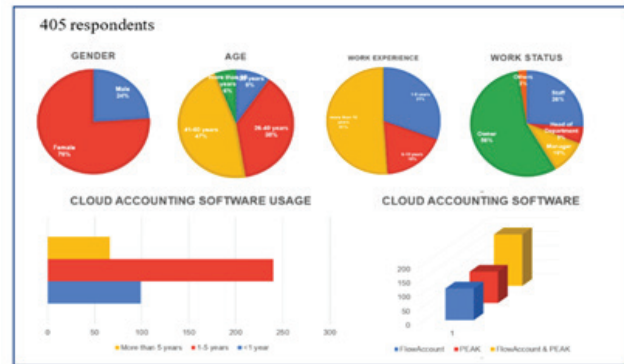


Figure 2. General information of the respondents

General information about 405 respondents from the sample group revealed that the majority were female, accounting for 76%, while males constituted 24%. Most respondents fell within the age range of 41-60 years, accounting for 47%, followed by those aged between 26-40 years, accounting for 38%. The majority of questionnaire respondents had work experience in accounting firms for over 10 years, accounting for 61%. The predominant work status was an accounting firm owner, constituting 56%, and the majority had previous experience using cloud accounting software for 1-5 years, accounting for 60%. Notably, a significant portion of respondents, 45%, utilized both cloud accounting software, FlowAccount and PEAK.

Table 1: Research results

Factors Affecting the Acceptance of Cloud Accounting Software of Accounting Firm Partners	Mean	Std. Deviation	Interpretation
Perceived Usefulness	5.60	.988	Agree
Perceived Ease of Use	5.50	.883	Agree
Social Influence	5.51	.962	Agree
Technology Credibility	5.60	.898	Agree
Technology Literacy of Perceived Usefulness	5.79	.929	Agree
Technology Literacy of Perceived Ease of Use	5.78	.891	Agree

Note: Class Interval 0.86, 1.00-1.86 Strongly Disagree, 1.87-2.72 Disagree, 2.73-3.58 Somewhat, 3.59-4.44 Neutral, 4.45-5.30 Somewhat Agree, 5.31-6.16 Agree, 6.17-7.00 Strongly Agree

Table 1 indicates that the primary factors impacting the acceptance of cloud accounting software among accounting firm partners were the technology literacy of perceived usefulness, which scored 5.79 (S.D.=0.929), and the technology literacy of perceived ease of use, scoring 5.78 (S.D.=0.891). The perceived usefulness and the technology credibility scored 5.60, with S.D. of 0.988

and 0.898, respectively. The social influence and the perceived ease of use attained scores of 5.51 (S.D.=0.962) and 5.50 (S.D.=0.883), respectively.

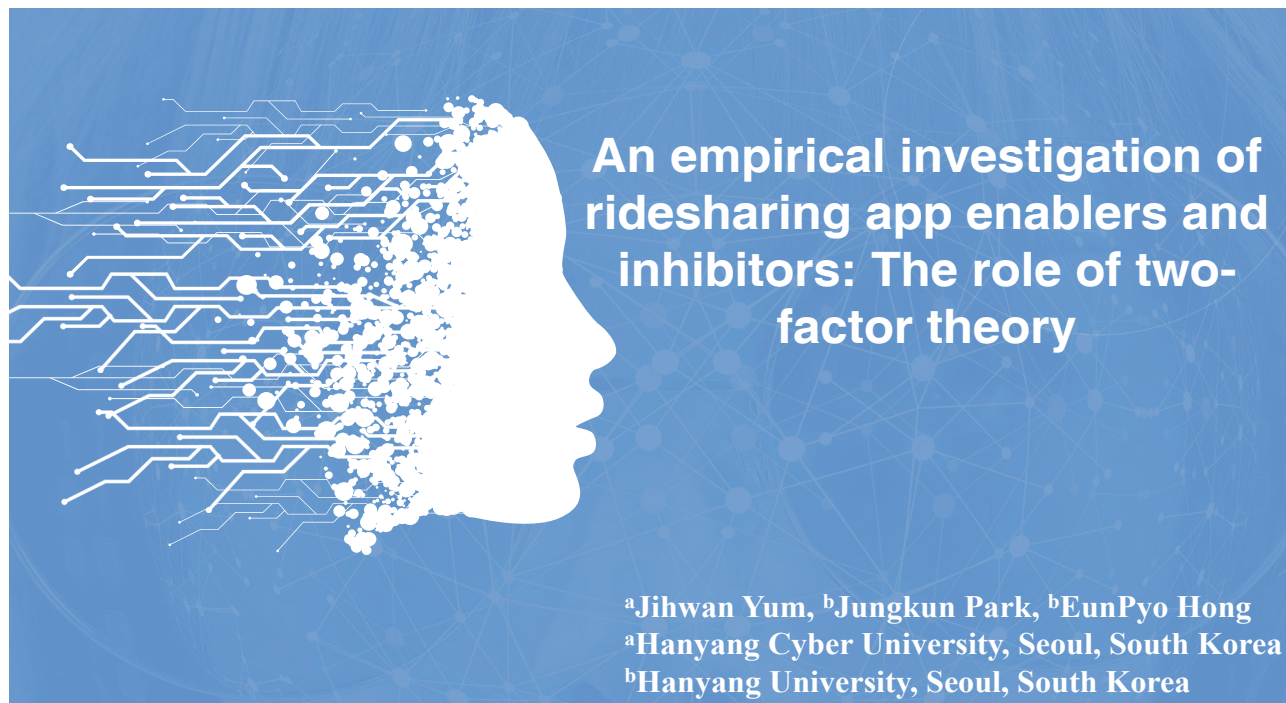
In summary, the findings reveal that users' technology literacy played an important role in shaping the perceived usefulness and the perceived ease of use of cloud accounting software. Moreover, technology credibility was another factor influencing the acceptance and application of the software.

Discussion

In conclusion, the findings of this study serve to bridge the gap between users and software providers, shedding light on the factors contributing to the successful utilization of cloud accounting software and potentially the longevity of many accounting firm partners. However, future research should consider employing a Structural Equation Model (SEM) to depict the interconnections among different aspects of a given phenomenon in a causal manner. SEM frequently contains postulated causal connections among some latent variables. Such an approach could potentially enhance the operational processes of accounting firms who support SMEs and startups with technology in the digital era.

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Empirical exploration of ridesharing app enablers and inhibitors: Understanding the role of the two-factor theory

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Empirical exploration of ridesharing app enablers and inhibitors: Understanding the role of the two-factor theory

Abstract

This research aims to investigate the impact of enablers and inhibitors on ridesharing apps in the transportation service industry. Results reveal interesting outcomes, showing that customers' enablers positively and inhibitors negatively influence word-of-mouth (WOM) related to the ridesharing app. Factors like service quality, content quality, and perceived uncertainty affect customers'

evaluation of ridesharing service experiences during their decision-making processes. Moreover, WOM plays a crucial role in shaping positive involvement intentions among customers, both situational and enduring. The study also examines the effects of citizenship behavior on enablers, inhibitors, WOM, and involvement intentions. By establishing and confirming these relationships, this study contributes to the existing literature on ridesharing apps. Further, the outcomes of this research have significant implications for transportation service managers and marketers.

Keywords: Ridesharing app, Two-factor theory, Enablers, Inhibitors, Word-of-mouth, Involvement intention

Factors Affecting the Acceptance of Mobile Accounting Applications Through Cloud Computing Technology

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Abstract

A mobile accounting application is accounting software specifically designed and optimized for use on mobile devices, such as smartphones and tablets. These software solutions enable individuals and businesses to manage transaction documents, track expenses, and monitor cash flow and business performance on a dashboard. Various factors affect the acceptance of accounting software on mobile devices through cloud computing technology. This study aims to explore factors affecting the acceptance of mobile accounting applications through cloud computing technology. The findings could improve and enhance the efficiency of accounting operations, leading to greater acceptance among users of the transformed system. This acceptance would contribute to the successful integration of accounting software into the work processes of accountants and serve as fundamental data for organizations considering implementing mobile accounting software through cloud computing technology. This study was conducted as an exploratory study, where the researchers used the Technology Acceptance Model (TAM) as a framework to explore the acceptance of this new technology implementation within an organization. Data were collected from 400 sets of questionnaires completed by individuals using accounting software on their mobile devices through cloud computing. The results revealed that training accountants to use new technologies and cloud computing is crucial for maximizing technology acceptance within an organization. This includes providing knowledge, understanding, and skill development in the specific technology being introduced. When technologies are compatible with existing systems and directly relevant to users' tasks and experiences, users will perceive them as more user-friendly, leading to higher technology acceptance. By doing so, accountants would be more aware of the ease of use and the benefits they can gain from using accounting programs on mobile devices via cloud computing. This heightened awareness could contribute to the overall success of using mobile accounting software through cloud computing for end-users.

Keywords

Mobile Accounting Application, Cloud-Computing Technology, Technology Acceptance Model

Introduction

In January 2022, the total number of mobile phone users worldwide reached 5.31 billion, representing 67.1% of the global population. This marked an 18% increase, equivalent to 95 million people, compared to the previous year. Currently, smartphones account for over 76.9% of these mobile devices while 19.5% are feature phones or non-smartphones, potentially running operating systems other than iOS or Android (Thailand Digital Stat, 2021). The user base continues to grow steadily, with smartphones becoming integral to various daily activities for individuals

(National Statistical Office, 2017). Internet usage is also widespread, and businesses utilizing mobile applications for data collection—such as customer information, sales figures, and product categories—can greatly benefit from analyzing these data. This analysis would provide valuable insights into the business's performance and operations.

Mobile accounting application

A mobile accounting program refers to computer software or applications designed to operate on various computing devices, including desktop applications, web applications, as well as portable communication devices

like mobile phones and tablets (Huang & Kofiat, 2015). The development of mobile accounting programs aims to provide business operators with convenient and efficient services through individuals' portable communication devices. These programs can be downloaded from mobile service providers' platforms on the iOS or Android operating systems. Currently, cloud computing technology is being integrated into accounting information systems, referred to as mobile accounting programs through cloud computing technology. These programs operate in the background using integrated information systems, such as Enterprise Resource Planning (ERP), which assist in front-office operations. Mobile applications can seamlessly function on large-scale systems using small-sized devices and conveniently leverage Cloud Servers for processing. This setup facilitates easy connectivity between front-line officers and accounting departments with an internet connection. Users can access the application instantly, whether through high-speed digital communication technologies like Asymmetric Digital Subscriber Line (ADSL) or public networks like 3G and 4G, without requiring program installation. Moreover, these applications can connect to a variety of systems, including desktop applications, web applications, and various types of legacy systems. Online cloud-based accounting software is designed for user-friendly operation and real-time processing, providing instant access to financial reports and facilitating quicker decision-making for organizational managers. The integration of cloud computing technology into accounting systems also ensures data security, protecting system access through User IDs and Passwords (Natthamon Pijitprairat, Prawet Pheenwuthikon, and Titaporn Sinjaroon, 2017). The popularity of integrating cloud computing technology is growing due to its efficient processing capabilities, capable of handling large and complex datasets. As a result, this study is interested in examining the factors influencing the acceptance of mobile accounting programs through cloud computing technology among accounting professionals. This exploratory research collected data from 400 sets of questionnaires completed by individuals using accounting software on their mobile devices through cloud computing. The research findings can enhance opportunities for accountants and accounting firms by transforming traditional work methods into online formats. This transition aligns with the growing role of the digital economy in society, fostering a stronger economy and enhancing an organization's ability to adapt and develop in the face of change, ensuring its long-term stability and sustainability.

Technology acceptance model

The Technology Acceptance Model (TAM) proposed by Davis, Bagozzi, and Warshaw (1989) explains users' acceptance of technology. This theory encompasses crucial factors, including external variables, perceived

usefulness, perceived ease of use, attitude toward usage, behavioral intention to use, and ultimately, actual system use. External variables refer to external factors that may influence a user's technology acceptance. Perceived usefulness refers to the belief that technology enhances task efficiency, reflecting the user's perception of its benefits. Perceived ease of use refers to the belief that technology is user-friendly and requires minimal effort. Attitude toward using refers to the user's overall emotional disposition and attitude towards technology utilization. Previous studies have identified numerous external variables influencing perceived usefulness and perceived ease of use; however, this study specifically emphasizes readiness for change (Kee-Young Kwahk & Jae-Nam Lee, 2008; Sternad & Bobek, 2013), job relevance and experience (Sang Hyun Kim, 2008; Sangkaew, Jago, and Alkmini, 2019), and technology trustworthiness (SY Bae & JH Han, 2020). Therefore, the researchers have proposed the conceptual framework shown in Figure 1.

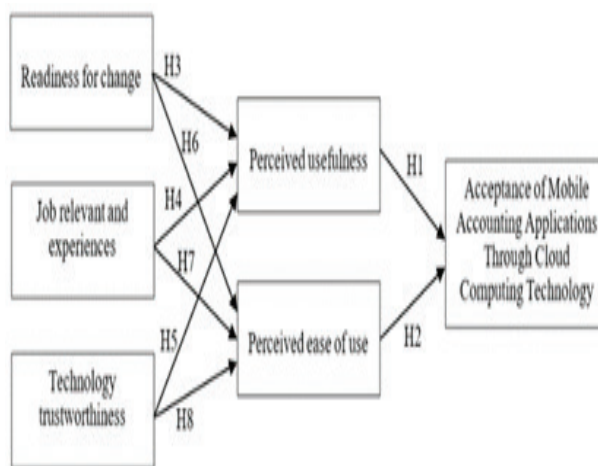


Figure 1: Conceptual Framework adapted from A Technology Acceptance Model (TAM) Davis, Bagozzi and Warshaw (1989)

Data and method

This research employs an exploratory survey approach utilizing the quantitative method. Online data collection was conducted from a sample group of 400 participants, consisting of business operators and accountants working within organizations. The survey questionnaire is divided into five sections, totaling 35 questions. A 7-point Likert scale was employed to measure participants' opinions. The questionnaire's validity was ensured through the calculation of the Item Objective Index (IOC), determined by three qualified experts. Additionally, pilot testing was performed to assess the questionnaire's reliability, resulting in each question achieving a Cronbach's Alpha value of over 0.9.

Results

The data collected from 400 sets of responses were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The analysis included descriptive statistics, incorporating measures such as frequency distributions, means, and standard deviations. Each variable was examined individually, as outlined below:

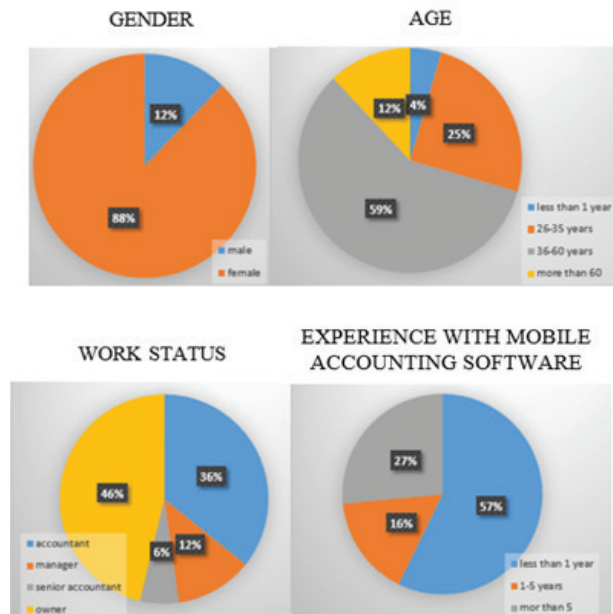


Figure 2: General information of the respondents

In this research article, the sample group comprising 400 individuals provides insights into several key trends. Regarding gender distribution, the majority of respondents are female, constituting 88% of the sample while male respondents make up the remaining 12%. Analyzing the age composition, the largest segment falls within the 36 to 60-year range, accounting for 59% of the participants, followed by those aged 26 to 35 years, comprising 25%. Respondents aged 60 and above constitute 12% whereas those below 25 years old represent 4%. In terms of job positions, the survey indicates that a significant proportion of respondents, 46%, was business owners, followed by accountants at 36% and managers at 12%. Exploring their familiarity with mobile accounting software, 57% of participants reported having less than 1 year of experience utilizing such technology.

Table 1 indicates that the primary factors impacting the acceptance of mobile accounting applications through cloud computing technology were readiness for change, which scored 6.08 (S.D. = 0.633), and technology trustworthiness, scoring 6.03 (S.D. =

0.765). Perceived usefulness achieved a score of 5.90, with an S.D. of 0.892. Perceived ease of use attained a score of 5.83 (S.D. = 0.887) while job relevance and experience scored 5.79, with an S.D. of 1.020. In summary, the findings reveal that users' readiness for change played an important role in shaping the acceptance of mobile accounting applications through cloud computing technology. Therefore, training accountants to use new technologies and cloud computing is crucial for maximizing technology acceptance within an organization. This includes providing knowledge, understanding, and skill development in the specific technology.

Table 1: Research results

Factors Affecting the Acceptance of Mobile Accounting Applications Through Cloud Computing Technology	Mean	Std. Deviation	Interpretation
Perceived Usefulness	5.90	0.892	Agree
Perceived Ease of Use	5.83	0.887	Agree
Readiness for Change	6.08	0.633	Agree
Job Relevant and Experience	5.79	1.020	Agree
Technology Trustworthiness	6.03	0.765	Agree

Note: Class Interval 0.86, 1.00, 1.86 Strongly Disagree, 1.87-2.72 Disagree, 2.73-3.58 Somewhat Disagree, 3.59-4.44 Neutral, 4.45-5.30 Somewhat Agree, 5.31-6.16 Agree, 6.17-7.00 Strongly Agree

Discussion

The ability of mobile accounting software to assist organizations in saving costs is noteworthy, particularly through the reduction of paper usage. Additionally, users find it convenient to exchange data with other applications, enabling them to work anytime and anywhere. Accountants and accounting firms employing mobile accounting software can enhance their current work processes for greater efficiency, such as quickly generating documents like invoices or tax receipts, in comparison to traditional accounting software. Moreover, they find it convenient and efficient to record stock-related transactions using barcode scanning with their mobile phones. Meanwhile, a key aspect that users prioritize is technology trustworthiness, as they seek assurance regarding data storage and security systems provided by reputable cloud computing service providers (e.g., Amazon Web Services) when deciding to adopt mobile accounting software. For future research, the consideration of employing a Structural Equation Model (SEM) to illustrate the interconnections among various aspects of a given phenomenon in a causal manner is recommended. SEM allows for the simultaneous use of multiple indicator variables per construct, leading to more valid conclusions at the construct level.

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Factors that drive the adoption of smart factory solutions by SMEs

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Abstract

This study aims to examine the factors affecting the introduction of Smart Factory and the resulting outcomes based on interview data and using the grounded theory analysis method.

Keywords

Environmental factors, technological characteristics, smart factory, management effect, utilization effects, grounded theory

Introduction

Smart factories have emerged as an important topic after the Fourth Industrial Revolution, and many companies are realizing the need to introduce smart factories¹.

While large companies are adopting smart factories and leading the way in terms of time and technology, there are various constraints for SMEs to take the lead in adopting smart factories².

It has been observed that various environmental factors influence the adoption of smart factories by SMEs. However, the extent to which environmental factors influence the adoption of smart factories by SMEs is not well understood, so this study aims to identify the extent to which environmental factors influence the adoption of smart factories by SMEs.

It is assumed that the technical characteristics of an organisation will affect its adoption of smart factories. However, it is not known to what extent the technical characteristics affect the adoption of smart factories by SMEs, so this study aims to provide guidelines for companies' smart factory adoption strategies by identifying the relationship between technical characteristics and smart factory adoption³.

Research background

Definition of smart factory

Based on the definitions of previous researchers, this study defines.

"A smart factory is a factory that integrates the entire process of product planning, design, and production with ICT technologies such as the Internet of Things, artificial intelligence, and big data to increase productivity, reduce energy, and create a human-centred work environment."

Deploying smart factories for SMEs

According to government disclosures, starting with the diffusion of 277 small and medium enterprises in 2014, a total of 5,003 enterprises have been supported as of December 2017, with the goal of supporting the diffusion and diffusion of a total of 30,000 enterprises by 2025⁴.

The level of manufacturing innovation capability of enterprises is classified according to the degree of ICT technology use and smart factory capability, and the five essential requirements of smart factories are (1) digitisation of 4M+1E, (2) integration, (3) intelligence, (4) engineering knowledge creation, and (5) connection with smart systems⁵.

1 Yoo, Jae-Hyung, Park, Jung-Yeol, Bae, Jae-Kwon, 2023

2 Im, Myung-sung, 2020

3 Lee, Ye-rim, 2019

4 Ministry of SMEs and Startups, 2022

5 Ko, Kyungseok, 2021

Table 1 - Smart factory adoption levels

Step	Category	Field automation	Factory Operations	Enterprise Resource Planning
1	ICT not applied	handwork	handwork	handwork
2	basics	Automated performance aggregation	Process logistics management (POP)	Individual operation of management function-oriented functions
3	Medium1	Automatic aggregation of facility data	real time Decision	Integration between features
4	Medium2	Facility control automation	real time factory control	Integration of factory operation
5	Advance-ment	IoT/IoS	Diagnosis and operation based on IoT/IoS (modular) big data	
		CPS based on IoT/IoS		

Review of existing smart factory research

In an analysis of previous studies on smart factories, Gil (2019)⁶ conducted an empirical analysis of the impact of technical factors (uncertainty, relative advantage, fit, and intangibility), organisational factors (entrepreneurship, firm size, financial readiness, and absorptive capacity), and environmental factors (government support, business environment, and consulting support) on the intention to adopt smart factories.

In a study of the relationship between the individual factors that determine the adoption of smart factories and the intention to adopt, Park (2020)⁷ found that technological factors (experts, technology readiness) affect the intention to adopt smart factories, higher technology readiness has a positive effect on the adoption of smart factories, and better availability of experts has a positive effect on the

adoption of smart factories.

Sung-Tae Kim (2021)⁸ conducted a hypothesis test on the impact of independent variables on adoption intention in relation to smart factory adoption and found that effort expectation and social influence were not significant on adoption intention, while financial factors, performance expectation, facilitating conditions, government support expectation, CEO willingness and ICT utilisation capability had a positive impact on adoption intention.

Case studies and grounded theory

Qualitative case study

Qualitative research is a research method that uses a subjective and interpretive approach⁹. The aim of the research is to understand the phenomenon as it occurs and the researcher needs to understand the phenomenon in context as a whole¹⁰.

Within qualitative research, the case study is an appropriate form of research when one wishes to examine how a phenomenon changes over time through intensive and holistic description and analysis of a single event, phenomenon or social unit¹¹. A qualitative case study is a useful research design for understanding and interpreting the uniqueness and complexity of a case as it unfolds within a critical context¹².

In addition, because qualitative case studies can give meaning to everyday events and lead to a deeper understanding of complex phenomena¹³, they are often used to place single or multiple cases in context and to explore bounded systems or the development of a particular case over time through diverse and rich data collection¹⁴.

Grounded theory

Grounded theory, as defined by Strauss and Corbin (1990), is an iterative process of inductive and deductive induction from the phenomenon under study that exists in the field, allowing for the discovery, development, and tentative validation of a theory through the systematic collection and analysis of data appropriate to the phenomenon in question.

Therefore, research that applies grounded theory becomes an important resource for explaining the various changes that occur in contemporary society, aiming for a spiral of research that derives the mechanism of the process by reconstructing the phenomenon¹⁵.

In addition, the inductive approach of validation, which involves hypothesis generation, comparison and inference

6 Hyungchul Gil, 2019

7 Hyun-Oh Park, 2020

8 Sung-Tae Kim, 2021

9 Miyoung Ko, 2009

10 Sunwoo Park, 2021

11 Merrim, 1998

12 Sunwoo Park, 2021

13 Miyoung Ko, 2009

14 Creswell, 1998

15 Lee, Eunsung, & Kim, Chulwon., 2011

through iterations of induction and deduction in the process of theory integration, and the selection of the assumptions that best explain the phenomenon, creatively confirms the relevance of categories and organises connections¹⁶.

This approach to grounded theory is suitable for developing theories and models by empirically validating phenomena in the real world and identifying related phenomena¹⁷. Among the different positions of grounded theory, this study adopts the position of Strauss and Corbin (1990).

Methods

Study design

This study followed the grounded theory research procedures of open coding, axial coding, and selective coding as suggested by Strauss and Corbin (1998).

In the open coding process, each interview was broken down into smaller units, such as phrases, sentences, and paragraphs, to identify their meaning and extract concepts that fit the meaning. The interviews were combined into one large file, and similar concepts were grouped together to compare and categorise the results of the analysis of each interview.

Categories are concepts that represent phenomena, and these categories are further divided into subcategories that clarify and refine the categories.

Axial coding is the process of linking categories to subcategories. It is called axial because it takes place around the axis of a coded category, linking categories at the level of attributes and dimensions.

The paradigm proposed by Strauss and Corbin (1998) was used to clarify the relationships between the categories by dividing them into central phenomena and situations (causal, contextual, and mediating conditions), and action and interaction strategies and outcomes.

We used a paradigm model to link categories, explore the contextual relationships of key phenomena, and identify the properties and dimensions of individual categories to provide a basis for developing a theory of entities.

Selective coding is the process of integrating and refining the theory. Using the relationships, attributes, and dimensions of the categories identified in the axial coding, the hypothesised relationships underlying the theory of entities are presented and typified.

By analysing the process of how the circumstances surrounding a central phenomenon can interact and influence its outcome over time, we clarify the story and present a levelled model of the situation that can serve as a direct basis for a theory of entities.

After the researcher's primary analysis was completed, the analysis team checked for consensus to ensure the validity of the categories.

Collecting data

One of the best implementation cases selected by the Smart Manufacturing Innovation Promotion Group under the SME Technology Information Promotion Agency. The analysis is based on interviews with selected companies in 2020-2021.

Interviewees include senior decision-makers who have implemented and operationalised a Smart Factory, and 3-4 employees from each company involved in the project.

Excluding top decision makers, 2-3 respondents are middle managers, senior level, such as deputy general manager, general manager and general manager, and 1-2 respondents are workers, junior level, such as deputy, employee and foreman.

Interview questions include: what prompted you to adopt Smart Factory, how you overcame difficulties, the impact of the implementation, what you liked and didn't like about the implementation, problems you had before the implementation, what has changed since the implementation, and what you are satisfied with.

Analysis

Open coding and categorization

Open coding results

Open coding is the process of generating concepts from data, then grouping them into similar concepts, then into subcategories of more abstract concepts, and then into more logical and abstract conceptual categories.

Based on the interview data, the researcher conducted open coding by constantly asking questions and comparing and analysing the data.

I used a combination of deductive and inductive thinking as described by Strauss and Corbin (1990).

While watching interviews about the adoption of smart factories, I first hypothesised in my head what factors would have an impact, collected and categorised concepts that fit this logic, and used a deductive method to check the appropriateness of the categorisation.

I also used an inductive method to group similar concepts into categories, discovering logic as I went along and refining the wording of each category to fit it.

Open coding resulted in a total of 87 concepts.

I was able to group them into 16 subcategories.

I ended up with six broad categories.

These six categories are 'Motivation for introduction', 'introduction context', 'introduction level', 'Skill Acceptance', 'Utilization effect' and 'effectiveness of management'.

16 Strauss and Corbin, 1990

17 Fawcett, 1989.

Table 2 - The result of an integrated analysis of concepts

Table 2 - The result of an integrated analysis of concepts					
Large categories	Subcategories	Concepts			
Motivation for introduction	external pressure	Requests and proposals from partner companies, level of demand from customers, latecomers from China, competition with global companies	Skill Acceptance	inside itself education	Erosion of the agitation that jobs may be reduced, new system education for the elderly, education for foreign workers, role-sharing education according to job relocation, sharing of common values with employees, establishment of in-house colleges and in-house training programs
	government support	The government's smart factory support project, the support of the Creative Economy Innovation Center, and the support of the Smart Manufacturing Innovation Promotion Team		external support education	Supplier technology review and advice, supplier-supported design advice, supplier certification maintenance support, supplier idea sharing, supplier business solution solution program, external expert consulting, external expert diagnosing and presenting customized factory directions, participating in government agency education and training institute training, supporting consultant matching free training, conducting training and consultation for invited Smart Meister employees
	Industry Trends	Introduction of smart factory system, introduction of ERP system, introduction of MES system, system establishment failure			
	production environment	Occurrence of human errors, labor-intensive and dangerous production sites, labor-intensive work, retirement of senior employees, short delivery times			
	Product Specifications	Multi-species production, various customer companies, mass production			
	technical characteristics	Line production, repeatability, standardization, difficulty in quality control, production sites that require precise data, and outdated facilities		usage	Automatic calculation and aggregation of performance and production status, real-time data check, computerization of the entire manufacturing process, accurate data extraction, accuracy of manufacturing product information, accurate inventory management
introduction context	IT technology experience	MES system use experience, automation system use experience, IT technology introduction failure experience, POP system introduction experience	Utilization effect	Satisfaction with use	Work fatigue improvement, problem solving speed improvement, efficient work progress, simple repetitive work improvement, manual work improvement, on-site quick response possible, job satisfaction improvement by reassignment of employees from simple repetitive work to high value-added work
introduction level	system introduction	Establishment of system integration operation, fast decision-making based on accurate data, development of artificial intelligence program, establishment of voice recognition function, establishment of system based on big data, power measurement system, introduction of MES system and cloud service		management effect	Reduced defect rate
	Facility Introduction	Establishment of a high-level quality control site, introduction of electronic measuring equipment by introduction of POP system, process automation by introduction of articulated robot for functional inspection, smartization of logistics system, attachment of sensor suitable for product characteristics, input of production information with touch screen	Improvement in delivery rate		Improvement of delivery compliance rate, reduction of delivery time
			growth of production		Productivity improvement due to reduction of machine setting time, productivity improvement, facility operation rate improvement, production efficiency increase, and reduction of man-hours

Securing category validity

Analytics team consensus work

Table 3 - interview analysis team information

category	job
Coder 1	Worked at a manufacturing company in Seoul
Coder 2	Worked at an architectural consulting firm in Seoul
Coder 3	Worked at a manufacturing company in Gyeongnam

Table 4 - How to ensure category validity

formula	source
$\text{Validity(reliability)} = \frac{\text{Number of consensus}}{\text{total target count}}$	Miles & Huberman, 1994
$\frac{\text{Number of consensus}}{\text{total target count}}$	
[blank line]	

Result of validity analysis by category

Out of a total of 336 episodes, 282 episodes were agreed by the independent coders, giving a result of 0.839. Specifically, category 16 (productivity improvement) had the highest score, with 24 out of 27 episodes agreed, giving a score of 0.888, and category 6 (technical features) had 8 out of 10 episodes agreed, giving a score of 0.8.

This is the lowest result, but it's over 0.8, so it's valid.

Table 5 - Result of validity analysis by category

	category1 (external pressure)	category2 (government support)	Category3 (Industry Trends)	category4 (production environment)
episode	16	23	9	36
match count	14	19	8	29
number of discrepancies	2	4	1	7
result	0.875	0.826	0.888	0.805
	category5 (Product Specifications)	category6 (technical characteristics)	category7 (IT technology experience)	category8 (system introduction)
episode	6	10	18	42
match count	5	8	15	35
number of discrepancies	1	2	3	7
result	0.8333	0.8	0.8333	0.8333
	category9 (Facility Introduction)	category10 (inside itself education)	category11 (external support education)	category12 (usage)
episode	30	27	13	24
match count	26	22	11	20
number of discrepancies	4	5	2	4
result	0.866	0.814	0.846	0.8333
	category13 (Satisfaction with use)	category14 (Reduced defect rate)	category15 (Improvement in delivery rate)	category16 (growth of production)

episode	27	21	7	27
match count	22	18	6	24
number of discrepancies	5	3	1	3
result	0.814	0.857	0.857	0.888
total				
episode	336			
match count	282			
number of discrepancies	54			
result	0.839			

Episode classification results by category

Table 6 - Episode Classification Results

Large categories	Subcategories	number of sentences	total
Motivation for introduction	external pressure	16	100
	government support	23	
	Industry Trends	9	
	production environment	36	
	Product Specifications	6	
	technical characteristics	10	
introduction context	IT technology experience	18	18
introduction level	system introduction	42	72
	Facility Introduction	30	
Skill Acceptance	inside itself education	27	40
	external support education	13	
Utilization effect	usage	24	51
	Satisfaction with use	27	
management effect	Reduced defect rate	21	55
	Improvement in delivery rate	7	
	growth of production	27	

axis coding

In order to derive a paradigmatic model of the environmental factors and technological characteristics that influenced the adoption of smart factories, the categories extracted by open coding were recoded.

Axial coding is the process of reassembling the findings from open coding to create a more systematic explanation of the phenomenon.

It identifies the attributes of categories and links them into subcategories along their dimensions, using paradigmatic models to show how categories are related¹⁸.

Causal condition

A causal condition is the cause of a central phenomenon and is "an event or occurrence that leads to the occurrence or development of a phenomenon"¹⁹.

External pressure

Many of the drivers of smart factory adoption have been external pressures. Increasing customer demands,

¹⁸ Strauss & Corbin, 1998

¹⁹ Strauss & Cobb, 1990

customer requirements and suggestions, competition from global companies and China's laggard status.

In addition, customers are becoming more demanding globally and our data collection rates are being linked to order opportunities. This has led to aggressive adoption for sustainable growth. (Vice President, Company N)

Hyundai actually suggested it first. Hyundai's suppliers were adopting MES as a whole, so we followed suit and adopted it to improve our overall production management capabilities."(Company C, CEO)

government support

The fact that various government departments supported the implementation of Smart Factories and continued to support the implementation of the next steps, not just once, was a motivation for the implementation of Smart Factories.

We have improved some of our manufacturing processes through this third round of support, but I think we still have a long way to go."(Company L, Director of Standard Division I)

At that time, the Gwangju Centre for Creative Economy and Innovation provided us with 20 million won, so we decided to pursue MES."(M, CEO, Company M)

Industry Trends

The introduction and operation of new systems in the industry, such as those of competitors or suppliers, was cited by companies as one of the motivations for implementing the system. The mere fact that competitors or suppliers failed to introduce the system, or tried to introduce it but failed, was cited as a motivation to introduce the Smart Factory.

Hyundai actually suggested it first. Hyundai's suppliers were adopting MES as a whole, so we followed suit and adopted it to improve our overall production management capabilities."(Company C, CEO)

production environment

The presence of human error, labour-intensive production sites, or dangerous or labour-intensive tasks are motivating factors for adoption, and as senior employees approach retirement, companies are more likely to adopt these smart factory systems.

Initially, we were able to manage the manual method with people because the production volume was not large. However, as the size of the factory grew and sales increased, the existing manual production method became a factor that reduced productivity because it took a long time and caused errors."(Company T, CEO)

As a 30-year-old foundry, we have a lot of long-serving employees. I think there is a reason for this. Long-term employees who work in the production part have their own know-how, and even if the system is not supported, there is no difficulty in production based on the know-how of the technicians. However, if these people leave or change

jobs, there will be a gap in the company. (Company C, CEO)

Product Specifications

Companies that produce large volumes, a wide range of products and a variety of customers are more likely to want to adopt an intelligent factory system.

We make 100 parts per minute and 6,000 parts per hour, and we operate in multi-product, high-volume production. Sometimes we lose a lot of money per hour when equipment or production efficiency goes down. Also, if we don't manage a lot of products by batch, we can't track production, and the range of products that have to be scrapped when defects occur is very large. (Company C, CEO)

"When you're dealing with a lot of items, it's really hard to get all the workers to do it correctly. We're producing a fairly large number of products at a low cost to the consumer, so of course we're all looking for systems that can collect data."(Company G, CEO)

technical characteristics

Companies with line production or repetitive and structured production technologies cited the smart factory system as a motivation for implementing the system, while companies with difficult quality control or ageing equipment cited it as a reason for implementing the system. In addition, manufacturing sites that require accurate data also cited this as a reason for adopting smart factory systems.

Previously, workers would run very simple repetitive tasks through the conveyor belt every time."(Company U, CEO)

When almost all the records from quotation to delivery are written manually, human error cannot be excluded, which inevitably affects quality. We decided to use it for accurate quality control."(Company L, CEO)

contextual condition

They are the "specific characteristics inherent in the central phenomenon" that influence the relationship between the causal conditions and the central phenomenon, and are the "specific conditions that lead to the choice of an action/interaction strategy"²⁰.

IT technology experience

Experience of using an MES or automation system appears to be a prerequisite for system adoption, and experience of failing to adopt IT technology is also cited as influencing the level of system adoption.

Even before the introduction of the Smart Factory, we started with the digitization of the site. As we developed the line with the link to MES, PLM, SCM, etc. in mind, we were concerned about the scope and processing method of the linked information."(Company Q, Team Leader)

20 Strauss & Corbin, 1990

Central phenomenon

A central phenomenon is "a central life event, process, or occurrence that is related to a set of actions, interactions, or causes a response. angle, event, or incident"²¹

system introduction

Building systems that enable integrated operations, making quick decisions based on accurate data, building voice recognition capabilities, and building systems based on big data will determine the level and scale of system adoption.

With the introduction of the PLM system, we were able to convert 3D to 2D in 2-3 hours instead of 3-4 days. This is a significant improvement. This is the result of three years of continuous consultation with the programme developer after the failure of the MES in 2017. (Company M, CEO)

Facility Introduction

The scale and level of equipment in a smart factory will be determined by establishing a high-level quality control site, introducing robots for quality inspection or articulated robots for functional inspection, automating processes, smartening logistics systems and attaching sensors to product characteristics.

The introduction of collaborative robots and the replacement of complex work elements by robotic arms is one of the biggest changes we have seen with smartisation. By transferring tasks that were previously performed by workers standing for long periods of time to robots, we have not only reduced the workload for workers, but also increased productivity and safety. In the end, smart factories benefit everyone in many ways. (Company R, CEO)

Intervening condition

It is the 'structural conditions that influence the action/interaction strategies in relation to the central phenomenon. structural conditions that facilitate or hinder the performance of those strategies in a particular context"²².

inside itself education

The introduction of the Smart Factory was met with both resistance and active participation from internal employees. The company continued to provide education and explanation to allay fears of job loss, trained senior and overseas workers on the new system, and promoted interactive strategies through various methods of internal self-education for the implementation and operation of the Smart Factory system.

It took a lot of trial and error to get used to the new environment, but we didn't stop there. We investigated the causes of every error that occurred and took corrective measures such as system modifications and user training" (Company S, Production Manager 1)

external support education

When implementing smart factories, we conduct various training activities not only through our own training but also through external institutions and companies. We are striving to increase the use of the Smart Factory system through various external training activities, including technical reviews and advice from suppliers, training to improve practical performance and develop leaders supported by the government, and know-how transfer through support for linking innovation activities tailored to the site using experts in each industry.

In the process of promoting smart factories, we were very concerned about how to actively involve employees. We held workshops at the company and sent them to the Kyungnam Education and Training Institute. We encouraged employees to participate by giving them high marks for completing the content." (J, Director, Company J)

We also invite smart masters to provide relevant training and advice to our employees to improve their understanding of smart factories. (Company P, Managing Director)

Action/Interaction

"Actions taken in response to a central phenomenon; strategies designed to adapt, manage, perform, or respond to the central phenomenon in a perceived concrete situation"²³.

usage

It can be said to be an action taken in response to the central phenomenon by applying the system adoption part and the facility adoption part of the smart factory system to the automatic calculation and aggregation of performance and production status, as well as real-time data verification, computerisation of the entire manufacturing process, and accurate data extraction.

It is very convenient that the production status and the previous day's performance are automatically calculated and the profit and loss can be checked immediately. As a manager, I feel it is easier to manage than before. As long as the programme is installed, all employees can share the same sales and production status." (Company A, General Manager)

Satisfaction with use

Depending on the level of adoption of the smart factory, it is possible to improve work fatigue, speed up problem resolution, efficient work progress, improvement of simple repetitive work, improvement of manual work, rapid on-site response, accurate inventory management, etc.

21 Strauss & Corbin, 1990

22 Strauss & Corbin, 1990

23 Strauss & Corbin, 1990

I used to write a lot of diaries a day and it took me 20-30 minutes to write each one. I felt burdened because I had to create a basic database for the workers. Now I can check the data just by looking at the ERP, so I think my work is 5 times faster."(Company B, Manager)

I think the biggest change is that even if there is a problem, we can solve it quickly through immediate feedback. In short, it has made it possible to work more efficiently and reduce work fatigue."(Company N, Quality Manager)

Consequences

It is 'the result or outcome of action and interaction and the moderated manifestation of the central phenomenon'²⁴.

Reduced defect rate

As the smart factory systems and equipment were implemented and used, the defect rate fell, and the defect rate fell in a number of ways, including a reduction in design defects, a reduction in product defects, only one defect in a million, and a reduction in process defects.

As a result, we have achieved positive results such as a 6% increase in productivity and an 11% decrease in defect rate after implementing the smart factory."(Company T, CEO)

In fact, since the implementation of the smart factory, the product defect rate has decreased from 0.8% in 2016 to 0.3% in 2019."(Company L, CEO)

Improvement in delivery rate

As the satisfaction of the employees implementing and using the smart factory increased, the delivery rate improved, the delivery standard yield increased and the delivery time decreased.

With better resource management, we have more confidence in our inventory. It's easier to produce and ship to customers at the right time, and our on-time delivery rate has increased from 88% to 98%. (Company U, CEO)

It used to take more than an hour to find the required threads before preparing for work, and more than a day to check for quantity or defects during the product shipping process. Now that the data is checked in real time, the work order process is reduced and the delivery time is shortened as the product is shipped immediately after production is completed. Looking at the actual performance indicators, the manufacturing lead time is reduced by 40%, the number of man-hours is reduced by 16%, and the delivery time is improved by 20%. (Company O, Business Management Department)

growth of production

The use of Smart Factory has led to productivity improvements in several areas, including reduced machine set-up time, increased productivity, improved equipment utilisation, increased production efficiency and increased productivity due to reduced labour.

The most tangible results are cost savings and productivity improvements. By redeploying the labour used for simple repetitive tasks to other production departments, we achieved cost savings of about 100 million won. We also achieved productivity improvements of 14.2% in the PCB inspection process and 20.2% in the voice inspection process. In the labelling automation process, productivity increased by 11.1% by reducing the number of workers by one."(Company F, Research Manager)

The ability to automatically extract product design specifications from purchasing specifications has increased production efficiency by 25% and reduced production costs by 56%."(Company E, CEO)

Selective coding

Selective coding is the final stage of coding in which core categories are derived and theory is integrated and refined²⁵. First, core categories are derived by linking categories and subcategories to form an outline of the narrative through which the participating companies can be observed, and then by explaining the content abstractly and conceptually. This process can be described as theory generation²⁶

core category

A core category is a central phenomenon that unifies all categories.

After analysing the overall structure with the axial coding results, we found that

"The motivation for adoption determines the level of adoption; experience with IT technology affects the level of adoption; the level of adoption determines usage and satisfaction; internal and external training affects usage and satisfaction; and the outcomes or results of usage and satisfaction are reduced defects, improved delivery rates, and increased productivity."

Story line

Storyline is a technique for theory synthesis and is the process of describing what the researcher knows about the study through instinctive senses gained through immersion in the data. It is a systematic description of the relationships between core categories and other categories. In other words, it is a process of conceptualisation through narrative description of how other categories relate to the core category. This narrative process should be followed by conceptualisation in the next step²⁷.

The companies in the study showed different types of motivations for adopting smart factories, including external pressure, government support, industry trends, production environment, product characteristics and technical characteristics. This means that motivation

²⁴ Strauss & Corbin, 1990

²⁵ Strauss and Corbin, 1990

²⁶ Byungmoon Seol, 2016

²⁷ Strauss & Corbin, 1990; 1998

can be divided into environmental factors and technical characteristics, and adoption motivation can be considered as a causal condition. The level of adoption of smart factory is determined by the "IT technology experience" of existing enterprises, and the level of adoption can be divided into "equipment adoption" and "system adoption". Internal self-training' and 'external support training' influence 'facility adoption' and 'system adoption' and promote 'usage' and 'usage satisfaction'. Usage and usage satisfaction are shaped by the central phenomenon in a perceived specific situation. Depending on 'usage' and 'usage satisfaction', 'defect rate reduction', 'delivery rate improvement' and 'productivity improvement' are the results.

Conclusion

Summary and meaning of study results

In this study, interviews with smart factory best practices from the Smart Manufacturing Innovation Promotion Group were analysed using grounded theory in qualitative research. External pressure, government support, industry trends, production environment, product characteristics and technical characteristics emerged as the main factors motivating the adoption of smart factories.

The factors can be broadly divided into environmental factors, such as external pressure, government support and industry trends, and technical characteristics of the firm, such as production environment, product characteristics and production technical characteristics. Companies' experience with IT technology influences the level of adoption. The areas of adoption are divided into system adoption and equipment adoption, with smart factory adopters adopting both areas.

Depending on the level of adoption, companies have increased their usage and satisfaction after implementing smart factories, and internal and external training has an impact on promoting this usage and satisfaction. Management effects are shown in terms of usage and satisfaction, and defect rate reduction, delivery rate improvement and productivity improvement are shown as effects of smart factory implementation.

We were able to derive detailed factors of environmental factors and technical characteristics that affect the adoption of smart factories, and we found that these factors also affect the level of adoption. We found that the level of adoption affects the usage effect and the management effect, and the usage effect affects the level of usage and satisfaction, and the management effect affects the reduction of error rate, the improvement of delivery rate, and the improvement of productivity. In addition, we found that IT technology experience affects the level of adoption, and internal self-training and external support training affect the utilisation effect.

Implications of the study

In this study, the environmental factors and technical characteristics that influence the adoption of smart factories were identified by analysing interview data. By synthesising external pressures, government support, industry trends and the production environment, product characteristics and production technology characteristics derived from the environmental factors and technical characteristics, we can provide guidelines for SMEs wishing to adopt smart factories in a new way.

In addition, it is possible to provide an appropriate level of introduction for enterprises with appropriate environmental factors and technical characteristics, allowing them to introduce smart factories in stages, identify their IT technology experience in advance to infer whether they will be able to introduce them successfully, and anticipate the effectiveness of their use through internal self-training and external support training. Based on these guidelines, government support for the deployment of smart factories can be further segmented and used as a basis for government policies to provide intensive support according to environmental factors and technical characteristics.

This study has examined the environmental factors and technical characteristics that influence adoption, and in the future it may be possible to investigate whether it is possible to skip stages of adoption, rather than sequentially increasing the level of adoption according to the level of IT technology experience.

In addition, at the introduction level, it is necessary to check how much the use, application and utilisation time is shortened depending on the level of internal self-education and external support education in the introduction of equipment and systems. In the case of the excellent construction companies, although they were selected as excellent construction cases in 20 or 21, it can be seen that the introduction starts from 18 and takes at least 2 to 3 years. It's important to look at how quickly it's implemented and how seamlessly the company is able to use the facilities and systems. If it is introduced quickly and settles in, the timing of the next stage of adoption will also be faster, and not only will domestic manufacturing SMEs become smarter, but the level of adoption will increase sequentially, increasing the likelihood of progression.

In addition, follow-up studies are needed to determine whether there are other factors besides the usage and satisfaction factors that have been identified as usage effects of smart factories, and if additional usage effects are identified, this could serve as a motivation for new companies to adopt smart factories.

In addition, based on the management effects of reducing defect rate, improving delivery rate and increasing productivity, empirical studies can be conducted on enterprises that have implemented and operated smart factories to determine which factors have the greatest

effect, and the factors with the greatest effect will be used as the basis for further government policy support for new implementations and enterprises with low effectiveness, and the factors with poor management effects will be used as the basis for government support policies or the introduction of smart factory systems and equipment to maximize the effectiveness of the factors.

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Analyzing the Effects of Anthropomorphism in NPCs Applied by GPT Technology on User Satisfaction and Loyalty: Focused on Flow and SOR Theories

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Abstract

This research studies NPCs applied by Generative Pre-trained Transformer (GPT) Technology. This study set three independent variables as characteristics of the NPCs applied GPT. User immersion is set as a mediator variable, while user game satisfaction and loyalty are chosen as dependent variables. The Stimulus-Organism-Response (SOR) theory is employed to study user attitude changes, and immersion is examined through the Flow Theory.

Keywords

Non-player Characters, Satisfaction, Loyalty, Flow Theory, SOR Theory

Introduction

Games have the unique ability to enable users to construct their own worlds (Turkle, 1994) and find enjoyment through competition within the game (Zubek & Khoo, 2002). In this process, users reflect their identities through their game characters, leading to increased interest and engagement in the game (Hefner et al., 2007). Additionally, game characters positively influence users' game preferences and playing intentions (Kempf, 1999; Mandryk & Atkins, 2007). Therefore, game characters play a vital role in enhancing user concentration and retention within the game.

The concept of game characters, also known as avatars (Soutter & Hitchens; Wu & Hsu, 2018), can be understood as the user's representation in the virtual environment (Ducheneaut et al., 2009). Players often choose intelligent or powerful characters to achieve success in the game (Ko & Park, 2021). The importance of Non-player Characters (NPC), however, has recently gained prominence (Drennan et al., 2003). NPCs play significant roles in users' gaming experiences, providing assistance, challenges, and services (Warpefelt & Verhagen, 2017). Due to the significance of NPCs, most video games rely on them during game development (Aarseth, 2012; Warpefelt & Verhagen, 2016).

The relationship between users and NPCs is important because of the various impacts on users' gaming

activities (Harth, 2017). Depending on the level of NPC's technological sophistication, it can either enhance or hinder the enjoyment of the game (Bartle, 2004) and create intense experiences through emotional connections with the users (Ravenet et al., 2016; Yannakakis et al., 2011).

This study focuses on NPCs integrated with GPT technology. The target game is 'Justice Mobile'. The game involves a recent case in China where NPCs based on GPT technology were incorporated into the game setting. The study aims to investigate the influence of GPT-based NPCs on users' immersion, game satisfaction, and loyalty. Specifically, the study aims to assess users' responses based on the level of anthropomorphism among NPCs.

The research questions are as follows:

Q1: How does the anthropomorphic feature of GPT-based NPCs influence users' immersion?

Q2: Does the anthropomorphic feature of GPT-based NPCs have an impact on users' game satisfaction and loyalty?

To address the research questions, the theoretical background of Flow and SOR Theory is adopted. Flow theory is explained based on previous studies (Bartle, 2004) that suggested how NPCs' technological sophistication can either enhance or hinder users' enjoyment. There are three factors in the SOR framework. First, the environmental

stimulus represents the anthropomorphic characteristics of NPCs. Second, the organism state reflects users' level of immersion. Lastly, the behavioral response explains users' game satisfaction and loyalty.

This study holds two implications. It analyzes the characteristics of NPCs utilizing the recent technology, GPT, from the users' perspective. By examining users' psychological states regarding this new technology, this research can serve as valuable evidence for future technology applications. Additionally, it systematically approaches the relationship between NPC characteristics and users based on the theories. This is expected to contribute to the theoretical expansion of NPC-user relationships in the future.

Theoretical background

Non-player Characters (NPCs)

Advancements in technologies such as automation and natural language processing systems (Luger, 2005; McCord et al., 2012) have greatly influenced the game industry. These technological developments have enriched the roles and values of NPCs within games. Generally, NPCs refer to characters in a game that are controlled entirely by the computer (Warpefelt & Verhagen, 2017).

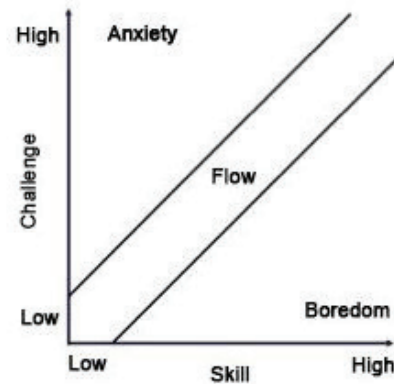
In most recently released video games, it is impossible for users to play without interacting with NPCs (Emmerich et al., 2018). During gameplay, users expect NPCs to perceive users' characters and to respond appropriately (Lankoski & Björk, 2007). This expectation causes users to trust the game and increases immersion in the game (Emmerich et al., 2018). NPCs have evolved from merely providing information to becoming cooperative entities that help users focus on and prolong their engagement in the game.

Warpefelt & Verhagen (2017), who have conducted research on NPCs, categorized them into 12 forms based on their roles. These forms include functional roles such as Vendor, Services, and Questgiver, as well as user adversaries such as Enemy and Opponent. There are also forms of interaction with users, including Sidekick, Ally, Companion, Pet, and Minion which are grouped under the category of Friends. Finally, NPCs serve as the provider, including Storyteller or Loot Provider. The diversity of NPC forms signifies their substantial role in games. Among them, NPCs that enhance user interaction, such as Sidekicks and Companions, support users to stay engaged in the game for longer periods (Warpefelt & Verhagen, 2017).

Recently, NPC development based on GPT technology has been actively pursued to enhance user interaction. In particular, the game 'Justice Mobile,' released in China in 2019, has achieved significant success by utilizing this technology. In this study, the focus is on NPCs applied GPT technology and their anthropomorphic characteristics.

Flow theory

Flow theory refers to the state in which a user intensely focuses on a specific activity, excluding any other thoughts or distractions (Csikszentmihalyi, 1990). Typically, individuals with a strong intrinsic motivation are more likely to become immersed in a particular activity and experience enjoyment (Csikszentmihalyi, 2003). In the context of gaming, the level of immersion in the game can be increased when users are exposed in challenges that are balanced with their abilities (Cho et al., 2021).



<Figure 1. Flow Theory>

In order for users to become immersed in a specific situation, various characteristics are required. These characteristics include enjoyment, emotional control, deep concentration, pleasure in the given tasks, time distortion, and a balance between challenges and the user's abilities (Su et al., 2016; Fabito et al., 2020).

Among these characteristics, the balance between given challenges and skills to users is considered a key feature that induces user immersion in the game (Cho et al., 2021). In this study, we set the level of user immersion as a mediating variable to explore the impact of GPT-based NPC characteristics concerning game satisfaction and loyalty of users.

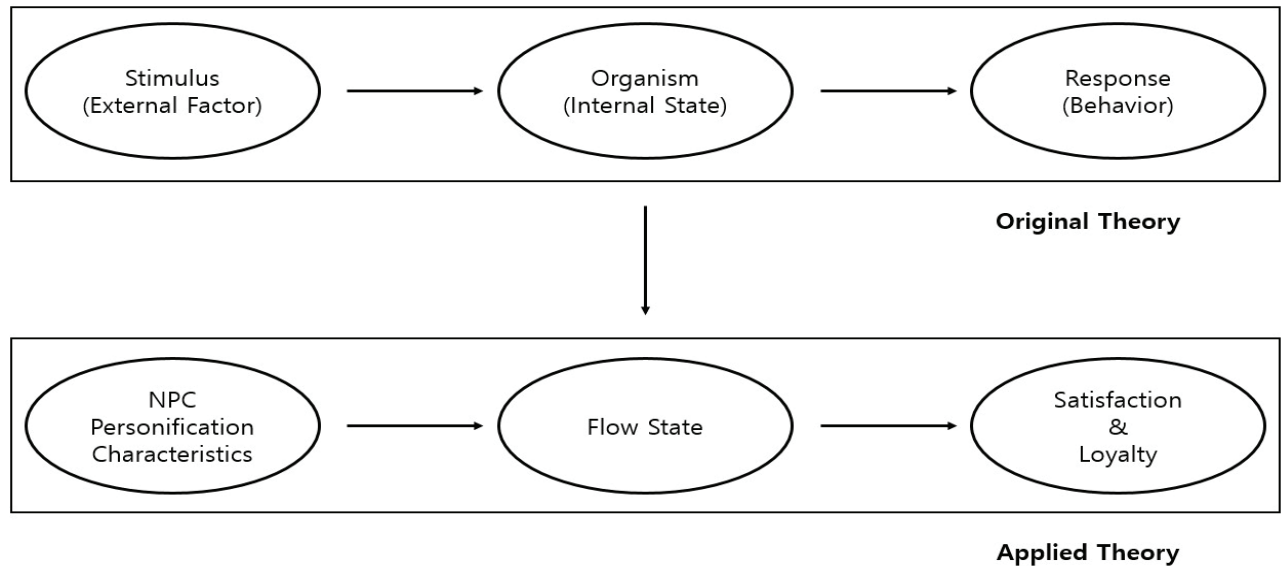
Stimulus-Organism-Response (SOR) Theory

The Stimulus-Organism-Response (SOR) theory refers to the cognitive response process in which specific stimuli influence human emotions and cognition, leading to observable behaviors (Mehrabian & Russell, 1974; Kamboj et al., 2018). According to this theory, external factors create certain cognitive and emotional responses in users, guiding them to engage in specific behaviors (Jacoby, 2002). As a representative theory in environmental psychology, the theory has been applied and researched in various disciplines, including psychology, management, and computer science (Ali, 2016; Manthiou et al., 2017).

Stimulus means the physical environment and factors that influence users (Mehrabian & Russell, 1974; Machleit & Davis, 2001), representing external stimuli that impact

users' internal states (Belk, 1975). Organism, as a mediator between S and R, denotes users' internal states based on cognition and emotions (Mehrabian & Russell, 1974). Therefore, O represents users' affective and cognitive states (Kamboj et al., 2018) and can be defined in terms of users' attitudes, beliefs, and comfort levels (Bitner, 1992). Lastly, Response refers to behavior and includes psychological and behavioral reactions resulting from external stimuli and the organism's attitudes (Sherman et al., 1997).

In this study, we apply the SOR theory to analyze how GPT-based NPCs influence users' internal states and produce certain outcomes. Specifically, we limit the external stimulus factor to the humanization characteristics of NPCs. As for the organism factor, we define it as the level of user immersion, while the response factor is represented by user game satisfaction and loyalty. The application of the SOR theory in this study is depicted as follows:



<Figure 2. Original Theory and Applied Theory>

Hypothesis development

Personification of NPC and immersion

Personification stands for attributing lifelike characteristics and personality to non-human entities, making animals or objects appear human-like (Aggarwal & McGill, 2007; Waytz et al., 2008). The concept of personification has been studied in various contexts, such as religious contexts (Gilmore, 1919) and perspectives on animals (Cheney & Seyfarth, 1990), and more recently, applied to devices (Epley et al. 2008) across different academic disciplines. Personification encompasses a broad range of attributes, from attributing human-like physical appearances to making moral judgments (Golossenko et al., 2020; Kim & McGill, 2011; Puzakova et al., 2009).

As the level of non-human personification increases, humans experience enhanced feelings of security and positive emotions toward the entity, while uncertainty decreases (Nowak & Biocca, 2003). These research findings are also evident in interactions between humans and computers, as users show a similar response to computers like humans when users perceive social cues like human appearances and using language (Reeves & Nass, 1996). These phenomenon has led to investigations into humanizing Chatbots (DiSalvo et al., 2002), cars,

graphic agents, humanoid robots (Bartneck, 2006), and robotic vacuum cleaners (Kwak, 2014), among other devices and systems. Considering the mutual perspective between humans and machines (Steuer, 1992), it can be emphasized that the level of personification of NPCs within games is crucial in shaping users' positive perceptions.

Previous studies have explored the personification characteristics of NPCs, and notable research in this context includes interactions between avatars and players in games (Banks & Bowman, 2016), as well as studies in the field of artificial intelligence voice recognition (Wagner et al., 2019; Moussawi & Koufaris, 2019). The interactions between in-game characters and players can be understood from cognitive, emotional, and behavioral perspectives, where both players and characters can serve as instruments of conveying meaning in digital and real-world contexts (Banks & Bowman, 2016). This underscores the importance of the social attributes possessed by characters (Waytz et al., 2010).

The second characteristic of NPCs is intelligence. Intelligence is a factor directly influencing the personification of characters, enabling efficient, effective, and goal-oriented behaviors (Moussawi &

Koufaris, 2019). Intelligence is commonly defined by terms such as knowledge, mental strength, learning, and understanding (Legg & Hutter, 2007). Thus, NPCs can engage intelligently with players, serving as assistants in problem-solving and goal achievement.

The final characteristic is human-likeness (Wagner et al., 2019). Since personification entails attributes encompassing human characteristics and emotions (Epley et al., 2007), it is essential for NPCs to possess human-like features. It is considered to be highly humanized when interactions are smooth under the condition of question-and-answer exchanges between NPCs and players in games (Wagner et al., 2019).

This study selected three specific NPC characteristics that are clearly defined and described, among the various attributes. They include intelligence, sociability, and human-likeness in NPCs that are applied GPT. To analyze the impact of these three variables on users' game immersion, we formulated the following hypotheses:

H1: NPC intelligence will be positively associated with users' immersion.

H2: NPC sociability will be positively associated with users' immersion.

H3: NPC human-likeness will be positively associated with users' immersion.

To measure the variables in this study, the following measurement items are employed. To assess the sociability of NPCs, it has a total of 8 items including emotional investment and companion consciousness, proposed by Banks & Bowman (2016). Regarding the intelligence of NPCs, 5 items suggested by Moussawi & Koufaris (2019) are utilized. Additionally, for measuring human-likeness, a total of 8 items, encompassing autonomy and appearance, are selected (Banks & Bowman, 2016; Wagner et al., 2019). Each measurement item is properly modified in accordance with the NPC attributes and the specific objectives of this study.

Immersion, Users Satisfaction, and Loyalty

The optimal personal experience that users feel online can be defined as immersion (Hoffman & Novak, 1996). In the case of online games, providing users with an optimal immersive experience as an engaging medium leads to overall satisfaction for users (Clark et al., 1994). The relationship between users' immersion and satisfaction is significantly crucial

As this immersive experience ultimately influences users' intention to continue using the online game (Hoffman & Novak, 1996),

Loyalty can be seen as a kind of user preference that emerges after satisfaction is formed (Aaker, 1991), and it causes a continuous and repetitive consumption attitude (Kotler & Keller, 2009). The user's positive perception should be researched in this area from immersion and

satisfaction to loyalty when loyalty to a game leads users to engage in repetitive gaming activities.

To analyze the area, users' immersion is set as an independent and mediating variable, and the following hypotheses are established:

Q4: Users' immersion will be positively associated with users' satisfaction.

Q5: Users' immersion will be positively associated with users' loyalty.

Q6-1: Users' immersion will have a positive mediating effect between NPC intelligence and users' satisfaction.

Q6-2: Users' immersion will have a positive mediating effect between NPC sociability and users' satisfaction.

Q6-3: Users' immersion will have a positive mediating effect between NPC human-likeness and users' satisfaction.

Q7: Users' satisfaction will be positively associated with users' loyalty.

Q8: Users' satisfaction will have a positive mediating effect between immersion and users' loyalty.

To measure the immersion variable, a total of 6 items are used based on Csikszentmihalyi's (1990) definition (Susan et al., 2010; Jackson, 1996). Users' satisfaction is composed of 4 items (Oliber, 1980; Garbarino & Johnson, 1999), and users' loyalty consisted of 6 items, including word-of-mouth recommendations (Methlie & Nysveen, 1999; Wong and Sohal, 2006). These scales are modified to proper the objectives of this study while ensuring that their meanings remained unchanged.

Research methodology

Research results

Conclusion

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Impact of Usefulness and Value of Facility AI Platform Service on Organization Performance based on IS Success Model

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Abstract

With the wide spread of the Fourth Industrial Revolution technology, manufacturing companies are enhancing existing labor productivity and accelerating efforts for the digital transformation of organizations through smart factory and AI platform. Based on IS success model, this study analyzed the relationship between information quality, systems quality, service quality and organization performance through user perception of value. This study divides value perception construct into facility AI platform service for predictive maintenance beyond something like MES (manufacturing execution systems) and POP (point of production). We prove that firms can improve their organization performance through value-based approach to adopt facility AI platform service. This study collects 98 data from manufacturing companies which implemented their smart factory projects. After analyzing the data, we conclude that digital transformation through facility AI platform service has become one of their core capabilities to build competitive advantage, and enables management innovation for sustainable growth of the firm.

Keywords

Information Quality, Systems Quality, Service Quality, Value Perception, Facility AI Platform, Organization Performance

Introduction

In recent decades, 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. 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).

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. 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 explaining this new digital transformation

phenomenon (Yu and Moon, 2021). This is because existing research has theoretical limitations. It is not easy to answer the question "What causes IS success?" Researchers attempting to measure the effects of user perception on the subsequent success of different IS systems may use usefulness and user satisfaction as the primary measure (Delone and McLean, 1992; 2003; Petter et al, 2013). So it is important to study the influence of information quality, systems quality, service quality, and organization performance through user perception like perceived usefulness and perceived value of customers.

The questions with this study are: 1) How do information quality, systems quality, and service quality have a positive impact on user adoption of facility AI platform service 2) How do user's value perception of AI platform service have a positive impact on organization performance? To solve this question, this study suggests a research model based on MIS literatures and IS success theory. Thus, this study proposes a research model to analyze the relationship between information quality, systems quality, service quality, and organization performance through user's value perception. 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.

Literature review

Digital transformation of SMEs

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. In a transitional economy, 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.

With the deep integration of digital technologies in the manufacturing industry, there has been a digital transformation that has changed the traditional production and operations management methods and offers the potential for the improvement of product development, production efficiency and customer service (Wei et al, 2017). The digital technology trends and design principles used by SMEs in digital transformation include: computer-aided design (CAD) and manufacturing (CAM), 3D printing, artificial intelligence (AI), big data analytics, cloud computing, industrial Internet of Things (IoT), mixed reality (virtual and augmented reality), simulation of connected machines (Paschou et al., 2020). Digital transformation goes beyond the traditional IT role in supporting existing business processes, as it can redefine value proposition.

IS success theory

The IS Success Theory was suggested by Delone and McLean(1992). They proposed that the dependent variable for information systems (IS) research is IS success. Since the original IS success model was published, research has developed a better understanding of IS success. Meanwhile, comprehensive and integrative research on the variables that influence IS success like recent AI platform service has been lacking (Petter et al., 2013).

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 and vision 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).

Facility AI platform service

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).

Research model and hypotheses

Research model

Based on IS success theory (McLean and Delone, 1992; 2003; Petter et al, 2013)., most companies have conducted smart factory strategy implementation to improve competitive advantage. This study proposes new approach of value perception and explores the impact of usefulness and value perception on organizational performance based on IS success model. This study developed a research model (Fig. 1), which explain facility AI platform service for obtaining the sustainable competitiveness.

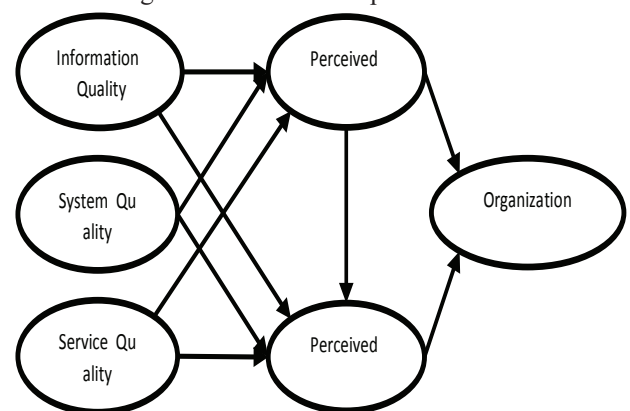


Fig. 1 Research Model

Research hypothesis

Since this study has a research direction to explain the need for smart factory strategy by usefulness and value perception, the sustainable competitiveness

of the firm can be obtained by the adoption of AI platform service for digital transformation.

H1: Information quality of facility AI platform service has a positive influence on (a) perceived usefulness and (b) perceived value of customers.

H2: Systems quality of facility AI platform service has a positive influence on (a) perceived usefulness and (b) perceived value of customers.

H3: Service quality of facility AI platform service has a positive influence on (a) perceived usefulness and (b) perceived value of customers.

H4: Perceived Usefulness of facility AI platform service has a positive influence on (a) perceived value and (b) organization performance.

H5: Perceived value of facility AI platform service has a positive influence on organization performance.

Research method

Operational definition

The purpose of this study is to conduct an empirical study on the relationship between process innovation, facility automation, digital transformation capability, and organizational performance of the firm. Preexisting construct measures have been used in this study. According to previous studies of resource-based theory and dynamic capability theory, this study developed the operational definition and measurement items of independent variables (process innovation, facility automation), digital transformation capability, and organization 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.

Sample statistics

This study collected the data for analyzing the level of smart factory readiness from 98 manufacturing firms. Survey respondents were comprised of decision makers (entrepreneurs) of 98 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 98 firm data was collected, and valid responses were analyzed using SPSS 27 and PLS 4.0.

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

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 98 firms in this study. 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.

Table 2 – Convergent Validity

Var	Items	Cross-Loading	AVE	Composite Reliability	Cronbach-a
IQ	3_1_1	0.929	0.758	0.899	0.894
	3_1_2	0.924			
	3_1_4	0.817			
	3_1_5	0.854			
SyQ	3_2_1	0.793	0.638	0.813	0.811
	3_2_2	0.839			
	3_3_3	0.785			
	3_3_4	0.780			

SeQ	3_4_1	0.820	0.680	0.855	0.844
	3_4_2	0.807			
	3_4_4	0.822			
	3_4_5	0.848			
xST	3_5_1	0.806	0.673	0.841	0.837
	3_5_2	0.833			
	3_5_3	0.882			
	3_5_5	0.778			
xVR	4_1_1	0.861	0.753	0.897	0.890
	4_1_2	0.894			
	4_1_3	0.900			
	4_1_5	0.813			
xUP	4_3_1	0.874	0.740	0.899	0.883
	4_3_2	0.808			
	4_3_3	0.819			
	4_3_4	0.860			

Table 3 – Discriminant Validity

	IQ	SyQ	SeQ	xST	xVR	xUP
IQ	0.891					
SyQ	0.527	0.799				
SeQ	0.778	0.468	0.824			
xST	0.647	0.530	0.751	0.821		
xVR	0.602	0.625	0.569	0.565	0.868	
xUP	0.406	0.683	0.541	0.499	0.699	0.860

All the loadings for the final model were above 0.778. Furthermore, all the construct measures met the criteria of AVE > 0.5 ranging from 0.638 to 0.794. To establish internal consistency, All the Cronbach-a values are above the threshold 0.7 value which ranged from 0.811 to 0.890.

Hypothesis testing

The results of hypothesis testing in this study are summarized as follows. For H1a and H1b, the result

shows that information quality influences positively on perceived usefulness and perceived value. For H2a and H2b, the result shows that systems quality influences positively on perceived value, not on perceived usefulness. For H3a and H3b, the result shows that service quality influences positively on perceived usefulness and perceived value. For H4a and H4b, the result shows that perceived usefulness influences positively on perceived value and organization performance. For H5, the result shows that perceived value has strongly positive influence on organization performance. This result means that the usage of facility AI platform service enables the organization to achieve direct effects on improving organizational competitiveness.

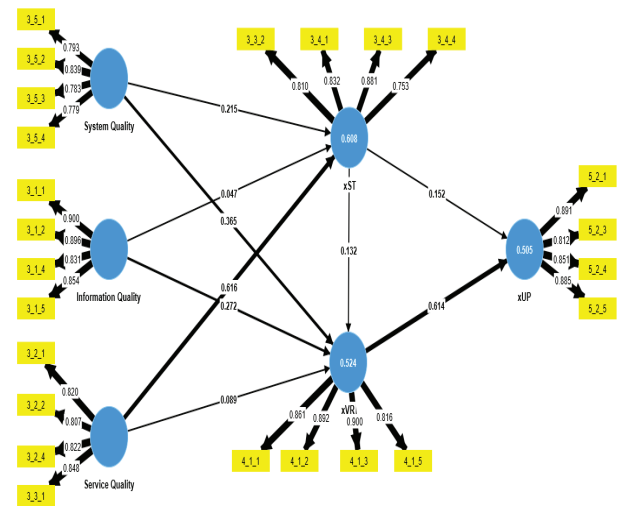


Fig. 2 The Result of Path Analysis

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 information, systems, service quality, and organization performance through value perception of digital transformation. 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. Also, future research needs to empirically study different countries and industries to implement smart factory project.

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A Comparative Study of the Effects of Consumer Innovativeness, Self-esteem, and Need for Cognition on Online Activity before and after COVID-19

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Abstract

This study tried to identify factors affecting online activity before and after the COVID-19 pandemic. To this end, the effects of consumer innovativeness, self-esteem, and need for cognition on the activity of online media such as Internet and social media were investigated, and whether privacy concerns had a moderating effect. For this study, survey data from 2019(before the outbreak of COVID-19) to 2021(after the outbreak of COVID-19) of the 'Korea Media Panel Survey' surveyed by the Korea Information Society Development Institute was used for analysis.

The research results that affect Internet activity are as follows. Before the outbreak of COVID-19, it was found that hedonic innovativeness and social innovativeness had a positive effect and cognitive innovativeness had a negative effect on increasing Internet activity.

The research results that effect social media activity are as follows. Before the outbreak of COVID-19, it was found that social innovation and cognitive innovativeness had a positive effect on increasing social media activity. There was no moderating effect on privacy concerns. The period after the outbreak of COVID-19, need for cognition was found to have a positive effect on increasing social media activity. In addition, the moderating effect of privacy concerns was found in the relationship between need for cognition and Internet activity.

As a result of the study, it was confirmed that factors affecting online activity were different before and after the outbreak of COVID-19. In addition, it was confirmed that there was no privacy concern effect before the outbreak of COVID-19, and the privacy concern effect appeared on functional innovation and need for cognition after the outbreak of COVID-19. This study aims to present various implications for companies to understand the characteristics of online consumers using the Internet and social media after the pandemic.

Keywords

Consumer innovativeness, Self-esteem, Need for cognition, Privacy concern, Online activity, Pandemic.

Introduction

Since the first COVID-19 confirmed case occurred in Korea in January 2020, the government's social distancing policy has required digital transformation to non-face-to-face methods in various fields such as education, work, consumption, and leisure (Lee etc., 2021). The direction of quarantine policies and the social atmosphere emphasizing such non-face-to-face contact had a significant impact on the consumption environment. As the online consumption market increased during the COVID-19 period, online media activity also increased. In addition, overall online

media activities such as online search, online commerce, SNS activity, and video viewing showed a large increase.

Companies experienced during the COVID-19 social distancing period are expected to further increase their investment in online and social media to catch consumers who are more focused online than offline in the future pandemic. As supporting the importance of online investment in a pandemic situation, companies that focused on online showed great performances in the COVID-19 situation.

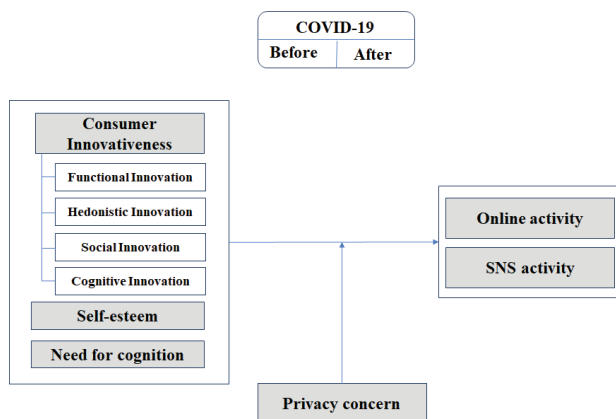
According to CB Insight, which provides market

intelligence on private business and investor activity, the impact of COVID-19 has hit an all-time high in the number of unicorns. The rapid increase in unicorn companies in the COVID-19 situation is because investment funds in the global market due to the pandemic have been concentrated in the online sector. It is analyzed that this has served as a background for the growth of e-commerce, fintech, and internet service startups as unfact services that can avoid direct contact between individuals have attracted attention due to the influence of non-face-to-face quarantine policies. (CBinsights, 2021).

These achievements suggest that it is important for companies to consider business in the non-face-to-face field in response to increased online activity during the pandemic. Furthermore, from the point of view of research on consumers, it is very important to recognize the difference between pre-pandemic and pandemic period in increasing online activity in consumers' propensity to use online. This study verified the effects of consumer Innovativeness, need for cognition, and self-esteem on Internet activity and SNS activity during the 2021 pandemic compared to 2019, before the outbreak of COVID-19. In addition, we investigated whether privacy concerns showed a moderating effect between consumer propensity, Internet activity, and SNS activity.

Research model

This study aims to identify the factors that affect the increase in online activity in a pandemic situation by analyzing the correlation between consumer Innovativeness, self-esteem, need for cognition, Internet activity, SNS activity, and privacy concern before and after the COVID-19 outbreak. do.



Figures 1. Research Model

Research Hypothesis

1.Relationship between consumer Innovativeness and online activity

Studies investigating SNS usage according to consumer innovativeness analyzed the effect of each of the four measures of consumer innovativeness. As a result of the study on the overall use of SNS, the higher the functional

innovation, hedonic innovation, and social innovation, the easier it was to use SNS, while the higher the cognitive innovation, the lower the SNS use. The following hypotheses are proposed through a review of previous studies that have examined the effect of consumer innovativeness on the use of the Internet and SNS.

H1. Consumer innovativeness (functional/hedonic/social /cognitive innovation) will affect Internet activity.

H2. Consumer innovativeness (functional/hedonic/social /cognitive innovation) will affect SNS activity.

2. Relationship between self-esteem and online activity

Self-esteem is used as a significant variable in explaining self-exposure to express one's thoughts, emotions, experiences, etc. to others, as well as Internet and SNS use behaviors and communication behaviors. Self-esteem is confirmed to have high explanatory power in explaining the behavior of people using the Internet, and through this, understanding of Internet activities can be improved. (Armstrong et al., 2000).

In a study by Krämer and Winter, it was found that people with low self-esteem were relatively more likely to use the Internet than those with low self-esteem. (Krämer and Winter, 2008). In this regard, self-esteem is also used as a major variable in studies related to online media to examine the relationship between addiction and excessive use of control power. In a study on the factors affecting SNS addiction, it was confirmed that as a result of the study, individuals with high self-esteem had a negative effect on self-exposure, and SNS users with low self-esteem tried to expose themselves more through SNS. .

As a result of the study on the effect of self-esteem on SNS use, individual self-esteem and the degree of SNS use showed a significant inverse relationship, and self-esteem in the psychological aspect had a negative effect on SNS use. In other words, it was confirmed that people with low self-esteem tended to use SNS more often than people with low self-esteem (Kim etc., 2020). The following hypotheses are proposed through a review of previous studies that examined the effect of self-esteem on the use of the Internet and SNS.

H3. Self-esteem will affect Internet activity.

H4. Self-esteem will affect SNS activity.

3.Relationship between need for cognition and online activity

There are precedent studies that explored how the characteristics of need for cognition, as seen in the theoretical review, affect online media activities. In a study on the status of utilization and effects of reviews left online after watching a movie, the method of accessing reviews was analyzed according to the level of need for cognition. As a result of the study, people with a high need for cognition tended to search for information using various channels related to movie viewing information

before making a purchase. Research subjects classified as a group with high need for cognition analyzed movie information through online activities using various information sources such as movie-related homepages or webzines in order to search for rich information related to movies even if they use the Internet, starting with portal sites. (Lee, 2009).

In terms of online activity, the group with high need for cognition showed higher online activity than the group without it in analyzing the movie before purchase using the movie viewing review. In a study that empirically demonstrated the factors that have a key influence on SNS use targeting senior consumers, it was found that need for cognition positively affect Internet activity and SNS activity. In other words, senior consumers with high need for cognition showed higher online activity than senior consumers with low need for cognition, which showed that the influence of need for cognition on online activity was greater compared to the non-senior consumer group. (Kim, 2019).

In a study that classified online community user groups into active, external propagation, internal enthusiasm, and pure latent groups, it was demonstrated that those with higher need for cognition tended to belong to the active group according to the activity of four types of Internet usage on the Internet. The results of this study also support the research result that the higher the need for cognition, the higher the Internet activity, as in the previous research results. (Hwang, 2020).

The following hypotheses are proposed based on previous studies examined through theoretical considerations on consumer propensity and online activity.

H5. Need for cognition will affect Internet activity.

H6. Need for cognition will affect SNS activity.

4. The moderating effect of privacy concerns

Privacy concern refers to the degree of concern about the possibility that personal information may be leaked or invaded against one's will. (Weitin, 1967).

In a recent study on privacy concerns, we can confirm the privacy paradox phenomenon in the online media environment where personal information is continuously provided or purchase experience and purchase frequency increase despite high privacy concerns. A study exploring the privacy paradox in the context of online purchases confirmed that the privacy paradox appears in the experience, frequency, and amount of money spent on online purchases. In addition, it has been demonstrated that a strong privacy paradox appears in online person-to-person transactions, especially in terms of experience and frequency.

Based on the review of these preceding studies, it was confirmed that privacy concerns had a significant moderating effect in the situation of purchasing products through online. Previous studies have examined the

moderating effect of privacy concerns in online product purchase situations. In this study, we will examine whether there is a moderating effect of privacy concerns in online activities such as Internet community, Internet news, online participation, and online knowledge production. Consumer innovativeness can be defined as the attitude or tendency to accept a new product before others when it appears, and it can be predicted that the higher the consumer innovativeness, the higher the information-seeking activity on the new product. Information seeking activities according to the degree of consumer innovativeness will use Internet communities, news, surveys, knowledge services, SNS, etc. as the main source of information acquisition. In the process of using these online media, personal information may be disclosed or traces may be left by providing information for membership registration or writing a post. Previous studies have confirmed the significance of the moderating effect of privacy concerns in the process of purchasing products online according to consumer Innovativeness. Considering that there is a moderating effect of privacy concerns, the following hypothesis is proposed.

H7. The relationship between consumer innovativeness and Internet activity will differ depending on privacy concerns.

H8. The relationship between consumer innovativeness and SNS activity will differ depending on privacy concerns.

In a study that analyzed the relationship between self-esteem and SNS use, focusing on the moderating effect of privacy concerns, it was found that people with higher self-esteem were more likely to belong to the SNS user group. Similarly, the higher the privacy concern, the higher the possibility of belonging to the SNS user group.

Most of the previous studies only looked at the main effects of self-esteem and privacy concerns on SNS use, and there were not many follow-up studies that analyzed interactions such as moderating effects or mediating effects. In this study, we tried to find out the interaction between self-esteem and Internet and SNS use through the privacy moderating effect. In the process of using SNS, clues or traces that can infer personal information may be disclosed not only at the membership sign-up stage but also during the use process, writing posts or uploading photos and videos.

Despite the threat of personal information infringement, a study by Kim Ye-Solan et al. (2020) shows that the higher the privacy concern, the more active SNS users belong to the group, and the higher the self-esteem. Contrary to the results of previous studies that found that the lower the self-esteem, the higher the use of SNS, the higher the self-esteem, the higher the use of SNS, when privacy concerns are put into the moderating effect. This study proposes the following hypotheses, considering that there will be

a moderating effect on Internet activity and SNS activity through the moderating effect of privacy concern, which has been confirmed to be significant in the relationship between self-esteem and SNS use.

H9.The relationship between self-esteem and Internet activity will differ according to privacy concerns.

H10.The relationship between self-esteem and SNS activity will differ according to privacy concerns.

Looking at previous studies examining the moderating effect of privacy concern on the relationship between need for cognition and online activities, the group using SNS was divided into a non-use group, an income use group, and an active use group, and individual characteristics factors affecting the degree of use were analyzed. The analyzed study investigated how cognitive needs and privacy interests affect the probability of using SNS. However, by setting need for cognition and privacy concerns as independent variables, it was not possible to confirm the relationship of direct mutual influence. (Lee, 2017). Due to the development of information and communication technology, various preceding studies related to concerns about invasion of privacy, such as concerns about leakage of personal information or tracking of location information, are being conducted. However, studies exploring the direct correlation between need for cognition and privacy concerns remain at an early stage. As a result of previous research (Mourali et al., 2005) showing the tendency to collect information from various information sources as the need for cognition is high, the high need for cognition that appears through active information collection activities has a positive (+) effect on web use. Based on previous research results (Jee and Lee, 2002; Tuten and Bosnjak, 2001), it seems that the higher the need for cognition, the more likely to accept the need to provide personal information in the process of using online media and actively seek information. Therefore, this study proposes the following hypotheses, considering that there will be a moderating effect of privacy concern in the relationship between need for cognition, Internet activity, and SNS activity.

H11.The relationship between need for cognition and Internet activity will differ according to privacy concerns.

H12.The relationship between need for cognition and SNS activity will differ depending on privacy concerns.

Methods

This study used data collected through the Korea Information Society Development Institute's 2019-2021 Korea Media Panel Survey, and the survey data used for research analysis was conducted using individual survey data provided by the media statistics portal site(<https://stat.kisdi.re.kr>) proceeded. This study was conducted with the same respondents to the Korean Media Panel Survey from 2019 to 2021.

Tables 1. Operational Definition of Factors

Factor		Operational Definition	Prior research
Consumer Innovative-ness	Functional Innovation	A tendency to improve productivity and avoid risk, which is expressed when a product is perceived to be useful or practical in terms of functionality.	Midgley and Dowling(1978) Hirschman(1980) Agarwal and Prasad(1998) Foxall et al.(1998) Veryzer(1998) Rogers(2003) Vandecasteele and Geuens(2010)
	Hedonistic Innovation	The tendency to seek emotional value that satisfies personal pleasure and satisfaction with external stimuli, such as purchasing innovative products or accepting new aspects	
	Social Innovation	Willingness to accept innovation ahead of others to improve one's social value, image, influence, etc. in social relationships	
	Cognitive Innovation	The tendency to pursue new experiences that stimulate mental activities to acquire new knowledge and information, and to enhance cognitive understanding of objects or phenomena	
Self esteem		A person's tendency to feel overall about how much he or she values and likes himself	Dutton and Brown(1997) Baumeister(1993) Branden(1992) Coopersmith(1981)
Need for cognition		The tendency of an individual to enjoy thinking while immersed in a certain event or object, a tendency inherent in individuals who have a high interest in the process of searching for information and find pleasure in this activity	Cacioppo and Petty(1982) Haugtvedt et al.(1992) Thompson(1995) Mourali et al.(2005)
Privacy concerns		Threats and concerns that users feel about the development of technology such as monitoring, storage, and retrieval in the process of handling personal information	Culnan(1993) Fishbein and Ajzen(1977) Grossklags and Acquisti(2007)
Internet activity		The degree of activity such as writing or commenting on Internet communities, online surveys, news/discussion boards, Internet knowledge services, etc.	Kaye and Johnson(2002) Swickert et al.(2002) Hill and Argyle(2003)
SNS activity		The degree to which activities such as writing posts directly on social media, uploading images, videos, etc., checking other people's posts, and leaving comments or likes	Nyland and Near(2007) Johnsonand Yang(2009)

Research analysis results

In this study, three data from the Korea Media Panel Survey 2019-2021 were combined based on response ID and a total of 3222 responses were used for analysis, and the empirical analysis method was analyzed using the IBM SPSS statistics 23.0 program. Exploratory factor analysis was conducted to confirm the validity of the collected data, and reliability was confirmed through Cronbach's a coefficient. Regression analysis was conducted to find out how the independent variables of consumer

innovativeness, self-esteem, and need for cognition affect the dependent variables of Internet activity and SNS use. The regression analysis method was used as a hierarchical regression analysis method to find out the moderating effect of privacy concern, a moderating variable. The regression model was designed so that the research variable set in this study could have a pure influence on the dependent variable by inputting the demographic factor showing the difference in average between groups for the dependent variable, Internet activity and SNS use status, as a control variable.

1. Impact on internet activity before the COVID-19

As factors influencing Internet activity before the outbreak of COVID-19, hedonic innovation ($B=.065$, $t=6.005$, $p=.000$) and social innovation ($B=.027$, $t=2.149$, $p=.032$) in the main effects were found to have a statistically significant positive (+) effect on Internet activity.

Cognitive Innovation ($B=-.041$, $t=-3.248$, $p=.001$) was found to have a statistically significant negative (-) effect on Internet activity. As a result of analyzing the standardized regression coefficient (β), it was found that hedonic innovation ($\beta=.141$) had a greater impact on Internet activity than social innovation ($\beta=.059$). In the case of the moderating effect of privacy concern, as a result of the individual regression coefficient test, all interaction terms were found to be statistically insignificant at the significance level of 0.05, indicating that there was no moderating effect.

Tables 2. Regression analysis of main effect and moderating effect on internet activity before COVID-19

Step/Variable	Before COVID-19 (2019)				
	B	SE	β	t	p
Step 1: Control variable (F: 10.72***; R ² :.035)					
(a constant)	1.137	.024		46.941	.000***
20's	.050	.034	.049	1.500	.134
30's	.122	.038	.097	3.223	.001***
40's	.070	.034	.064	2.052	.040
50's	.005	.035	.004	.138	.890
60+	-.054	.045	-.026	-1.195	.232
university graduation	.108	.021	.111	5.206	.000***
Graduate school or higher	.074	.058	.024	1.292	.196
Less than 2 million won	-.015	.026	-.012	-.582	.560
Less than 2-3 million won	.023	.023	.022	.988	.323
Less than 3-4 million won	-.008	.028	-.006	-.281	.779
over 4 million won	.090	.034	.056	2.646	.008***
Step 2: Main Effects (F: 12.83***; R ² :.064)					
(a constant)	1.133	.024		46.555	.000***
20's	.057	.033	.055	1.175	.086
30's	.140	.038	.112	3.712	.000***
40's	.092	.034	.085	2.704	.007***
50's	.040	.035	.033	1.133	.257
60+	-.008	.045	-.004	-.189	.850
university graduation	.097	.021	.100	4.703	.000***

Graduate school or higher	.066	.057	.021	1.150	.250
Less than 2 million won	-.020	.025	-.016	-.804	.421
Less than 2-3 million won	.017	.023	.016	.720	.471
Less than 3-4 million won	-.019	.028	-.015	-.692	.489
over 4 million won	.063	.034	.039	1.877	.061
Functional innovation (A)	.014	.012	.031	1.171	.242
Hedonic innovation (B)	.065	.011	.141	6.005	.000***
Social Innovation (C)	.027	.013	.059	2.149	.032*
Cognitive Innovation (D)	-.041	.013	-.089	-3.248	.001***
Self-Esteem (E)	.009	.009	.020	1.070	.285
Need for cognition (F)	.014	.009	.030	1.510	.131
Step 3: Interaction effect (F: 9.689***; R ² :.068)					
(a constant)	1.136	.025		46.380	.000***
20's	.059	.033	.057	1.754	.080
30's	.141	.038	.113	3.751	.000***
40's	.089	.034	.082	2.618	.009**
50's	.038	.035	.032	1.085	.278
60+	-.008	.045	-.004	-.169	.866
university graduation	.095	.021	.098	4.620	.000***
Graduate school or higher	.059	.057	.019	1.030	.303
Less than 2 million won	-.024	.025	-.020	-.954	.340
Less than 2-3 million won	.017	.023	.016	.727	.467
Less than 3-4 million won	-.020	.028	-.015	-.708	.479
over 4 million won	.061	.034	.038	1.824	.068
Functional innovation (A)	.012	.012	.027	.994	.320
Hedonic innovation (B)	.063	.011	.137	5.845	.000***
Social Innovation (C)	.024	.013	.052	1.904	.057
Cognitive Innovation (D)	-.039	.013	-.086	-3.133	.002**
Self-Esteem (E)	.009	.009	.019	1.020	.308
Need for cognition(F)	.016	.009	.034	1.736	.083
privacy concerns (G)	.025	.009	.055	2.913	.004**
AXG	-.009	.012	-.022	-.0769	.442
BXG	.004	.010	.010	.412	.681
CXG	-.004	.012	-.011	-.370	.711
DXG	.007	.013	.015	.507	.613
EXG	-.015	.008	-.034	-1.788	.074
FXG	.001	.008	.003	.134	.893

* $p<.05$, ** $p<.01$, *** $p<.001$

2. Impact on social media activity before COVID-19

Social innovation ($B=.253$, $t=4.479$, $p=.000$) and cognitive innovation ($B=.118$, $t = 2.089$, $p = .037$) was found to have a statistically significant positive (+) effect on SNS activity. Also, according to the standardized regression coefficient (β), social innovation ($\beta=.119$) had a greater impact on SNS activity than cognitive innovation ($\beta=.056$). In the case of the moderating effect of privacy concern, as a result of the individual regression coefficient test, all interaction terms were found to be statistically insignificant at the significance level of 0.05, indicating that there was no moderating effect. In the case of the moderating effect of privacy

concern, cognitive innovation ($B=.118$, $t=2.107$, $p=.035$) and privacy concern ($B=.214$, $t=5.534$, $p=.000$), and the interaction term ($B=.116$, $t=1.987$, $p=.047$) were all found to have a statistically significant positive (+) effect at the significance level of .05, indicating a moderating effect. In the relationship between cognitive innovation and Internet activity, it was found that the increase in Internet activity according to the change in cognitive innovation was larger in the case where privacy concern was higher than in the case where privacy concern was low, and it can be interpreted that there is a strengthening effect of the moderating variable.

Tables 3. Regression analysis of main effect and moderating effect on SNS activity before COVID-19

Step/Variable	Before COVID-19 (2019)				
	B	SE	B	t	B
Step 1: Control variable (F: 28.997***, R ² :.090)					
(a constant)	4.426	.109		40.745	.000***
20's	-.262	.151	-.055	-1.737	.082
30's	-.457	.169	-.079	-2.706	.007**
40's	-1.325	.153	-.263	-8.634	.000***
50's	-1.454	.157	-.262	-9.259	.000***
60+	-1.745	.202	-.183	-8.649	.000***
university graduation	.280	.093	.062	3.021	.003**
Graduate school or higher	-.044	.259	-.003	-.172	.863
Less than 2 million won	.273	.115	.048	2.366	.018*
Less than 2-3 million won	.145	.105	.030	1.382	.167
Less than 3-4 million won	-.057	.127	-.010	-.452	.652
over 4 million won	-.051	.152	-.007	-.333	.739
Step 2: Main Effects (F: 23.075***, R ² :.109)					
(a constant)	4.448	.110		40.582	.000***
20's	-.322	.151	-.067	-2.135	.033*
30's	-.505	.170	-.087	-2.980	.003**
40's	-1.329	.154	-.264	-8.645	.000***
50's	-1.435	.158	-.258	-9.108	.000***
60+	-1.690	.202	-.177	-8.367	.000***
university graduation	.291	.093	.065	3.142	.002**
Graduate school or higher	.044	.257	.003	.173	.863
Less than 2 million won	.281	.114	.049	2.456	.014*
Less than 2-3 million won	.116	.104	.024	1.119	.263
Less than 3-4 million won	-.084	.127	-.014	-.662	.508
over 4 million won	-.077	.152	-.010	-.510	.610
Functional innovation (A)	-.042	.055	-.020	-.759	.448

Hedonic innovation (B)	-.047	.048	-.022	-.961	.337
Social Innovation (C)	.253	.057	.119	4.479	.000***
Cognitive Innovation (D)	.118	.056	.056	2.089	.037*
Self-Esteem (E)	-.055	.039	-.026	-1.413	.158
Need for cognition(F)	-.034	.040	-.016	-.852	.395
Step 3: Interaction effect (F: 12.998***, R ² :.089)					
(a constant)	4.474	.110		40.742	.000***
20's	-.298	.150	-.062	-1.987	.047
30's	-.475	.169	-.082	-2.811	.005**
40's	-1.325	.153	-.263	-8.653	.000***
50's	-1.434	.157	-.258	-9.138	.000***
60+	-1.679	.201	-.176	-8.354	.000***
university graduation	.274	.092	.061	2.968	.003**
Graduate school or higher	-.022	.256	-.001	-.084	.933
Less than 2 million won	.238	.114	.042	2.089	.037*
Less than 2-3 million won	.102	.104	.021	.981	.327
Less than 3-4 million won	-.091	.126	-.015	-.723	.470
over 4 million won	-.101	.151	-.014	-.667	.505
Functional innovation (A)	-.069	.055	-.033	-1.261	.208
Hedonic innovation (B)	-.065	.048	-.031	-1.343	.179
Social Innovation (C)	.239	.056	.113	4.233	.000***
Cognitive Innovation (D)	.118	.056	.056	2.107	.035*
Self-Esteem (E)	-.065	.039	-.031	-1.655	.098
Need for cognition(F)	-.017	.040	-.008	-.420	.675
privacy concerns (G)	.214	.039	.101	5.534	.000***
AXG	-.043	.053	-.023	-.801	.423
BXG	-.054	.043	-.029	-1.239	.215
CXG	-.044	.052	-.023	-.831	.406
DXG	.116	.058	.059	1.987	.047*
EXG	-.057	.038	-.028	-1.515	.130
FXG	.043	.037	.021	1.146	.252

* $p<.05$, ** $p<.01$, *** $p<.001$

3. Impact on internet activity after the COVID-19

As factors influencing Internet activity in 2021, the period after the outbreak of COVID-19, functional innovation ($B=.037$, $t=2.709$, $p=.007$) and hedonic innovation ($B=.059$, $t=4.870$, $p=.000$), and need for cognition ($B=.037$, $t=3.697$, $p=.000$) were found to have a statistically significant positive (+) effect on Internet activity. Cognitive innovation ($B=-.065$, $t=-4.666$, $p=.000$) was shown to have a statistically significant negative (-) effect on Internet activity. In the case of the moderating effect of privacy concern, functional innovation ($B=.036$, $t=2.679$, $p=.007$) and privacy

concern ($B=.087$, $t=9.789$, $p=.000$), and the interaction term ($B=.044$, $t=3.504$, $p=.000$) were all found to have a statistically significant positive (+) effect at the significance level of 0.05, indicating a moderating effect. In the relationship between functional innovation and Internet activity, it was found that the increase in Internet activity according to the change in functional innovation was larger in the case where privacy concern was higher than in the case where privacy concern was low, which can be interpreted as having an effect of strengthening the moderating variable. Need for cognition ($B=.041$, $t=4.098$, $p=.000$), privacy concern ($B=.087$, $t=9.789$, $p=.000$), and interaction terms ($B=.025$, $t=2.642$, $p=.008$) were all found to have a statistically significant positive (+) effect at the significance level of 0.05, indicating a moderating effect.

Tables 4. Regression analysis of main effect and moderating effect on internet activity after COVID-19

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
Step 1: Control variable (F: 6.258***, R ² :.021)					
(a constant)	1.218	.027		45.020	.000***
20's	.006	.038	.005	.156	.876
30's	.023	.042	.016	.542	.588
40's	.060	.038	.050	1.581	.114
50's	.021	.039	.016	.537	.5901
60+	-.043	.050	-.019	-.860	.390
university graduation	.121	.023	.112	5.236	.000***
Graduate school or higher	.074	.064	.021	1.145	.252
Less than 2 million won	-.080	.029	-.058	-2.777	.006***
Less than 2-3 million won	-.036	.026	-.031	-1.371	.170
Less than 3-4 million won	-.003	.032	-.002	-.100	.921
over 4 million won	.038	.038	.021	1.007	.314
Step 2: Main Effects (F: 9.701***, R ² :.049)					
(a constant)	1.219	.027		44.866	.000***
20's	.014	.037	.012	.378	.706
30's	.040	.042	.029	.954	.340
40's	.083	.038	.068	2.170	.030*
50's	.056	.039	.042	1.443	.149
60+	.003	.050	.001	.061	.951
university graduation	.104	.023	.097	4.535	.000***
Graduate school or higher	.055	.064	.016	.866	.387
Less than 2 million won	-.086	.028	-.062	-3.023	.003**
Less than 2-3 million won	-.045	.026	-.039	-1.763	.078
Less than 3-4 million won	-.021	.031	-.015	-.676	.499
over 4 million won	.006	.038	.003	.152	.879
Functional innovation (A)	.037	.014	.073	2.709	.007**
Hedonic innovation (B)	.059	.012	.115	4.870	.000***
Social Innovation (C)	.026	.014	.051	1.861	.063
Cognitive Innovation (D)	-.065	.014	-.128	-4.666	.000***
Self-Esteem (E)	.007	.010	.014	.725	.468
Need for cognition(F)	.007	.010	.073	3.697	.000***
Step 3: Interaction effect (F: 12.998***, R ² :.089)					
(a constant)	1.224	.027		45.815	.000***

20's	.023	.037	.020	.620	.536
30's	.044	.041	.032	1.066	.287
40's	.087	.037	.072	2.325	.020*
50's	.058	.038	.043	1.505	.132
60+	.006	.049	.003	.127	.899
university graduation	.093	.023	.086	4.107	.000***
Graduate school or higher	.021	.063	.006	.339	.735
Less than 2 million won	-.090	.028	-.065	-3.234	.001**
Less than 2-3 million won	-.046	.025	-.040	-1.811	.070
Less than 3-4 million won	-.015	.031	-.010	-.480	.631
over 4 million won	-.005	.037	-.003	-.147	.883
Functional innovation (A)	.036	.013	.071	2.679	.007**
Hedonic innovation (B)	.052	.012	.103	4.407	.000***
Social Innovation (C)	.024	.014	.048	1.775	.076
Cognitive Innovation (D)	-.062	.014	-.121	-4.489	.000***
Self-Esteem (E)	-.002	.010	-.004	-.197	.844
Need for cognition(F)	.041	.010	.080	4.098	.000***
privacy concerns (G)	.087	.009	.170	9.759	.000***
AXG	.044	.012	.088	3.504	.000***
BXG	.002	.012	.004	.155	.877
CXG	-.011	.014	-.021	-.776	.438
DXG	.004	.013	.007	.287	.774
EXG	.005	.009	.009	.485	.628
FXG	.025	.009	.051	2.642	.008**

* $p<.05$, ** $p<.01$, *** $p<.001$

4. Impact on social media activity after COVID-19

As a factor influencing SNS activity in 2021, the period after the outbreak of COVID-19, need for cognition ($B=.215$, $t=5.268$, $p=.000$) in the main effect had a statistically significant positive (+) effect on SNS activity. appeared to have an effect. In the case of the moderating effect of privacy concern, need for cognition ($B=.238$, $t=5.960$, $p=.000$), privacy concern ($B=.431$, $t=11.986$, $p=.000$), and interaction term ($B=.431$, $t=11.986$, $p=.000$) =.115, $t=3.015$, $p=.003$) were all found to have a statistically significant positive (+) effect at the significance level of 0.05, and it was analyzed that there was a moderating effect. In the relationship between need for cognition and SNS activity, it was found that the case of high privacy concern showed a larger increase in SNS activity according to the change in the need for cognition, and it can be interpreted that there is a strengthening effect of the moderating variable.

Tables 5. Regression analysis of main effect and moderating effect on SNS activity after COVID-19

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
Step 1: Control variable (F: 28.997***, R ² :.090)					
(a constant)	4.229	.110		38.518	.000***
20's	-.129	.145	-.027	-.891	.373
30's	-.456	.155	-.080	-2.947	.003**
40's	-.970	.140	-.194	-6.914	.000***
50's	-.873	.142	-.159	-6.138	.000***
60+	-1.334	.192	-.141	-6.940	.000***
university graduation	.396	.091	.089	4.341	.000***

Graduate school or higher	.232	.257	.016	.903	.367
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Step 2: Main Effects (F: 23.075***; R ² :.109)					
(a constant)	4.280	.111		38.450	.000***
20's	-.126	.146	-.027	-.864	.388
30's	-.479	.157	-.083	-3.051	.002**
40's	-.960	.141	-.192	-6.782	.000***
50's	-.861	.144	-.156	-5.988	.000***
60+	-1.279	.193	-.135	-6.616	.000***
university graduation	.316	.092	.071	3.434	.001**
Graduate school or higher	.124	.258	.009	.479	.632
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Functional innovation (A)	.008	.056	.004	.141	.888
Hedonic innovation (B)	.048	.049	.023	.976	.329
Social Innovation (C)	.063	.057	.030	1.093	.274
Cognitive Innovation (D)	-.010	.057	-.005	-.181	.857
Self-Esteem (E)	-.073	.040	-.035	-1.821	.069
Need for cognition(F)	.215	.041	.102	5.268	.000***
Step 3: Interaction effect (F: 12.998***; R ² :.089)					
(a constant)	4.342	.109		39.999	.000***
20's	-.102	.142	-.021	-.718	.473
30's	-.467	.153	-.081	-3.057	.002**
40's	-.970	.138	-.194	-7.044	.000***
50's	-.883	.140	-.160	-6.311	.000***
60+	-1.291	.188	-.137	-6.871	.000***
university graduation	.256	.090	.058	2.841	.005**
Graduate school or higher	-.025	.251	-.002	-.100	.920
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Functional innovation (A)	-.002	.055	-.001	-.028	.978
Hedonic innovation (B)	.014	.048	.007	.301	.763
Social Innovation (C)	.050	.056	.024	.886	.376
Cognitive Innovation (D)	.024	.056	.012	.437	.662
Self-Esteem (E)	-.097	.039	-.046	-2.496	.013*
Need for cognition(F)	.238	.040	.113	5.960	.000***
privacy concerns (G)	.431	.036	.205	11.986	.000***
AXG	-.068	.051	-.033	-1.332	.183
BXG	-.174	.047	-.086	-3.680	.000***

CXG	.036	.055	.017	.645	.519
DXG	.172	.053	.082	3.237	.001**
EXG	-.075	.038	-.036	-1.956	.051
FXG	.115	.038	.057\	3.015	.003**

* $p < .05$, ** $p < .01$, *** $p < .001$

Conclusion

As a result of this study, the most distinctive difference when comparing before and after COVID-19 is that during COVID-19, the increase in Internet activity and SNS activity increases according to the positive (+) effect of need for cognition. In addition, it was found that the increase in Internet and SNS activity increased in the case of high privacy concern according to the positive (+) change in need for cognition. In the average difference in Internet and SNS activity before and after COVID-19, it was found that need for cognition had a positive (+) significant effect in the main effect, and need for cognition were positive (+) in the moderating effect for the average difference in SNS activity was analyzed to have a positive effect. Need for cognition, which did not have a significant effect on Internet and SNS activity before COVID-19, appear as a factor that has a significant effect during the period of COVID-19, such as activity restrictions due to social distancing quarantine guidelines, work and learning, etc. The cause can be found in the acceleration of digital transformation in the field. In a situation where existing ways of daily life such as leisure, exercise, work, and study are restricted due to social distancing quarantine measures, individuals may have increased cognitive desire to explore new alternative ways. It is interpreted that the active use of online media as a source of information to explore these new alternatives may have served as a cause of increasing online activity during the COVID-19 period.

The digital transformation that affected society during the COVID-19 period centered on the use of online tools, accelerating the existing methods of interpersonal communication, collaboration, learning, and consumption into digitalization, and in this process, learning of online tools inevitably would have entailed. Even in the elderly, who have relatively low digital capabilities and acceptance, they would have had to learn at least how to use vaccine authentication using mobile in order to use essential living facilities during the social distancing period. In this way, during a pandemic such as COVID-19, people are restricted by quarantine measures and become more active on the Internet and SNS to seek new alternatives in a changed living environment. When companies inform and provide products and services to consumers during the pandemic, it is important to emphasize that their products and services can be a new alternative in a situation where the lifestyle of consumers is being restricted by quarantine measures. It can be seen as important, and it is necessary to diversify the media and means to provide information according to the characteristics of need for cognition that search for various information sources.

Functional innovation is also a major factor influencing the increase in Internet activity during COVID-19,

emphasizing that it is useful and practical in terms of functionality when companies use Internet media to inform and provide products and services during COVID-19. It is necessary to emphasize that the focus on the usefulness and practicality of these Internet activities can be a new alternative in everyday life restricted by quarantine measures.

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Bridging the Gap: A Comparative Study on Social Media Activities Among Avid and Casual Gamers

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Abstract

E-sports, closely linked to social media, is heavily influenced by its users. Previous research in engagements with social media among gamers has little interest in the habits of casual gamers. This study aims to bridge that gap by exploring various activities on social media from both avid and casual gamers. The uses and gratification theory (UGT) serves as the theoretical framework for understanding their media interactions. I collected data on five key social media activities from gamers and non-gamers in China, South Korea, and the US. Findings reveal that both avid and casual gamers have distinctive social media usage patterns compared to non-gamers. Interestingly, casual gamers' social media activities overlap with avid gamers in two areas and differ in two. One area requires further investigation. These patterns could inform strategies to differentiate and engage both avid and casual gamers. Additionally, systematic monitoring of social media activities may provide insights into shifts from non-gaming to gaming behaviors, and vice versa.

Keywords

Gamers, Social media activities, E-sport, Uses and gratification theory, Virtual world

Introduction

The e-sport world is rich, inhabited by diverse types of players. Avid gamers, who spend a significant portion of their time immersed in gaming, occupy one end of the spectrum. Research has shown that for avid gamers, gaming is not merely a hobby but a crucial part of their lifestyle, identity, and social interactions. They derive a sense of fulfillment and gratification from their gaming experiences, which can contribute to their overall well-being [17]. Casual gamers, on the other end, approach gaming with a different perspective. These individuals consider gaming as one of many leisure activities they take part in. The amount of time, involvement, and social interaction surrounding games is significantly lower for casual gamers when compared to avid gamers.

Previous studies have shed light on the variations in social media behavior between individuals who actively participate in video games and those who do not partake in gaming activities. These research findings hint that gamers are likely to dedicate more of their time to online platforms compared to non-gamers [10, 3]. Furthermore, they exhibit heightened levels of interaction with others on these platforms and are at increased risk of developing symptoms associated with addiction to social media influences [1]. This study observes that the literature

largely focuses on psychological issues of avid gamers and coarsely views social media when online activities are considered.

More research into the cross interaction between social media behaviors and various gaming intensities is vital. This study seeks to illuminate the variance in patterns of social media use across a range of gaming intensities, and the potential implications these patterns have for various industries. The insights of this study can be crucial for game developers, helping them tailor their marketing strategies, game design, and online features to resonate with different segments of the gamer. The healthcare sector could greatly benefit from this research. The insights gleaned could inform early interventions for potential gaming disorders. They could also guide the development of tailored therapeutic strategies. Policymakers also have much to gain from these findings as they navigate legislation in education, consumer protection, and public health [5, 13]

Uses and gratification theory is utilized as a guiding paradigm for this study. I explore deeper into the social media usage patterns of both avid and casual gamers through an examination of data collected from gamers and non-gamers in China, South Korea, and the United States. The data provides a glimpse into five key social

media activities and helps us draw comparisons between gamers based on their levels of engagement.

In the following section, the theoretical foundation discusses what gratification is indulged by social media users and gamers. Hypotheses are formulated at the intersection of gaming intensity and social media activities. The next section involves methodology covering everything from data collection to statistical analysis. The section before the last offers the results from the analysis. The last section presents implication and limitation and brings closure to this study.

Theoretical foundation

The Uses and Gratification Theory (UGT)

This study believes that gamers partake in social media to integrate themselves into virtual societies. It uses the uses and gratification theory (UGT) as the theoretical background. UGT is a communication theory that focuses on understanding how individuals actively choose and use media to satisfy their psychological and social needs and to achieve their personal goals. At its core, UGT underscores the active role of the media user, who is driven not just by the media content itself, but by their individual needs and the gratification derived from meeting those needs through selective media use. The term “uses” refers to the motivated actions taken by individuals when actively selecting and engaging with specific media sources, while the term “gratification” represents the fulfillment these users derive from such engagement. The theory emphasizes that these actions are intentional and goal-oriented, targeting the unique gratifications offered by each media source. It’s important to note, however, that “uses” in UGT do not imply frequency or intensity of media engagement. While frequency and intensity could potentially reflect the level of reliance on specific media to fulfill certain gratifications, they are not the primary focus of UGT. Rather, this theory prioritizes understanding why people use media and highlighting the purposes and implications of their media interactions.

Social media

According to UGT, people take an active role in selecting specific media content based on their individual preferences, motivations, and goals. It suggests that individuals use social media for various gratification [19]. There are five major social media activities, and each activity offers complemented gratifications.

Commenting

Participating through comments on social media can meet several gratifications. Firstly, individuals may find the social interaction element appealing. Commenting offers a channel for social engagement, allowing users to connect and interact with others in their community. Additionally, commenting serves as a conduit for information sharing. As users contribute their insights or

access new perspectives from others, they satisfy their desire for knowledge acquisition and distribution. Lastly, commenting provides an avenue for self-expression. Through their comments, users can voice their opinions, feelings, and experiences, meeting their need for self-expression and identity creation.

Following

Following people on social media addresses multiple gratifications. Firstly, information seeking, users follow others to stay informed of content pertaining to their interests. This activity caters to the users’ desire for knowledge and understanding of the community at large. Secondly, personal identity, the accounts a user chooses to follow often reflect his/her values, interests, and beliefs [6]. As such, the act of following can affirm and bolster one’s personal identity. It’s a way of associating with groups or ideas that users connect with on a fundamental level, creating a social identity that is displayed to the world. Lastly, entertainment, users often follow accounts that provide content which amuses or captivates them. The act of following individuals or accounts that provide such content is a way for users to gain consistent access to personalized entertainment.

Liking

Liking posts on social media serves three crucial gratifications. First, it allows for the expression of personal identity. As users “like” content that mirrors their preferences and beliefs, they are signaling who they are to their network. Secondly, liking posts offers emotional release. This activity can engage users emotionally and offer personal satisfaction, aligning with the escapist aspect of UGT [7]. Finally, this action is a component of social interaction. By liking posts, users are not only connecting with others but also often start conversations or signal support. Furthermore, it can be an act of appreciation or a way of maintaining contact.

Posting

Posting messages on social media aids in information sharing, personal identity formation, and social integration. Users distribute ideas, news, and personal updates, gratifying their need to exchange and disseminate information, aligning with UGT’s premise of media as a platform for communication. Concurrently, these posts also serve as digital identity formation tools. Posted content indicates unique preferences and offers personal insights, driving identity manifestation. Lastly, these posts encourage social interaction and integration within the online community, promoting dialogues and sustaining connections. Posts encourage discussion, building social relationships and contributing to the feeling of community.

Sharing

The act of “sharing” on social media platforms gratifies users in many ways. First, sharing satisfies the desire for social connectivity. By promoting the dissemination of

various types of information, sharing helps establish a sense of community among users of networks. Furthermore, the idea of self-expression and validation is greatly tied to the sharing activity. Users can carefully position and manipulate their online personas through the content they decide to share. The more positive feedback users receive from the shared content, the more validated they feel. Lastly, the activity of sharing plays an instrumental role in the rendition of information exchange. When users share content, they are actively contributing to an ecosystem, satisfying the information needs of the network.

Gaming

There is no concrete agreement on who constitutes different levels of gaming activity. This study broadly categorized the activity into avid gaming, casual gaming, and non-gaming. UGT suggests that individuals seek out gaming to fulfill their needs and obtain gratifications [11]. UGT explains different levels of gaming based on the posit that different intensities demonstrates individuals' diverse needs and motivations in seeking contents and experiences.

Avid gamers

These gamers consistently spend a significant portion of their free time engaging in complex, multiplayer online games. UGT would suggest that they are drawn to gaming primarily for gratifications like escapism, entertainment, challenge, and social interaction that multiplayer games can provide. They may also find a sense of personal identity within gaming communities.

Casual gamers

They occasionally play easy-to-learn mobile games during their commute or in between work periods. These brief gaming activities provide brief entertainment and relaxation. Gaming serves to fill gaps in time rather than constituting a primary leisure activity. This behavior, according to UGT, demonstrates casual gamers' primary gratification needs related to casual entertainment and stress relief.

Non-Gamers

Their gratification needs are likely met through alternative forms of media or activity. For example, the need for entertainment could be satisfied by watching shows or movies or reading books. Non-gamers might find social interaction through social media platforms or in-person gatherings. The need for escapism or relaxation could be fulfilled through activities like travel, exercise, or hobbies. Essentially, non-gamers' choice of activity or media consumption doesn't involve gaming but rather alternatives.

Interplaying between gaming intensity and social media activity

UGT suggests that social media activities lead to a set of gratifications. Some gratifications intertwined as

individuals engage in various activities. In teams of gaming, this theory postulates that gamers' motivations, such as entertainment, information-seeking, social interaction, and leisure, underpin their degree of gaming engagement.

To draw an initial comparison, this study employs UGT to shed light on the differences in social media behaviors between gamers and non-gamers. This theory lays a foundation that social media usages are driven by the desire to fulfil certain needs. An examination of desires and gratifications of both gamers and non-gamers can create a clearer picture of the divergence in their motivations and, thus, social media behaviors.

This study proposes that gamers, including both avid and casual gamers, might use social media platforms for entertainment and information exchange specifically related to their gaming interest. It enables them to inquire deeper into their chosen games, connect with fellow gamers, or share insights. Gratifications are drawn from the activities. On the other hand, non-gamers use social media primarily for more general goals such as tuning into news, maintaining connections with friends and family, sharing life events, or indulging in passive forms of entertainment like streaming movies or shows. This group might also participate in online communities according to their hobbies, interests, or social circles.

Based on the discussion above, it is inferred that the gratifications sought from social media use differ between gamers and non-gamers. As a result, motivations are differentiated between the two groups. Studies show that highly focused gratification leads to heightened motivation [4]. Thus, this study proposes an initial comparison expecting that the concentration of gratifications around gaming may result in an active social media involvement from gamers more than non-gamers.

Baseline proposition: *Gamers actively participate in social media more than non-gamers.*

This proposition for initial comparison will be tested during hypothesis testing, using various social media activities. After the comparison, this study moves to distinguish between avid and casual gamers, and their respective social media motives. This move is to close the gaps in literature. Both groups of gamers could share similar gratifications but express them differently on social media. This study theorizes how gratifications and motives compel different levels of gamers to engage on social networking platforms through commenting, following, liking, posting, and sharing.

Commenting

This study follows UGT and analyzes "commenting" activity through the three gratifications mentioned earlier.

Social interaction is the first gratification. For avid gamers, engaging in commenting activity is often seen to connect with their gaming community which gives them a sense

of belonging. Casual gamers may show less frequency of commenting compared to avid gamers when it comes to gaming topics, but they too engage in social interactions on a wide array of topics that interest them.

Moving on to the second gratification, information sharing. Avid gamers may use the commenting function to share information or knowledge about games such as updates, strategies, and reviews. Casual gamers, with a varied range of interests, could be sharing information about other topics, including but not limited to gaming.

Lastly, the third gratification is self-expression. Commenting serves as a space for self-expression. Avid gamers might express their identity, enthusiasm, and expertise about specific games or gaming culture. On the other hand, casual gamers might use it to express a broader range of interests and opinions, thus reflecting their diverse engagements.

Therefore, although the content might differ, the level of activity in terms of information sharing could be equally vibrant for both groups.

Hypothesis 1: Both avid and casual gamers are equally active in commenting on social media.

Following

Avid gamers demonstrate a gratification media usage profile that is well aligned with personal identity, information seeking, and entertainment. For instance, when constructing personal identity, these gamers mostly follow gaming pages, influencers, or communities that reflect or validate their gaming identities. They build their identity around gaming preferences and affiliations. Information seeking is another prominent motive that translates into avid gamers following various game developers, industry insiders, or competitors to stay updated with the latest developments or strategies. Finally, for entertainment, avid gamers usually follow gaming personalities, memes, and other entertaining gaming content.

On the other hand, casual gamers also display their unique “following” behavior bounded by the three gratifications, albeit with different motivations and behaviors. Their personal identity online may not be heavily gaming-focused, and it often seems more diverse. Casual gamers would typically follow a variety of accounts representing their broader interests, while some are based on their gaming interests. In terms of information seeking, casual gamers show a more restrained pattern. They might stick to basic updates or high-level industry news. For entertainment, casual gamers with their varied interests, might follow a mixture of gaming and non-gaming related accounts.

Hence, while UGT applies to both types of gamers, its manifestation differs based on their unique relationship with gaming and its impact on their “following” activity. The “following” profile of avid gamers requires them to be more up to date when compared to their casual

counterparts. Therefore, this study is expecting the following hypothesis.

Hypothesis 2: Avid gamers are more active in following on social media than casual gamers do.

Liking

UGT finds personal identity, emotional release, and personal satisfaction gratify social media users. Regarding personal identity, avid gamers may use linking activities to assert their identity by engaging with content that reflects the games they play and their personal gaming skills. Casual gamers may not define themselves as strictly around gaming as their counterparts. However, they can still find identity-related gratification through the sharing of content that both gaming interests and other interests.

Considering the second gratification, emotional release, avid gamers can use social media to convey frustrations or to share successes [2]. Casual gamers may do the same with different intensity. The emotional release might not be proportional to their gaming passion, making this feature common and possibly equal between both groups of gamers.

Moving to the last gratification, personal satisfaction, both avid and casual gamers could gain personal satisfaction from engaging with gaming content and affiliated social interactions. This engagement gives them a sense of accomplishment and affirmation of their choices, regardless of the time spent gaming.

Based on UGT, we can infer that both types of gamers can find personal identity, emotional release, and personal satisfaction gratification in an equally active social media linking behavior, despite their difference in gaming intensity.

Hypothesis 3: Both avid and casual gamers are equally active in linking on social media.

Posting

Three gratifications are used to rationalize how avid and casual gamers exercise their posting on social media.

Information sharing is the first gratification. Avid gamers with their superior gaming experiences may frequently share insights, strategies, or game related opinions. Casual gamers may also share information. However, their less immersive engagement with gaming might lead to less frequent posts.

The next gratification is digital identity. For avid gamers, their gaming identity could be a more significant part of their overall identity, and they may express it frequently through social media posts. Casual gamers may also form a part of their identity around gaming, but the formation might not be as dominant or frequently expressed as their avid counterparts.

Social integration is the last gratification. Avid gamers might post more frequently to foster a sense of belonging

in their gaming communities. On the other hand, casual gamers might not feel a strong need for social validation within gaming communities. This leads casual gamers to less active posting.

Therefore, it's plausible that avid gamers are more active in social media posting due to their entrenched engagement with gaming compared to casual gamers.

Hypothesis 4: Avid gamers are more active in posting on social media than casual gamers do.

Sharing

Avid gamers could actively use social media for sharing, according to UGT. This could stem from a desire to strengthen social connectivity with their gaming communities, which is possible through regular content sharing. Through self-expression gratification, avid gamers might strengthen their efforts on social media sharing. They express personality through sharing achievements, game reviews, and strategies. Additionally, avid gamers may actively engage in content sharing to demonstrate their expertise and knowledge about game strategies and updates. This activity forms the core of their information exchange gratification.

In contrast, casual gamers, though they also engage in similar behaviors, might do so to a lesser extent due to their less immersive relationship with gaming. They might seek social connections and participate in building communities, but perhaps with less frequent or less in-depth sharing. While casual gamers may also express their gaming experiences through social media, self-expression might be less frequent or less intense due to the less central role of gaming in their social identities. When information exchange is considered, casual gamers might partake in less in-depth sharing or do so less frequently due to their being less immersed in gaming.

In conclusion, the distinct patterns of engagement in social media activities between avid and casual gamers provide recognition for differentiating needs between the two groups.

Hypothesis 5: Avid gamers are more active in sharing on social media than casual gamers do.

Methodology

Data collection

This study collected gaming intensity and social media activities from the global consumer survey (GCS) of Statista. GCS was a global survey organized by Statista covering 55 countries in multi regions. According to GCS methodology [18], Statista paid very close attention to the validity of the survey. Participants between the age of 18 and 64 were carefully selected to represent views of the country. This representation included ethnicity, migration, and sexual orientation. The survey instrument was translated to 39 languages, which were enough to cover local languages of all targeted countries. All survey data was cleaned, verified, and ready to use. Therefore, Statista's GCS was high quality and reliability.

To enhance the relevance with the e-sport industry, this study collected the survey data from China, South Korea, and US. These countries are considered the capitals of e-sports. The collected data covered four years and one quarter, spanning from 2019 to early 2023. It consists of thirteen distinct waves of the survey. Initially, two waves of data were surveyed each year between 2019 and 2020. However, this rate increased to four waves annually for the years 2021 and 2022. The final wave was in early 2023. Table 1a in Appendix A shows the number of participants across the thirteen waves. The number of participants ranged from a thousand at the beginning to several thousand at the later waves. These numbers solidify the representation of the survey results.

This study understood that there was currently no universally accepted definition for categorizing gaming intensity. This study utilized the categorization of the GCS. There are three levels of gaming intensity. First, the heavy gamers who played more than 11 hours a week. The second was light gamers, who played less than 11 hours a week. The classification between avid gamers and casual gamers by time spending on games is practice common and this classification is in line with literature [12]. The last category was the non-gamers. Participants in this category considered themselves not interested in or not applicable to gaming activities. The categorization is mutually exclusive. Therefore, a survey participant identified oneself as either one of heavy gamers, light gamers, or non-gamers. This study mapped heavy gamers to avid gamers and light gamers to casual gamers. The non-gamers category was kept as a reference.

Six social media activities were selected from the GCS. They were commented on posts, followed people, liked other users' posts, posted pictures / videos, posted texts / status updates, and shared posts by other users. It is noteworthy that a theoretical posting activity was manifested into two activities in the GCS database. The social media survey question asked "Which of these things have you done on social media in the past 4 weeks? (multi-pick)". The "past 4 weeks" in the question strongly hints active participation in social media. The collected data was the number of participants in the gamer categories identified themselves with social media activities. The numbers of identified participants were then converted to percentages. An example of collected data is shown in Table 1.

Table 1 - Example of collected data

	Activity	Avid Gamers	Casual Gamers	Non-Gamers
China (Mainland) 2019 Wave 1	Commenting on posts	140 / 302	252 / 644	22 / 109
China (Mainland) 2019 Wave 1	Following people	131 / 302	267 / 644	25 / 109

According to the example, 140 out of 302 avid gamers did “Commented on posts” activity on social media. This portion was converted to 46.36 percent. Another example is that 25 out of the total of 109 non-gamers followed people on social media during 2019 wave 1. This example was translated to about 22.94 percent of non-gamers followed the people during the wave of the survey.

Demographic information

This study gathered two key demographic characteristics of gamers from the database: gender and generation age group. This data served dual purposes. Primarily, it offered an insight into the demographic composition of gamers. A brief examination revealed a male-dominant trend in gaming, with Generations X and Y forming the substantial parts of the e-sport communities. Details of these attributes can be found on Table 2a and Table 3a in Appendix A.

Secondarily, the demographic data was used for cross-validation to enhance the relevance of the study outcomes. Although exhaustive validation was not feasible, preliminary cross-validation with various e-sport publications affirmed the overall demographic trends observed in the e-sport communities. For instance, it was corroborated that the e-sport industry weighs heavily towards males [9, 16] and that the largest demographic groups involved in e-sports are indeed Generation X and Generation Y. This lends validity and relevance to the study’s data.

Statistic method

Given the nature of the data, employing a nonparametric statistical approach is appropriate. This decision stems from the fundamental differences between nonparametric and parametric statistics. The parametric methods rely heavily on data that is normally distributed and maintain other specific underlying assumptions, such as homogeneity of variances. In contrast, nonparametric methods require fewer assumptions and provide more flexibility, making them more robust and reliable when dealing with data that does not fulfill the strict requirements of parametric methods. The use of percentage data commonly violates the assumption of normal distribution, thus necessitating a non-parametric approach [15].

This study implemented Kruskal-Wallis for omnibus hypothesis testing. If the difference was detected, Dunn-Bonferroni post-hoc test was carried out. Hence, in analyzing the social media activities of different gamer types using percentage data, these nonparametric tests likely yield more reliable and valid conclusions. All the statistical testing was executed using SPSS version 28.

Result

The baseline proposition was foremost addressed. The omnibus and pairwise tests across social media activities comparing between non-gamers and gamers

were examined. According to omnibus tests on tables 2 to 7, all tests are statistically significant. Furthermore, all pairwise Dunn-Bonferroni tests between non-gamers and casual gamers, and non-gamers and avid gamers are also statistically significant. These significances strongly indicate that gamers are more active on social media than non-gamers. Therefore, the baseline proposition is supported.

H1 testing is addressed using statistics in Table 2. Omnibus statistical significance is identified ($H=38.43$, $p\text{-value} < 0.001$). Pairwise analysis utilizing the Dunn-Bonferroni post-hoc test between avid gamers and casual gamers with respect to commenting on social media reveals no statistical significance (13.67 , $p\text{-value}=0.226$). Avid gamers and their causal counterparts demonstrated an equal propensity towards leaving comments on social media platforms. The H1 is supported.

Table 2 - Commenting on posts

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	23.98 (16.29-42.54)	N-C: 32.67, $p=0.000$
Casual gamers (C)	41.25 (31.64-49.05)	N-A: 46.33, $p=0.000$
Avid gamers (A)	48.50 (33.74-50.38)	C-A: 13.67, $p=0.226$

* Kruskal-Wallis $H = 38.43$, $p\text{-value} < 0.001$

Presented in Table 3 are statistical data supporting H2. Kruskal-Wallis H indicates statistical significance ($H=62.28$, $p\text{-value} < 0.001$). A significant statistical disparity is indicated by the Kruskal-Wallis H test ($H=62.28$, $p\text{-value} < 0.001$). Subsequently, a post-hoc analysis using the Dunn-Bonferroni method was conducted. It revealed a statistically meaningful difference between avid and casual gamers (21.90 , $p\text{-value}=0.013$). This lends credibility to H2. Avid gamers showed a higher tendency to follow other individuals compared to their more casual counterparts.

Table 3 - Following people

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	27.51 (15.04-29.52)	N-C: 38.90, $p=0.000$
Casual gamers (C)	40.80 (28.84-44.55)	N-A: 60.80, $p=0.000$
Avid gamers (A)	45.61 (36.84-47.15)	C-A: 21.90, $p=0.013$

* Kruskal-Wallis $H = 64.28$, $p\text{-value} < 0.001$

H3 expects no variability in liking activity on social media between avid gamers and casual gamers. This expectation is verified by statistical values in Table 4. The H statistics ($H = 28.94$, $p\text{-value} = 0.001$) show dissimilarities through omnibus testing. However, when performing post-hoc tests to compare specific pairs - in this case, avid and

casual players - no statistical variances were detected (14.41, p-value=0.182), confirming H3. Therefore, both types of gamers were equally active in liking posts by other users.

Table 4 - Liking posts by other users

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	28.44 (24.09-47.96)	N-C: 26.33, p=0.002
Casual gamers (C)	43.42 (38.85-53.23)	N-A: 40.74, p=0.000
Avid gamers (A)	50.32 (46.50-52.93)	C-A: 14.41, p=0.182

* Kruskal-Wallis H = 28.94, p-value < 0.001

To elucidate the H4, statistical values from tables 5 and 6 were examined. The results of omnibus tests from both tables indicate that there are variations across different groups. Further examination using Dunn-Bonferroni test statistics provides partial support for hypothesis H4. When comparing the posting of pictures/videos between avid and casual gamers in Table 5, no statistically significant difference was found (16.95, p-value=0.082). However, when comparing the posting of texts/status updates in Table 6, it was observed that avid gamers are more active than their counterparts with less focus on gaming (24.08, p-value=0.005). Therefore, a detailed analysis indicates that the propensity to post on social media by avid and casual gamers depend on the type of content being posted.

Table 5 - Posting pictures / videos

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	28.70 (21.93-31.92)	N-C: 46.56, p=0.000
Casual gamers (C)	42.58 (35.92-44.70)	N-A: 63.51, p=0.000
Avid gamers (A)	45.77 (37.04-50.12)	C-A: 16.95, p=0.082

* Kruskal-Wallis H = 73.33, p-value < 0.001

Table 6 - Posting texts / status updates

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	23.77 (16.54-26.02)	N-C: 40.46, p=0.000
Casual gamers (C)	34.26 (27.80-36.65)	N-A: 64.54, p=0.000
Avid gamers (A)	39.48 (33.33-41.76)	C-A: 24.08, p=0.005

* Kruskal-Wallis H = 72.11, p-value < 0.001

This study found that there was a significant difference in the level of sharing activity between avid gamers and casual gamers, as shown in Table 7. The Kruskal-Wallis H test yielded statistically significant results (H=39.59, p-value=0.001), confirming the initial expectation that avid gamers would be more active than casual gamers. Further analysis using Dunn-Bonferroni post-hoc tests revealed insights to pairwise comparisons, particularly

between avid and less dedicated gamers. With a Dunn-Bonferroni value of 22.33 and a p-value of 0.011, it can be concluded that there are indeed differences in activity levels between these two groups. Therefore, H5 is validated. Avid gamers exhibited higher levels of engagement when it came to sharing posts on social media compared to their less dedicated counterparts.

Table 7 - Shared posts by other users

	Median (IQR)	Dunn-Bonferroni
Non-gamers (N)	16.81 (8.77-28.41)	N-C: 25.95, p=0.002
Casual gamers (C)	29.81 (16.81-35.30)	N-A: 48.28, p=0.000
Avid gamers (A)	36.25 (23.61-38.81)	C-A: 22.33, p=0.011

* Kruskal-Wallis H = 39.59, p-value < 0.001

Discussion

UGT has served as a tool to explore the motivations and needs driving both gaming and social media activities. However, very few attempts have been made to evaluate the interaction between these two areas. Additionally, most studies have disproportionately focused on avid gamers. This research endeavors to address these limitations and highlight how different gaming intensities associate with social media usage patterns. Hypotheses were formulated around the five primary social media activities. Multi-year social media usage data from gamers in three countries were gathered and analyzed. The resulting insights are as follows:

1. Both avid gamers and their casual counterparts exhibited a similar inclination to leave comments on social media platforms.
2. Avid gamers showed a greater tendency than casual gamers when it came to following other individuals.
3. Both avid and casual gamers are equally active in liking others' posts.
4. The likelihood of posting on social media by both groups depended on the type of content being shared.
5. Notably, avid gamers demonstrated higher levels of engagement when it involved sharing posts on social media as opposed to their less committed counterparts.

The findings of this study indicate that gaming behavior has a significant impact on individuals' interactions on social media. Both avid and casual gamers demonstrate similar levels of engagement through commenting and liking. This similarity suggests a mutual interest in user-generated content. The data also reveal that both types of gamers are influenced by the type of content when deciding to post. This insight highlights the importance of content when engaging with gamers. However, there is a higher tendency for avid gamers to follow others and

share posts. This tendency indicates a more active online social behavior among avid gamers. In summary, there are shared behaviors between these two groups and their level of engagement varies depending on their dedication to gaming and content.

Implication

This deep awareness of the varying behaviors of different segments presents an invaluable opportunity for businesses, particularly in the gaming and marketing industries. While both avid and casual gamers share some activities such as commenting and liking posts, avid gamers display a higher likelihood of following other users and sharing posts. Understanding these insights offers businesses the ability to craft targeted strategies. For instance, content designed for sharing can actively engage avid gamers, while content focused on eliciting comments and likes can appeal to both groups. Essentially, companies must recognize and exploit the obvious parallels and disparities in social media behaviors between these two groups to create a more engaging and customer-centric approach. Recognition and appropriate actions could improve customer connections, increase brand visibility, and potentially lead to greater market traction.

Furthermore, recognizing and catering to the unique behaviors of these gamer groups may also have implications for social psychological well-being. Social media platforms provide a virtual space for gamers to interact, validate, and engage with peers based on common interests. For avid players who tend to be very active and form online social relationships, creating content that promotes sharing and follow-up can enhance a sense of community. As a result, feelings of connectedness and belonging among gamers could be enhanced. For casual players, the opportunity to share by liking and commenting can provide a positive feedback and validation platform and increase self-esteem. Realizing these social and psychological needs can help improve the general health of various levels of players and further prove the importance of targeted content strategies.

Considering concerns from the likes of Ferguson [8] and Lopes et al. [14], the findings of this study suggest that policymakers should recognize positive aspects of online engagement. Policymakers should acknowledge that both avid and casual gamers exhibit active participation on social media platforms, including leaving comments, following others, and liking posts. This engagement can contribute to social connections and a sense of community among gamers. Furthermore, policymakers should promote responsible gaming together with online socializing. This can include raising awareness of the potential risks of excessive gaming and providing resources to gamers to maintain a healthy balance between gaming and other activities, including the use of social media. Lastly, this could be an appropriate time to foster a

positive gaming identity. Policymakers should recognize gaming as a socially constructed identity and promote a positive perception of gamers. This can help combat stereotypes and stigmatization associated with gaming, leading to a more inclusive and supportive environment for gamers.

Limitation and future direction

This study has several limitations that need to be addressed. First, the data used in the study is aggregated data concerning gaming and social media usage across various quarters and regions. Though the data is comprehensive and contains several waves over four years and one quarter (2019-2023). It does not entail individual-level information because of the aggregated nature of the data. This lack of granularity could potentially limit the depth of understanding around specific user behavior.

Second, the study builds on UGT to explore the intersection between social media and gaming. However, there is a limited body of research that has previously engaged with this conceptual approach. The emerging state of this research area might underpin some of the unexpected findings or raise questions about the nature of the relationships uncovered.

To improve on these limitations, future research could focus on gathering individual level data to provide a more in-depth look at the behaviors and motivations of different categories of gamers. This might involve using more qualitative research techniques, such as in-depth interviews or participant observations, or exploring collaborations with gaming platforms to obtain individual user data.

Additionally, as more research is conducted at the crossroads of social media and gaming using UGT, the cross-validation of these findings should become possible. Another approach is trying to triangulate these results with other relevant theories, which could also provide a more holistic view and increase the robustness of the findings.

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Appendix A

Table 1a - Number of participants

	China (Mainland)	South Korea	US
Year 2019 wave 1	1,055	1,049	2,095
Year 2019 wave 2	2,100	2,080	4,181
Year 2020 wave 1	2,093	2,075	4,183
Year 2020 wave 2	2,097	2,086	4,191
Year 2021 wave 1	2,623	2,091	5,058
Year 2021 wave 2	3,109	2,076	5,719
Year 2021 wave 3	3,593	2,062	6,360
Year 2021 wave 4	4,078	2,053	7,020
Year 2022 wave 1	4,032	2,038	7,608
Year 2022 wave 2	4,029	2,036	8,397
Year 2022 wave 3	4,027	2,034	9,210
Year 2022 wave 4	4,019	2,031	9,985
Year 2023 wave 1	4,079	2,024	10,008

Table 2a – Gamers' gender

	China (%)		South Korea (%)		US (%)	
	Male	Female	Male	Female	Male	Female
2019-W1	53.59	46.41	55.44	44.56	52.41	47.59
2019-W2	53.70	46.30	55.63	44.37	52.53	47.47
2020-W1	54.03	45.97	55.76	44.24	52.86	47.14
2020-W2	54.38	45.62	55.65	44.35	52.13	47.87
2021-W1	54.49	45.51	54.60	45.40	52.22	47.78
2021-W2	54.52	45.48	54.51	45.49	51.96	48.04
2021-W3	54.01	45.99	54.14	45.86	51.77	48.23
2021-W4	53.98	46.02	52.93	47.07	51.92	48.08
2022-W1	53.22	46.78	53.50	46.50	52.06	47.94
2022-W2	52.49	47.51	53.72	46.28	51.99	48.01
2022-W3	52.08	47.92	53.75	46.25	52.35	47.65
2022-W4	51.81	48.19	54.95	45.05	52.06	47.94
2023-W1	52.30	47.70	54.77	45.23	51.76	48.24

Table 3a - Gamers' generation age groups

	China (%)				South Korea (%)				US (%)			
	Gen Z	Gen Y	Gen X	Boomer	Gen Z	Gen Y	Gen X	Boomer	Gen Z	Gen Y	Gen X	Boomer
2019-W1	17.65	48.84	30.44	3.07	15.52	38.06	32.36	14.06	20.10	40.64	28.99	10.27
2019-W2	18.15	49.23	29.38	3.25	15.96	38.08	32.52	13.44	20.24	40.07	29.26	10.42
2020-W1	21.87	47.52	24.54	6.07	18.59	35.29	33.67	12.46	21.26	39.84	27.72	11.18
2020-W2	22.12	44.30	25.27	8.31	17.26	33.91	35.05	13.78	20.41	39.11	27.58	12.90
2021-W1	24.27	45.96	24.18	5.58	17.35	34.18	34.38	14.09	21.06	39.39	27.49	12.06
2021-W2	25.23	46.79	24.52	3.45	18.10	34.05	34.44	13.40	21.31	39.88	27.31	11.51
2021-W3	25.93	47.05	24.25	2.77	19.32	33.25	33.71	13.73	21.96	39.98	26.83	11.23
2021-W4	25.94	48.67	23.54	1.86	19.99	33.86	33.40	12.75	22.35	40.20	26.60	10.85
2022-W1	24.11	47.74	25.36	2.78	20.46	34.05	33.71	11.78	23.06	39.93	26.43	10.58
2022-W2	23.27	46.80	26.06	3.87	20.64	33.69	34.44	11.23	23.40	39.81	26.39	10.40
2022-W3	22.12	46.01	27.32	4.55	19.92	34.38	35.06	10.64	23.38	39.79	26.65	10.18
2022-W4	21.61	44.25	28.67	5.47	20.22	34.38	34.66	10.74	23.27	39.87	26.84	10.02
2023-W1	22.10	45.49	27.24	5.17	20.83	34.57	34.57	10.03	23.55	40.00	26.97	9.48

Analyzing the Impact of Reviews Trust on Product and Corporate Trust: Focused on the Trust Transfer Theory

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Abstract

The purpose of this study is to investigate the influence of trust in reviews. Five characteristics of reviews, namely expertise, empathy, recency, usefulness, and objectivity, are set as independent variables, and trust in reviews is set as the mediating variable. The review characteristics of empathy and objectivity were found to have a significant impact on trust in reviews. However, expertise, recency, and usefulness were found to have no influence on the formation of trust in reviews.

Keywords

Review, Characteristics of Review, Trust, Trust Transfer Theory

Introduction

Word-of-mouth (WOM) refers to the exchange of opinions regarding specific products or experiences between individuals (Westbrook, 1987). With the advent and advancement of the internet, WOM has transformed into online word-of-mouth (e-WOM), which signifies the communication of product information on the online platform (Gelb & Johnson, 1995). This transformation has brought about changes in consumer behavior. Consumers, when making purchasing decisions, seek online consumer reviews to gather essential information about products (Zhu & Xiaoquan, 2010), and they rely on such reviews as references before making a purchase (Chevalier and Mayzlin, 2006). Technological progress has facilitated the emergence of a new form of product purchasing, wherein consumers assess and share product information online (Avery et al., 1999).

Due to the significance of reviews in influencing consumer purchases, they have become a crucial resource for consumer marketing and corporate activities (Mayzlin et al., 2014; Chevalier & Mayzlin, 2006). Successful consumer marketing strategies utilizing reviews, pioneered by Amazon (New York Times, 2004), have been adopted by various online platforms such as internet retailers and search engine sites (Chen and Zie, 2008; Lantz, 2019). Unlike recommendation systems managed by companies, reviews are generated based on consumer experiences (Jabr and Zheng, 2014), making them valuable

for establishing customer trust in products offered by businesses (Nielsen Online Global Consumer Study, 2009) and potentially influencing product purchases.

The influence of reviews on consumers has been the subject of various studies examining the relationship between reviews and consumers. Research has been conducted from diverse perspectives, such as analyzing the relationship between product evaluations and consumers' purchase intentions and payments (Sridhar & Srinivasan, 2012; Cheung and Thadani, 2012), investigating how reviews assist consumers' purchase decision-making process on specific websites (Mudambi & Schuff, 2010), exploring the effects of reviews on product and consumer characteristics and purchase intentions (Zhu & Xiaoquan, 2010), and studying fake reviews (Luca and Zervas, 2015).

Because consumers' trust in reviews was formed, consumers' purchases were made with reference to reviews. (Li et al., 2006; Quershi et al., 2009). Consumers strive to reduce risks through relationships with trusted third parties (Mayer et al., 1995), and online reviews serve as a means of communication or a source of trust-building with these third parties. This trust is considered a crucial factor and strategy that can even influence consumers' repurchasing behavior (Flavian et al., 2006; Gefen, 2002). Consequently, the trust formed through reviews is highly important, which is regarded as a manageable aspect from a corporate perspective.

In this study, the Trust Transfer Theory (hereafter TTT) is adopted as the background theory to analyze the flow of trust. TTT refers to the cognitive process in which trust in one specific entity can be transferred to other related entities (Stewart, 2003). That is, TTT is a valuable theory for understanding the essence of trust. This theory has been predominantly applied and utilized in e-commerce and mobile commerce contexts (Cheng et al., 2019; Lu et al., 2010). However, the aim of our research is to investigate whether the trust formed through reviews can be transferred to the trust in related products and companies based on the prior studies that demonstrated the transfer of trust between related entities such as companies and their employees (Doney and Cannon, 1997).

In this study, the five key characteristics of reviews, namely expertise, empathy, recency, usefulness, and objectivity, are set as independent variables, while the trust in reviews is set as the mediating variable. The dependent variables are set as trust in products and trust in companies. The research questions for this study are as follows:

Q1: Which factors of reviews influence the formation of trust?

Theoretical background

Characteristics of reviews

As the importance of online reviews has increased, various forms of review platforms have emerged. Yelp.com is a platform where users can share reviews of various restaurants, while STEAM has grown as a platform for consumers to write reviews about games they have played. These online reviews, also known as Electronic Word of Mouth (e-WOM), differ from traditional face-to-face communication in that they occur on the internet, where consumers share information and experiences about products (Schindler & Bickart, 2002). The e-WOM differs from traditional word-of-mouth in terms of speed, convenience, and the number of people reached (Sun et al., 2006; Cantallops & Salvi, 2014).

The significance of online reviews lies in the fact that these are not information conveyed by companies but rather information generated and transmitted directly by consumers who have used the product or service. As a result, other consumers perceive such information to be highly trustworthy and relevant (Bickart, 2002; Harrison-Walker, 2001). In other words, online reviews serve as a channel for consumers to obtain objective information when they cannot directly examine the product (Dabholkar, 2006).

Online reviews have more purpose than merely disseminating information. They can also provide enjoyment in the process of information exploration for consumers (Mathwick & Ridgon, 2004) and facilitate extended engagement on review platforms (Kumar & Benbasat, 2006). According to a survey conducted in Korea in 2017, 87 percent of consumers check reviews

when making online purchases and approve of the reviews' significance and necessity. (TrendMonitor, 2017). Previous research results suggest that online reviews play various roles. From a business perspective, reviews also hold significant importance due to their substantial impact on various aspects of corporate activities. They play a crucial role in formulating detailed marketing strategies, enhancing customer interactions and loyalty, and facilitating communication with the target market (Cantallops & Salvi, 2014). Therefore, reviews are significant in the realm of corporate activities. The unique online environment accentuates the importance of online reviews (Elliott, 2002).

Online reviews can generally be categorized into positive and negative reviews (Sparks & Browning, 2011). Positive reviews share favorable experiences and recommendations with potential consumers, while negative reviews discourage potential consumers from making purchases based on unfavorable experiences (Hu et al., 2009; Litwin et al., 2008; Mauri & Minazzi, 2013). Some studies have shown that information contained in negative reviews is perceived as more valuable and helpful to potential consumers due to its rarity and unpredictability (Yin, Bond & Zhang, 2014). Therefore, review management is essential in business (Lee & Yang, 2015) because reviews can impact not only product or company image but trust (Mauri & Minazzi, 2013).

Online reviews have evolved beyond being a form of word-of-mouth and can influence both product and company trust. In this study, we focus on examining the characteristics of online reviews, such as expertise, empathy, recency, usefulness, and objectivity.

Trust transfer theory (TTT)

Trust has been extensively studied and discussed in various academic fields, including management, as one of the fundamental factors influencing human interactions (Gambetta, 1988; Rousseau et al., 1998; Oh and Cho, 2016). It is defined as a psychological state that involves accepting risks based on positive expectations or behaviors, and as a belief that others will not engage in malicious actions (Eddleston et al., 2012; Dyer, 2012; Robinson, 1996).

Trust tends to shift from well-known targets to unfamiliar ones (Uzzi, 1996), and in the online context, this characteristic of trust can even facilitate purchase decisions (Quelch & Klein, 1996). This process of trust transfer, based on persuasion theory, can influence consumer behavior in online marketing (Funkhouser, 1984; Milliman & Fugate, 1988; Stewart, 2003). Due to these traits of trust, trust transfer is considered an important and long-term issue in online marketing (Keen, 1997). Trust transfer can be observed in both online and offline contexts. For example, higher trust in courier services can lead to increased trust in the online sites where orders

are placed, which can influence customer satisfaction through the online word-of-mouth effect (Sirdeshmukh et al., 2002). The formation of trust in the online context is attributed to the existence of multiple communities where evaluations are conducted (Bakos & Dellarocas, 2002).

Research on trust transfer in the online context has been conducted in various topics. The earlier studies focused on inter-organizational trust transfer through web pages of two online platforms (Stewart, 2003), and dominated online purchases (Fang et al., 2014). Previous studies have explored diverse topics, including the impact of reviewer characteristics on consumers' positive behavioral intentions (Xu, 2014), the formation of trust relationships between platforms (McKnight et al., 1998), and the trust formation and transfer processes in shared accommodation platform companies (Gutiérrez et al., 2017). Several studies have demonstrated the essential and significant nature of trust formation and transfer in the process of online transactions transitioning to offline products and services, concerning consumers' perceptions of products and companies (Ert et al., 2016; Zamani et al., 2019). Trust, which is an effective and indispensable factor in enhancing long-term relationships between businesses and consumers (Agag & El-Masry, 2016), plays a crucial role.

In this study, we utilize the trust transfer theory to investigate the process by which trust in reviews transfers to trust in products and companies. We set reviews as the starting point for trust formation and measured the trust in reviews through their characteristics. Using that, this study elucidates the aforementioned trust transfer process.

Hypothesis development

Expertise in Reviews

Expertise refers to the ability of an information provider to objectively evaluate the characteristics or performance of a product (McGuire, 1968). In the past, expertise was measured using factors such as specialized knowledge, experience, and qualifications related to the information source (Ohanian, 1990). However, in recent online review research, reviewer expertise has been analyzed by measuring factors such as the number of followers, rankings, and social status within a specific site (Yin et al., 2014; Cheng & Ho, 2015; Craciun & Moore, 2019).

If there are characteristics within online reviews that indicate reviewer expertise, consumers can easily recognize and find more useful reviews (Mackiewicz, 2010). Moreover, as these characteristics increase, reviewers can gain more trust from consumers (Banerjee et al., 2017; Willemsen et al., 2011). Indeed, reviewer expertise has been found to directly influence the trust of reviews (Willemsen et al., 2011).

In this study, expertise is defined based on McGuire's (1968) definition as the ability of experienced consumers to provide valid evaluations of product characteristics or

performance. Building on prior research, we hypothesize the following relationship between reviewer expertise and trust in reviews:

H1-1: Reviewer expertise will be positively associated with trust in reviews.

Empathy in reviews

Empathy refers to the fundamental basis of forming interpersonal relationships in the process of human social life (Redmond, 1989). In the field of management, it is defined as the extent to which two or more individuals agree on the evaluation of products and services (Chiou & Cheng, 2003).

The importance of empathy in online reviews lies in the fact that potential consumers have shown a tendency to trust empathetic expressions formed through online reviews more than the information provided by sellers, ultimately influencing their purchasing attitudes (Chiou & Cheng, 2003).

In this study, empathy is defined as the degree of individual agreement on the review (Chiou & Cheng, 2003), and it is expected to influence the trustworthiness of the review depending on the level of empathy. Based on this, the following hypothesis is formulated:

H1-2: Empathy review will be positively associated with trust in reviews.

Recency in reviews

Considering the fundamental purpose of websites as information dissemination platforms, the presence of up-to-date and high-quality information can lead to positive user attitudes toward websites (DeLone & McLean, 1992; Tandon et al., 2020). The recency of information provided online is one of the crucial indicators for consumers to judge whether it is useful (Madu, 2002). In fact, consumers tend to assess businesses based on the recency of reviews rather than their quantity, with reviews older than three months being considered irrelevant to product-related information (BrightLocal, 2019).

When making decisions, consumers tend to focus more on the most recent information than outdated information (Xie et al., 2016). In other words, through reviews containing the latest information, consumers make purchase decisions for products (Wulff et al., 2015). The location of links within a website has been found to be a significant factor influencing consumers' clicking behavior, with links placed at the top of a page being more likely to be clicked by users (Murphy et al., 2006; Ansari & Mela, 2003). Therefore, the most recent reviews can instill the trust in consumers and influence their purchase decisions for products or services.

In this study, the recency of reviews is defined as the most recent experiences written by consumers that are associated with the post-date of the review (Tandon et

al., 2020; Xie et al., 2016). Based on this, the following hypothesis is formulated:

H1-3: Recency review will be positively associated with trust in reviews.

Usefulness in Review

Review usefulness refers to the perception of consumers that online reviews written by others will be beneficial and helpful to them (Schuckert et al., 2015). The usefulness of reviews is largely influenced by the characteristics of both the product and the review itself (Mudambi & Schuff, 2010). Factors such as the review's rating and length can have an impact, and the usefulness may vary depending on whether the product is an experiential or search good (Liu & Park, 2015).

The significance of review usefulness lies in its role as a criterion for potential consumers to judge the quality of reviews, ultimately influencing their behaviors (Filieri et al., 2018; Li et al., 2019; Salehan & Kim, 2016; Zhao et al., 2019). Some researchers argue that review usefulness represents the most efficient characteristic among a plethora of review information, enabling consumers to save time and effort (Filieri et al., 2018). In other words, higher review usefulness can induce product purchases or certain behaviors, and this process can be interpreted as part of the trust-building process.

In this study, review usefulness is defined as the perception that reviews are beneficial and helpful to consumers (Schuckert et al., 2015). Based on previous research, the following hypothesis is formulated:

H1-4: Usefulness review will be positively associated with trust in reviews.

Objectivity in Review

Consumers, especially when purchasing unknown experiential goods, seek objective information that is applicable to themselves in order to reduce purchase uncertainty (Dai et al., 2020). They may doubt reviews written by fake consumers, such as companies or inexperienced individuals (Chua & Banerhee, 2015), and the reliability of reviews due to the subjective nature of personal opinions expressed in them (Ayeh et al., 2013).

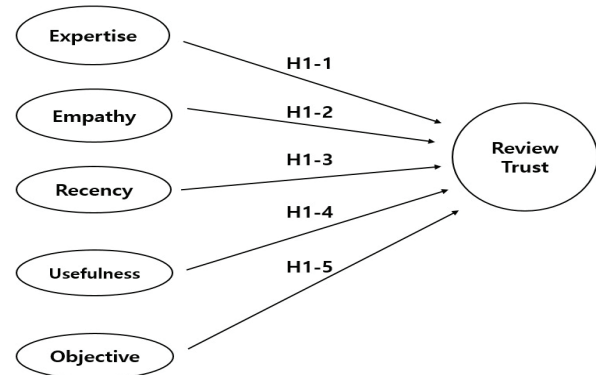
The objectivity of reviews means that they can accurately convey information about the product or service to potential consumers and provide an opportunity for trust to be transferred. Review objectivity can, therefore, reduce uncertainty in the purchasing experience (Freedman, 2008; Dai et al., 2020).

In this study, review objectivity is defined as objective information that consumers can apply to themselves (Dai et al., 2020). Based on this definition, the following hypothesis is formulated:

H1-5: Objectivity review will be positively associated with trust in reviews.

Research methodology

To find answers to the research questions, correlations between variables, exploratory factor analysis, and multiple regression analysis were performed using SPSS version 21. The study participants were Chinese consumers who had recently made purchases based on product reviews.



<Figure 1. Research Model>

Research results

Demographic Results

A total of 242 respondents participated in this study, and among them, 228 questionnaires were used for analysis after excluding 14 incomplete responses. The respondents consisted of 56 males and 172 females, with a predominance of female participants. In terms of age groups, the majority was in the 20 to 25-year-old category, accounting for 119 individuals, while there were also 60 respondents aged 40 or above. Detailed demographic characteristics are presented in Table 1.

<Table 1. Result of Demographic Analysis>

Category		Frequency	%
Sex	Male	56	24.6
	Female	172	75.4
Age	20 – 25	119	55.2
	26 - 30	33	14.5
	31 - 35	12	5.3
	36 - 40	4	1.8
	Over 40	60	26.3
Education	High School Grad.	33	14.5
	University Student	49	21.5
	University Grad.	67	29.4
	Graduate Student	53	23.2
	Graduate School Grad.	26	11.4
Product Category	Food	45	19.7
	Electronic	26	11.4
	Cosmetic	34	14.9
	Daily Supply	94	41.2
	Etc	29	12.7
Purchase Site	Coupang	25	11.0
	Naver	2	0.9
	Taobao	157	68.9
	Pinduoduo	25	11.0
	SSG / Kurly / Olive Young	3	1.3
	Etc	16	7.0

Results of Correlation and Mean, Standard Deviation Analysis between Variables

The analysis of correlations between variables along with their means and standard deviations is as follows. For the means, values ranged from 3.4239 to 3.6374, while for standard deviations, values ranged from 0.6244 to 0.7159. The correlation analysis revealed significant correlations among all the variables included in the analysis. Notably, a strong correlation was observed between the variables of product trust and company trust (Table 2).

<Table 2. Results of Correlation, Means and Standard Deviation>

Variable	M	SD	Exp	Ent	Rec	Use	Obj	Review	Product	Company
Exp	3.4239	0.7159	1							
Emp	3.6286	0.6699	.578**	1						
Rec	3.6374	0.6891	.569**	.625**	1					
Use	3.8888	0.6244	.432**	.654**	.626**	1				
Obj	3.4912	0.6382	.594**	.608**	.620**	.546**	1			
Review	3.4791	0.6497	.578**	.671**	.632**	.657**	.776**	1		
Product	3.5087	0.6636	.553**	.634**	.594**	.542**	.729**	.779**	1	
Company	3.5230	0.6871	.558**	.598**	.608**	.503**	.688**	.752**	.834**	1

Exp: Expertise, Emp: Empathy, Rec: Recency, Use: Usefulness, Obj: Objective, Review: Trust in Review, Product: Trust in a Product, Company: Trust in a Company
 **p < .01

Exploratory Factor Analysis and Reliability Analysis Results

The results of exploratory factor analysis are presented as follows (Table 2). Excluding the 7 items that did not meet the factor loading criterion, a total of 19 items were utilized for the subsequent analysis. While some factors slightly fell short of the threshold of 0.6 (use1: .569, obj2: .587), they were considered important items for this study and were included in the analysis. The reliability analysis results yielded a minimum value of 0.780, ensuring reliability for each variable. The total variance accounted for was 74.614 (Table 3).

<Table 3. Result of Exploratory Factor Analysis>

Variable	Item							Crobach α	Explained Total Variance (%)
		1	2	3	4	5	6		
Expertise	exp1	.661						.833	74.614
	exp3	.801							
	exp4	.831							
Empathy	emp1		.675					.796	
	emp2		.823						
	emp3		.648						
Recency	rec2			.727				.859	
	rec3			.774					
	rec4			.780					
Usefulness	use1				.569			.839	
	use3				.849				
	use4				.788				
Objective	obj1					.633		.780	
	obj2					.587			
	obj5					.797			
Trust in Review	review1						.672	.895	
	review2						.757		
	review3						.749		
	review4						.589		

Kaiser-Mayer-Olkin: .923,
 Battlett's chi-squared: 2060.567, df: 120, sig: .000

Hypothesis Testing Results (H1-1 ~ H1-5)

The results of hypothesis testing are as follows. Expertise was found to not have a significant impact on trust in reviews. Furthermore, novelty and significance yielded results opposite to those of prior studies. Neither of these variables significantly influenced the credibility of reviews. However, both empathy and objectivity were shown to have a significant impact on trust in reviews. Particularly, in the case of objectivity, a value of $t=7.675$ was derived, indicating the strongest influence. The assessment of multicollinearity through the Variance Inflation Factor (VIF) showed that all VIF values were below 10, indicating the absence of multicollinearity issues. Detailed results of multiple regression analysis and hypothesis testing are provided in the following (Table 4, 5).

<Table 4. Results of Analyzing Hypothesis>

Model		Coefficient		Standard Coefficient	t	p-value	Multicollinearity	
		B	S.E.	β			Tolerance	VIF
1	(Constant)	.251	.194		1.289	.199		
	Expertise	.071	.053	.076	1.331	.184	.544	1.838
	Empathy	.208	.064	.210	3.233	.001**	.426	2.348
	Recency	.090	.061	.094	1.482	.140	.447	2.239
	Usefulness	.061	.065	.058	.950	.343	.484	2.065
	Objective	.486	.063	.467	7.675	.000**	.483	2.069

R : .776^a, R² : .603, adjusted R² : .594, Durbin-Watson: 2.096

* : $p < 0.05$, ** : $p < 0.01$

Dependant Variable : Trust in Review

<Table 5. Results of Hypothesis>

Hypothesis		Result
H1-1	Reviewer expertise will be positively associated with trust in reviews.	Rejected
H1-2	Empathy review will be positively associated with trust in reviews.	Accepted
H1-3	Recency review will be positively associated with trust in reviews.	Rejected
H1-4	Usefulness review will be positively associated with trust in reviews.	Rejected
H1-5	Objectivity review will be positively associated with trust in reviews.	Accepted

Conclusion

The results of this study are as follows. Reviewer expertise was found to have no impact on trust in reviews. While prior research confirmed that the expertise of the author appearing in reviews influences potential consumers, this study showed no significant influence. However, empathy was found to influence trust in reviews. Potential consumers exhibited a tendency to purchase products based on emotionally agreeable reviews. In other words, if the content of the review is emotionally written rather than emphasizing expertise or usefulness, it can lead to consumer outcomes.

In this study's results, both recency and usefulness of reviews were found to have no impact on their credibility. This contrasts with prior research suggesting that older reviews influence consumer purchasing behavior. When considering empathy along with this, it can be inferred that even older reviews can lead to purchases if consumers strongly empathize with them.

Lastly, objectivity was found to have the most significant impact on trust in reviews. This implies that when reviewers objectively evaluate products or services in their reviews, potential consumers are more likely to agree and purchase the products.

The limitations of this study are as follows. Respondents who participated in the survey were predominantly young females. To generalize the results, it would be necessary to conduct surveys encompassing various genders and age groups. Additionally, some factors fell short of the loading criterion. Further studies addressing this limitation are warranted in the future.

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An empirical study on effective use and design of business dashboards: The role of affordances and representation fidelity

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Abstract

Representational fidelity, which referred to the extent to which a user can obtain a representation that faithfully reflects the domain that the system was designed to represent, was found to predict informed decisions. This emphasizes the need to design dashboards that reflect a decision-task so that users can have full understanding of the situation being confronted. Failure to truly reflect on the decision-making task (e.g., inaccurate, incomplete, untimely) may lead to poor decision-making outcomes. The theory of affordances (Gibson, 1977) was argued to be closely related to the representation theory. The theory implies that users must be able to access the representation through a system's surface and cognitively understand what to do with it. Hence, this research hypothesizes that representational fidelity and decision-making affordance are two major predictors of informed decision. A quantitative research design is employed to empirically test the conceptual model proposed in this research. Data were collected from online self-administered questionnaires. A total of 101 respondents were obtained. Respondents were shown with two different versions of dashboards. The first version is high affordance and representation fidelity. The second one is low affordance and representation fidelity. The results of data analysis show that significant statistical differences of affordances, representation fidelity, and effective use between the two versions of dashboards. The results suggest that designing a dashboard should follow guidance from the theory of affordances and the representation theory.

Keywords

Business dashboard, affordances, and representation fidelity.

The role of information and technology in adding value to the city

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Abstract

Smart cities add value to cities with digital intelligence to existing urban systems, making it possible to do more with less. Connected applications put real-time, transparent information into the hands of users to help them make better choices. These tools can save lives, prevent crime, and reduce the disease burden. They can save time, reduce waste, and even help boost social connectedness. When cities function more efficiently, they also become more productive places to do business. The article intends to reveal the role of ICT technologies in smart service delivery to the residents of the city. The data were collected through primary and secondary sources. The data is based on Kathmandu Metropolitan City.

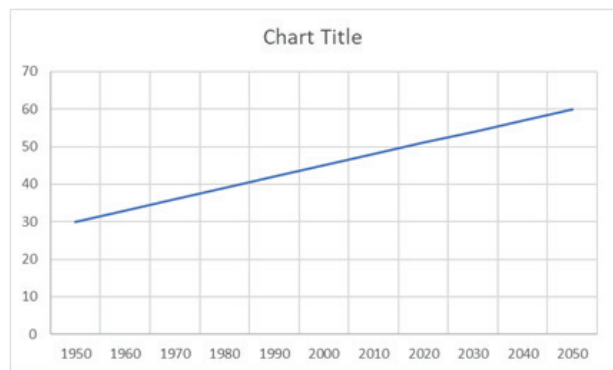
Keywords

Smart city, Digital technology

Introduction

The world's cities are relentlessly growing. Since the 19th century, there has been a steady flow of people from rural areas into the urban centers of the world. According to the United Nations Department of Economic and Social Affairs, the global percentage of the urban population was approximately 30% in 1950 and surpassed the 50% mark sometime in 2008. It is predicted that by 2050, 64% of the developing world and 86% of the developed world will be urbanized.

Year	Population in urban
1950	30
1960	33
1970	36
1980	39
1990	42
2000	45
2010	48
2020	51
2030	54
2040	57
2050	60



Urban infrastructure including utilities, transport, environmental services, and housing are often overtaxed and under-maintained. Social services, healthcare, and education become difficult to sustain. These issues can no longer be addressed using the traditional methodology of throwing more money at the problem or opening a new department in the municipality to deal with the challenge. A new, more intelligent method of urban management must be adopted.

A smart city encompasses an urban development vision that emphasizes the intelligent management of a city's resources to solve urban challenges. This intelligent management almost always includes the participation of all the stakeholders of the city and not just the municipality itself. A vital prerequisite of this vision is the active participation and engagement of the most important stakeholder of all, the citizens.

As urban areas grow increasingly larger and as the interrelationships between stakeholders become more and more complex, it becomes exponentially more complicated

to maintain any kind of meaningful interaction between interested parties for the collective management of urban resources and smart city goals.

the collection of data about the urban environment and its services. This includes statistics and metrics obtained from various sources like civic services, city stakeholders, as well as electronic sensors conforming to the Internet of Things (IoT) standards. This collected data is essential for intelligent and responsible decision-making by local government and city stakeholder officials[1].

It's a paradigm shift, providing services and information that several decades ago would have been considered out of this world. Traditionally, the major services running on both private and public telecommunications networks have been voice, data and more recently—video. IoT is quickly becoming increasingly prevalent and is well on its way to attaining the status of a fourth significant service delivered over telecom networks[2].

IoT Trends

2020	50 billion
2025	50billion*2=1 trillion
2030	1 trillion*2=2 trillion

A wide range of fields that have been adopting IoT infrastructures includes connected buildings and smart cities, manufacturing, energy and utilities, transport, logistics, and even agriculture

There can only be so many PCs, laptops, mobile phones and tablets per person—how many gadgets can one person use at a time? However, the number of IoT devices is only limited by the scope of the applications themselves

For example, an agriculturalist who owns 2,000 acres of land may have several sensors per acre to measure moisture, sunlight and wind. A smart city may have several hundred sensors along each major road providing smart lighting, smart parking, or measuring pedestrian and vehicular traffic.

This article tries to evaluate does Nepalese cities consider ICT to add value to the cities

A smart city is a city that connects physical, social and economic infrastructure with information technology (IT) to improve the collective intelligence of a city [5] and the quality of services delivered to citizens. It is therefore characterized by a high level of community engagement for making the city economically dynamic and efficient[6] (TM Forum, 2019), socially stable, inclusive and attractive, and operationally sustainable [7], [8]. This vision was largely inspired by the challenges a city faces in coping with massive urbanization while keeping essential services running (ISO, 2018). The related challenges involve the need for a city to connect institutional and industrial stakeholders (economic,

technological) and citizens while also creating physical, social, economic and technological infrastructure for innovating and improving citizen services. There is also a need to ensure an understanding of smart cities as a data ecosystem where local government authorities coordinate data initiatives through three elements: openness, diffusion and a shared vision[9]. Hence, a smart city can be defined as an ecosystem that enables innovative initiatives based on data and IT in an institutional context driven by the need to address urbanization problems faced by current and future cities.

Materials and methods

The research is based on an extensive review of the literature. Some discussions concerning the addition of needed ICT infrastructure were made with the authorities of the Kathmandu and Pokhara municipalities.

Results

Information technology (IT) has become an increasingly vital part of every organization in today's digital age. It encompasses the use of computers, software, networks, and electronic systems to store, process, transmit, and retrieve information. Here are a few reasons why IT is crucial for organizations:

Data Management: Organizations deal with vast amounts of data, and IT plays a crucial role in managing and organizing this data effectively. IT systems enable companies to store, analyze, and retrieve data efficiently, enabling better decision-making and strategic planning.

Communication and Collaboration: IT facilitates communication and collaboration within organizations and between different stakeholders. Email, instant messaging, video conferencing, and project management tools are just a few examples of how IT enables effective communication and collaboration, even across geographically dispersed teams.

Efficiency and Automation: IT systems automate routine tasks, streamline processes, and increase operational efficiency. From accounting and payroll to inventory management and customer relationship management, IT solutions automate various functions, reducing manual efforts and human errors.

Competitive Advantage: Organizations that effectively leverage IT have a competitive edge in the marketplace. It enables innovation, helps businesses adapt to changing market conditions, and facilitates the development of new products and services. It also enables organizations to analyze market trends, customer behavior, and competitors' activities, providing valuable insights for strategic decision-making.

Customer Engagement: IT plays a vital role in customer engagement and experience. From online platforms and e-commerce websites to customer relationship management systems and social media, organizations

use IT to interact with customers, gather feedback, and provide personalized experiences.

Security and Risk Management: With the increasing reliance on digital systems, organizations face various cybersecurity threats. IT is essential for implementing robust security measures to protect sensitive data, intellectual property, and customer information. IT systems also aid in risk management by monitoring and mitigating potential vulnerabilities and ensuring business continuity.

Considering these factors, organizations across industries and sectors recognize the importance of IT in driving efficiency, productivity, innovation, and competitiveness. Consequently, IT has become an integral and vital part of virtually every organization today[3].

Discussions

A smart city simply means a city that uses information technologies like the internet, machines, sensors, automation, and clean energy in real time. With real-time data, we can create a well-equipped smart city that improves the overall urban development issues. The concept focuses on improving sustainability and urban development through the efficient use of urban space and technology[4].

Though the idea of a smart city came to Nepal late, it instantly caught the attention of leaders and people. That's mainly because it focuses on reducing the issues arising from urbanization, inefficient manual work, and more. However several projects based on creating smart cities haven't taken place in Nepal. Let's find out Nepal's position for the required ICT infrastructure and Digitization needed for Smart City.

A smart city is not only highly technical but also costly mainly because of the requirement for the establishment of various physical infrastructures. A contemporary smart city should be based on a cost-effective analysis. It is something the cities of Nepal are unable to incorporate.

The investment is generally in digital infrastructure, transportation systems, high-speed wireless internet systems, fiber optics, sensors, cameras, architectural design, etc. Several other costs add up for a well-furnished sustainable system. And it needs to be inculcated in all the cities. All the cities of Nepal may not be the priority for now but a major city like Kathmandu still lacks the facilities and artificial intelligence that a smart city demands.

Authorities talk about the idea of a smart city frequently, but they are unable to convert their promises into reality. Years pass by, and people still struggle with the same issues that they have been tolerating for ages.

The government takes years to implement a project in Nepal that can bring changes in our traditional life. For example, Transportation management, Ticketing system, tax payment, seamless connectivity from any technology or 5G, etc.

For connectivity, which is a must for any digital, 4G has not yet reached all the places of the country, not even available throughout a city. Similarly, the testing of 5G networks has not started yet, while the government initiation to prepare for 5G has just begun, yet nothing seems to proceed. Our cities are still struggling with drainage problems, scarcity of drinking water, muddy roads, no surveillance cameras for security, overhead wires, unmanaged parking areas, and the list goes on. So, the challenge lies in the overpromise of the leaders and unstable government.

As for 2021, Nepal has seen a lot of turbulence due to the Covid-19 outbreak. Though the pandemic situation has opened new doors towards digitalization in Nepal, the latest instability is taking a toll on our future.

To implement sustainable smart cities in Nepal, thorough planning and proper execution are necessary. The government, service providers, and several stakeholders are already taking action to digitize our cities. For example, Worldlink brings Express WiFi, which comes a free internet in hotspot areas. Other than that, the Sajha bus, a passenger-friendly bus, is a modern touch to a traditional bus. Solar-powered automated streetlights are being placed in several areas. Digital hoarding boards replaced traditional hoarding boards. Some changes occurred in the past few years.

Despite a good start in adopting innovations, we lag due to poor implementation of the Urban development model. What we can perhaps do is start from a local level. The local administration can make their development plans to create infrastructure as per their needs and necessities. Similarly, Public-private participation (PPP) can increase efficiency and reduce costs.

We can conclude that digitalization is the key to implementing a smart city. In the context of Nepal, transformation is necessary to start from basic infrastructure. Basic services like getting information about a bus arrival at a station, speed checker, CCTV placement, etc. are not that hard to implement. Whereas for a complete overhaul design and implementation of a Smart city, the government might have to select a spare land for a better plan from the very start.

A definite framework for digitalizing various features of a city will gradually create a smart city. The process might take a long but with the proper framework and guidelines governing the infrastructure, the result will be worth the wait.

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How Transparency Impacts Trust in AI ?

Refining the Relationship Between Transparency and Trust in AI

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Abstract

This study explores the redefinition of the relationship between transparency and trust in AI, challenging the traditional notion of transparency as a catalyst for trust. While transparency has been associated with the absence of betrayal intentions in human interactions, its application to AI, lacking volition, requires a different perspective. The research unpacks transparency into accuracy, clarity, and disclosure, and trust in technology into functionality, helpfulness, and predictability. Findings from a survey on ChatGPT suggest that functionality and helpfulness are prerequisites for establishing the link between transparency and trust in AI, particularly in mitigating distrust. Additionally, predictability emerges as a key mediator of transparency's impact on trust, potentially reducing mistrust. The paper advocates for a more comprehensive understanding of transparency and trust in AI and proposes a trust-building strategy based on their redefined relationship.

Keywords

Transparency, Functionality, Helpfulness, Predictability, Volition

Introduction

Transparency has long been associated with positively influencing trust, as supported by numerous previous studies in various fields [17, 19, 23, 36]. By continuously disclosing information, trustees are less likely to violate trustors' interests, and trustors can make informed decisions about trusting the trustee [19, 39].

However, recent research challenges the straightforward assumption that transparency always positively impacts trust. Some argues that disclosing a trustee's poor abilities can have a negative effect on trust [14]. Others suggests that transparency and trust involve multiple attributes that may not always align [39]. Therefore, a simplistic view of transparency's positive impact on trust can lead to misunderstandings, necessitating further investigation into their complex relationship.

The complexity of the transparency-trust link is particularly evident when examining technology. Trust in humans differs from trust in technology, where the latter lacks intentionality to betray trustors' interests [40]. Consequently, traditional notions of transparency may not directly apply to technology, like artificial intelligence (AI), where intentional failure is not a concern [28]. This study challenges the conventional approach and seeks to explore the relationship between transparency and trust in AI, crucial for ethical human-AI interactions [23]. The research aims to address the following questions:

RQ1. How does transparency contribute to establishing

trust in AI?

RQ2. What transparency-based strategies can foster trust in AI among users?

Literature review

Trust in technology

Trust is commonly understood in connection to risk and uncertainty. According to this perspective, trust emerges when individuals choose to rely on the expected behavior of others despite potential risks and uncertainties that may arise in social interactions [24]. Particularly, in situations where individuals are vulnerable, as their interests are influenced by the decisions or actions of others, trust can be defined as the trustor's belief in the trustee's competence, benevolence, and integrity to fulfill the promised decisions or behaviors [26, 27]. Competence refers to the trustee's skills, capabilities, and attributes that empower them to exert influence within a specific domain. Benevolence relates to the extent to which the trustor perceives the trustee's genuine intention to act in the best interests of the trustor. Integrity signifies the trustor's perception that the trustee consistently adheres to a set of principles that are deemed acceptable by the trustor [26].

Historically, the concept of trust primarily pertained to interpersonal relationships, but in modern times, it has expanded to include human-to-technology interactions [40]. For instance, as individuals become vulnerable to the

decisions made by AI, they must rely on and place their trust in the AI itself. However, a fundamental distinction exists between trusting humans and trusting technologies: technologies lack volition or malicious intent to break commitments [28]. In simpler terms, since technology is not a moral agency, trust in technology is not based on a belief in its intentions, but rather on the conviction that the technology will deliver results consistent with the trustee's past experiences and knowledge of the technology [20]. As a result, prior research suggests that attributes of trust in technology should encompass functionality, helpfulness, and predictability, while excluding volition from the characteristics associated with interpersonal trust.

Functionality refers to an individual's expectation regarding a technology's capability to perform a required task [28]. This concept is analogous to the competence aspect of interpersonal trust, as both revolve around the trustee's ability to fulfill promised tasks [5]. Since malicious intent does not determine the absolute level of capability, competence and functionality have been considered similar in terms of volition [25].

Helpfulness, on the other hand, refers to an individual's expectation that a technology will provide adequate and responsive assistance [20]. This attribute aligns with the benevolence aspect of interpersonal trust, as both concepts aim to serve the best interests of the trustee [5]. Given that technologies lack emotions or intentions, helpfulness primarily focuses on providing useful functions that cater to the user's interests [28].

Predictability is the extent to which an individual can depend on a technology to consistently behave in a predictable manner [28]. This attribute corresponds to the concept of integrity in interpersonal trust, as both emphasize the need for the trustee to demonstrate reliable and consistent actions, enabling trustors to anticipate expected outcomes [25]. However, in terms of volition, humans can intentionally deviate from consistent results, while technologies are expected to consistently produce reliable outcomes once their consistency has been established [28]. Therefore, predictability entails fewer risks and uncertainties compared to integrity once the technology's consistent functioning has been proven.

Distrust and mistrust

Trust is a commonly studied concept by itself, but there are related concepts that provide valuable perspectives and insights into trust. Distrust is one such concept that emerges as a separate idea from trust, rather than being a mere absence of trust [12, 14]. It signifies the trustor's conviction of not placing trust in a situation characterized by uncertainty or lack of information [4, 12]. For example, if trustors perceive the decision-making process of the trustee as unreliable, they may confidently choose not to trust the subsequent decision, rather than having a reduced level of trust [16, 23]. In this regard, previous studies have

suggested a trust continuum model that encompasses distrust, undistrust (the absence of distrust), ignorance, untrust (the absence of trust), and trust [4].

Mistrust refers to misplaced trust, where the trustor places trust in the trustee under conditions where trust should not be granted [4]. Mistrust often arises when information is misled, manipulated, or abused [8, 11]. During communication, information can be distorted as it travels from the sender to the receiver through a channel [34]. Mistrust can occur when the sender deliberately manipulates the information during transmission [35], when the information is misunderstood due to communication skill gaps between the sender and/or the receiver [37], or when the information is compromised due to low-quality channels used for providing and/or transmitting the information [30].

Transparency

Transparency refers to a state in which the basis of a decision and its relevant information are accessible to individuals with the appropriate rights, regardless of their level of expertise [23, 41]. In the realm of information technology, transparency is often linked to algorithmic interpretability, which entails understanding the inner workings of an algorithm [2, 36]. Generally, transparency is believed to positively influence trust, as the sincere disclosure of information demonstrates an absence of volition and acts as a structural safeguard against betraying trust [19, 39].

Traditionally, previous studies have commonly regarded transparency as a dependent variable of trust [23, 36] or utilized trust attributes as mediators of the relationship between transparency and trust [3]. However, recent research challenges this simplistic view of the transparency-trust relationship. For instance, if information revealed through transparency indicates a poor or untrustworthy decision-making process, transparency may have a negative impact on trust [14, 16]. Moreover, even if information about the decision process is clearly provided to trustors, it does not guarantee the trustee's competence to fulfill the promised task [39]. To better comprehend the intricate relationship between transparency and trust, scholars have recommended exploring the concept of transparency further and focusing on its various attributes. Previous studies proposed three major attributes of transparency: accuracy, clarity, and disclosure [33].

Accuracy in the context of transparency refers to the perception that the information conveyed is precise and reliable, instilling confidence in the users [42]. In the context of AI transparency, accuracy may relate to the algorithm's ability to effectively explain the key features that influenced its decision-making process, ensuring users understand the underlying reasoning behind AI decisions [18, 23].

Clarity pertains to the perceived level of lucidity and comprehensibility of the received information [44]. Transparent practices should offer clear and comprehensive explanations to prevent misunderstandings and facilitate decision-making [29]. In AI transparency, clarity may involve the understandability of information provided by the AI, such as supervised learning-based explainable AI (XAI) effectively reflecting the purpose of the decision through relevant labels [32]. Comparatively, encoder-decoder architectures like transformers may not provide the same level of clarity in highlighting relevant information, making XAI more advantageous in this regard [1].

Disclosure is the perception that relevant information is accessible in a timely manner [33]. It entails providing information to those with the right to know whenever and in the quantity they desire [39]. In the realm of AI transparency, disclosure signifies openness and accessibility, ensuring users have access to and can understand the causal justifications behind the AI's results [23]. For instance, decision trees are considered more disclosure-friendly compared to deep learning algorithms, as decision trees can be easily simulated and observed, providing users with more sufficient information about the AI's decision criteria [2].

Hypotheses development

Functionality and helpfulness

Transparency is widely acknowledged to positively influence interpersonal trust, as it signals the trustee's lack of intention to deceive or act against the trustor's interests [39]. For example, in a principal-agent relationship, when the agent demonstrates transparency in carrying out their duties, it indicates a willingness to prioritize the interests of the principal, even in situations where conflicts of interest may arise [13]. The continuous and sincere disclosure of the agent's competence and benevolence fosters trust in the principal.

However, when it comes to technologies like AI, the positive relationship between transparency and trust cannot be explained by volition, as technologies lack the capability for intention or self-interest [28]. AI cannot prioritize its own interest over the user's interest, regardless of whether it is transparent or not. Therefore, considering transparency as an independent variable of functionality and helpfulness in AI is not appropriate, as the AI's functionality and helpfulness are predetermined and not subject to volition.

Instead, issues of distrust may arise in AI if its performance is subpar or if it is not designed to effectively address the specific problem that users are attempting to solve, even when the decision-making process is disclosed to users [14]. Thus, functionality and helpfulness should be seen as prerequisites for the relationship between transparency and trust in AI. Accordingly, this study proposes that

functionality and helpfulness serve as moderators of the relationship between transparency and overall trust in AI, rather than being employed as mediators of trust attributes.

Functionality is likely to play a moderating role in the impact of accuracy on overall trust in AI. Since functionality represents users' perception of the AI's performance, if the AI's overall performance is perceived to be low or subpar, users may question the accuracy of its explanations, leading to a decrease in trust. In other words, if users find the AI's functionality unsatisfactory, they may doubt the accuracy of the information it provides, affecting their overall trust in the AI.

Similarly, helpfulness is likely to moderate the impact of clarity on overall trust in AI. As helpfulness represents the AI's ability to provide relevant assistance in a given context, if the AI is not perceived as helpful in addressing users' needs, users may question the relevance and usefulness of the information provided by the AI, thus diminishing trust. In this case, even if the AI's explanations are clear and understandable, if users don't find the AI helpful in their specific context, it may impact their trust in the AI.

H1a. Accuracy, clarity, and disclosure of an AI will positively influence overall trust in AI.

H1b. Functionality will have a positive moderating effect on the impact of accuracy on overall trust in AI.

H1c. Helpfulness will have a positive moderating effect on the impact of clarity on overall trust in AI.

Predictability

From the perspective of AI, predictability is primarily determined by whether the AI's output for each input is predictable [28]. Transparency plays a crucial role in enhancing predictability by providing users with additional information about the decision criteria employed by the AI, enabling them to anticipate the output more easily [23, 43]. When an AI offers accurate and clear information in a timely manner, users can more readily predict the expected output [19, 39]. Increased predictability can mitigate mistrust issues and contribute to overall trust in AI for users [4]. In other words, the more users are informed about the decision criteria of an AI, the less likely they are to face risks of trusting untrustworthy decisions. This, in turn, reduces the risk of mistrusting AI and encourages users to trust the overall AI system.

However, it is crucial to note that mistrust can still arise even when transparency is provided. This is because users may not possess the necessary capability to effectively utilize the transparent information provided by the AI. Even if the AI cannot manipulate information due to its lack of volition and it provides clear and explainable decision criteria, mistrust can still occur if users abuse or misinterpret the information due to their limited ability to manage and understand it [37]. Properly predicting the expected output of an AI requires users to possess the

skills to simulate, decompose, or observe the algorithm [2]. Individuals who are not familiar with the principles of AI may struggle to adequately consider the additional information provided by transparency, leading to interactions with the AI that are meaningless or complex [21, 23].

Therefore, this study proposes that predictability plays a mediating role in the relationship between all transparency attributes and overall trust in AI. However, it emphasizes that the human capability to effectively manage and interpret the AI's decision criteria should be a prerequisite for establishing the relationship between transparency and predictability. In other words, transparency can enhance predictability, but users' ability to understand and utilize the transparent information effectively is essential for predicting the AI's output accurately and building trust in the AI system.

H2a. Accuracy, clarity, and disclosure of an AI will positively influence predictability.

H2b. Human capability will have a positive moderating effect on the impact of disclosure, clarity, and accuracy on predictability.

H2c. Predictability will positively influence overall trust in AI.

Methods

To validate the research model, data were collected from ChatGPT end users in the Republic of Korea through a survey. Participants were given information about the study's purpose and were provided with definitions for each construct. They were asked to respond to the questionnaire based on their experiences using ChatGPT. The definitions and items were translated into Korean for the participants' convenience. The survey ensured voluntary participation and did not collect personally identifiable information.

The questionnaire consisted of 30 items, and participants rated their responses on a 7-point Likert scale, ranging from "strongly agree" to "strongly disagree." To ensure the survey's quality, all definitions and items were derived from reputable references, which is described in Appendix A. The accuracy, clarity, and disclosure items assessed participants' perceptions of the information provided by ChatGPT, while the functionality, helpfulness, and predictability items evaluated participants' perceptions of ChatGPT itself. The human capability items focused on participants' self-perception of their own abilities.

After receiving 272 responses, the researchers conducted a partial least squares (PLS)-based structural equation modeling using SmartPLS. They eliminated insincere responses from the collected data, resulting in 264 valid samples for analysis. To account for any potential variations in response behavior among respondents, the remaining samples were standardized before being applied to the PLS analysis. The sample demographics are prepared in Appendix B.

Analysis and results

Validity testing

To evaluate the reliability of the analysis, the researchers conducted tests to assess the convergent and discriminant validities of the constructs. Convergent validity was assessed using the average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha (CA) values. AVE values of 0.5 or higher, and CR and CA values of 0.7 or higher are considered indicative of convergent validity [9, 10, 38]. The results of the convergent validity test are provided in Appendix C, and they indicate that all variables meet the specified thresholds, confirming convergent validity.

For discriminant validity, the researchers examined the correlation between latent variables and ensured that it was lower than 0.85 or the square root of the AVE for the corresponding variable [9]. The results of the discriminant validity test are presented in Appendix D, where the diagonal elements represent the square root of the AVE for each variable. This ensures that the variables have discriminant validity, meaning they are distinct and not excessively correlated with each other.

Research model testing

The standardized path coefficients (β) in the research model provide an estimate of the explanatory power of each variable, and p-values of 0.05 or lower indicate their statistical significance. The summarized results of the research model, both without and with moderating effects, are presented in Appendix E. In these figures, asterisks (*) are used to denote the level of significance (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

Without moderating effects, accuracy ($\beta = 0.199^{**}$, $p = 0.002$), clarity ($\beta = 0.292^{***}$, $p < 0.000$), and disclosure ($\beta = 0.256^{***}$, $p < 0.000$) significantly influence predictability ($R^2 = 0.416$). Similarly, accuracy ($\beta = 0.261^{***}$, $p < 0.000$), clarity ($\beta = 0.094^*$, $p = 0.039$), disclosure ($\beta = 0.259^{***}$, $p < 0.000$), and predictability ($\beta = 0.323^{***}$, $p < 0.000$) significantly influence overall trust in AI ($R^2 = 0.606$). These results support H1a, H2a, and H2c.

With moderating effects, functionality significantly moderates the relationship between accuracy and overall trust in AI ($\beta = -0.085^*$, $p = 0.011$), but H1b is rejected since its effect is negative. On the other hand, helpfulness significantly moderates the relationship between clarity and overall trust in AI ($\beta = 0.084^*$, $p = 0.030$), which supports H1c. Finally, human capability significantly moderates the impact of accuracy ($\beta = 0.084^{**}$, $p = 0.002$), clarity ($\beta = 0.111^{***}$, $p < 0.000$), and disclosure ($\beta = 0.106^{**}$, $p = 0.001$) on predictability, supporting H2b. These findings indicate that functionality, helpfulness, and human capability play crucial roles in shaping the relationships between transparency attributes and overall trust in AI.

Discussions

Findings focusing on functionality and helpfulness

The significant relationship between transparency attributes and overall trust in AI supports H1a, which is consistent with previous literature. However, the novel finding comes from the introduction of the moderating effect of helpfulness (H1c). The relationship between clarity and overall trust in AI was found to be insignificant without the moderating effect of helpfulness ($\beta = 0.044$, $p = 0.178$). However, when considering the interaction between clarity and helpfulness, a significant relationship emerged ($\beta = 0.084^*$, $p = 0.030$). This result suggests that even if the AI provides clear explanations, users may still distrust it if they perceive that the AI's helpfulness does not align with their intended usage. Therefore, AI providers should ensure the helpfulness of AI before providing clear explanations of the decision-making process to build trust in AI.

On the other hand, the moderating effect of functionality has a negative impact on the relationship between accuracy and trust in AI ($\beta = -0.085^*$, $p = 0.011$), contrary to H1b. However, their relationship remains significant without the moderating effect ($\beta = 0.252^{***}$, $p < 0.000$). Two alternative explanations are proposed for this rejection. Firstly, respondents in the study may perceive ChatGPT to have exceptional performance in various domains, leading to a lack of experience of low functionality with ChatGPT. This could influence their responses towards high functionality, resulting in unexpected results [6]. Secondly, external variables such as social influence or trialability may have affected the results. Users with limited exposure to ChatGPT may have higher expectations of its functionality due to social influence, leading to higher levels of trust, while those with extensive experience may be aware of its functional limitations but still trust it due to their confidence in prompt engineering [31]. Therefore, unless an AI system possesses exceptional performance like ChatGPT, functionality is expected to have a moderating effect on the relationship between accuracy and trust in AI.

In summary, the functionality of ChatGPT did not have a positive moderating effect on the relationship between accuracy and trust in AI, but the helpfulness of ChatGPT was found to significantly moderate the impact of clarity on trust in AI in a positive manner. These findings suggest that transparency alone is not sufficient to gain user trust in AI. Instead, transparency needs to demonstrate excellent functionality and helpfulness of the AI system to enhance user trust. Even if an AI system has good functionality, a lack of helpfulness may undermine user trust. Further research is needed to investigate these relationships in various AI systems beyond ChatGPT.

Findings focusing on predictability

The significant impacts of transparency attributes on predictability and the significant effect of predictability on overall trust in AI support the indirect effect of transparency attributes on overall trust in AI through the mediation of predictability (H2a and H2c). These findings suggest that when accurate and timely information is clearly provided, users are better able to predict the expected output of an AI system, which in turn leads to stronger trust in the AI system by reducing mistrust. Unlike the relationship between transparency and trust in humans, where all trust attributes are believed to serve as mediators between transparency and trust, predictability is the only attribute that mediates the relationship between transparency and trust in technology. This distinction arises because the absence of volition in AI eliminates the risk of deliberately violating predictability once transparency is assured [3]. Consequently, transparency in AI is closely intertwined with predictability, and establishing trust in AI through transparency bears a striking resemblance to ensuring predictability.

The significant moderating effects of human capability on the impact of accuracy ($\beta = 0.084^{**}$, $p = 0.002$), clarity ($\beta = 0.111^{***}$, $p < 0.000$), and disclosure ($\beta = 0.106^{**}$, $p = 0.001$) on predictability support H2b. These findings emphasize the importance of users' capability to interpret the information provided through transparency in making accurate predictions about the expected results of an AI system. If users lack the capability to interpret the information, the system becomes unpredictable and difficult to trust, regardless of how transparently the AI system provides the source of information [2]. This result underscores the knowledge gap that can exist between different stakeholders involved in the adoption and utilization of AI systems. Bridging this knowledge gap is crucial to foster predictability and trust in AI among all stakeholders.

However, external factors such as robustness, user interface, and intuitive information processing can influence the moderating effects of human capability on transparency and predictability [7, 15]. For example, if an AI system has robustness features that automatically correct typos or inappropriate prompts, it can make it easier for users to predict the expected results, potentially decreasing the moderating effect of human capability. On the other hand, if the transparency presented by an elusive interface acts as an entrance barrier for non-experts to predict the expected output, it can enhance the moderating effect of human capability. Therefore, when aiming to enhance trust in AI through transparency and predictability, it is important to consider not only algorithmic transparency but also user experience and external factors that can influence users' capability to interpret and predict AI outcomes.

Implications

This research paper provides valuable insights into the relationship between transparency and trust in AI, considering the unique characteristics of AI systems that lack volition. By breaking down transparency and trust into distinct attributes, the study challenges the conventional view and offers a more nuanced understanding of trust in AI. The findings underscore the importance of functionality and helpfulness as prerequisites for establishing trust through transparency and emphasize the role of predictability as a mediator between transparency and trust in AI.

The practical implications of the research suggest that building trust in AI requires not only transparent disclosure of information but also ensuring the functionality and helpfulness of the AI system. Moreover, additional factors contributing to predictability, such as robustness and user-friendly interfaces, should be considered to further enhance trust in AI [7, 15]. These findings can guide the development of strategies to foster greater trust in AI systems.

Furthermore, the study contributes to the advancement of AI transparency by proposing dimensions of accuracy, clarity, and disclosure for evaluating the effectiveness of explanations provided by AI systems [2, 18]. These criteria can serve as valuable metrics in Explainable AI (XAI) research and contribute to the development of more user-friendly and effective algorithms [23].

Overall, this research significantly contributes to the understanding of trust in AI and offers valuable insights for both academia and practical applications in the field of AI. Future studies can build upon these findings and explore additional factors that influence trust in AI, thus advancing our knowledge of human-AI interactions and enhancing the usability and acceptance of AI technologies.

Limitations

While the study provides valuable insights into the relationship between transparency and trust in AI, it is crucial to avoid conflating the roles of functionality and helpfulness as moderators and direct influencers of trust in AI [16]. Future studies should explicitly examine the separate impact of functionality and helpfulness on overall trust in AI to gain a comprehensive understanding of their individual contributions.

Additionally, the influence of external factors, such as social influence and trialability, on trust in AI should be considered when investigating the interplay between transparency and trust [31]. The experience and expertise of users with technology can significantly affect their perceptions of transparency and trust in AI. Recognizing and considering these factors can lead to more nuanced and contextually relevant findings.

Furthermore, distinguishing between trust in the technology supplier and trust in the technology itself is

crucial, particularly when the supplier's intentions and behaviors can influence users' perceptions of AI [22]. Disentangling these constructs can provide a clearer understanding of the factors contributing to trust in AI systems and the role of technology suppliers in shaping user trust.

Finally, the specific nature of ChatGPT may have impacted the observed moderating effect of functionality. As the study focuses on a specific AI system, future research should include a broader range of AI systems and conduct case studies to explore the role of functionality in the relationship between accuracy and trust in AI more comprehensively.

Conclusions

Absolutely, developing a nuanced understanding of the relationships between transparency, trust, and volition in technology is crucial for advancing our comprehension in this field. The study's focus on delving into the intricacies of transparency and trust in AI systems, considering the absence of volition, provides valuable insights into the complex interactions between these factors. As AI and technology continue to play an increasingly prominent role in various domains, understanding how transparency influences trust and how it interacts with other attributes is essential for ensuring the responsible and effective adoption of AI.

By contributing to this complex puzzle, the study helps build a more comprehensive framework for assessing and promoting trust in AI systems. As technology evolves and becomes more ingrained in our daily lives, it is imperative to establish a robust foundation for transparency practices that can foster trust and predictability for users. Furthermore, recognizing the nuances in the relationships between transparency, trust, and volition can inform the design and development of AI systems to better meet the needs and expectations of users.

The insights provided by this study can serve as a steppingstone for future research in the field of AI transparency and trust. Continued exploration and refinement of these concepts will aid in creating more trustworthy AI systems that can enhance user experiences and lead to greater societal acceptance and adoption of AI technologies. Ultimately, this will contribute to the responsible and ethical development of AI, ensuring that AI systems are designed and used in ways that align with human values and benefit society as a whole.

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Appendix A. Items of the Questionnaire

Construct	Definition	Items	
Accuracy	The perception that information is correct to the extent possible given the relationship between sender and receiver.	AC1	The information source from ChatGPT appears to be true.
		AC2	The information source from ChatGPT appears correct.
		AC3	The information source from ChatGPT appears accurate.
		AC4	The information source from ChatGPT appears right.
Clarity	The perceived level of lucidity and comprehensibility of information received from a sender.	CL1	The information source presented by ChatGPT is understandable.
		CL2	The information source from ChatGPT is clear.
		CL3	The information source from ChatGPT is comprehensible.
		CL4	The information source from ChatGPT is presented in understandable words.

Disclosure	The perception that relevant information is received in a timely manner.	DC1	The information source I receive from ChatGPT fully encompasses what I want to know about.
		DC2	The information source I receive from ChatGPT covers all the topics I want to know about.
		DC3	I have all the information source I need from ChatGPT.
		DC4	A sufficient amount of information source is presented by ChatGPT.
Functionality	Whether one expects a technology to have the capacity or capability to complete a required task.	FT1	ChatGPT has the functionality I need.
		FT2	ChatGPT has the features required for my tasks.
		FT3	ChatGPT has the ability to do what I want it to do.
		FT4	ChatGPT the overall capabilities I need.
Helpfulness	Users' beliefs that the technology provides adequate, effective, and responsive help.	HF1	ChatGPT supplies my need for help.
		HF2	ChatGPT provides competent guidance as needed.
Predictability	The degree to which an individual can be relied upon to act in a predictable manner.	PD1	ChatGPT is a predictable AI.
		PD2	ChatGPT does not fail the expected results.
		PD3	ChatGPT is extremely reliable.
		PD4	ChatGPT does not malfunction to produce expected results.

Human Capability	The human capability to deal with and understand the transparent AI.	HC1	I am capable of understanding the information source of ChatGPT.
		HC2	I have much knowledge relevant to understanding information source of ChatGPT.
		HC3	I feel confident about understanding information source of ChatGPT.
		HC4	I have specialized capabilities that can understand the information source of ChatGPT.
Overall Trust in AI	The attitude that an agent will help achieve an individual's goals in a situation characterized by uncertainty and vulnerability.	TR1	I trust the results from the ChatGPT.
		TR2	ChatGPT is trustworthy.
		TR3	I can rely on ChatGPT.
		TR4	I feel I can depend on ChatGPT.

Appendix B. Sample Demographics

Measurements	Items	Frequency	Proportion
Gender	Male	186	70.50%
	Female	78	29.50%
Age	Twenties	91	34.50%
	Thirties	82	31.10%
	Forties	69	26.10%
	Fifty or more	22	8.30%
Industry	Student	101	38.30%
	Information Technology	54	20.50%
	Public Service	32	12.10%
	Manufacture	22	8.30%
	Other	55	20.80%

Appendix C. Convergent Validity

Constructs	AVE	CR	CA
Accuracy (AC)	0.814	0.926	0.924
Clarity (CL)	0.724	0.896	0.874
Disclosure (DC)	0.76	0.899	0.985
Functionality (FN)	0.785	0.91	0.908
Helpfulness (HF)	0.8	0.75	0.75
Predictability (PD)	0.664	0.984	0.831
Human Capability (HC)	0.826	0.934	0.93
Overall Trust in AI (TR)	0.834	0.937	0.934

Appendix D. Discriminant Validity

	AC	CL	DC	FN	HF	PD	HC	TR
AC	0.902							
CL	0.663	0.851						
DC	0.64	0.697	0.583					
FN	0.427	0.521	0.583	0.872				
HF	0.416	0.55	0.546	0.829	0.886			
PD	0.6	0.665	0.64	0.562	0.461	0.815		
HC	0.266	0.449	0.343	0.525	0.425	0.473	0.909	
TR	0.684	0.651	0.706	0.621	0.646	0.416	0.742	0.913

Appendix E. Results of the Research Model

Dependent Variable	Overall Trust in AI		Predictability	
	Model A	Model B	Model A	Model B
Independent Variable				
Accuracy	0.264*** (p < 0.000)	0.252*** (p < 0.000)	0.199** (p = 0.002)	0.189** (p = 0.004)
Clarity	0.094* (p = 0.039)	0.044 (p = 0.178)	0.292*** (p < 0.000)	0.209** (0.003)
Disclosure	0.259*** (p < 0.000)	0.209** (p = 0.001)	0.256*** (p < 0.000)	0.209** (p = 0.002)

Predictability	0.323*** (p < 0.000)	0.287*** (p < 0.000)		
Moderator				
Functionality (Accuracy → Overall Trust in AI)		-0.085* (p = 0.011)		
Helpfulness (Clarity → Overall Trust in AI)		0.084* (p = 0.030)		
Human Capability (Accuracy → Human Capability)				0.084** (p = 0.002)
Human Capability (Clarity → Human Capability)				0.111*** (p < 0.000)
Human Capability (Disclosure → Human Capability)				0.106** (p = 0.001)

Cryptocurrencies a bear or bull: A critique of the CBDC (Central Bank Digital Currency)

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Abstract

Cryptocurrencies are starting to take the place of traditional investing options in India, it utilizes cryptography and block chain technologies to function (Zhang & Huang, 2022). The distributed ledger known as the “block chain” keeps track of earlier transactions through mining, allowing users to resolve each transaction in a secure, trustworthy manner (Fauzi et al., 2020). Moreover, mining creates wealth by way of new currency units. Being peer-to-peer networks, cryptocurrencies do not have a centralized authority to regulate transactions (Tata, 2023). The limited supply of bitcoin to 21 million makes it scarce just like gold, which enables crypto currencies to store the value of money. Propulsive analysis of this paper is to disclose, from where the need of crypto currency and CBDC (Central Bank Digital Currency) emerged, its progressive evolution in India and its future scope through conducting systematic literature review (Xiao & Watson, 2019) and Bibliometric analysis (Randhawa, Wilden, & Hohberger, 2016) on 146 articles collected from Web of Science and Scopus databases. The conceptual foundation of CBDC and cryptocurrency is explained in the paper; with a focus on how CBDC has influenced the development of cryptocurrency and people’s trustworthiness therein. In addition, the study sought to offer a detailed description based on its findings.

Keywords

Cryptocurrency, CBDC, Bibliometric analysis, Systematic Literature Review

Introduction

Digital currency is an umbrella term under which cryptocurrency and central bank digital currency comes (Alsalmi et al., 2023). The Central Bank Digital Currency (CBDC) is government-backed fiat money. The central bank issues this sort of digital money, which is connected to the nation’s currency (Kaur, 2023). To avoid the issue of trust in an entity, cryptocurrency adopts a decentralized ledger technology.

Cryptocurrencies cannot be printed or manufactured without work, the “mining” procedure has been established, in which in order to receive Bitcoin, computers and particular devices must overcome algorithm challenges. The mining word brings up images of the laborious process of gold extraction in this case (Bibi, 2023).

. The limited supply of bitcoin to 21 million makes it scarce just like gold, which enables crypto currencies to store the value of money. The concern here is which of

them (CBDC and Cryptocurrency) is best suited to the current situation.

All of the prior studies have been empirical in character. Although there has been various research in this area, there is a perceived lack of comprehensive approaches to Cryptocurrency and Central Bank Digital Currency. The current study would broaden understanding by offering a complete overview of the literature. There is, in Indian perspective, barely any study that combines qualitative and quantitative work. To show the evolution of this notion, an analysis of the literature is required. Many individuals in India, in our opinion, are still unaware of the conceptual distinction between CBDC and cryptocurrency. As a result, it is critical to familiarize these two with the World’s clarity of thought. As a result, there is immediate necessity to critically evaluate the work done to date, identifying shortcomings and making suggestions for future improvements.

To fill this vacuum in the literature, the current study used two-tier analysis, namely bibliometric analysis and content analysis. The report explains the conceptual framework of CBDC and Cryptocurrency, emphasizing the influence of CBDC on the growth of Cryptocurrency and individual trustworthiness on it. Furthermore, the study aimed to provide an extensive framework based on the findings of the current study.

The primary contributions of this study are

- It is the first attempt to use bibliometric analysis to synthesize the literature on CBDC and cryptocurrency using content analysis. We employed Citation Analysis, Keyword Analysis, Author Influence Analysis, Trend Analysis and Journal Quality Analysis.
- Two different perspectives have been explored conceptual framework of CBDC and Cryptocurrency, highlighting the effect of CBDC on the growth of Cryptocurrency and individual trustworthiness on it, that influenced the study and practice; and
- In addition, the current analysis highlights gaps in the literature and makes suggestions for future research topics.

The remainder of the paper is organized as follows. Section 2 focuses on the Research Methodology. Section 3 discusses bibliometric analysis. Following that, in Section 4 (content analysis), we analyzed notable articles in the subject of CBDC and Cryptocurrency. The results are then reviewed in Section 5. Section 6 discusses the study's gaps and future research topics, followed by the study's conclusion.

Methods

Bibliometric analysis of CBDC and cryptocurrency was performed in this study using different tools for analysis i.e. Trend Analysis, Citation Analysis and Keyword Analysis. Following that, content analysis is carried out by synthesizing the literature on CBDC and Cryptocurrency. The following is the procedure (illustrated in Figure 1). The subsections that follow clarify the specifics of the technique we chose for our investigation.

1. Conceptualization and hypothesis

The conceptual parameters and the systematic literature review have been defined. The study's main goal is to offer the most recent research on CBDC and Cryptocurrency with the following research hypothesis(H).

H1. Describe the conceptual framework of CBDC and cryptocurrency literature.

H2: What role will CBDC and cryptocurrency literature play in addressing various financial challenges?

H3. What is the publishing trend in the subject of CBDC and Cryptocurrency in terms of journals, authors, nations, institutions, and research type?

H4: What are the major studies and research approaches in the domains of CBDC and cryptocurrency?

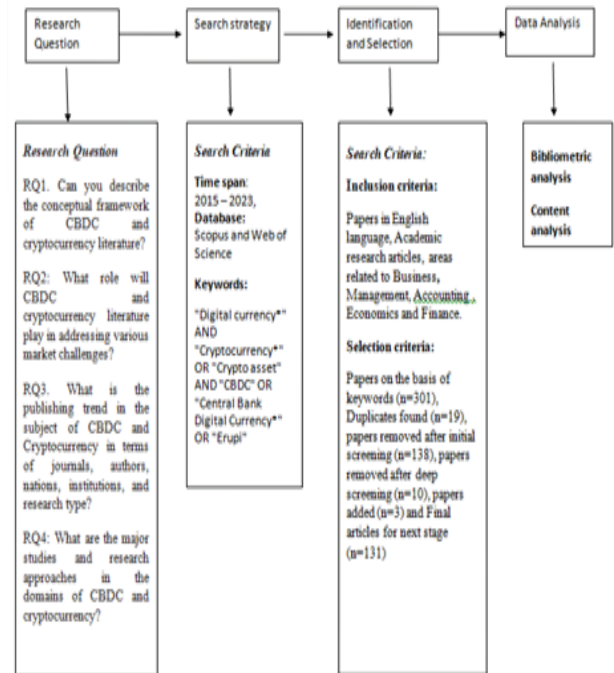


Figure1. Framework

Following the formulation of the research questions, the authors conceptualized the study boundaries by identifying the following concepts: emphasizing the impact of CBDC on cryptocurrency growth and individual trustworthiness

2. Search Strategy

We use several search algorithms to identify relevant material. First and foremost, we have chosen the bibliometric database. i.e., Scopus and Web of Science, Scopus. The use of these two bibliometric databases is motivated by two factors: (1) their widespread acceptance in management studies, and (2) their broad coverage of the literature (de Oliveira et al. 2018; Visentin et al. 2020; Yin and Fernandez 2020). Consistent with prior SLR search strategies, the title, abstract, and keyword fields were searched in the databases stated before (Singh and Walia 2022). The search string of "Digital currency*" AND "Cryptocurrency*" OR "Crypto asset" AND "CBDC" OR "Central Bank Digital Currency*" OR "Erupi" yielded 301 results, 110 from Scopus and 191 from Web of Science from 2015 to July 2023. The authors experimented with numerous keyword combinations using Boolean and proximity operators.

3. Screening

We found and selected research publications in two phases in this study (as indicated in Fig. 1).

3.1 Criteria for inclusion/exclusion. Academic research articles are used as the unit of analysis in literature reviews (Hina et al., 2022). An initial search revealed 301 research records. The following inclusion

and exclusion criteria were used to analyze these research records. Because of the language barrier, only research studies written in English have been taken into account. Papers produced in other languages, while important to the subject, were disregarded. Additionally, papers presented in conference proceedings and white papers have been ignored because they are not regarded as reliable and are typically poorly reported (Saric et al., 2020). After applying the above-mentioned criteria 163 papers were included in the study.

3.2 Evaluation standards. The following criteria were used to choose the various research articles for the study:

Initial screening: All articles containing any of the phrases were chosen after combining the keywords from the three groups. 17 Duplicates were found and removed from the data set. 15 non-contextual publications were eliminated from the initial data set after the title and abstract of these papers were reviewed.

Deep screening: We examined the remaining 131 publications in-depth and discarded an additional 5 irrelevant research papers.

Snowball sampling using: In this stage, we found an additional 10 publications that were included to the bibliometric data collection with the use of forward and backwards referencing. Finally, we found 136 publications that were pertinent to our research.

4. Data evaluation

The writers of this study work followed Caputo et al. (2018)'s advice and used bibliometric analysis and content analysis. The bibliometric approach is the ideal technique for examining the study subject and acquiring information about it (Goel et al., 2021; Singh and Walia, 2022). For bibliometric analysis, a variety of open-source programs are available, including Histcite, ScientoPy, Bibexcel, CiteSpace, Bibliometrix, and Sitkis. The bibliometric R package (3.0.1) has been used for the initial bibliometric investigation of CBDC and Cryptocurrency. The association between and within the research that emphasize the findings gained from the diverse literature have then been discovered using the content analysis technique (Bailey et al., 2017; Nijmeijer et al., 2014).

Bibliometric Analysis

1. Publication trend

The successive publication study is shown in Figure 2 and shows the number of papers published each year between 2015 to 2023. The graph unequivocally demonstrates an upward trend in publications over time. It is clear that from one publication in 2015 to twelve publications in 2020, the amount of research on CBDC and Cryptocurrency increased at a decreasing rate up until that point. While there is a rising upward tendency in the annual publication connected to CBDC and cryptocurrency starting in 2021.

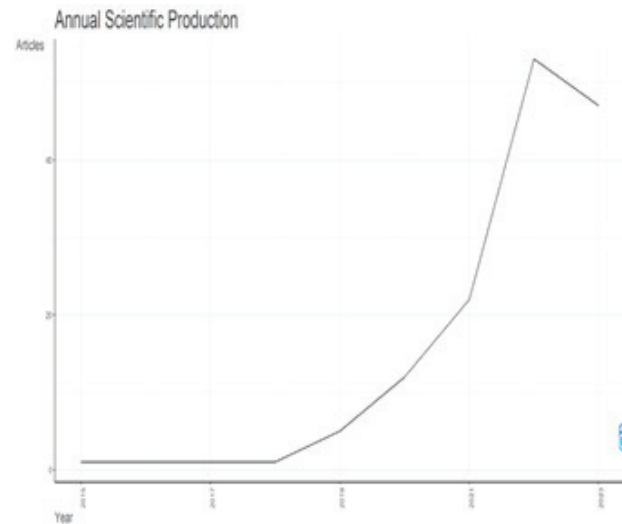


Figure:2 Annual Scientific Publications

YEAR	ARTICLE
2015	1
2016	1
2017	1
2018	1
2019	5
2020	12
2021	22
2022	53
2023	47

Table:1 Yearly publication of Article

The increase in pilot testing of CBDC projects in various countries in 2021 may be the potential reason for the above mentioned upward trend. In 2022 the highest number of papers published i.e. 53 and in 2023 it is 47 papers. The increased trend indicates that people are becoming more aware of CBDC, cryptocurrency, and all of its different facets. The scope and dimensions of CBDC and cryptocurrency have also increased as a result of growing academic research.

Sources	Articles	H-Index	Total citation	Year
RESEARCH IN INTERNATIONAL BUSINESS AND FINANCE	20	6	114	2020
JOURNAL OF ECONOMIC DYNAMICS & CONTROL	7	4	86	2022

JOURNAL OF PAYMENTS STRATEGY AND SYSTEMS	7	3	19	2020
JOURNAL OF MONETARY ECONOMICS	5	4	96	2019
FINANCE RESEARCH LETTERS	4	2	54	2022
FINANCIAL INNOVATION	4	3	39	2020
APPLIED ECONOMICS	3	-	0	2019
APPLIED ECONOMICS LETTERS	3	1	59	2019
ASIAN ECONOMIC POLICY REVIEW	3	1	3	2022
CHINA ECONOMIC JOURNAL	3	3	47	2021

2. Premier journals

CBDC and Cryptocurrency are part of Financial Technology and Digital currency so RESEARCH IN INTERNATIONAL BUSINESS AND FINANCE is leading Journal in this domain since the beginning with 20 articles. After that comes JOURNAL OF ECONOMIC DYNAMICS & CONTROL and JOURNAL OF PAYMENTS STRATEGY AND SYSTEMS as the topic is related to monetary policy and payment method but there is huge difference in their total citation which can be seen in the table 2.

Table 2: Top 10 Journals

3. Author's impact

Table 3 shows the top 10 authors who have contributed to the field of CBDC and cryptocurrencies through their publications. Wang Y is the top influencer with 58 citations. It is very evident that Andolfatto D has more total citations (45) in comparison to Agur I(29).When it comes to the H and G Index, Wang Y outperforms the other authors. The G index, a statistic that measures authors individually, is preferable to the H index because "it is the (unique) largest number such that the top g articles received (together) at least g² Citations" (Egghe, 2006).

Authors	Articles	H-In- dex	G-In- dex	Total citation
WANG Y	5	3	5	58
AGUR I	2	1	2	29
ANDOLFAT- TO D	2	1	2	45
BIBI S	2	1	1	1
DAVOODAL- HOSSEINI S	2	1	2	26
DU M	2	1	2	7
FUJIKI H	2	1	1	1
HARBORTH D	2	1	2	7
KEISTER T	2	2	2	16
KUMHOF M	2	2	2	40

Table 3: Top 10 authors

4. Influential countries

Figure 3 displays the top 10 countries in respect to frequencies of CBDC and cryptocurrencies. Most research regarding CBDC and cryptocurrencies has happened in the USA then in China and UK. After that Germany and South Korea are also contributing regarding research related to this. Western countries dominate this field of research as people there are very inquisitive and willing to adopt new technologies. USA pioneers this work with 83 researches followed by Canada with 16 studies.

Region	Freq
USA	83
CHINA	55
UK	46
GERMANY	18
SOUTH KOREA	17
CANADA	16
ITALY	13
INDIA	11
SWITZERLAND	11
VIETNAM	11

Country Scientific Production

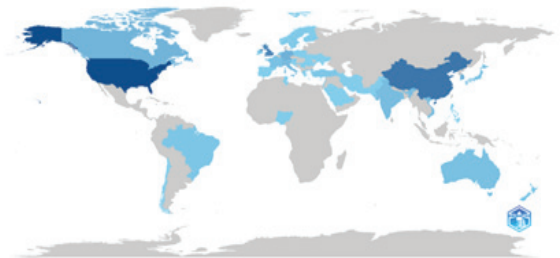


Figure 3: Countries' scientific production

5. Keyword analysis

Category	Count	Percentage
crypto	34	34%
digital currency	29	29%
central bank digital currency	40	14%
cryptocurrencies	14	5%
monetary policy	13	4%
fintech	11	4%
stablecoins	10	3%
blockchain	18	6%
digital money	7	2%
currency	5	2%
digital euro	4	2%
stablecoin	4	2%

6. Citation analysis

Author (Year)	Local citation (LC)	Global citation (GC)	LC/GC ratio (%)
<u>(Brunnermeier & Niepelt, 2019)</u>	24	48	50.00
<u>(Andolfatto, 2021)</u>	23	45	51.11
<u>(Agur et al., 2022)</u>	16	29	55.17

(Williamson, 2022)	14	22	63.64
(Davoodalhosseini, 2022)	14	25	56.00
(Barrdear & Kumhof, 2022)	13	21	41.94
(Bindseil, 2019)	10	30	33.33
(Lee et al., 2021)	10	32	31.25
(Ferrari Minesso et al., 2022)	10	14	71.43
(Allen et al., 2022)	10	40	25.00

Content analysis

The conceptual framework of CBDC and cryptocurrency, as well as the impact of CBDC on the development of cryptocurrency and individual trustworthiness on it, has all been studied by previous researchers, according to a review of the literature. These studies have influenced current research and practice. Here are some instances of that:

Segment 1: Cryptocurrency and the CBDC's theoretical underpinnings

In this context, we reviewed a total of 17 studies. From 2015 to 2023, a lot of research was done on the development of cryptocurrency and CBDC, its difficulties, how it threatens central bank money, and how it functions in various monetary systems. All of the studies made an effort to look at the effects of cryptocurrency and CBDC from various angles. A basic overview of the same has been attempted to be presented. (Bibi, 2023) examines the development of cryptocurrencies. By its very nature and character, Bitcoin posed a challenge to and implied danger to the position of central bank money. Central banks have also begun pilot programs for self electronic currency, the Central Bank Digital money, while simultaneously exploring cryptocurrencies. Most economists previously saw Bitcoin as purely a speculative asset, but El Salvador's intention to make it legal tender in 2021 (under the Bitcoin Law) calls into doubt this perspective. (Oerth & Dowsett, 2023) make an effort to elucidate cryptocurrencies, their history, diversity, and possible role in investment portfolios. where blockchain can be used for purposes other than cryptocurrencies. The possibility of central bank digital currencies (CBDCs) being issued by central banks as legal tender is part of the unclear and fast changing future of cryptocurrencies. We investigate them (crypto) as investable assets that may be included in portfolios and assess various efforts at valuing them, however, these studies were published before El Salvador declared Bitcoin to be legal tender in 2021. (Peruffo et al., 2023) In order to prove that it won't destabilize the global monetary and financial system, this article delves into the insights of China's CBDCs, particularly in regards to money and power relations. It makes an effort to bring together three theoretical perspectives on the qualities of money, currency internationalization, and currency hierarchy. Between China's economic sway and the extent to which its currency is used abroad, there is an imbalance. This does not imply that the issue would be resolved with an equal distribution of political and economic advantages. (Bibi & Canelli, 2023) The goal of this study is to employ Endogenous Money Theory (EMT) to explore CBDCs' insights.

Segment 2: Impact of cryptocurrency and CBDC

According to the findings 113 comprehensive studies could be identified in this segment. Many researchers tried examining the global impacts of cryptocurrency and CBDC. (Karau, 2023) demonstrated that using a privately-issued cryptocurrency as a universal payment method results in the In a basic two-country asset pricing model, forced synchronization of nominal interest rates results in a loss of monetary policy independence. The same approach is employed in this study to show that the same result holds true in a scenario in which central banks issue digital currencies (CBDC) that may be used globally. It

then includes the asset price circumstances into a fully detailed changing stochastic universal equilibrium model in order to evaluate shock propagation across borders. Shock transmission is symmetric in the base case, but asymmetric when just one nation issues worldwide CBDC or when cryptocurrency are linked to a single currency (stablecoin). (Prasad, 2023) argued that cross-border payments will become more affordable and efficient because of new and developing financial technology, such as the emergence of cryptocurrencies and central bank digital currencies (CBDCs). Reduced global capital flow frictions, however, could potentially lead to growup capital flow and exchange rate dynamic, which is especially worrying for technology. (Ivanovski & Hailemariam, 2023) dived into the matter with multifold objectives, which are to (i) thoroughly evaluate and explain domestic retail CBDCs and (ii) determine if the US dollar's status as the primary currency of the global monetary and financial system is threatened by the emergence of CBDCs. It will be argued that the introduction of multiple CBDCs (mCBDCs) by itself won't have an impact on the role of the US dollar, notwithstanding any innovations a CBDC may bring. Even while mCBDC arrangements would decentralize the global payment system, the fundamental mechanisms behind the current unipolar system would not necessarily change. In order to build a different global monetary system, central banks must cooperate. Various authors have stated the reaction and adoption tendency of CBDC and cryptocurrency among people. It examines the specific social, political, and economic ramifications of the procedures put in place that will result in the Chinese government's introduction of the digital yuan in 2021. Additionally, it contends that China's development and the special contextual surroundings of the digital yuan are unique. suggests that the battle between the world's two most important emerging CBDCs, the U.S. dollar and the euro, has a significant impact on the changing function and long-term significance of the digital yuan in a global setting. (Tronnier et al., 2023) applies the attitude formation theory to analyze the formation of Germans, traders do not consider CBDCs to be a danger to cryptocurrencies. Instead, more supportive views of CBDCs seem to be seen as positive signs for other types of digital currency as well. Although perceived compatibility does not directly affect people's BIs to use CBDC, perceived security, perceived utility, and perceived simplicity of use completely moderate its impact on people's BIs to use CBDC. Dealing with CBDC and cryptocurrency has invited a lot of risk, various authors talk about the risk associated with its application. (Gupta et al., 2023) examines the impact of risks using six perceived risk factors and benefits using four perceived benefits factors on trust and CBDC adoption in India. Besides this it also highlights the partial mediation effect of trust on the effect of perceived risk towards readiness to adopt CBDC. (Tian

et al., 2023) investigates the growing threats from the private sector and the systematic risks to the financial system, along with their effects on central banks' perceptions of CBDC in the context of global cyberattacks. They discovered that central banks' perceptions of CBDC have changed for the better as a result of escalating losses from cyberattacks on crypto assets. This finding suggests that central banks now see CBDC as a potential public solution to concerns posed by the private sector. However, after increasingly aggressive cyberattacks, which could pose systemic dangers to the country's financial system, their opinion of CBDC substantially decreased. (Tian et al., 2023) investigates the effects of two different categories of cybersecurity threats on central banks' perceptions of CBDC in the face of widespread cyberattacks. These risks are distinguished as emerging risks from the private sector and systematic risks to the financial system. They discovered that central banks' perceptions of CBDC have changed for the better as a result of escalating losses. This finding suggests that central banks now see CBDC as a potential public solution to concerns posed by the private sector. However, after increasingly aggressive cyberattacks, which could pose systemic dangers to the country's financial system, their opinion of CBDC substantially decreased. (Kaur, 2023) applies a non-linear framework to check the effect of CBDCs updates on cryptocurrency and financial technology. TVP-VAR model developed by Primiceri (2005) brings into the light that the reaction of the cryptocurrency market to CBDCs declaration differs extensively over the period. In the period of Covid-19, there has been a huge hike in CBDCs shocks on financial markets. (Ozili, 2023) highlights that the use of CBDC wallets raises a number of user-facing challenges, including those related to accessibility and financial inclusion, usability, security, and privacy. This article analyzes these difficulties and mentions 11 major user-centered concerns, along with suggestions for solutions. A CBDC wallet would be able to better address the needs of those who are underserved by the current financial system by implementing these suggestions. (Wang et al., 2022) Central bank digital currency (CBDC) has quickly gained popularity, which has created a contentious debate about its security, oversight, and audit. It has created architecture to demonstrate the authenticity of the data and the precision of the auditing using blockchain technology and the Pedersen Commitment. Few researchers have talked about the impact CBDC and cryptocurrency had on its introduction. (Xin & Jiang, 2023) mentions that the zero lower bound (ZLB) interest rate constraint and the cash barrier make it less effective than ideal to implement a negative interest rate policy (NIRP) under the conventional fiat system. They built a dynamic stochastic general equilibrium (DSGE) model to examine the efficacy of NIRP following the introduction of CBDC. The findings imply that: (i) The CBDC can

remove the ZLB limitation and stabilize the NIRP-induced economic fluctuations. (ii) To encourage spending, investment, and output and quicken the macroeconomic recovery, the central bank can put NIRP into practice by directly altering the interest rate of digital currency. (iii) Welfare analysis demonstrates that the central bank can successfully select various NIRP regulations in accordance with the economic goals. (Williamson, 2022) assessed the effects of the introduction of central bank digital currency (CBDC), by building a banking and payment method model. The fact that CBDC pays interest is not a benefit because replacing real money with CBDC does not increase the range of possible equilibrium allocations. By competing with private payment methods and relocating secure assets from the private banking industry to what is essentially a narrow banking facility, CBDC can improve welfare. Given the issues with private banking's incentives, this more effectively employs the total amount of safe collateral. (Wang et al., 2023) uses two TVP-VAR-based spillover models to detect the time- and frequency-domain spillover effects between cryptocurrency markets and a recently created central bank digital currencies attention index (CBDCAI). It shows that CBDC attention has a big impact on cryptocurrency markets. Additionally, most bitcoin investors like to trade in the short term. The findings of this study assist investors and financial institutions in reducing investment risks, minimizing losses, and forecasting the return of some cryptocurrencies. (Glenn & Reed, 2023) elucidates the crucial roles in a microfounded model of exchange of money. They take into account the prospect that central banks could create their own digital currencies, which could have an impact on how much private banking is intermediated. These currencies will eventually become a significant part of banking system activity as their role continues to grow. Furthermore, in addition to their usual function of facilitating lending, financial intermediaries can be useful companies that assist with token safeguarding. (Park & Youm, 2022) presents an interoperable architecture between heterogeneous blockchains and a decentralized peer-to-peer (P2P) service model based on the interoperable architecture in order to transfer heterogeneous cryptocurrencies and CBDCs between blockchain-based heterogeneous cryptocurrencies. (Chiu et al., 2023) originates a micro- founded general equilibrium model of payments to analyze the effect of CBDCs on mediation of private banks. It brings out that CBDCs can make improvements in competition, deposit rates, intermediation and outputs. Measurements of US economy states that CBDCs can increase the bank lending rates by 1.57% and output by 0.19%. It also examines the aspect of non- interest bearing CBDCs as the use of cash falls. (Afolabi & Olanrewaju, 2023) argues that cryptocurrencies support the development of cashless economies and frictionless international trade, but lack of

global coordination has prevented them from realizing their full potential. The need of central bank digital currencies (CBDCs) for successful financial sector regulation and user protection was therefore highlighted by this study. In order to effectively manage both conventional and unconventional monetary policies, this would broaden the central banks' perspective and increase their capacity to take advantage of this innovative financial innovation.(Wang et al., 2023) shows how CBDC attention has a big impact on cryptocurrency markets. Additionally, most bitcoin investors like to trade in the short term. Many authors have also examined the impact of cryptocurrency and CBDC on payment systems and monetary policy.(Bhaskar et al., 2022) mentions that the development of CBDCs could lead to the creation of a universal common currency, and they have significant consequences for financial and payment systems. The relationship between CBDCs and global trade and assets, notably cryptocurrencies, is the subject of intense research. In any case, the pace of inflation is entirely within government control. Equilibria in which government currency loses its ability to function as a medium of trade are impossible with an interest-bearing digital currency. This advantage comes at the expense of giving up control over the inflation.(Son et al., 2022) proposes a payment portfolio model that incorporates new payment techniques. Consumer choices would not be impacted by the convenience of digital currency if a government replaced cash with a CBDC. More people will utilize CBDCs than deposits as the government's interest rate on them rises.(Alsalmi et al., 2023)reveals that, despite the expected market capitalization of cryptocurrencies in 2022 being USD 200 billion, present accounting standards do not exactly address the accounting treatment of digital currencies.(Makarov & Arzhevitin, 2022) predicted that the introduction of the third type of currency would result in additional risks, which would be reduced by properly parameterizing the new currency. (Scollan & Darling, 2023) states that the use of CBDC wallets raises a number of user-facing challenges, including those related to accessibility and financial inclusion, usability, security, and privacy. This article analyzes these difficulties and highlights 11 major user-centered concerns, along with suggestions for solutions. A CBDC wallet would be able to better address the needs of those who are underserved by the current financial system by implementing these suggestions.Many researches have been conducted to trace the understanding of people regarding CBDC and cryptocurrency.(Fujiki, 2023) examined the cash demand in Japan, ownership of cryptocurrency assets, and understanding and use of central bank digital currency (CBDC). While just 4% of respondents said they understood what CBDC was, 10% said they would use it if they could. Respondents who understand CBDC share many of the same demographic traits as owners of cryptocurrency assets.

Gaps and future research questions

Category	Gap	Research directions
Prognosticator	Lack of dynamic effect.	Investigating how predictors interact with contextual factors acting as
Adoption of CBDC and cryptocurrency	Dearth of awareness of fintech.	Including wider number of detailed investigations regarding awareness of CBDC and cryptocurrency
Risk	Securities regarding digital currencies.	Examining end to end virtual currency usage.
Monetary policy	Universal digital currency leads to loss of monetary policy autonomy.	Role of digital currency in framing monetary policy.
People's perception	Restricted to cash demand reduction only.	Studying efficacy of people's perception on a larger perspective.
Research methodology	Dominated by longitudinal research.	Need for cross-sectional and empirical studies.

Conclusion

CBDC and cryptocurrencies have drawn a lot of scrutiny recently due to their expanding position in the market (Benigno, 2023). Although there is only a little research on certain aspects of CBDC and cryptocurrency in the literature, a complete, structured review and bibliometric analysis have not yet been conducted (Pattnaik et al., 2023). In the starting point, the author tried to give an insight of the development of the idea of CBDC and cryptocurrency and how it has changed recently, gaining a significant position in financial technology(Scollan & Darling, 2023) . A content analysis of highly regarded research publications from top-ranked journals was also done in addition to this. Finally, the paper has arrived at the conclusion of 1st research question addressed above which describes the CBDC and cryptocurrency are two newly developing financial technologies concepts that have a significant impact on the monetary system and investment strategies of logical investors after synthesizing the literature. The study addressees the various financial technology challenges the CBDC and cryptocurrency literature plays while dealing with the 2nd research question. Findings regarding 3rd research question points out that, future academics should go deeper into these two ideas to better understand how they work (Copestake et al., 2023) First, this study will aid academics in getting a broad perspective of previous research on CBDC and cryptocurrencies. They can prevent redundancy and build a solid literature structure with its assistance. Second, it can allow finding deficiencies in the literature and creating compelling themes. Thirdly, by combining bibliometric analysis and content analysis, this work pioneers a new methodology in the study of CBDC and cryptocurrencies. 4th research question is being addressed in bibliometric section through various analysis.

The study's conclusions could be constrained by a few issues. First off, Web of Science and Scopus are the only two databases that our research uses. There are other additional databases accessible, such as ScienceDirect, which were not considered. Second, the current

study exclusively took academic research papers into account. While conducting the research, books, PhD theses, monographs, and conference proceedings were disregarded. Thirdly, only research articles that relate to business, management, accounting, and finance have been examined and taken into consideration. To this effort, papers from other disciplines may also contribute. Fourth, the study may have flaws as a result of the inclusion of papers with few citations due to their recent release. Because there haven't been as many studies on CBDC and cryptocurrencies, papers with few citations have also been included. Despite these drawbacks, the authors think the new study will make an important contribution to the study of CBDC and cryptocurrencies. Additionally, it provides a range of chances for academics and industry professionals to advance this field's research.

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Scope of e-learning in developing country as two-way resolution: Earning and Learning opportunities

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Abstracts

This article tries to analyze the possibility of addressing the mass who have a rising interest in formal and informal learning from the far distant places of cities. The method adopted is an extensive review of literature in the field of distance and e-learning. Mostly it uses secondary data.

Keywords

e-learning, distance learning

Introduction

E-learning is a platform where the learner can get their required skill and knowledge for doing their occupation sitting at home. Traditionally, people have to go to schools, colleges, universities, or libraries to learn, for which an important part of their important parts of time availed was used just in traveling, and residential arrangements. For example, a person must go to the city, stay there with an arrangement of temporary residents, arrange the traveling time to go to the institutions and return. Besides these he/she has to leave the family members for some time. This way lots of anxiety were to be taken by the learner which kills the important and relevant activities that he/she can do in the working moments. An important part of contributions and creativity in the person in the life could lapse due to the time and effort to be given by the person in the name of seeking to learn through an institution by a person. This way important part of life goes in vain. Unnecessarily money is to be spent on irrelevant activities. In many developing countries, people have to start their work from the beginning stage of their early life due to economic status and the absence of social security provisions in the country. The old people do not get any security benefits, so adults have to earn for the children for bringing up and looking after their old parents which is costlier than their own life, so if they also are to leave the house then whole family members may be suffered. In this periphery, this article tries to assess eLearning to make more contributions to human life for their learning as well as earning.

Most people have started to leave the country for learning and earning abroad. They are offered 3-D jobs, side by side some learning opportunities. In the abroad, their life becomes even harder. To pay the tuition bills they work, they work hard. They live on a credit card and every month they had to pay the bill the bill amount accumulates so much that they can not return to the country, and the full family suffers from them due to their absence because

old people have left in their house can not work for their survival.

Research questions

The research questions raised while writing this article to infer e-learning be made practical to insist that people stay in the country rather than go abroad for earning and learning. What should be the model of e-learning imparted in the country to assure that the education system is competitive and competence-based to make the learner able to create and do the jobs in the country?

Objective

The objective of this article is:

1. to identify the model that can make the education system competent and competitive
2. to identify the procedures that can insist the people that no need to go abroad for higher learning and earning thereafter.

Methods

The article is based on the review of kinds of literature and the models of eLearning successfully being executed in different parts of the world. And analyzing them in the context of Nepal.

Review of kinds of literature

The history of eLearning can be traced back to the direction from 1840s Stenography[6].¹

The 1840s: stenography

When there was no audio recorder to record the voices and speeches, correspondence was the means of learning the far distance places. Isaac Pitman who was the teacher of Wotton-under-Edge, the market town in England, used to teach his student shorthand, known as Pitman Shorthand. Teacher Isaac Pitman used mail service to teach shorthand (stenography) to his students (Leerbeleving, n.d.). Students were to submit by mail

back the assignment sent by Isaac Pitman through by mail. Shorthand was the script to take notes fast by secretaries, journalists, and other professionals to the speeches delivered by leaders, and managers. It was like note-taking at the time of speech delivery and later was converted to a full form which was called transcribing.

1924: Automatic teacher

Automatic teacher was a Machin, a device, to teach the students, designed by Ohio University Educational Psychology Professor Sidney Pressey, which asks the students a question and gives 4 choices[1]. When students give the correct answer then the machine asks the second question and so on. The machine does not proceed to the second question until it does not get the correct answer from the students. The questions and correct answers were to be programmed by the teacher before the automatic teacher is put into operation.

1954: GLIDER

GLIDER is a teaching machine devised by Harvard Professor BF Skinner, that allows using programmed instruction in schools and colleges. [1]. A box containing a series of questions from simple to complex is given to students, where he rolls the rolling lever and gets one question in the window. The students were to write the answer following the instructions given. When the machine gets the correct answer then it proceeds to the second step. The difference between Sidney Pressey and B.F. Skinner is in the purpose of using the machine. Pressy designed the machine for testing the students and Skinner designed it for teaching the students.

Radio programs

When radio broadcasting was becoming popular then institutions realized how radios could be of great help to teaching and learning [2]. Then several radio programs came out to teach the subjects like religion, politics, current events, economics, and science. After the 60s television programs became popular in teaching and learning from distance mode.

Even these days radio programs are popular. Studies have found that radio is the most popular broadcast medium used for teaching in times of crisis all over the world. Several studies [3,4,5] have demonstrated that radio is the cheapest and most affordable technological means of information dissemination.

The 1960s: computer-based education

After 1960 computer became an aid to programmed instruction type teaching and learning. Program instruction means a sequence made by the programmer to present things to make the learners learn fast. The model designed by Harvard Professor BF Skinner, and before Sidney Pressey can be termed program instruction. Computers now enhanced them. But these models cannot be said as eLearning. To be e-learning there requires additional

facilities of connecting two distance places between learner and facilitators. However, it can be said that the models developed by two professors inspired Daniel Alpert and Don Bitzer, who developed and invented Programmed Logic for Automated Teaching Operations (PLATO)[2].

PLATO became the computer-based tool of teaching and demanded to link two computers of two different places, termed networking, developed form of which is the internet. It was developed for the student's University of Illinois, but the fruits of this invention speeded in many areas. In four decades, assignments through emails, and message boards became popular and took the form of online learning.

It is Stanford psychology professors Patrick Suppes and Richard Atkinson who started using computers to teach mathematics and reading. Media Psychologist Bernard Luskin jointly with Stanford engineers and professors made a device called teaching Machin in 1966 [2]

Based on the knowledge of the interconnection system of computers and teaching machines so far developed over a couple of years, in 1968, the University of Alberta's Department of Medicine became the first university to offer online courses. IBM 1500 instructional system was designed to implement classes from 32 workstations at a time. This way within a short period the university provided online classes to 20,000 students through 17 classes using IBM 1500 instructional system. Conclusively, it was the first formal and declared online learning in the history of the eLearning system [2]

Though the Interconnection of computers started for teaching and learning, Immediately after a year, in 1969, a network named Advanced Research Projects Agency Network (ARPANET) was developed [2] ARPANET appeared as a technical origin of the internet, covering wide areas with secured protocols. Businesses and individuals started using it. And it took the form of the present internet and eLearning, which is used to connect vast distance places.

1976: Internet-based courses

Teaching with programs designed and teleconferencing was introduced in different countries of the West. For instance, the UK's The Open University of the UK began its first online classes through CICERO(Roman statesman, scholar, and writer)[6]². The courses were to be on credit hours one hour per week) and Cyclops whiteboard system(a combination of some audio-visual devices, used to hear, talk and see) was used like Skype or Zoom [2] of the present day.

In 1976 a new remote community college was born to focus to give self-directed, off-campus education mode through many centers known as mini campuses. However, this college provides on-campus education also these days [2]

In 1979, Apple and Bell & Howell established Apple Education Foundation to supply computers and grants to people who could design software for educational purposes [7]

The 1990s: LMS

Virtual environments gain popularity when people started owning personal computers which could do several functions so began sharing information. At that time Apple's Macintosh 128K was a popular personal computer having ample functions to suit online education. So people started learning from home.

The 2000s: Rise of the MOOC

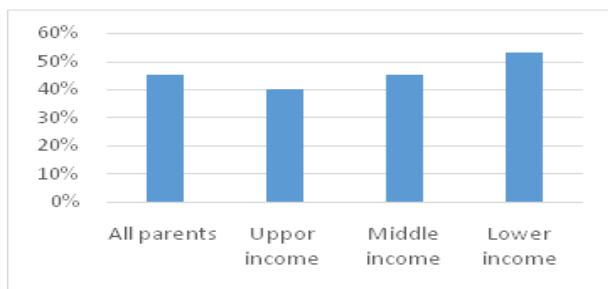
Online courses speeded up in the early 1990s when many schools opened just for online courses. Consequently, many students are admitted for online courses because of geographical distances from the regular school located areas and because of the dearth of physical facilities one needs to attend the school regularly. Other reasons are absence schedule to go to school, compulsion of learning, and earning both at the same time. Online courses started collecting a vast number of students.

Schools and universities designed and developed different learner-friendly software as their learning management system. Within 1995 learning management system gained popularity and the popularity has risen much even today. Such a system was made more capable to monitor the assignments, attendance, and studies. Such software also was made capable of testing, grading, commenting, counseling, collecting fees and providing facilities for learnings.

Many American companies like Blackboard use LMS in providing academic professionals, businesses, and government institutions with education, mobile, communication, commerce software, and other related services. In 2014, over 17,000 schools and organizations in 100 countries were using Blackboard's software and services [2]

Researchers and educators started advocating eLearning in seminars and workshops. For instance, Elliot Masie in a CBT Systems seminar in 1999 explained the term eLearning and how a computer can be used and works for e-learning [2].

Figure 1: Share of parents with K-12 children entirely on distance learning (US)



Source: Source: Pew Research Center, October 2020

eLearning today

eLearning is taking shape as the computer, internet and peripheral parts are being developed. Now every people have a mobile, tablet PC, laptop and desktop PC with wireless connection facilities. Every office and house is equipped with these. eLearning has taken the shape of learning facilities for children from 2 years to older aged people in the form of different types of education: formal, nonformal and informal. No organizations of any nature: business, society and government can be escaped from it.

Looking at the development pace of eLearning it can be concluded that there can be many things is remained to develop yet because 2e have not achieved what we were to do and achieved. Every year billions of potential individuals are deprived of education to develop according to their potentialities, in other words, our societies are not able to get maximum contributions from individuals. So, it is high time we should do a lot in this regard[8].

Instruction design for eLearning

Only the materials things as the internet, computer and its peripheral parts are not enough to enhance eLearning. So it is essential to evaluate different designs of e-learning that take part to transfer knowledge from one part of the world to another parts and equitable distributions of technological output to each part of the world.

The following instructional design has been used for eLearning[8]

1. ADDIE

ADDIE (Analysis, Design, Development, Implementation, and Evaluation) is a model of eLearning which includes elements like analysis of the needs of the people including identification of a combination of needs that an education program addresses. These are personal needs, social needs, economic needs and national needs. The design of the eLearning includes curricular parts of the eLearning. A curriculum includes learning objectives, learning materials, delivery method, and evaluation of the learner. Development of the curriculum develops material that can be used in each step of learning which can be put in the lesson plan and for delivery of the actual sessions. Implementation of eLearning involves activities like using the software appropriately at the right time for the intended students. And evaluation embraces the activities to know the successful operation of the program and student achievement from the eLearning. This step helps the programmer to take any action in the program in the future to improve the programs.

Because of its simplicity, shortness, and clarity, this design is the most popular. Each part of this design requires deep attention. It is holistic and demands trough reviews of each element used in the eLearning process[8].

2. SAM

SAM means successive approximation methods in full form. SAM is complementary to ADDIE, SAM intervenes when there seem flaws in the sequence of ADDIE. So once the SAM steps seem problematic little thought is put there. So, it is also called an alternative to the SAM model. For instance, eLearning takes a long time to complete a cycle from analysis to evaluation, and in between or middle of the process if any unexpected actions are needed then SAM will be useful. It provides flexibility to the initial programs designed under ADDIE. The key difference between ADDIE and SAM is that the former involves a more systematic or linear strategy, while SAM is more cyclical, which makes it ideal for eLearning projects with a smaller scope[8].

3. Dick and Carey Systems Approach Model

This is a process-based model similar to ADDIE but elaborated extensively. This model is a very clearly explained model for the eLearning ProJet planner. Entire projects are divided into 9 steps strategic plans beginning from goal setting to summative evaluation. Here are 9 key strategic steps of the Dick And Carey Model[9]

Determine the learning goals and objectives

1. Conduct a thorough analysis
2. Research your audience to identify behaviors and traits
3. Develop performance objectives based on tasks and specific criteria
4. Create eLearning assessments based on learners' preferences and needs
5. Create your Instructional Design strategy
6. Pick appropriate eLearning activities and resources
7. Evaluate the eLearning course to pinpoint areas for improvement (formative evaluation)
8. Verify that the eLearning content aligns with desired outcomes (summative evaluation)

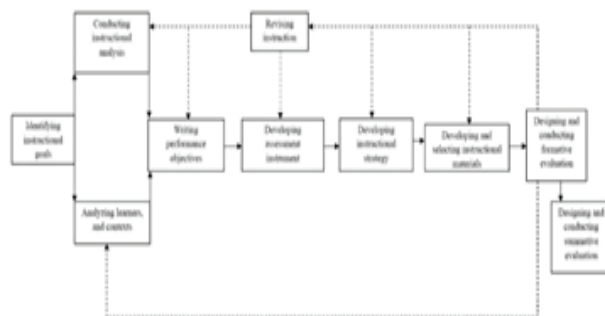


Figure 1: Dick, W., Carey nine-step model

Source: Dick, W., Carey, L., & Carey, J. O. (2005)[10].

4. Rapid Instructional Design

When short programs for eLearning are to be launched,

their design also follows short processes. Rapid Instructional Design Model aims short paced eLearning cycle when the planners have no time to give much for its design. For Rapid Instructional Design 4 such pillars are: prepare, present, practice, and perform.

a. Prepare

This step involves setting goals, informing the learners, assuring the learners about the program benefits, making the curriculum, preparing schedules, etc.

b. Present

This step involves giving materials and teaching learning modes for the learners to follow. Inform them how they will be evaluated and give them the schedule of the evaluation. This also includes delivering the content and demonstrating the skills.

c. Practice

in this process, learners get enough opportunity to practice their exercise until they do not reach a competency level. The exercises correspond to simulations to represent real-life situations so that their learning could have a direct transfer to real-life situations.

d. Perform

Under this situation, the learners are given real-life situations or put into internship programs and allowed to be interns. Differences between online learning and real physical learning can also be bridged here.

5. Rapid Prototyping

This design takes full benefit of testing the design made to the people as pilot tests. Until the design is finalized they are implemented one after another and comments and feedback are sought from the user. After the programmer and designer think it is flawless, the program is implemented. programhe core concept

- Develop the framework (“skeletal system”)
- Evaluate the refined core concept through user evaluations
- Implement changes based on user evaluations to refine the eLearning content

By name it is clear that this design is useful when eLearning mechanisms and software are developed by the own organizations and the organization has sufficient internal experienced and technical staff to handle. Under this mechanism the model is repeatedly tested over and over and, in each step, interval improvements are brought based on the technical testing and feedback obtained. This design is not suitable if the organization has to lunch the program designed by outsourcing because that time it has not the expertise it has its own.

Conclusively, whatever the names are given to eLearning models they are meant for understanding the need of

the target learner design and develop the instructional materials and implement it with sufficient provisions for bringing improvement in the future.

Result

In Nepal, many people are doing the most common jobs. They are farmers, teachers, engineers, retailers, businesses, hoteliers, tour guides, construction workers, and government jobs. Different skills are needed for them as the soft skills are: Verbal and written communication skills, Attention to detail, Innovation, Creativity, Business/Finance/ mathematical acumen, Teamwork, Ability to work under pressure, Problem-solving skills, IT skills, Motivation, and resilience. And the hard skills differ from their job to job as the nature of jobs.

If Nepal is analyzed from the major occupational point of view.

Table 1: Occupational distribution and share in GDP

Primary sector(Agri-culture)	69.4%(2018)	24.5%(2021)
Secondary (Industry)	12%(2018)	13.1%%(2021)
Tertiary (Services)	19% (2018)	61.8%%(2021)

Source: Economic Survey, 2021/22 [11]

Farmers

Agriculture is the art and science of cultivating the soil, growing crops and raising livestock. It includes the preparation of plant and animal products for people to use and their distribution to markets. Agriculture provides most of the world's food and fabrics. Being agriculture a science of plant and soil a farmer need to learn many things about soil, plants, and different climate under which plants are grown. However, in Nepal the least trained and educated people are farmers. Due to their ignorance of plant and soil knowledge, they are not able to take benefits from farming. Though farming is an entrepreneurship-type occupation. The farmers are not enjoying and benefit from it for the national, individual, society and economy is not being realized. Despite youth leaving the country to abroad for a laborer job.

Teachers

Table 2: Teachers of different levels

Basic level	243,520
Secondary	938,897
Higher Secondary	450,753
Total	1,633,170

Source: Economic Survey, 2021/22 [11]

Teachers are getting online education from different centers designed for them.

Engineers

In the country, there are 36,359 engineers, according to the Engineers' Association. Engineers for engineering

in Nepal online courses are not designed, however, the country has a lot to do with

Construction worker

According to Luitel, nearly 2.5 million workers are employed in the construction industry (Chandra Kumar Malla, Kathmandu Post, Thursday, August 17, 2023)



Source: <https://tkpo.st/3xRTGis>

Nearly 85 percent of the country's total workforce is employed in the informal sector,

Hotelier

Hoteliers, there is an absence of online hospital management courses in Nepal.

Table 3: Hoteliers in Nepal

Enterprise		2018	2019	Change
Hotel	(Star)	129	138	7
Hotel	(non-star)	1125	1151	2.3
Beds	(total)	40856	43999	7.7
Travel	Agen-cies	3508	3680	4.9
Trekking	Agen-cies	2649	2764	4.3
Tourist	Guide	4126	4200	1.8
Trekking	Guide	16248	17625	8.5

Government jobs

Table 4: Number of civil servants in Nepal (up to Rashad, 09 2068)

Service	Total Number of Posts
Nepal Economic Plan-ning and Statistics	292
Agriculture	5480
Justice	3771
Admini-stration	46922
Audit	395
Forestry	3604

Education	1718
Parliament	123
health	23557
Miscellaneous	3288
Engineering	9532
Foreign Affair	171
Total	१८,८०३

Health care workers

As of mid-July 2020, Nepal had 90,946 health personnel, including doctors, specialist doctors and health workers. But the number decreased to 90,369 by mid-March of 2021, according to the Economic Survey 2020-21. [Kathmandu Posts, Thursday, August 17, 2023]

Businesses

Table 5: Business Registered in Nepal

Gross domestic product	37.67 kharab
investment	30053 kharab
Registered Companies	238920
Private companies	233214
Public limited	1608
Nonprofit	2847
Foreign	320
Shareholder of private company	636781
Share members of the non-profit company	19494

Source: Investor paper, August 16, 2023

Addressing people through online

In the education system education can be delivered in three modes. The first mode is an informal mode which is being received by every individual in the society he/she lives while traveling, working, and making conversation. The second mode is providing education through formal modes. For this different universities use to provide education formally in different courses and pupils join the classes physically. The third mode is open and distance mode where the pupil can get their required education without being physical through any means like mail. These days through email and newly designed computer software like Zoom, skype and Microsoft Team, etc.

To provide education without being physically present there is a term often used by society and universities, “open”. The term ‘open’ first came into use due to the practices of the Open University of the United Kingdom.

It was the first university termed ‘open.’ Since then, open learning has evolved into distance learning and later into open and distance learning[12].

In Nepal, Face-to-face tutoring has long been monopolized as the education culture. The education culture of the country has a long history starting from the ancient Gurukul teachings to the present formal education system. Uses of technology in education have emerged recently, where online learning has been promoted as a form of distance education.

In 1956 an institute named the College of Education was established to develop teachers for primary education teachers which started its teaching in both modes: physical and distance. In the later days, the institute was changed into an institute of education and put under Tribhuvan University. The online mode of teaching was the radio program on ‘Radio Nepal ‘ a national flagship of Nepal. After 1980 this program took the form of a Radio Training program. It started giving certificates like Certificate/Diploma(intermediate and Bachelor level in education).

National Education System Planning, a planned move to integrate the traditionally run disbursed education system into one tie, initiated and launched distance education, under the organization and management of the Ministry of Education. This move brought policy for distance education in Nepal. The policy addressed the people of secondary level education from remoter areas. A large number of students, who could not come to cities and present themselves physically to read were trained and benefitted. through this.

In Nepal, an open university was established only in 2016 whereas in this region it was opened by other counties earlier. For example, Pakistan opened in 1974.

Open and distance education center of tribhuvan university (ODEC, TU)

Tribhuvan University opened Distance Education as its constituent center in 215 to bendit the large number of people having different occupations in different parts of the country and abroad. It launched the programs with a well-structured curriculum pattern.

Current programs that ODEC offers include:

- 1) MEd in English Education
- 2) MEd in Mathematics Education

Nepal open university

NOU is Nepal’s flagship open university, with legal standing equivalent to that of other Nepalese universities. The university’s goal is to increase access to higher education for those who have never had access to traditional higher/tertiary education. The university is working to provide inclusive and relevant programs to the national requirements of building a knowledge society and educating the young for a job in Nepal and global markets.

Nepal Open University has been commenced with the following objectives:

- Through open and distant procedures, close the gap in higher education demand now disappointed by the combined capacity of all institutions.
- Bring higher education to Nepal's rural, distant, and disadvantaged populations, particularly women and unrecognized communities like Dalits. They have been restricted to villages owing to familial commitments, societal obstacles, and financial restrictions.
- Provide chances for teachers and government personnel living in rural and distant areas and those who are unemployed to further their education, skills, and careers.
- Provide a way for youth who work in foreign nations to continue their education temporarily or permanently.
- Advance a computer-based education to rural Nepal related to health, social systems, productivity, economic improvement, and sustainability disciplines.

NOU currently offers 23 courses ranging from BBA to MPhil. You can learn more about it [here](#).

Foreign online courses in Nepal

Some international Universities like Indira Gandhi National Open University (IGNOU), Amity University Online, and Sikkim Manipal University-Distance Education offer degrees in Nepal. In contrast, significant colleges are also starting to give partial degrees owing to the Covid-19 pandemic.

List of Universities offering distance education - Nepal

Distance education is the answer to the strict need for education of those who cannot commit to traditional student life, so let's have a look at the top universities around the world that could help you to advance in your professional life with disrupting your professional and personal commitments. These universities offer all sorts of programmes that might interest you, starting from graduate, post graduate and doctorate programmes, to short courses.

Harvard University Extension School

The esteemed Harvard University in America now also offers more than 200 courses online via distance education. These offerings include videos of actual lectures on campus which are available in different formats based on students' needs. Current popular subjects are management, English, environmental management, government courses and computer science.

Boston University Online

Boston University is another respected American university currently offering great courses through distance education. Apart from undergraduate to doctoral level, various noncredit professional courses are also available.

Indira Gandhi National Open University

Founded in 1985, the Indira Gandhi National Open University offers 310-degree programmes in science, arts, social sciences, commerce, and information technology through 21 Schools. It is the biggest university in the world with more than four million students in India as well as 36 other countries.

Open University Of Catalonia

The Open University of Catalonia in Spain was only founded in 1994 but already boasts somewhat 60 876 students. They offer more than 1000-degree programmes up to doctoral level in three different Schools, including Open Programmes.

University of South Africa (Unisa)

With more than 250 000 students, Unisa has campuses in Pretoria and Florida, Johannesburg, South Africa and numerous contact centers abroad. It also has mega university status. The University was founded in 1873 and in 2004 merged with Technikon Southern Africa to form the new Unisa. It offers internationally recognized qualifications ranging from undergraduate to doctoral studies as well as informal courses in six Colleges.

United Kingdom Open University

Founded in 1969, and with approximately 250 000 students worldwide, the UK Open University, whose academic faculties and research centers are based in Milton Keynes, United Kingdom, offers more than 250 undergraduate and postgraduate qualifications of a high standard.

University of the Philippines Open University

University of the Philippines Open University was founded in 1995 as a campus of the University of the Philippines. It provides online teaching and learning in three Faculties, namely that of Education, Management and Development Studies and Information and Communication Studies. It offers qualifications ranging from undergraduate to doctoral and non-formal courses to students in the Philippines and abroad.

Open University of the Netherlands

The Open University of the Netherlands was founded in 1984. Students can study academic programmes or select from almost 300 modular courses. Students have the option to either register for a full-length degree programme or for modular courses, meaning they can register for two modules only if they wish. Programmes

in Computer Sciences, Learning Sciences, Environmental Sciences, Law, Management, Cultural Sciences and Psychology are offered.

Open University of Hong Kong

The University offers more than 100 postgraduate, degree, associate degree and sub-degree programmes to its students, determined to provide only high quality education.

Thomson rivers university open learning

It has more than 20,000 registrations and offers approximately 55 degrees, diploma and certificate programmes online, web-based and in printed, formats according to student's own personal requirements.

The Open Polytechnic of New Zealand

More than 100 qualifications and 1200 courses are offered including technical and vocational training to higher professional and continuing education. The Bangladesh Open University was founded in 1992 after researching a new mode of education for many years. It already has more than 2 million students and offers both formal and non-formal programmes through six different Schools.

The Universities listed here are among top universities in distance learning. However, there are available many more universities, colleges and institutes of higher education in distance learning. To find a distance learning programme of your choice go to [University Hub](#).

Conclusion

The widespread acceptance of ODL in both rich and developing nations indicates the mode's great potential. This does not, however, imply that ODL will supplant the conventional approach. There is still a long way to go before the current dominance of campus-based higher education fades away. Because of learners' availability, the accessibility of libraries, and the promise of potential collaborators, ODL appears to have a lot of potential in nations like Nepal. However, we face obstacles such as a hostile political climate, a lack of electrification, and mistrust from academics about the strength of the degree, making the danger of confronting it nearly impossible.

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Perceived Congruent Factors Affecting Customer Value Co-Creation: The Cases of Small Hotels in Eastern Thailand

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Abstract

A change in the business model of small hotels because of the pandemic and modern technology affects the attitudes and behaviors of small hotel entrepreneurs and their customers. The needs to cocreate values by both parties are prevalent. This study identifies factors contributing to customer value co-creation of small hotel businesses and connects customers' needs to the small hotel entrepreneurs with local communities. This research has addressed issues, focusing on factors from customers and entrepreneurs affecting small hotel businesses' customer value co-creation model. Several detailed case studies point to three congruent factors from small hotels and their customers: joint information sharing, feedback-engagement-interaction activities, and extended network knowledge management and dissemination.

Keywords

Customer Value Co-Creation, Entrepreneur, Small Hotel Business, Innovation, Technology

Introduction

After the pandemic, the hospitality and tourism industry became the expected source of economic upturns for many countries, including Thailand. The sector can generate an economic value of up to 10.40 percent of the world's GDP and contributes up to 10 percent of the total employment rate (The World Travel Tourist Council, 2019). Small hotels are instrumental to tourism and business travel in the country tremendously.

To build an innovative model of customer value co-creation for small hotel businesses, we aim to explore the factors that influence customer value co-creation. Once a solid outlook of customer-hotel value co-creation is established from this qualitative study, an extensive survey will be conducted, and the result will be used to design and develop a technology-enabled prototype for small hotel businesses. For the survival of small hotels facing various uncontrollable changes in economic uncertainty and customer lifestyles, it is imperative to differentiate their business and offer new services according to customer needs through co-creation.

The present manuscript provides the detailed results of qualitative research by describing two case examples from small hotel operators and their respective customers.

Factors affecting value co-creation will be explained using thick descriptions according to the ethnographic study method. No triangulation technique will be used at this time. Insights from the cases will be juxtaposed with the technologies and processes of value co-creation.

Literature Review

Customer Value Co-creation

At least two parties, between businesses within the network or between companies and customers, can cocreate new value from connection, cooperation, confluence, or trade-off (Galvagno & Dalli, 2014). The exchange process includes sharing knowledge resources and skill-building to benefit businesses and individuals (Vargo & Lusch, 2004). Companies would be more credible from having transparent communication with their customers and benefit from a joint activity that can create value for products and services (Pralhad & Ramaswamy, 2004; Prahalad & Ramaswamy, 2005).

Service-Dominant Design Logic (SDL) focuses on creating a shared value between the customer and the business (Maglio et al., 2009). The value creation process requires interaction and synthesizing insights to develop a shared value with customers (Grissemann & Stokburger-Sauer, 2012). To create shared value with the community,

researchers proposed the development of technology that can enhance yields, productivity, service quality, sustainability, and an innovative way of marketing and value chain management (Porter, 2011; Porter & Kumar, 2011; Kramer and Pfitzer (2016) posit that the extension to incorporate the Ecosystem of Shared Value would create value leading to facing challenges and, eventually, a competitive advantage. Although co-creation can extend beyond companies and their customers to include community networks where the business is located (Ramaswamy & Ozcan, 2014), the interaction of business-customer dyad still appears to be the most promising architecture in value co-creation (Ramaswamy & Gouillart, 2010).

Service providers must foster shared resource interactions to create value from co-creation (Shaw et al., 2011). These entrepreneurs should constantly look out for business opportunities and be ready to face problems and obstacles. Partnering with the local community would help satisfy customers' needs better (Kramer, 2010). They should also promote technology-enabled development to successfully realize shared values (De Silva & Wright, 2019).

Perceived positive service quality can be expected when the customer plays a vital role in value creation (Bruce et al., 2019; Kelleher et al., 2019). Customer Participation Behavior and Customer Relationship Behavior are the essential behavioral factors that will affect customer value creation by engaging in customer behavior. Customers seek helpful information to create shared value, sharing knowledge resources engagement, and interaction (Yi et al., 2011; Yi & Gong, 2013).

To create mutual value for service providers and customers, the body of knowledge acts as an intermediary to connect resources within the business network system with stability and sustainability through primary value-adding activities

(Krenz et al., 2014). Knowledge management is essential to creating shared values since complex management problems require extensive knowledge (Wiendahl et al., 2007). By learning and transferring knowledge, a shared experience will affect the cognitive process of creating a shared value in the network system using knowledge as an intermediary (Weyrich 2005).

Self-Congruence Perspective

Self-congruity theory (Maille & Fleck, 2011) is linked to consumer behaviors since Sirgy (1982) derived self-congruity from individual self-concept and attribution theories. The concept describes the match between the consumer self-concept and the value-expressive of a product or service. The construct has been further dissected, such as actual/ ideal self-congruence (Sirgy, 1985). and self-congruity/ functional congruity (Sirgy et al., 1991). Although many studies examine the relationship between self-congruity and, for example, consumer preference, purchase intention, and brand loyalty, other research extends the link to trustworthiness/ competence (Zogaj et al., 2021), celebrity/ influencers (Zhu et al., 2019; Shan et al., 2019), and social media influencers upon travel destination (Xu & Pratt, 2018).

Methodology

Informants. In-depth interviews were conducted with ten small hotel entrepreneurs and ten customers or users. The chosen hotels are small, with at least 5 rooms and not more than 79 rooms, near a natural tourist destination and not too far from the industrial area. These managers/ owners are entrepreneurs who have operated the hotels for over three years. These hotels are convenient samples with matching customer informants. Each interview session took one-two hour. The profile of the entrepreneurs and their customers is shown in Table 1.

Table 1: Informant Profiles

E#	Years Establishment	Age	Gender	Size (No. of Front Employees)	C&	Age	Gender	Visit Purpose
1	20 Years	50	Female	6	1	35	Male	Family Travel
2	13 Years	36	Male	6	2	42	Female	Family Travel
3	15 Years	34	Female	7	3	41	Female	Family Travel
4	23 Years	32	Male	9	4	67	Female	Family Travel
5	10 Years	40	Male	5	5	36	Female	Family Travel
6	10 Years	47	Male	9	6	30	Female	Family Travel
7	8 Years	30	Male	7	7	28	Male	Family Travel
8	14 Years	45	Female	6	8	39	Female	Family Travel
9	10 Years	44	Female	5	9	40	Female	Family Travel
10	18 Years	27	Female	5	10	42	Female	Family Travel

The oldest establishment (E#4) is 23, and the youngest (E#7) is 8. Five owners/ managers are less than 40, with 27 as the youngest. The same goes for five customer's age less than 40 years old. While hotel informants are equal in the numbers of males and females (5:5), there are more female customers than males (8:2).

Interview Questions with Self-Congruence Perspective. Questions were centered around various aspects of value-cocreation, coining after the literature reviews. We use the questions to acquire the perspectives of each hotel and its customer. The open-ended questions are, for example, asking the interviewees to explain their views of value co-creation, to give examples of the factors that induce the co-creation of value, to identify the activities that would lend themselves to the engagement and interaction between the hotel and its customers, to pinpoint the types of needs and experiences a customer might want to have, and to come up with a specific/ unique thing the hotel would be able to offer to fulfill the needs of individual customers.

Result

A summary of factors affecting co-creation value from the standpoint of small hotels is shown in Table 2, and customers in Table 3. When asked, an individual's brain would select, organize, and interpret information from their senses. The informants were asked about the factors affecting the co-creation value from both their points of view and their customers' views. Thus, the congruence between self-perception and self-other perception would indicate the importance of that factors to the informants.

Among the factors influencing co-creation value identified by the hotel entrepreneurs and their respective customers, H1 and C1 are highly congruent by the informants' self-perception and self-other perception. H3, H4, C2, C5 a medium and H2, H5, C3, C4 a low congruence. Hotel Entrepreneurs E#1, E#3, E#4, E#5, and E#8 identified the first three factors in unity, whereas the other 5 hotels specified the factors somewhat sporadically. On the other hand, customers (C&3, C&4, C&6) and (C&5, C&10) had similar perceptions, whereas the other five customers differed.

Table 2: Perception of hotel-self and hotel toward customer regarding factors influencing co-creation value

Hotel entrepreneur >>> Customer	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
H1. Knowledge/ experience / knowledge management of hotels	●	●	●	●	●	●	●	●	●	●
H2. Using technology innovation by hotels	●	◐	●	●	●	●	◐	●	○	◐
H3. Working with extended networks and community of the hotel	●	○	●	●	●	●	●	●	●	●
H4. Economic status of the hotel	○	○	○	○	○	◐	○	○	○	○
H5. Adaptability of the hotel	○	●	○	○	○	◐	◐	○	○	○
Note	●	Hotel perceived factor = Hotel view of customer perceived factor								
	◐	Hotel perceived factor								
	◑	Hotel view of customer perceived factor								
	○	Not a perceived factor								

Table 3: Perception of customer-self and customer toward hotel regarding factors influencing co-creation value

Customer >>> Hotel entrepreneur	&1	&2	&3	&4	&5	&6	&7	&8	&9	&10
C1. Sharing of information and research new customer experience activities by the hotel	●	●	●	●	●	●	●	◐	●	●
C2. Interaction & communication between customers and hotels	◐	◐	●	●	●	●	●	●	◐	●
C3. Feedback, support and help cutomers	●	◐	◐	◐	◐	◐	●	●	●	◐
C4. Responses to complaints of customers	◐	○	○	○	○	○	○	○	●	○
C5. Customer Technology capability	◐	○	○	○	○	○	○	○	○	○
Note	●	Hotel perceived factor = Hotel view of customer perceived factor								
	◐	Hotel perceived factor								
	◑	Hotel view of customer perceived factor								
	○	Not a perceived factor								

The self-congruence mechanism used to collect data regarding the co-creation value aligns with current consumer behavior issues (Yu et al., 2020), particularly in the service industry. Researchers posit that value creation and co-creation during direct interaction can cut short the dialogical and collaborative process (Grönroos, 2017; Grönroos & Voima, 2013). The informants indicate the congruent perception by self and from self to others regarding the factors affecting customer co-creation. Active seeking, sorting, maintaining, and sharing of information/ knowledge about specific, general, community-based activities are the crucial factors (H1, C1) unanimously shared by both informant groups. Communication and interaction appear to be the factor sought out by the customer informants.

Case Examples

We asked the informants about the examples illustrating factors affecting the co-creation value from both their point of view and the views of their customers. There are two use cases addressing the factors below.

Use Case 1 depicts Hotel knowledge management, Joint Information, and Feedback Interaction.

Hotel E#7 illustrates how small hotels adapt to the pandemic. The hotel is small and has been in business for less than ten years. The male owner is still young, and he chose a young customer about his age group (less than 30 years old) whose visit purpose is family travel.

The perception of the hotel self and hotel toward customers is that people do not want to go out to any places during COVID-19; “the customers came because they had to and stayed inside the hotel most of the time.” The travel and tourist situation was sluggish; the hotel was temporarily closed. Nevertheless, the service was not the same when the operation resumed. The disruption from COVID-19 was evidenced. Although the hotel tries to bring back the outside activities, it has not succeeded.

Regarding the hotel’s perspective toward customers, they considered providing customers with new experiences, photography, and good services. The hotel knew that service value would start since the customers booked in. They had asked what activities the customers wanted, whether through phone calls or social media. They prepared a website that provides knowledge and information to customers. When customers check-in, they focus on customer care services to take them to the room.

Once customers check in at the hotel, they will have activities inside, and bicycles can ride to various vantage points. The hotel has created a story about the fisherman’s clothing that the hotel lends to take pictures in the resort. This one is free and exceptionally wow. For those who like to take pictures, this automatically promotes an attractive hotel service because customers can borrow a fisherman’s outfit, take pictures, and post them on social media. The hotel also set up the tie-dye fabric activity.

This activity is quite popular and well-liked by customers. The customer would start tie-dyeing their fabric after they check in and be able to take home the shirt they made when they check out.

Many unconventional activity ideas are on a trial and error basis to test the liking of their customers. Starting when each activity is offered, the hotel collects customer feedback, for example, whether the activity is a good idea, what can be improved, and which activity suits what season. However, the hotel still keeps some activities, such as taking customers to top-spot viewpoints, even though the feedback from customers is negative due to the hot weather. When the customer checks out, the front will receive input and collect information from the customer about the experience of lodging. A customer feedback card is also placed in the room for comments, suggestions, or additional things the hotel should fix. This form of co-creation value contributes to the activity part and an overview of the entire hotel.

From the customer perception, activities provided by the hotel are favorable, for example, taking customers out to see sharks. However, during COVID-19, the shark-watching activity was canceled without informing the customers. From the customer’s point of view, they can see the efforts of the staff and the hotel in trying to arrange these activities for them. The hotel makes an effort to adjust what is supposedly to be indoor activities by accommodating customers to have long-distance undertakings and still be outdoors. Customers then can avoid crowded places and small restaurant areas. This scheme allows the hotel to have better services and customer-perceived value.

Use Case #2 demonstrates the factors: Sharing information and researching new customer experience activities by the hotel and extended networks.

Hotel #9 is a tiny hotel run by a middle age female entrepreneur, established about ten years ago with only five employees. The customer who agreed to join the interview is roughly the same age as the hotel owner.

The hotel recognizes the problem of Silver Age customers feeling uncomfortable when going to the toilet. The elders have to bend and put pressure on their knees while standing. Since safety from falls is one of the most critical standards of hospitality services, the hotel takes a precaution seriously by pushing the mattress to stick to the edge of the cement. When the hotel accepts the booking from silver-age customers, the receptionist will coordinate with the housekeeper to push the futon up. Older customers would feel like being in a familiar environment or at home. Operating with exceptional care for elderly needs comes from earnestly talking and receiving customer feedback. The hotel tried to pay attention to every comment. If they receive a compliment, an acknowledgment will be in the morning brief to encourage their staff. However, if the

guest complains about anything, immediate action will be immediately forwarded to the responsible supervisor. Feedback is constantly reviewed to develop an innovative solution and monitor so that no severe cases can be expected. Ultimately, guest reviews are helpful for the hotel to improve its services.

The perception of customer-self and customer toward the hotel regarding factors influencing co-creation value can be explained through the staff recommendation such as a tourist attraction. If a customer shows a slight interest in a given activity or appealing place, the staff would respond by paying attention and sharing additional information immediately—the customer values and impresses with the attentiveness of the hotel's proactive move. For example, the hotel would ask the customer from the beginning what kind of trip they want. Then they will suggest a local package or recommend a tourism service provider from a local insider's point of view. The hotel might also advise a family dinner of authentic local herbal food by setting up a specific sign at the food station explaining the background or origin of the menu. The hotel brings storytelling about local decoration concepts by equipping each room with local products and brochures inside each room.

Concluding remarks

Factors influencing customer co-creation value were discovered from the in-depth interviews of twenty hotel entrepreneurs and their customers. These factors consist of sharing information to create mutual value for customers and engaging in customer interactions to create shared value and customer feedback loops. **As a result, customers seek to interact with the business**, for example, by providing feedback that will help improve and develop products or services to meet customers' needs through word of mouth.

Small hotel entrepreneurs have enormous local expertise and community networks. If they link scattered information with their expertise, integrate them into a knowledge management system, and share it with their customers, the co-creation of shared values would be in place. The **shared knowledge management system** is among the most congruently mentioned factors by the hotel and customer sides. Note that customers as co-creators who contribute to the shared knowledge management system cannot be overlooked because innovative services may not be embraced without an endorsement from customers.

By engaging customers, small hotel businesses can help solve problems and offer products or services to customers who perceive them as unique and valuable. Focusing on how to innovate and meet customer needs to create shared value for all parties; customer value co-creation means building collaboration through the interaction of a combination of customers with small hotel businesses through open innovation as service providers and related stakeholders and local communities.

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Analysis of the Effect of FIBER Model Factors on Successor's Willingness to Succeed: Using Absorptive Capacity as Mediating Variable

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Abstract

This study aims to analyze the socioemotional wealth of family businesses from the perspective of successors. To measure Social Emotional Wealth (SEW), the FIBER model was selected, and the study seeks to understand the influence of successors' managerial capabilities and succession intention. In particular, by setting absorptive capacity of successors as a mediating variable, the study intends to provide guidelines for successors' preparation for succession and successful transition.

Keywords

Family Business, Succession, Successor, FIBER Model, Absorption Capability

Introduction

Family business research encompasses the values and motivations of family members, as well as the strategies of the business (Randolph et al., 2022). Various research topics related to family members can be seen as indicative of the uniqueness of family businesses. Unlike non-family businesses, family businesses integrate their possessed knowledge and resources into their operational activities in their distinct manner (Brinkerink, 2018; Classen et al., 2012; Matzler et al., 2015; Gusenbauer et al., 2023). In contrast to non-family businesses, family businesses are strongly connected with both ownership and management (Hoffman et al., 2006; Stasa and Machek, 2022), possess intentions of succession to the next generation (Fiegener et al., 1994), and make strategic decisions for socio-emotional value rather than purely economic gains (Gomez-Mejia et al., 2007; Nason et al., 2019).

SocioEmotional Wealth (SEW) is a factor that distinguishes family businesses uniquely (Holt et al., 2018). Choosing non-economic values surrounding the business over financial gains might seem inefficient, yet leaders of family businesses make decisions that entail economic sacrifices to uphold SEW (Gomez-Mejia et al., 2007). Decisions from the SEW perspective particularly emphasize the identity of the family business and make choices for the long-term survival of the company (Neckebrouck et al., 2018; McLarty and Holt, 2019). SEW encompasses intergenerational succession, social

capital, emotional connection to the business, and the family's reputation (Berrone et al., 2012), and due to leaders prioritizing SEW in decision-making (Swab et al., 2020), it's considered one of the most significant models in recent developments of family business theories (Brigham and Payne, 2019).

An essential factor of SEW (Berrone et al., 2012), and the most crucial event for the sustainability of a family business is succession (Blumentritt et al., 2013). However, considering the low likelihood of successful succession (Ward, 1987), and the difficulty for family businesses to survive beyond a decade (U.S. Census Bureau, 2015), it implies that the process is as challenging as its significance (Stavrou, 2003; Gagné et al., 2019). Post-succession performance of the business can decline (Villalonga and Amit, 2006), and if succession ends in failure, it can leave trauma among family members (Berns and Klammer, 2017). Nevertheless, despite these challenges, preparing for and executing succession remains a vital characteristic unique to family businesses (Zellweger et al., 2012). Through succession, management know-how can be developed, and by acquiring skills for swift decision-making and overcoming trials, a business can thrive as a long-lasting enterprise (Cho et al., 2022).

Through succession, businesses can gain both social and economic benefits. Successful succession signifies the stable and continuous preservation of tangible and intangible assets held by the company, as well as the ability

to maintain employment (Yu, 2020). The meaning of successful succession goes beyond merely indicating the success of the business; it can be explained as providing benefits for social stability, including the survival of the company (Cho et al., 2018).

This study applied the FIBER model, deemed most suitable for measuring the multidimensional concept of SEW, to the succession process for conducting research (Swab et al., 2020). The FIBER model is considered most appropriate for measuring SEW, which primarily represents non-economic concepts (Chrisman et al., 2012; Martin & Gómez-Mejía, 2016). In this study, successors, who are a highly critical factor determining the future of the company, were selected as the research subjects (Handler, 1994). The aim is to explore the relationship between the FIBER model, successors' managerial capabilities, and succession intention, with a focus on the successors' absorptive capacity.

This study holds significance in analyzing the impact of the FIBER model from the perspective of successors. By analyzing the environment surrounding successors from their point of view, meaningful guidelines for succession preparation or processes are anticipated to be provided. Additionally, through analyzing the relationship between absorptive capacities, it is expected that insights will be gained into the attitudes successors should adopt to enhance their future managerial capabilities and succession intentions. The research questions of this study are as follows:

Q1: What influence do the factors of the FIBER model have on successors?

Q2: Can successors enhance their capabilities through absorptive capacity?

Literature Review

SEW and FIBER Model

Since its introduction in 2007 (Gómez-Mejía et al., 2007), SEW has been regarded as one of the most significant concepts in family business research (Brigham & Payne, 2019). While there are issues with the application of SEW to various topics in family business (Newber & Craig, 2017), it remains a suitable theory for describing family businesses that emphasize and prioritize non-economic yet sustainable aspects of the business (McLarty and Holt, 2019). The suitability of SEW in family business research lies in its ability to explain family members' perceptions and decision-making behaviors (Berrone et al., 2012).

SEW exists in various perspectives, and to measure it, the proposed model is Family control and influence (F), Identification of family members with the firm (I), Binding social ties (B), Emotional attachment of family members (E), and Renewal of family bonds (R) (Gómez-Mejía et al., 2007). Each of these FIBER factors explains different dimensions specific to family businesses. Berrone et al. (2012) interpreted and conceptualized the factors of the

FIBER model (Swab et al., 2020). According to their research, Family control and influence entail that the principal shareholders of the company should be family members (Berrone et al., 2012), and family members should influence the strategic decisions or directions of the family business (Blanco-Mazagatos et al., 2016). This is aimed at maintaining the influence and independence of family members.

Identification of family members with the firm refers to the perception that family members belong to the business (Berrone et al., 2012). It also emphasizes that the existence of the family business should hold personal significance for family members and they should take pride in being part of the family business. By recognizing the identity of the family business, family members, considering the image projected to external stakeholders (Micelotta & Raynard 2011), can influence internal activities such as the quality of services or products offered by the business (Carrigan, M., & Buckley, 2008).

Binding social ties refer to active engagement within the local community where the family business operates, involving the establishment of long-term relationships with local suppliers based on trust, mutual benefit, and contract-based relationships (Berrone et al., 2012). Through this, family businesses extend their role within the community (Le Breton-Miller, I., & Miller, 2009), maintaining positive relationships with relevant stakeholders over time (Koropp et al., 2013).

Emotional attachment of family members, a distinctive difference from non-family businesses, implies that emotional factors of family members impact the decision-making processes of the business (Berrone et al., 2012). The involvement of emotions suggests blurred boundaries between family and business, where factors like family divorce, death, succession conflicts, etc., can have an influence (Dunn, 1999; Shepherd et al., 2009). The influence due to emotional involvement is sometimes used to measure family members' satisfaction as part of family business performance (Mahto et al., 2010).

The final factor of the FIBER model is Renewal of family bonds. Renewal of family bonds emphasizes the importance of preserving and maintaining family heritage and traditions, often involving long-term investments from a generational perspective (Berrone et al., 2012). It particularly describes successful intergenerational succession as a key goal for family members. Through Renewal of family bonds, family businesses can explain themes related to intergenerational control and succession (Strike et al., 2015; Zellweger et al., 2012). The FIBER model factors effectively explain the non-economic aspects of family business characteristics. In this study, we aim to analyze the five factors of the FIBER model from the perspective of successors.

Successor's Absorptive Capacity

Absorptive capacity has grown in significance in the modern knowledge-intensive business environment as a crucial factor for a firm's success (Schlagwein & Hu, 2017). Cohen & Levinthal (1990) defined absorptive capacity as the ability to apply the value of external innovation and knowledge to the organization to achieve performance. Absorptive capacity is typically categorized into potential and realized dimensions (Zahra & George, 2002), and enhancing such capabilities can lead to improved organizational performance.

From the perspective of recognizing the value of external knowledge and integrating it into internal business activities for performance (Cohen & Levinthal, 1990), absorptive capacity can be closely linked to organizational innovation (Stock et al., 2001). Given its importance within corporate strategy research (Jansen et al., 2005), it is a domain that should also be addressed in the field of family business research.

While absorptive capacity has primarily been applied at the organizational level in prior research, this study applies it at the individual level. Particularly, by focusing on successors as key players in the future strategic perspective of family businesses, the study aims to explore the impact of successors' absorptive capacity on their managerial capabilities and succession intentions. Absorptive capacity is set as a mediating variable in this study, allowing investigation into how non-economic factors surrounding successors are absorbed.

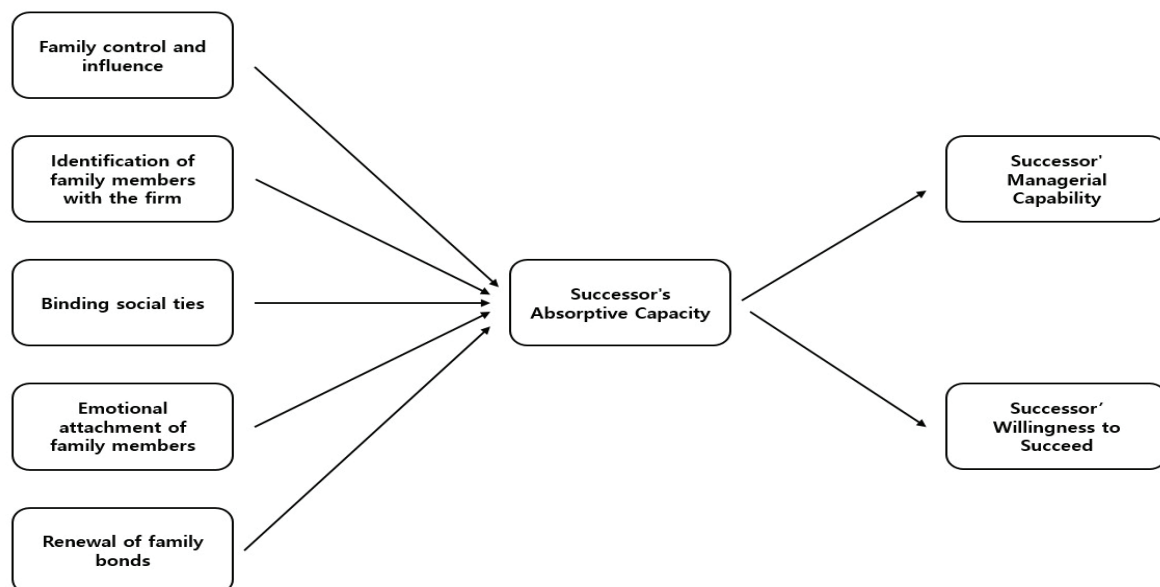
Successor's Managerial Capability and Willingness to Succeed

The presence of a successor can become a critical perspective as it symbolizes the continuity of a family business (Marques et al., 2022). The absence of a successor implies the absence of someone to lead the future of the family business, thereby potentially causing the loss of family heritage, the meaning of the business's existence, and significantly impacting the business's continuity (Cho et al., 2018).

For a successor to successfully conclude the succession process and become the leader of the future family business, they must possess a range of capabilities and preparations (Sharma, 2004). Among these, the importance of the successor's managerial capabilities can be accentuated, with managerial capabilities being assessed as the most crucial factor among various competencies and psychological elements (Cho et al., 2022). Managerial capabilities can be defined as decision-making experience (Ward, 1987), business-related experience, and the ability to perform assigned tasks (Cho et al., 2018).

Beyond the successor's managerial capabilities, another pivotal factor for successful succession is the successor's intention to succeed. The voluntary determination of the successor to continue the business becomes a significant criterion for the incumbent successor's ability to transition the business (Richards et al., 2019). The successor's voluntary intention to succeed is described as one of the essential prerequisites, as it also influences the satisfaction of various stakeholders, including family members, throughout the succession process (Venter et al., 2005).

In this study, the factors of successor's managerial capabilities and succession intention are set as dependent variables. The study aims to analyze how the five factors of the FIBER model directly or indirectly through absorptive capacity influence these variables.



<Figure 1. Research Model>

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E-Tourism: A systematic review, bibliometric analysis, and Future trends

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Abstract

With the development of the technological infrastructure around the world, e-tourism is taking hold in the tourism sector and attracting a lot of tourists' attention. This paper presents an examination of the emerging trends of e-tourism. Through a comprehensive review of the literature by using PRISMA and bibliometric analysis, this paper aims to shed light on the advancements made in the field of e-tourism based on the 62 qualified articles published between 2018 and 2022. The findings highlighted the future research directions. Our findings offer key insights into the tourism sector aimed at enabling e-tourism.

Introduction

As more accessible and affordable information and communication technologies (ICTs) have been developed, the tourism industry has undergone a paradigm shift (Cranmer et al., 2020; Tribe and Mkono, 2017). The emergence of sophisticated Internet applications tailored specifically for the travel industry has altered how both consumers and travel service providers operate (Kolahkaj et al., 2020). According to Kazandzhieva and Santana (2019), e-tourism is the use of ICT by tourism service providers to offer travel-related services remotely to potential customers, where they can transact as and when necessary (Subramaniaswamy et al., 2019; Valdivia et al., 2019; Abbas et al., 2021).

The multibillion-dollar travel and tourism industry has made it possible for travelers to plan, book, and pay for their upcoming trips online in just a few clicks as per their convenience (Kumar, 2020). Information technology (IT) has played a significant role in enabling, catalyzing, and, in some cases, disrupting travel and tourism ever since the commercialization of the Internet (Werthner and Klein 1999; Buhalis, 2020). This is especially true in today's world because IT is ingrained in every aspect of travel and tourism, affecting essentially every travel process step, every tourism stakeholder, and every industry subdomain (Benckendorff et al. 2019; Xiang et al., 2021). Owing to IT proliferation and as a result of real-time data analytics and intelligence, consumers can also read reviews, compare different services, and make decisions using e-tourism (Nilashi et al., 2019; Kontogianni and Alepis, 2020). As the nexus of IT and tourism, the field of e-Tourism now needs to deal with the two "fronts" of a rapidly evolving new reality and enormous potential for long-term change. From the perspectives of e-Tourism researchers, we discover that this new reality presents both enormous challenges and exciting opportunities (Gretzel et al., 2020). Considering the above backdrop, it becomes imperative to explore the transpiring journey of e-tourism. Further, a lot of research is available in the

area of e-tourism, still a significant rise in the e-tourism has been witnessed in post covid times. In fact, many COVID-19 recovery efforts in the tourism sector now anticipate IT as the condition sine qua non, without which there would be no tourism during and after COVID-19 (Raza et al., 2021). Hence, this research is an attempt to unearth the underlying themes based on the systematic review and bibliometric analysis of e-tourism based on the qualified articles published between 2018 and 2022. Also, this research tries to answer the existing question of "What are the future research perspectives with respect to e-tourism". This research also offers key insights into the tourism sector aimed at enabling e-tourism in a digitally booming economy.

Methodology

PRISMA analysis was used in the method section to perform a systematic literature review to explore the future research directions, and VOSviewer was used for bibliographic coupling, citation analysis, and co-occurrence analysis to provide a bibliographic overview.

Systematic review

Figure 1 displays the PRISMA analysis with the exclusion criteria.

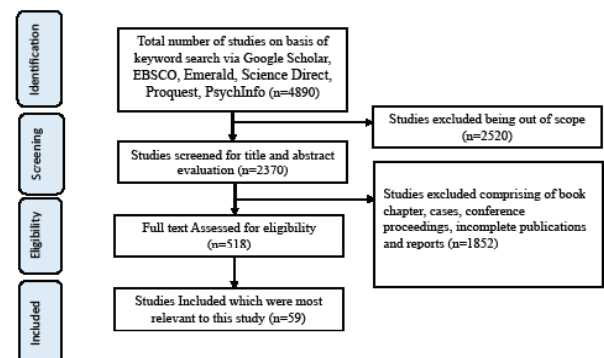


Figure 1: PRISMA Diagram with exclusion diagram

Bibliometric Analysis

Keyword co-occurrence map

Using keywords from the journal articles that appeared more than five times in the SCOPUS database, the final analysis was conducted. Out of 415 keywords only 15 met the threshold with minimum number of occurrences of a keyword being equal to 1. The principal themes or subjects being researched within the field of study are represented by the clusters as shown in figure 2. Based on the frequency of co-occurrence, the size of each cluster represents the degree of relationship between the keywords within that cluster.

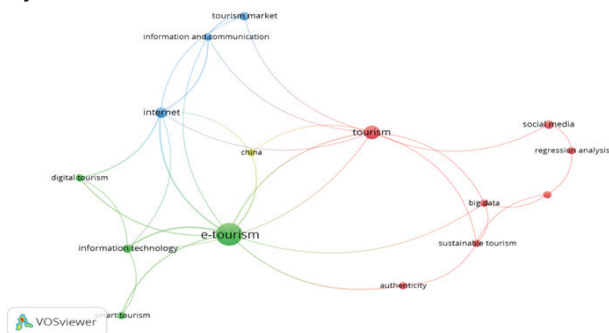


Figure 2: Keyword map for themes

Bibliographic coupling

Based on the bibliographic coupling, wherein the two publications share the common intellectual capital, only 38 documents out of 62 documents met the requirement for having at least 5 citations. The largest set of connected documents after using VOSviewer to mine secondary data was only 25 documents as shown in Figure 3. Further, out of 61 authors, only 38 met the thresholds with minimum number of documents of an author equal to 1 and minimum number of citations of an author equal to 5. The analysis depicted that the largest set of connected items consists of 25 items as shown in Figure 4. The top 5 authors in the field of e-tourism are: 1) Julio Navío-Marco, 2) Alfonso Marino, 3) Jialin Wu, 4) Teresa Garín-Muñoz, and 5) Shuting Tao. Further, out of 146 organizations only 92 met the threshold with minimum number of citations of an organization equal to 5 and minimum number of documents of an organization being equal to 1. The analysis resulted in the largest set of connected items being equal to 52.

In addition, the bibliographic coupling of countries was performed with full counting method and 43 countries met the threshold out of 46 countries having minimum number of documents and citations from a country equal

to 1 as shown in figure 5. Also, figure 6 represents the bibliographic coupling of the sources and out of 44 sources, only 40 met the threshold with minimum number of citation and documents being equal to 1. The top 5 sources/journals are 1) Information Technology and Tourism 2) Tourism management 3) Journal of Cleaner Production 4) IEEE Engineering Management Review, and 5) International Journal of Contemporary Hospitality Management.

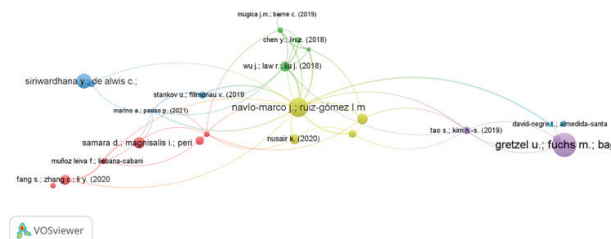


Figure 3: Bibliographic coupling depicting documents

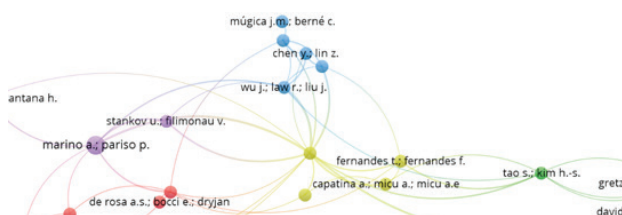


Figure 4: Bibliographic coupling depicting authors

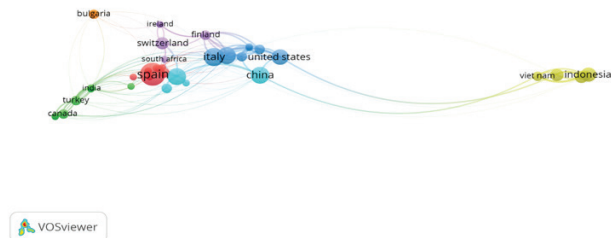


Figure 5: Bibliographic coupling depicting countries

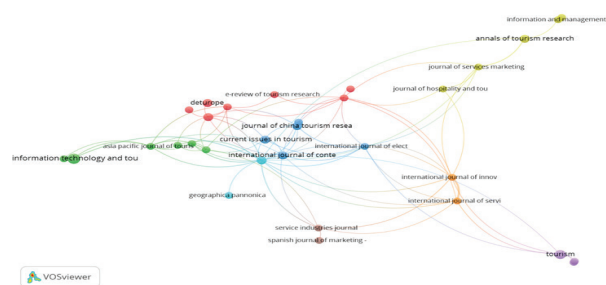


Figure 6: Bibliographic coupling depicting sources

Co-citation analysis

The co-citation analysis (van Eck and Waltman, 2020), which gauges how frequently one paper cites another, was also used to determine who the most influential authors were in the field. The results revealed that out of 6016 authors, only 33 met the threshold. The analysis used the association strength method with minimum cluster size being kept as 1. The results further revealed a total of 5 clusters namely red cluster (8 items), green cluster (8 items), blue cluster (7 items), yellow cluster (6 items), and purple cluster (4 items) as shown in figure 7.

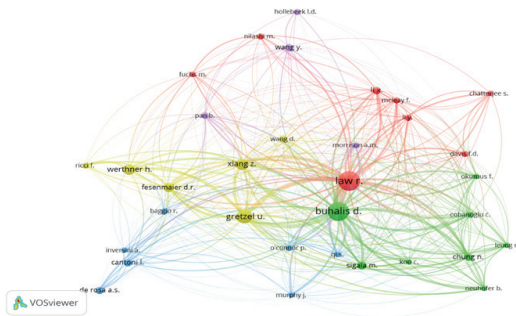


Figure 7: Co-citation analysis of authors

Bibliometric analysis based on text data

The research articles' titles and abstracts were used to create a term co-occurrence map based on an analysis of SCOPUS data, with the structured abstract labels and copyright statements being disregarded. The analysis employed a binary counting method with a 5-occurrence minimum for terms. This resulted in 2014 terms, of which 56 met the requirement based on the aforementioned standards. Additionally, figure 8 displays the term co-occurrence item map, and figure 9 displays the item density visualization with three clusters. Each item in this visualization is represented by its label, and a color gradient that shows the density of items in various parts of the network. With the help of this feature, researchers can examine the connections between various terms and notice patterns in the literature. For example, researchers can use VOSviewer to identify keywords or concepts that frequently co-occur in the literature, indicating areas of active research or emerging trends as indicated by Van Eck & Waltman (2011). The results depicted 3 clusters i.e., 1) red cluster with 12 items, 2) green cluster and 3) blue cluster having 9 items each. Broadly, 3 themes

emerged from the analysis as discussed further wherein, a) customer centric/characteristics for e-tourism b) role of ICT or internet in enabling e-tourism with focus on evolution of tourism owing to covid, and c) social media influence on e-tourism.

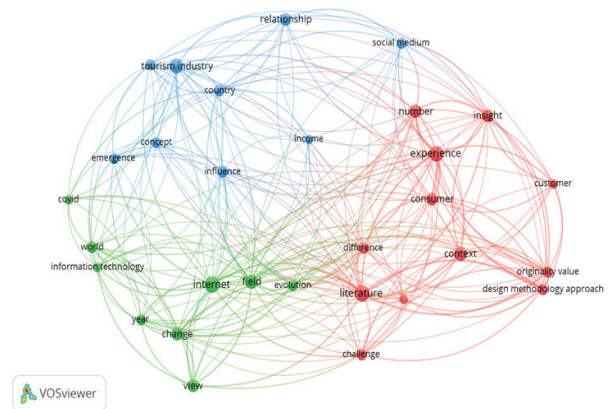


Figure 7: Network map of term co-occurrence

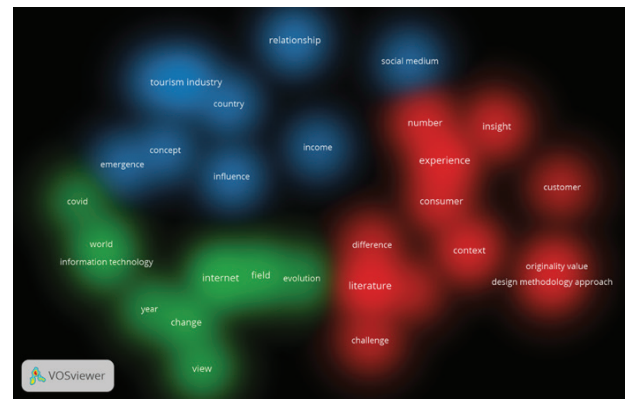


Figure 8: Density visualization of term co-occurrence

Discussion

In order to evaluate the development and significance of e-tourism research, bibliometric analysis has become a crucial tool. This research study used bibliometric techniques to quantify trends, identify important institutions, countries, and authors who have made significant contributions to the field, as well as to find new areas of study. Based on the analysis of 62 qualified research articles between 2018 to 2022, the researchers have shared 3 themes which emerged from the systematic review and bibliometric analysis. The analysis revealed three themes: a) customer centricity/characteristics of e-tourism; b) the role of ICT or the internet in enabling e-tourism with a focus on the evolution of tourism due to covid; and c) social media's influence on e-tourism. Further, as e-tourism uses electronic platforms, such as

websites, mobile apps, and social media, to facilitate different aspects of the tourism industry, from travel planning and booking to destination exploration and post-trip sharing. Given the present sustainability momentum, travelers are looking for eco-friendly options, and therefore, e-tourism platforms are highlighting eco-friendly lodging, transportation, and activities. In addition, utilising the big data analytics, new strategies are being formulated to target the tourists in order to offer tailor made services along with smart information to improvise overall experience.

The dynamic blend of technology and tourism known as e-tourism is constantly changing the way tourists discover, plan, and experience their travel destinations. Several trends have emerged that are changing the landscape of e-tourism as digital innovations develop at an unprecedented rate. These trends are influencing not only the industry but also how visitors engage with their chosen travel destinations.

As depicted by the term co-occurrence density map, the repeated occurrence of terms like “change”, “challenge”, “insight”, “view”, “insight” etc reminds the researchers that the e-tourism landscape is constantly evolving owing to the proliferation of ICT.

Future research directions

This study has several future research directions as discussed further. The investigation of sustainable e-tourism practices, the examination of the impact of social media on travel decision-making, and the incorporation of AI and machine learning in travel recommendations are just a few of the new trends in e-tourism research that have been discovered via the extensive analysis of the existing research base (Baggio and Fuchs, 2018). Future studies may focus on the moral implications of e-tourism, the impact of virtual reality on destination marketing (Lama et al., 2020), and the application of blockchain technology to enhance traveller security and privacy as technology develops (Caddeo and Pinna, 2021).

Conclusion

A thorough understanding of the development, trends, and effects of technology on the tourism industry has been made possible by performing a systematic review and bibliometric analysis to explore the concept of e-tourism.

Further, researchers learn important lessons from bibliometric analysis that direct further investigation, guide policy choices, and influence the direction of e-tourism research in the future. This symbiotic relationship is poised to foster innovation and offer a deeper understanding of the constantly shifting landscape of travel and technology as the field develops.

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Strategic Importance of Supply Chain Management in Small and Medium Enterprises with Reference to Nepal

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Abstract

It is well known that supply chain management is an integral part of most businesses and is essential to company success and customer satisfaction. The main objective of this study was to investigate the strategic importance of supply chain management in different small and medium industries in Nepal. The industry considered for the research are soap and detergent manufacturing industries, scaffolding clamp industries in Nepal. The data collection is based on Primary and secondary sources. The study concludes with the better understanding of SCM benefits for SME as well as the understanding the importance of SCM through the proper planning and control.

Keywords

Supply Chain Management, Small and Medium Enterprises, customer satisfaction

Background

Supply chain management (SCM) is the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective and efficient ways possible. Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities. The concept of Supply Chain Management (SCM) is based on two core ideas:

1. The first is that practically every product that reaches an end user represents the cumulative effort of multiple organizations. These organizations are referred to collectively as the supply chain.
2. The second idea is that while supply chains have existed for a long time, most organizations have only paid attention to what was happening within their "four walls." Few businesses understood, much less managed, the entire chain of activities that ultimately delivered products to the final customer. The result was disjointed and often ineffective supply chains.

The organizations that make up the supply chain are "linked" together through physical flows and information flows.

Physical Flows

Physical flows involve the transformation, movement, and storage of goods and materials. They are the most visible piece of the supply chain. But just as important are

information flows.

Information Flows

Information flows allow the various supply chain partners to coordinate their long-term plans, and to control the day-to-day flow of goods and materials up and down the supply chain.

Supply Chain Management (SCM) is the major function of any manufacturing organization which describes distribution options and network of facilities. Functions such as material procurement, transformation of the material into intermediate and finished products, and then distribution of the finished product to consumer are included in SCM. Though the complexity of supply chain may vary vastly from industry to industry and firm to firm but are found to exist in both service and manufacturing sectors, however it represents a logical advance in our evolving understanding of business performance (Smith & Budress, 2005).

According to the Council of Supply Chain Management Professionals (CSCMP), supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies (CSCMP, 2011).

In general, a supply chain includes the activities

of information systems management, sourcing and procurement, production scheduling, order processing, inventory management, warehousing, customer service and after-market disposition of packaging and materials. Thus, the integration of these activities through improved relationships ensures a sustainable competitive advantage.

A very simple example of supply chain can be explained involving a single product. The chain involves procurement of raw material from vendors, transformed into finished goods in a single step, then transported to distribution centers and ultimately to consumer. Realistically supply chains are always very complex having multiple end products with shared components, facilities and capacities. The flow of materials is not always along a simple network, various modes of transportation gets involved and the cost of material for the end items may become exorbitant (Bertodo, 2002).

Traditionally planning, procurement, manufacturing, marketing and the distribution set ups in the organizations along the supply chain operate independently having their own objectives and generally these are conflicting. Marketing objective of high consumer service and attainment of maximum sales output, always conflicts with manufacturing and distribution goals. Many manufacturing operations are designed to maximize output and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts are often negotiated with very little information beyond historical buying patterns. The resultant of these factors is creation of a void with respect to an integrated plan in the organization. There is a definite need for a system through which these different functions can be coordinated and integrated together (Bertodo, 2002) and SCM is a strategy through which such integration can be achieved.

SCM is managed by the supply chain which can be expressed as the sum of parts involved in fulfilling a customer request and consists of suppliers, manufactures, warehouses, retailers, transporters and customers. The purpose of a supply chain analysis is to maximize company's profit in the process of generating value for the customer, namely maximizing the difference between the final product worth and the total cost expended by the supply chain to provide the product to the customer (Franca et al., 2010).

Small and medium industries (SME)

Small and medium-sized enterprises (SMEs) are the categories of the business that can be defined by the number of the employee in the enterprises as well the annual financial turnover. The maximum number of staff that can be employed for a business to be considered small to medium-sized differs around the world, as too does the upper turnover threshold.

Small and medium-sized enterprises (SMEs) has a major share in the economic activity of developing countries. Recently, SMEs accounted for 90 percent of total industrial establishments, contributed 50 percent in employment generation by industrial sector, and shared about 40 percent in the industrial sector's contribution to national gross domestic product (GDP) in emerging economies. In context of Nepal, the role of SMEs is often relatively greater. It play an important role in creating self-employment opportunities, mobilizing and using local resources, and raising the income of the rural populace. Since the late 1980s, Nepal has transitioned to an open market regime, which has resulted in the removal or significant reduction of barriers to international trade. Nepalese SMEs have been impacted by this change and are finding it more and more challenging to compete with imported goods in the domestic and global markets for exportable goods. Different incentives for SMEs have been promised by Nepal's development plans and other policies related to commerce, but lack of knowledge, errors in policy declaration, and issues with the actual implementation of the policies have largely prevented SMEs from reaping any meaningful benefits

SMEs in Nepal

Rice, pulses, oil and flour mills, dairy, aerated soft drinks, fruit juices and processed products, noodles, biscuits and light snack products, chocolates and candy, mineral water, dried vegetables, and some other household utilitarian and consumption goods have dominated SM in Nepal.

Other areas of SMEs' involvement include Wooden, plastic, and metal furniture, printing presses, polythene pipes, utensils, jute products, poultry products, livestock products, wire drawing, nail and iron rod, sheet metal, gig and black pi, as well as wooden, plastic, and metal handicrafts, handmade paper and products, apparels and garments, woolen carpets, pashmina shawls and rugs, and leather. At the micro, cottage and family level, a sizeable number of unregistered enterprises operate on a seasonal basis. Due to the opening up of investment for infrastructure development to the private sector, investment in micro hydropower and tourism resorts and complexes have also been witnessed in some regions.

In this research, I am considering the Scaffolding Clamps and Soap and Detergent Industries in Nepal.

Introduction to the scaffolding industry

Scaffolding structures are used at construction sites to allow workers to climb up to higher levels safely and securely, and the scaffold is typically made from strong, high-grade metal such as steel. Each steel pipe must be attached to another to create a sturdy structure, and at every joint, a scaffolding clamp can be used to create an angle or a straight line to secure the pipes in place

The size, shape, and function of the scaffolding clamp will vary. Corner clamps are often T-shaped to accept three or

more scaffolding pipes, and once the pipes are in place, the scaffolding clamp can be tightened down, usually using a nut and bolt system, to secure each component in place. The overall structure is likely to use numerous clamps at every joint or connecting point. These points are not necessarily always at angles. Two horizontal pipes can be secured to each other using a horizontal scaffolding clamp, for example, and the design of such a clamp will differ significantly from one used at an angle.

Scaffolding industry in Nepal

There is no such scaffolding clamp industry history in Nepal. We have a record of establishment of different hardware dealers working and dealing in Nepal for clamps. In the year 2019 there is the record of establishment of one clamp industry in Nepal namely Clamp Tech Pvt. Ltd which is situated at Jagati, Bhaktapur Nepal. The industry is duly registered under The Industrial Enterprises act 2076. Scaffolding clamps are crucial components of any scaffolding system, used to connect two scaffolding cylinders securely in Nepal. Clamp Tech Pvt Ltd is a distinguished Scaffolding Clamps Manufacturers in Nepal. They provide a vast selection of high-quality scaffolding clamps to satisfy the requirements of a variety of construction projects in Nepal.

Introduction to the soap and detergent industry

Soap and detergents are used very commonly in our daily life. We use them for washing clothes and utensils. Soap and detergents industry is a pretty old industry. Soap and detergents industry include products for washing, viz laundry soaps and synthetic detergents. These are consumer items. Technology, quality, marketing & distribution network determine the success of the units in this sector. The industry has developed both in the small-scale sector and the organized sector; yet 90% of production of laundry soap is in the small-scale sector. Two critical raw materials are required for the production of laundry soaps. Nominal investment is sufficient for this industry as it involves simple methods of processing and manufacturing of various types of soap and detergents.

Soaps and detergent industry in Nepal

In ancient Nepal too, people used soap preparations made from plant or animal fats. There is no any fixed history of the evolution soap industry of Nepal. Though, previously the soap in Nepal were homemade or in small scale industries. The soap were called as “Dalla Sabun”. Modern technology has provided synthetic detergents that have slowly replaced soaps. The detergents were used chiefly for hand-dishwashing and laundering of fine fabric. This was followed by the development of all-purpose laundry detergents introduced in the U.S in 1946. Today the detergent market is a highly competitive one.

As a history of soap and detergent industry in Nepal

we have a record of establishment of Mahashakti Soap and Chemical Industry Pvt. Ltd in 1974 AD. Unilever Nepal Limited as a subsidiary of Hindustan Lever was established on 1988 AD. Recently, there is 60 soap and detergent industries operating in Nepal including small and large scale operation.

Unilever Nepal has a leading industry in production of detergent power in Nepal named as “Wheel”. Similarly, Gopal Soap Industries Pvt. Ltd is the second leading soap and detergent manufacturer in Nepal after Unilever Nepal Pvt. Ltd. Gopal Soap Industries P. Ltd dealing in detergent powder after “Wheel” with the name “V-Series”. The sale of V-Series has been drastically increased within the last decade. According to them, out of many factors for the sale growth of V-Series one major factor is proper planning and implementation of supply chain management. They would have to say that they have proper arrangement with the supplier as well as with the logistic company for upstream movement of raw material and other component as well as proper control over the marketing intermediaries for the downstream. This has made company competent with regards to the customer service which leads to the better sales growth.

Supply Chain Management and SMEs

Supply chain management (SCM) is a management philosophy designed to have the control over the flow of raw material from suppliers to the flow of finished product to the end customers. It is a management technique for integrating different business activities between enterprises (Ellram & Cooper, 1993; Hong, 2005). This refers to the methodology for integrated management of all activities in the entire supply chain process, and encompasses the flows of goods concerning the conversion and logistics of materials and finished products, the flows of information that supports those processes, and the flows of capital which entirely assists in noticing down the business/firm performance. SCM is a customer empowering supply system aimed at harmonizing product and service flows, information being created, and individualised customer values in the market, as well as providing innovative solutions. It is a business philosophy that guides companies and their business partners between interacting distribution channels, and internal resources and production capabilities, in the right direction (Ross, 1998). Park (2003) defines SCM as a collaborative strategy to rebuild an organization by rearranging new ITs and enhance the business efficiency of enterprises by making strategic alliances that ensure a competitive edge for their products and services. Simchi-Levi et al. (2000) define SCM as a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed in the right quantities, to the right locations, and at the right time, in order to minimise system-wide costs while satisfying service level requirements. This

eventually refers to an integrated process for providing the end consumers with the value that they demand. Thus, SCM seeks to achieve comprehensive optimisation in the flow of products and information from production to final sales that better responds to actual consumer demands and improves business efficiencies.

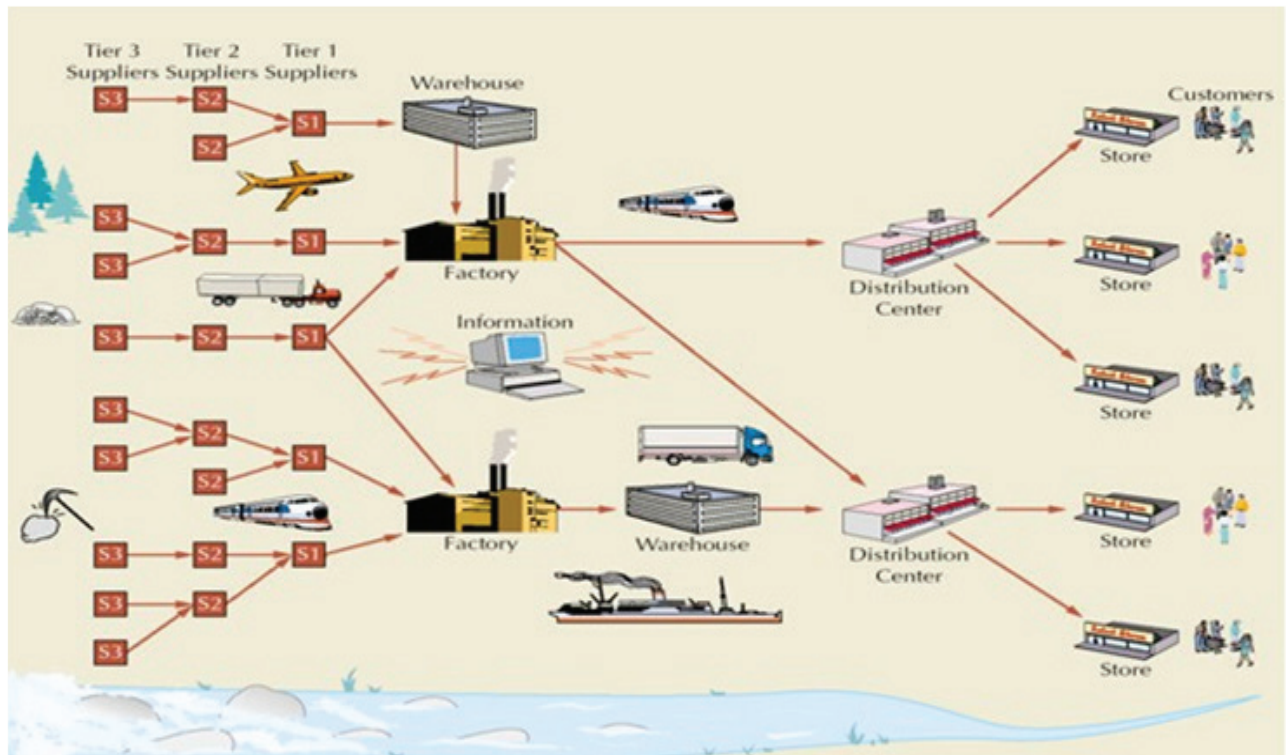


Fig- 1 – Supply Chain Management

Objectives of the research

The objective of this article is to illustrate the importance of supply chain management to the import based companies for gaining competitive advantage in Nepalese market. This article has major following objective;

1. The main objective of this article is to highlight the importance of supply chain management to the SMEs in Nepal.
1. Secondary the importance of supply chain in SMEs
1. Finally, the importance of supply chain management for better business performance in SMEs in Nepal. This can be lower prices, higher quality, higher dependability or shorter delivery time and can lead to high levels of economic performances, customer satisfaction and loyalty and relationship effectiveness.

Methodology

The study is based on primary and secondary data. In this research paper, the primary data is collected directly through the personal in-depth interview to the respondent from Gopal Soap Industries Pvt. Ltd. The secondary data is collected from the annual report, newspapers, websites etc.

Data Collection and Analysis

The researcher has asked questions to the personnel of the companies who are engaged directly with the supply chain function in the organization and their answers are presented below.

1. *Interviewer* - According to your view what is supply chain management?

Respondent – Supply Chain management involves managing the timely and cost-effective flow of finished products from producer to the different re-seller to the final consumer , as well as the Effective inflow of raw materials from the suppliers to the production facilities .

1. *Interviewer* - Do you think supply management is important to your organization for being competitive in market?

Respondent - Yes, providing service or product on time, in a good price is main key to be successful on this competitive market.

1. Does your company evaluate the performance of the supply chain management practices? If yes, at what interval? Why

Respondent - Yes, on quarterly basis, Sometime even on monthly basis. We conduct this evaluation to know the customer service level yet maintaining the cost of

production at minimum level without compromising the quality of the product.

1. Which attributes is / are given more significance in the evaluation of the performance of the supply chain management practices?

Respondent – Sale report (Increase on sale), consumer interaction, transport management, logistic cost (in bond and out bond cost) etc

1. Does your company have a separate logistic department?

Respondent – -Yes, we give importance to the timely flow of material to the consumers for effective material flow, we have separate logistic and supply chain department.

Findings and conclusion

This research paper is based on two major variables, the first variable is the Supply Chain Practice i.e. (supplier, partnership, customer relationship, level of information sharing and quality of information sharing, postponement) and the second is competitive advantage i.e. (price and cost, quality, delivery dependability, product innovation, time to market). The result of this paper concludes with the following importance of Supply Chain Management to the SMEs for gaining competitive advantage:

- Selection and management of suppliers effectively for supporting entire procurement processes.
- Making transportation and distribution efficient for marketing campaigns.
- Communicating with customers periodically and monitoring a flow of the product.
- Responding to delivery problems in a collaborative way.
- Proper handling of raw material on import as well as in a warehouse.
- Effective selection of supplier.
- Proper supply chain practice leads to the consumer satisfaction.
- Effective selection of supply chain partners for the flow of goods from point of production to the point of consumption.
- Proper implication of supply chain practice leads to the cost reduction in the import.
- This research indicates that the proper implication of supply chain management practice in an organization works as competitive advantage for soap and detergent industries.

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Electric Scooter Purchase Intentions: The Influence of Environmental Concern, Price Consciousness, and Social Norms

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Abstract

Scooters are a popular way to get around on your own in many places, such as Taiwan, India, Thailand, etc., because they are easy to move around in, small, and cheaper to buy than cars. On the other hand, traditional scooters that run on fossil fuels put some pollution into the air and add to problems like global warming and air pollution. Switching from scooters that run on fossil fuels to electric scooters can help clean up the air in cities with much pollution. To promote the use of electric scooters, it's important to know how consumers feel about them. The current study investigates consumers' purchase intentions for electric scooters. Based on the questionnaire survey results (n = 567), we found that consumers' environmental concerns, price consciousness, and perceived subjective norms are associated with electric scooter purchase intention. Consumers with price consciousness may choose fossil-fuel-powered scooters because they consider electric-powered scooters more costly, although environmentally friendly. The study gives researchers and practitioners a glimpse into consumers' environmental concerns and subjective norms for a sustainable product.

Keywords

sustainable vehicle; electric scooter; air pollution; subjective norms; purchase intentions; price consciousness

Introduction

The 2030 Agenda for Sustainable Development advocates 17 Sustainable Development Goals (SDGs) to call for action to ensure sustainability. The SDG target 11.6.2, “Annual mean levels of fine particulate matter in cities (population-weighted),” aims to improve air quality in the urban area to make cities and human settlements sustainable (Nations, 2015). According to the World Health Organization (WHO), air pollution is one important environmental risk, killing around seven million people worldwide yearly. Almost all of the global population breathes air that exceeds WHO guideline limits and contains high levels of pollutants (WHO, 2018, 2021). In the urban area, the street microenvironment has a high concentration of pollution that is primarily contributed by vehicle emissions. Daily commuting substantially contributes to total air pollution exposure, even though only a brief period is spent there (WHO, 2021). Fossil fuel vehicles (internal combustion engine vehicles) cause poor air quality by emitting pollutants such as nitrogen oxides

(NO_x), hydrocarbons (HC), ammonia (NH₃), PM_{2.5} (particles smaller than 2.5 microns), and PM₁₀ (particles smaller than 10 microns) pollution. In addition, fossil fuel vehicles also contribute to fossil fuel dependence and global warming (Chen et al., 2021; Espey & Nair, 2005; Leung et al., 2018). Reducing the usage of fossil fuel vehicles can enhance environmental sustainability by reducing air pollution, fossil fuel dependence, and global warming.

Battery-powered electric vehicles reduce greenhouse gas and air pollutant emissions in urban areas. Even when charging electric vehicles with electricity from hard coal and all particle sources associated with electric vehicles are counted, electric vehicles still contribute fewer air pollutants than fossil-fuel scooters (Cox & Mutel, 2018; OECD, 2020; Smit, 2021). Adopting electric-powered vehicles is a feasible solution for environmental sustainability and air quality improvement in urban areas (Calef & Goble, 2007; Ferrero et al., 2016; Rizza et al., 2021).

People ride passenger vehicles for commuter purposes. Buses, cars, and motorcycles are the major passenger vehicles for passenger transportation in urban areas. Buses are for public transportation, while cars and motorcycles are for private transportation. People in the United States and some western countries usually drive cars for personal transportation. However, there are cost-saving benefits to using motorcycles as commuter vehicles (Hagen et al., 2016). In many countries, scooter-style motorcycles (hereinafter scooters) are used for passenger transportation, while other heavy motorcycles are used for goods delivery, racing, sporting, and recreational activities. Scooters are usually used for commuting purposes in urban areas.

Scooter ownership costs are as low as one-tenth or fewer than private passenger cars. Thus, scooters are frequently used as commuting vehicles in many Latin American (Hagen et al., 2016) and South and Southeast Asian countries, such as India (Shirgaokar, 2016), Vietnam (Jones et al., 2013), Thailand (Leong et al., 2002), Indonesia (Guerra, 2019), and Taiwan (Chen & Lai, 2011), etc. Due to cost considerations, fossil fuel scooters are usually less efficient emission reduction devices. Thus, although fossil fuel scooters are significantly smaller in size than cars, the air pollution of fossil fuel scooters is similar to or even greater than that of fossil fuel cars. As a result, fossil fuel scooters exhaust many air pollutants and are a major source of air pollution in many cities (Esmaeilirad et al., 2021; Gentner et al., 2017; Platt et al., 2014). Promoting electric power scooters to replace fossil fuel scooters is a sustainable transport strategy to reduce the burden of air pollution in urban areas (Hwang, 2010; van Boven et al., 2017).

Electric scooters can be good substitutes for fossil-fuel scooters from the viewpoint of sustainability because they reduce air pollution in metropolitan areas, fossil fuel dependence, and global warming. Nevertheless, not all consumers choose electric scooters. Some people use the scooter as a commuter vehicle because of transportation cost savings considerations. The cost of electric scooters is higher than that of fossil fuel ones. As a result, cost concerns may be a barrier to adopting electric scooters. People with price consciousness may prefer fossil-fuel scooters to electric scooters since fossil fuel scooters have a lower cost than electric ones.

Subjective norms perception is another reason influencing electric scooter adoption. Previous literature revealed that subjective norms play a role in influencing sustainable consumption behaviors (Slocum et al., 2022), and pro-environmental values were perceived as shared subjective norms (Welsch & Kühling, 2018). When people perceive social pressure from others to perform a behavior, they perceive the existence of social norms to conduct the behavior. Social norms can be used to promote green product consumption by affecting individuals' behaviors

(Ge et al., 2020). Thus, individuals' subjective perceptions of norms may be a factor influencing electric scooter adoption.

Not all consumers accept electric scooters. Although many governments have undertaken actions to support electric scooters, the market share of electric scooters is still limited due to consumers' preferences (Scorrano & Danielis, 2021). Some people value electric scooters less than fossil-fuel ones (Scorrano, 2021). To develop a suitable strategy to promote electric scooters, we must understand the factors influencing consumers' purchase intentions. Therefore, the following research questions are proposed:

RQ1: Would consumers' environmental concerns and price consciousness influence their purchase intentions for electric scooters?

RQ2: Would consumers' perceptions of subjective norms associated with owning electric scooters influence their purchase intentions?

This paper is organized as follows: Section 2 reviews the literature relevant to the adoption of electric scooters. Then, the third section describes the survey conducted and the data sample used for this study. Section 4 provides the data analysis. Finally, the fifth section discusses the main findings, conclusions, and suggestions for future research.

Literature and hypotheses development

Scooters are frequently used in many countries due to ownership costs, energy costs, and mobility convenience considerations. However, fossil fuel scooters exhaust many air pollutants (Esmaeilirad et al., 2021; Gentner et al., 2017; Platt et al., 2014). It is feasible to use electronic power scooters to replace fossil fuel scooters (Calef & Goble, 2007; Cox & Mutel, 2018; Ferrero et al., 2016; Hwang, 2010; OECD, 2020; Rizza et al., 2021; Smit, 2021; van Boven et al., 2017) to reduce air pollutants and maintain environmental sustainability in urban areas. However, not all consumers have already accepted and adopted electric scooters. Literature has worked on this topic to foster electric scooter adoption.

Shared scooters are a relatively new way to get around in some US and European cities, as well as on college campuses, for the last mile or short distances. The literature discussed consumers' attitudes and behavior toward shared scooters (Buehler et al., 2021; Clewlow, 2019; Fang et al., 2018; Hollingsworth et al., 2019; Kopplin et al., 2021; Ma et al., 2021; Sanders et al., 2020; Smith & Schwieterman, 2018). Few studies, however, focused on the purchase of electric scooters. People own scooters in many Latin American and Asian countries (Chen & Lai, 2011; Guerra, 2019; Hagen et al., 2016; Jones et al., 2013; Leong et al., 2002; Shirgaokar, 2016) rather than just riding shared scooters. The attitude toward shared scooters differs from the attitude toward owning scooters. When discussing shared electric scooters,

battery recharge or replacement is not a critical issue that consumers need to consider; they only need to choose a shared electric scooter with enough battery power for their trips. Riding a shared electric scooter does not require much battery recharge effort. Also, customers of shared electric scooters need not consider the ownership cost of the scooter. Instead, customers of shared electric scooters only need to consider the usage cost and convenience of a single-ride trip. Electric scooter owners, however, need to consider battery recharge convenience and ownership cost.

Electric scooters can be considered a new technology product. The Technology Acceptance Model (TAM) (Chen et al., 2021; Ho & Wu, 2021; King & He, 2006) and the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Haryanti & Subriadi, 2020; Khechine et al., 2016; Ratan et al., 2021) are frequently used to explain new technology adoption and acceptance. However, electric scooters are not only new technology products but also green products. Electric-scooter adoption is not just another instance of new technological product adoption; it is about riders' social responsibility to reduce air pollution. Environmental sustainability is one major advantage of electric-powered scooters.

Environmental concerns

Environmental concerns refer to an evaluation of or an attitude towards facts, one's own behavior, or others' behavior with consequences for the environment (Fransson & Gärling, 1999; Sjöberg, 1989; Weigel & Weigel, 1978). People with environmental concerns are aware that the overuse and destruction of natural resources pose a serious environmental threat. Literature has reported that consumers' environmental concern is one of the influencing factors for green product purchase intention (Albayrak et al., 2013; Jaiswal & Kant, 2018; Mainieri et al., 1997; Paul et al., 2016).

Electric scooters are environmentally friendly. Literature has reported that people with environmental concerns have positive attitudes towards using electric scooters (Ionescu & Cazan, 2020; Scorrano, 2021). Consumers with environmental concerns may switch from fossil-fuel scooters to electric ones.

However, most literature focused on shared electric scooters (Buehler et al., 2021; Clewlow, 2019; Fang et al., 2018; Hollingsworth et al., 2019; Kopplin et al., 2021; Ma et al., 2021; Sanders et al., 2020; Smith & Schwieterman, 2018). Few studies have focused on exploring the role of environmental concerns in electric scooter adoption (Chen et al., 2021). Since electric scooters are green products and caring about the environment makes people more likely to buy green products, we can say that environmental concern affects the decision to buy an electric scooter.

Based on what we've talked about so far, we think that a consumer's decision to buy should be based on their

concerns about the environment. Thus, the following hypothesis 1 is proposed:

Hypothesis 1: Environmental concerns would positively influence electric scooter purchase intentions.

Price consciousness

Environmental concern is not the only factor influencing green product consumption behavior. Fossil fuel scooters are mature products, while electric scooters are developing ones. Thus, it makes sense that the price of fossil fuel scooters is higher than that of electric ones. Although electric scooters can help reduce urban air pollution, the cost of owning an electric scooter is still high. Some consumers value electric scooters less than fossil fuel ones due to technical (range, power, speed) and economic reasons (price, fuel costs, circulation tax, insurance premium) (Scorrano, 2021). Literature advocates that there is almost certainly a market for electric scooters, but their price and performance will have to be competitive with low-cost fossil fuel ones (Guerra, 2019).

Cost factors, like the purchase price, fuel economy, the cost of the annual circulation tax, and the cost of insurance, are found to affect the decision of whether to buy an electric or fossil fuel scooter (Scorrano & Danielis, 2021). Fossil-fuel scooters provide an inexpensive transportation solution. Thus, the cost of electric scooters is a barrier to electric scooter purchases (Guerra, 2019). Due to cost issues, not all consumers have satisfactory electric scooters.

Individuals' price consciousness is relative to their cost consideration. The original idea of price consciousness by Gabor and Granger (1961) refers to individuals' awareness of prices. The concept of price consciousness refers to an individual's preference of being unwilling to pay a higher price or hoping to pay a low price for a product (Lichtenstein et al., 1993; Sinha & Batra, 1999).

Price is an important criterion for consumer perceptions and behavior (Ahmetoglu et al., 2014). However, green products are usually more expensive than traditional ones. For some companies, higher sales and margins are key goals for retailers promoting green products (Bezawada & Pauwels, 2013). The high price may hinder green product adoption, especially for individuals with price consciousness. The price premium of eco-friendly products is one reason a low proportion of respondents frequently purchase them (Lea & Worsley, 2008). Individuals with price consciousness might not be willing to buy green products due to the perceived high cost (Sun & Wang, 2019). The literature revealed that price consciousness negatively affects the purchase of green products (Arce Salazar & Oerlemans, 2016; Sun & Wang, 2019).

Based on the discussion above, electric scooters are costly compared to fossil fuel scooters. Thus, we argue that individuals' price consciousness would negatively

influence their intention to purchase an electric scooter, as hypothesis 2:

Hypothesis 2: Price consciousness would negatively influence electric scooter purchase intentions.

Subjective norms

Subjective norms are social influences recognizing others' normative behavioral ideas (Ajzen, 1991). The influence of subjective norms on predicting behavioral intention is determined by the value placed on the normative ideas and individuals' willingness to conform to them (Kamalanon et al., 2022). According to the theory of planned behavior (Ajzen, 1985, 1991), subjective norms are an antecedent for individuals' intentions to engage in a behavior.

When individuals believe others hold a normative idea about behavior, they experience subjective norms. The subjective norms will lead individuals to do or not do the behavior. Green consumption is a kind of behavior that may influence normative ideas. People may conduct green consumption to conform to others' expectations. The literature revealed that subjective norms positively affect purchase intentions for green products (Sun & Wang, 2019). Arce Salazar and Oerlemans (2016) revealed the existence of peer effects on consumers' willingness to pay for sustainable products. Social influence variables significantly increase the explanatory power of green product purchase behavior. Chan (2001) found that others' opinions influenced heavy green consumers.

Choosing electric or fossil-fuel scooters is a dilemma. From the prosocial viewpoint, electric scooters are more environmentally friendly than fossil fuel ones; despite this, from the self-interest viewpoint, fossil fuel scooters provide a low-cost and convenient point-to-point transportation solution (Guerra, 2019). Subjective norms may influence consumers' choice of fossil-fuel scooters or electric ones. People who perceive high subjective norms about green consumption may conform to others' normative ideas and purchase electric scooters. Based on the discussion mentioned above, we proposed the following hypothesis 3:

Hypothesis 3: Subjective norms would negatively influence electric scooter purchase intentions.

Methodology

Data and the sample

In order to collect the information that was required for this study, an online survey in the form of a self-reporting questionnaire was used. The participants were either scooter riders or scooter passengers. In Taiwan, The scooter is a popular transportation vehicle. There are more than 14 million scooters registered in Taiwan, according to data from the government registration system (<https://stat.motc.gov.tw/>), which contributes to Taiwan having the highest density of scooters of any country in the world. Taiwan's population is approximately 23 million.

The study posted advertisements on Facebook to recruit volunteer subjects since Facebook is the largest social media site in Taiwan, with a more than 90 percent penetration rate. Because the living area (urban or rural) may be an influential factor for the adoption of electronic scooters, the study dispersed the geographic distribution of the targeted audience of Facebook advertisements. The study tried to ensure the samples represented the whole population of Taiwanese scooter users. The subjects are citizens of all counties and cities in Taiwan.

The study employed an online questionnaire for one week. Participants in this study were voluntarily recruited, and the questionnaire took approximately 5 minutes to complete. All volunteers were recruited through Facebook ads to access the online questionnaire. We offered a lottery to participants who completed the online questionnaire. The prize was one NT\$1,000 (about US\$35) and sixty NT\$100 (about US\$ 3.5) cash offered by bank wire.

Measures

The questionnaire consisted of two parts. First, we asked participants to report their previous scooter experience and demographic data. Second, the participants answered questions about their environmental concerns, price consciousness, subjective norms about the electronic scooter, and intention to purchase it.

The scale used to measure price consciousness consisted of three items derived from the works of Ailawadi et al. (2001), Noh et al. (2013), and Lichtenstein et al. (1993). This study used a three-item scale from Paul et al. (2016) and Balderjahn et al. (2013) to measure environmental concerns. Subjective norms were measured using a three-item scale adapted from Paul et al. (2016). The detailed items for price consciousness, environmental concerns, and social norms are in the appendix. We revised the item statements to fit the context of the current study.

Sample

Table 1 shows the demographic profiles of the respondents who participated in Study 1. This study recruited 707 participants. However, among them, 140 (19.8%) subjects did not hold scooter driver licenses or did not ride scooters for the past year. Subjects who do not ride scooters as a transportation vehicle are not potential customers of electric scooters. The remaining 567 subjects were included in the study.

Among the 567 subjects, 304 (53.6%) participants were female, 243 (43.5%) were male, and the other 20 (3.5%) did not disclose their gender. 165 (29.1%) of the subjects were between the ages of 40 and 49; 158 (27.9%) were between the ages of 50 and 59; 103 (18.2%) were between the ages of 30 and 39; 77 (13.6%) were over 60 years old; and 63 (11.1%) were between 18 and 29 years old. In Taiwan, the legal age to obtain a scooter driving license is 18. As Table 1 reveals, the current study subjects were not restricted to a specific gender or age. The gender ratio and age distribution of the current study were both acceptable.

Reliability, validity, and common variance bias

The current study used multi-item scales to measure how the subjects felt about the environment, prices, and subjective norms. To measure the reliability of the measurement scales, we calculate Cronbach's α and composite reliability. As revealed in Table 2, Cronbach's α are .907, .803, and .905 for environmental concern, price consciousness, and social norm, respectively. The composite reliability coefficients for environmental concerns, price consciousness, and subjective norms are .900, .803, and .908, respectively. All Cronbach's α and composite reliability (CR) values exceed 0.70, demonstrating acceptable reliability for the measurement scales.

The study assessed the convergent validity by examining each dimension's average variance extracted (AVE). The results showed that all the constructs' AVE values were above the cutoff value of 0.5 suggested by Fornell and Larcker (1981) and Straub et al. (2004). Therefore, we confirmed the acceptable convergent validity of the measurement scales.

Fornell and Larcker (1981) looked at the discriminant validity of the construct by comparing the square root of AVE to the correlation values between the construct and the square root. The results showed that all the square roots of AVE were greater than the correlation coefficient of the latent constructs. Hence, the measurement scales of the current study exhibited favorable discriminant validity.

Since all scales were measured at the same point in a self-reported online questionnaire survey, common method bias could strengthen the relationships between the variables. To find the common method bias, we used Harman's one-factor test. This test is based on the idea that the common method bias exists if exploratory factor analysis (Podsakoff et al., 2003) shows that most of the covariance between measures can be explained by a single factor. Based on EFA with Promax rotation for nine items of environmental concern, price consciousness, and subjective norms, there are three distinct factors rather than a single factor with an eigenvalue greater than 1.0. The three factors together accounted for 70.7% of the total variance; the largest factor accounts for only 41.8% of the variance, below the 50% level. According to Podsakoff et al. (2003), this study was free from the common method bias.

Table 1. Demographic profile.

Gender		Age					Not disclosure	Total
		18-29	30-39	40-49	50-59	60 and above		
Male	Count	34	33	72	67	37		243
	%	6.1 %	5.9 %	12.9 %	12.0 %	6.6%		43.5 %
Female	Count	29	68	87	84	36		304
	%	5.1 %	12.0%	15.3%	14.8%	6.3%		53.6 %
Not disclosure	Count	0	2	6	7	4	1	20
	%	0.0 %	0.4 %	1.1 %	1.2%	0.7 %	0.2%	3.5%
Total	Count	63	103	165	158	77	1	567
	%	11.1 %	18.2 %	29.1 %	27.9 %	13.6 %	0.2%	100.0 %

Table 2. Reliability and validity

Constructs	Indicator	Factor Loading	Cronbach's α	CR	AVE
Environmental Concern	Environ 1	.828	.907	.900	.750
	Environ 2	.900			
	Environ 3	.869			
Price Consciousness	Price 1	.777	.803	.803	.577
	Price 2	.723			
	Price 3	.777			
Subjective Norms	Norm 1	.755	.905	.908	.769
	Norm 2	.941			
	Norm 3	.922			

Note: CR stands for composite reliability; AVE stands for average variance extracted.

Table 3. Correlations and discriminant validity.

	Environmental Concern	Price Consciousness	Subjective Norms
Environmental Concern	0.866		
Price Consciousness	0.123	0.759	
Subjective Norms	0.543	0.177	0.877

Note: Diagonals represent the square root of the average variance extracted (AVE) while the other entries represent the correlations.

Results

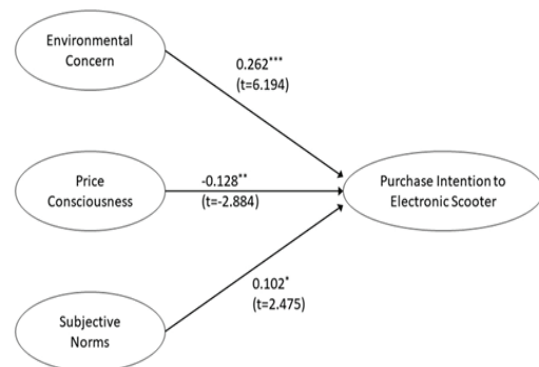
In this study, structural equation modeling (SEM) was used to look at and test the research hypotheses. To evaluate the adequacy of the research model, some indicators were used: Goodness-of-Fit Index (GFI), Normed Fit Index (NFI), and Non-Normed Fit Index (NNFI). Generally, GFI, NFI, and NNFI greater than or close to 0.90 are strong evidence that the overall tested model fits the data very well (Hair et al., 1995). The SEM model has a GFI of 0.921, an NFI of 0.917, and an NNFI of 0.900. Figure 1 summarizes the results of the SEM analysis. The model shows that environmental concern has a positive effect on the purchase intention of electric scooters (coefficient = 0.262, $p < 0.001$), price consciousness has a negative effect on the purchase intention of electric scooters (coefficient = -0.128, $p = 0.004$), and subjective norms have a positive effect on the purchase intention of electric scooters (coefficient = 0.102, $p = 0.013$). All three hypotheses were confirmed based on the empirical analysis results. The study concluded that consumers' purchase intentions for electric scooters are positively influenced by their environmental concerns and subjective norms and perceptions about choosing electric scooters. Nevertheless, consumers' price consciousness is an obstacle to electric scooter adoption. People with price consciousness may have a lower intention of choosing electric scooters due to cost considerations, which is a barrier to the adoption of electric scooters.

To realize if subjects with different levels of environmental concerns, price consciousness, and subjective norms have varying intentions of purchasing, we divide the subjects into high and low groups for each environmental concern, price consciousness, and subjective norm and use a t-test to test the difference. Nevertheless, the median splitting approach to dichotomizing a continuous independent variable has some weaknesses. Fitzsimons (2008) advocated a "spotlight" analysis of the subjects with some standard deviations above and below the mean value. In the study, the authors followed the suggestion by Fitzsimons (2008) and divided subjects into groups with high or low levels of environmental concern, price consciousness, and subjective norms. Subjects were assigned to the high-level groups when their environmental concern, price consciousness, and subjective norms scores were 0.5 standard deviations above the mean. Subjects were assigned low-level groups when their environmental concern, price consciousness, and subjective norms scores were 0.5 standard deviations below the mean. Subjects were not included for analysis when the differences between their scores and the means were less than 0.5 standard deviations.

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Table 6 shows the results of the t-test for how likely people are to buy an electronic scooter based on subjective norms. Subjects with a high subjective norm of purchasing electronic scooters have a lower intention to purchase electronic scooters ($t = 4.36$, $p < .001$). We can advocate that subjective norms potentially facilitate electronic scooter diffusion. People will buy electronic scooters when they subjectively believe they should not buy fossil fuel scooters. Thus, creating a subjective social norm can help the diffusion of the electronic scooter. Consumers with high subjective norms will choose electronic scooters over fossil-fuel ones.



Note: * $p < 0.5$, ** $p < 0.1$, *** $p < 0.001$

Figure 1 Structured Equation Modeling (SEM) Results

Table 4. T-Test results of purchase intention between high and low environmental concern subjects

	High Environ-mental Concern	Low Environ-mental Concern	t	df	P
Purchase Intention	Mean=2.86 (SD=1.17, n=130)	Mean=1.95 (SD=1.01, n=144)	6.89	272	< .001*
Note: *Significant at $p < .05$					

Table 5. T-Test results of purchase intention between high and low price consciousness subjects.

	High Price Con-sciousness	Low Price Con-sciousness	t	df	P
Purchase Intention	Mean=2.34 (SD=1.21, n=176)	Mean=2.59 (SD=1.03, n=147)	-1.98	321	0.05*
Note: *Significant at $p < .05$					

Table 6. T-Test results of purchase intention between high and low social norms subjects

	High Subjective Norms	Low Subjective Norms	t	df	P
Purchase Intention	Mean=2.70 (SD=1.12, n=185)	Mean=2.06 (SD=1.09, n=83)	4.36	266	< .001*
Note: *Significant at $p < .05$					

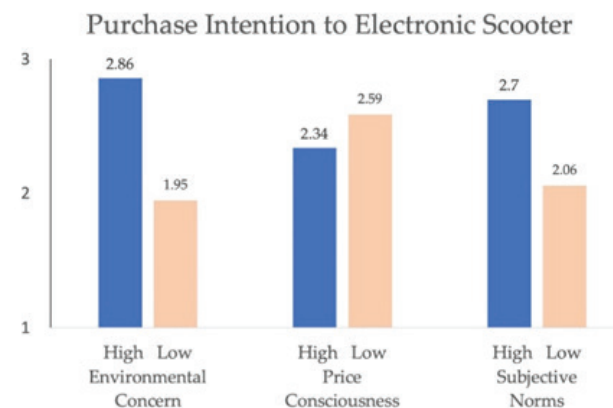


Figure 2. Purchase intention by environmental concern, price consciousness, and social norms

Discussion

Getting rid of fossil fuel cars and replacing them with electric cars could help reduce air pollution in cities. For countries like Taiwan, which depend on fossil fuel scooters as commute transportation vehicles, adopting electric scooters can help solve the air pollution issues caused by fossil fuel scooters. However, even though

government agents and environmental organizations have strived to promote electric scooters, the penetration rate and market share of electric scooters are still not high. Thus, it is important to understand the factors influencing consumers' acceptance of electric scooters.

The study examines how environmental concern, price awareness, and subjective norms affect the purchase intention of an electric scooter. Based on the empirical study results, environmental concern is positively related to purchase intention. People with environmental concerns are with high intention to purchase electric scooters. Price consciousness is negatively related to purchase intention. Price consciousness consumers have a low intention to purchase electric scooters. Besides, the current study also found that subjective norms positively impact individuals' purchase intentions for electric scooters. People who believe others have a normative idea about choosing electric scooters have a high intention to purchase electric scooters.

Theoretical contribution

This study makes a theoretical contribution by figuring out how people's environmental concerns and price consciousness affect their purchase intentions for electric scooters. Understanding how environmental concerns affect the purchase of electric scooters can help prove that people's sustainability consciousness is a key factor in what green products they purchase. Understanding how price consciousness affects the purchase intention of an electric scooter can help to realize the barriers to promoting green products, especially when they cost more to own and use. This study also contributes to academic and practical knowledge by helping us understand how subjective social norms affect the purchase intention of an electric scooter. This can help us realize that some green product purchases are influenced by social norms rather than consumers' personal interests.

Practical implications

The electric scooter is an eco-friendly product. Electric scooters attract consumers with environmental concerns since adopting electric scooters is a quick way to contribute to the clean air of the metropolitan area. Thus, we should persuade consumers with environmental concern that electric scooters are green products so that they can accept electric scooters. Air pollution is not the only dimension of environmental concern. Thus, electric scooter manufacturers should adopt eco-friendly product designs and improve the manufacturing process to be more sustainable so that consumers with environmental concerns will choose electric scooters.

Cost-saving is a benefit of using scooters as commuter vehicles (Hagen et al., 2016). In some developing countries, scooters are popular because of their low cost. However, the cost of owning an electric scooter is higher than owning a fossil-fuel scooter. Thus, for price

consciousness consumers, the high price of electric scooters is a barrier to choosing electric scooters. Since electric scooters are just in the product development stage, the price is still high. Thus, a price incentive is important to promote electric scooters to price consciousness consumers. A subsidy for purchasing an electric scooter is a feasible alternative when trying to sell electric scooters to price consciousness consumers.

Subjective norms can help form a social consciousness. People with conformity traits tend to follow others' normative ideas. The perceived subjective norms are guidelines that direct people's behaviors. Since subjective norms would positively impact individuals' intentions to purchase electric scooters, we should try to form a social consciousness about electric scooters. Once people believe that adopting electric scooters is social consciousness, they will perceive subjective norms that require them to purchase electric scooters rather than fossil-fuel ones. Formal social pressure may be a way to promote electric scooters.

Limitations and future research direction

The current study has several limitations that should be addressed in future research. First, in the current study, we focus our research on three factors, including environmental concerns, price consciousness, and social norms. These three factors represent three different prospects for electric scooters. Some consumers with environmental concerns may consider electric scooters must-buy products to save our earth. Some consumers with price consciousness may consider electronic scooters high-priced products and not want to adopt them because of cost considerations. Some consumers buy electric scooters because of the social norm of scooter adoption. Future studies can consider other influencing factors for the adoption of electric scooter.

The current study does not include convenience considerations' influence on electric scooters. Convenience is a barrier for electric scooters. Fossil fuel scooters need gasoline refueling, while electric scooters need battery charging or exchange (Chen et al., 2018). The popularity and location of battery charging or exchange stations determine electric scooters' convenience. Literature has found that if individuals consider the consequences of convenience important, they may not purchase green products because they are not as convenient as the traditional ones (Ramayah et al., 2010). For many consumers, an energy supply's convenience or lack thereof is the main difference between electric scooters and fossil fuel scooters. Thus, future research may focus on the influence of convenience considerations.

In addition, the current study only discusses the purchase intentions of electric scooters. The current study does not include the purchase intentions of fossil-fuel scooters. People with environmental concerns may take public

transportation vehicles rather than buy new scooters, whether electric or fossil-fuel scooters, when their old ones need replacing. However, the current study only discusses electric scooters' purchase intentions. Future research may include the impact of the purchase intention of fossil fuel scooters to compare the difference between electric scooters and fossil fuel ones.

The current study discusses only purchase intention. The decision factors for owning a scooter differ from those for renting a shared one. Shared scooters are an option for last-mile transit or short-distance trips in some places. Future studies may include the intention to rent share scooters to compare the influence of environmental concern, price consciousness, and social norms on purchase and rental intentions.

Conclusions

Electric scooters are good for the environment and are seen as a sustainable way to reduce air pollution in metropolitan areas. However, fossil-fuel scooters are still mainstream products. It is important to understand the factors influencing consumers' adoption of electric scooters to increase the penetration rate. Based on the empirical survey results, we conclude that environmental concern, price consciousness, and subjective norms are three influential factors for electric scooter adoption. To improve electric scooter penetration, we should increase consumers' environmental concerns, reduce the price of electric scooters by providing subsidies or reducing product costs, and formulate subjective social norms for electric scooters. There is no single silver bullet for the popularization of electric scooters. We need to realize consumers' considerations about electric scooters to adopt appropriate persuasive strategies to promote electric scooters.

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Price Prediction Models Development and Pattern Analysis for Korea Allowance Unit and Renewable Energy Certificate

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Abstract

This study attempted to analyze and predict the market prices related to carbon credit and REC (Renewable Energy Certificate) in the age of Net Zero response to the climate crisis. Although the price volatility of carbon credit-related securities is less than that of stock prices, the volatility is still high on a monthly basis. KAU and REC transaction data were extracted from Korea Power Exchange (KPX). The data used for dependent variables in the analysis is the seven-year data from 2015 to 2022. Macroscopic variables such as interest rates, exchange rates, and international oil prices were used as independent variables to predict transaction prices. This study has contributions in the following points. Several independent variables that affect carbon credits and REC price fluctuations were found. From this, we could draw the influence relationship between the target variable and the main independent variables. In addition, we could draw schematic diagrams that derive major rules and patterns through the decision tree method, moreover, it was possible to conduct multi-dimensional analysis for price prediction rather than mathematical modeling techniques.

Keywords

Net Zero, RPS, REC, KAU, Carbon Credit, Price Prediction, Data Mining, Decision Tree

Introduction

The carbon reduction movement that started with the Paris Climate Agreement made it possible to trade carbon credits. In addition, as RPS (Renewable Energy Portfolio Standard) and mandatory quotas system for renewable energy supply were implemented worldwide, the REC trading market became a hot place for many investors who have an interest in the renewable energy market. Although the price volatility of carbon credit-related securities is less than that of stock prices, the volatility is still high on a monthly basis.

For companies that are obligated to purchase carbon credits or RECs, predicting the price of these securities is one of the most important decisions in determining the purchase point. Accurate price predictions for these securities help companies to make rational purchasing decisions. Sometimes, carbon credit allocation companies with a financial surplus can obtain great economic benefits through optimal purchasing decisions. Although the volatility analysis and price prediction of carbon credits and REC prices are very important issues to companies, research in this field is still lacking.

In this study, a model to predict these prices was developed through big data analysis of the price volatility of carbon

credits and REC. The main purpose of this study is to analyze how the price fluctuations of KAU(Korea Allowance Unit) and REC change due to policy changes, international circumstances, and macroeconomic changes. KAU is currently one of the tradable carbon credits in Korea, as well the REC trading market is well-established in Korea.

Literature Reviews

Greenhouse Gas Emissions Trading System

Heavy rains, typhoons, droughts, and rising sea levels, as well as heat waves due to global warming, are typical abnormal weather phenomena, and their frequency and intensity are getting stronger in recent years. The main cause of the temperature rise is due to the carbon emissions from fossil fuels, which are referred to as greenhouse gases (Carbon Neutrality Committee, 2021). Currently, the world is making efforts to reduce carbon emissions. This is widely used as the concept of 'carbon neutrality' that is often mentioned today. Carbon pricing systems include a carbon tax and an emission trading system. Carbon tax refers to a tax imposed on emitters who use fossil fuels such as coal, oil, and natural gas for the amount of carbon dioxide emitted (Greenhouse Gas Comprehensive Information Center, 2021).

Imposing a carbon tax directly on fossil fuel suppliers shifts the tax burden on them in a way that in turn raises the price of products and electricity produced from fossil fuels and, by extension, goods and services available to consumers. If a tax is imposed on companies emitting fossil fuels according to their emissions, it can promote indiscriminate energy use reduction and investment and development of alternative energy sources such as renewable energy. In particular, power generation companies (power producers) have the effect of using low-carbon fuels for power generation.

The greenhouse gas (GHG) emission trading system allows the government to allocate annual emission rights to companies that emit greenhouse gases and to conduct emission activities within the allocated range. The system allows the surplus or shortfall of allocated emission permits to be secured through market transactions. The trading system was implemented in 2015 and has been maintained until now (Greenhouse Gas Comprehensive Information Center, 2018).

Currently, most companies are trading emission rights for the purpose of meeting mandatory quotas, but in the future, if companies use it well, it is expected to be a system that can not only reduce carbon emissions but also create additional profits. In particular, if systems such as the Clean Development Mechanism (CDM) and P-CDM are used, it is possible to easily achieve the objective of the GHG reduction quota. There is a system in which a company conducts greenhouse gas reduction activities and is recognized as the reduction amount of the business site through offset credits certified by the Ministry of Environment.

In Korea, since the government plans and sets the total amount of emission, it has the advantage of being able to clearly know the target amount to be reduced, but the price volatility of the emission permit itself exists. The price of the Korea Allowance Unit (KAU) rose significantly until December 2019, then fell sharply due to the impact of COVID-19. The trend after 2021 is repeating an increase and a decrease, and the price is showing an upward trend again in line with the recent rise in energy prices and the advancement of carbon neutrality.

Rec trading system

In the RPS system, power generation companies of a certain

size or larger are designated as obligatory suppliers, and they are obliged to supply more than a certain percentage of total power generation with renewable energy. Due to the RPS system, renewable energy supply certificates (REC) can be traded between renewable energy suppliers and power generation companies. The REC trading system was started in 2012 after the implementation of RPS system (Lee, 2015). REC is a unit of the certificate that proves that a power generation company has produced and supplied electricity using renewable energy facilities, and a supply obligator can purchase REC and use it for the performance of obligations to the mandatory supply.

Currently, the Korean RE100 (K-RE100) system has been introduced and a REC trading system in the form of a platform is being pilot operated for the expansion of participating companies. The system is in progress with a green premium system under the regulation that corporate-level contributions to greenhouse gas reduction are permitted as REC purchase performance (Korea Energy Agency, 2021).

The price of REC is more volatile than KAU. In March 2016, as the solar and non-solar integrated market was formed, the price rose significantly for a while. However, due to the problem of oversupply, the 100,000 won line collapsed after 2018 and fell sharply. Recently, REC prices are showing an upward trend due to the rise in energy prices and the introduction of 100% renewable energy policies (RE100, etc.) by global leading companies.

Research methods

Research framework

Figure 1 shows a research framework to forecast KAU and REC prices. The overall flow of the research is the same as the decision-making model development process through the general big data analysis method. The basic process is as follows. A predictive model was developed through the process of data collection → data processing (including preprocessing) → data analysis → derivation of results. In the data collection process, price data for KAU and REC, which are the target variables, were collected, and data such as contract volume, transaction volume, and transaction amount that could be collected along with the price were collected.

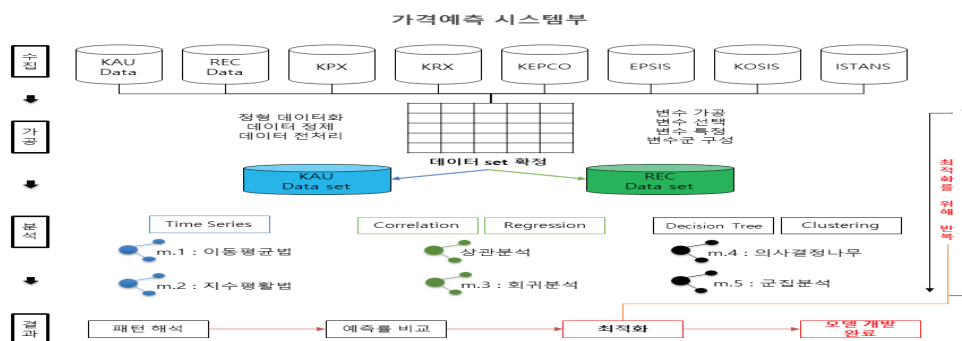


Figure 1. Research Framework

Data set and analysis methods

KAU and REC transaction data were extracted from Korea Power Exchange (KPX). The data used for dependent variables in the analysis is the seven-year data from 2015 to 2022. Macroscopic variables such as interest rates, exchange rates, and international oil prices were used as independent variables to predict transaction prices. In addition, the model used various power energy-related variables such as electricity transaction volume, SMP price, and the volume of solar and wind power generation. This paper also considered qualitative data such as WOM data extracted from energy-related articles and policy variables of national carbon emission and renewable energy to increase the explanatory power of the model.

In the processing step of preprocessing into data suitable for big data analysis, unstructured data was transformed into structured data, data was refined, and processing or derivation was performed appropriately for variables. The data that went through the processing step were synthesized into a dataset for predicting one target variable. In Figure 1, the data set for predicting the price of GHG emission permits is the 'KAU data set', and the data set for predicting the REC price is the 'REC data set'.

The analysis was conducted using time series analysis, basic statistics analysis, correlation analysis, and decision tree technique as data mining. The random forest algorithm for predicting numerical and categorical data and the C4.5 algorithm for predicting categorical data were utilized (Quinlan, 1993; Breiman, 2001). The techniques aimed at supplementing and improving the performance of the predictive model were also applied. Comparison and performance evaluation were conducted between the developed prediction models by adding the performance improvement techniques, and the main prediction models were selected. Decision tree-based major rules and patterns were derived from the selected prediction model. This paper suggests an influence diagram schematically based on the results of the predictive model centering on the target variables, KAU and REC.

Research Variables

The target variables are KAU and REC price, and the entire

period is from August 2015 to July 2022, which is the entire range of the research data, with 1,386 KAU transactions and 588 REC transactions. In the last year, from July 2021 to July 2022, there were 255 KAU transactions and 102 REC transactions. Table 1 summarizes the results of the analysis of basic statistics for the entire period and the recent year for the target variables.

Table 1. Basic Statistics of Target Variables

Category	Unit	KAU		REC	
		Total Period	Recent 1 Year	Total Period	Recent 1 Year
Mean	Won	25,140.01	26,564.90	73,966.48	42,742.16
Std. Dev.	Won	6,571.45	6,092.76	37,158.59	9,721.23
Max value	Won	42,000	35,400	174,044	58,600
Min. value	Won	22,550	28,000	29,200	29,200
Instances(n)	Trans.	1,386	255	588	102

First, the interpretation of the basic statistics on KAU is as follows. Compared to the entire period, the average price has increased over the past year, and the deviation has narrowed. The implication of the basic statistics for the entire period of KAU and the recent 1 year can be summarized as the fact that the average price itself has been partially raised and the volatility has decreased within the recent year. The interpretation of basic statistics on REC is as follows. Compared to the entire period, the average price has decreased over the past year, and the deviation has narrowed significantly. The highest price was 170,000 won, recorded within the entire period, and the lowest price was about 29,000 won, which is believed to have been recorded within the last year. The implication of the basic statistics on the REC price over the entire period and the recent year is that the price itself has declined significantly and the volatility has also decreased significantly. Also, within the data period, the highest price was 170,000 won and the overall average was about 74,000 won, but it can be seen that the current price has fallen significantly. Lastly, it can be seen that over the past 7 years, the range of fluctuations in the price of renewable energy supply certificates has been very large compared to that of greenhouse gas emission rights.



Figure 2. Normalized Trend of Research Variables (2016.06~2022.07)

In Figure 2, the trends in macroeconomic variables, the base interest rate, the international oil price symbolizing energy prices, and SMP prices, which is the basis of electricity transaction prices, are clearly charted. To compare the data on the same scale, the data were normalized between 0 and 1.

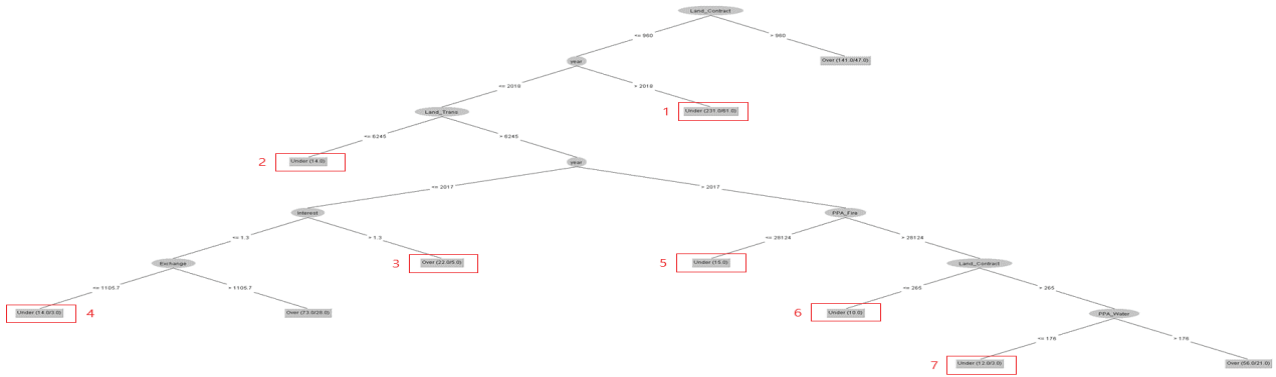


Figure 4. Decision Tree for REC

The detailed major rules that recorded a hit rate of 70% or more than the overall prediction rate are summarized in Table 4 and Table 5 respectively.

The method of interpreting the table for the main rules of the decision tree is as follows. A rule (leaf node) means that it is created by a combination of input-independent variables when developing a predictive model. The rule for ‘whether the price has risen or fallen compared to the previous transaction’ is determined by the combination of the independent variables. Corresponding instance means the number of instances included in the combination of independent variables, and misclassification means the number of instances included in the combination of independent variables but misclassified due to incorrect rules.

Table 4. Decision Rules for KAU

No	Conditions(Rules)	Price (Up/Down)	Instances	Mis-Classification	Hit Rate
1	Year <= 2018	Under (Down)	438	123	71.92%
2	Year > 2018 & Week <= 28 & wind power <= 132 Gwh & exchange rate > 1,132.2 & KAU trading volume <= 17,106	Over (Up)	17	4	76.47%
3	Year > 2018 & Week > 28 & Year <= 2019	Over (Up)	161	44	72.67%
4	Year > 2018 & Week > 28 & Year > 2019 & KAU19 & REC price <= 45,500	Under (Down)	24	5	79.17%
5	Year > 2018 & Week > 28 & Year > 2019 & KAU20 & Friday	Over (Up)	24	6	75.00%
6	Year > 2018 & Week > 28 & Year > 2019 & KAU21 & KAU trading volume <= 7,450	Under (Down)	31	8	74.19%
7	Year > 2018 & Week > 28 & Year > 2019 & KAU21 & KAU trading volume > 7,450	Over (Up)	71	21	70.42%

Table 5. Decision Rules for REC

No	Conditions(Rules)	Price (Up/Down)	Instances	Mis-Classi-fication	Hit Rate
1	trading volume <= 960 & Year > 2018	Under (Down)	231	61	73.59%
2	trading volume <= 960 & Year <= 2018 & trading volume <= 6,245	Under (Down)	14	0	100.0%
3	trading volume <= 960 & Year <= 2018 & trading volume > 6,245 & Year <= 2017 & interest rate > 1.3	Over (Up)	22	5	77.27%

4	trading volume ≤ 960 & Year ≤ 2018 & trading volume $> 6,245$ & Year ≤ 2017 & interest rate ≤ 1.3 & exchange rate $\leq 1,105.7$	Under (Down)	14	3	78.57%
5	trading volume ≤ 960 & Year ≤ 2018 & trading volume $> 6,245$ & Year > 2017 & thermal power $\leq 28,124$ Gwh	Under (Down)	15	0	100.0%
6	trading volume ≤ 960 & Year ≤ 2018 & trading volume $> 6,245$ & Year > 2017 & thermal power $> 28,124$ Gwh & trading volume ≤ 265	Under (Down)	10	0	100.0%
7	trading volume ≤ 960 & Year ≤ 2018 & trading volume $> 6,245$ & Year > 2017 & thermal power $> 28,124$ Gwh & trading volume > 265 & hydro-power ≤ 176 Gwh	Under (Down)	12	3	75.00%

The main rules of KAU and REC decision trees are as follows. As for KAU-related major rules, there were 4 price increase rules and 3 decrease rules compared to previous transactions, and 6 price decrease rules and 1 increase rule for REC-related major rules compared to previous transactions. Branching criteria for deriving major rules related to KAU include year, week, wind-power trading volume, KAU item, REC price, and day of the week. Branching criteria for REC include land contract volume, year, land transaction volume, base interest rate, thermal power transaction volume, and hydro-power transaction volume.

In the patterns of models developed so far, time series-related variables, such as the year, day, week, and base rate, appeared as the criteria for the rule. For example, in Rule 4 in Table 5, the year appears twice based on the branch, and it can be seen that the pattern is related to the year before 2017. Also, unlike rule 3, since the base rate is 1.3 or less, it can be inferred that this rule is for transactions that took place after June 2016.

The implication of inference rules based on time-series variables is that they can be used as a basis for retracing what kind of policy changes occurred at that time, changes in the base interest rate, how much carbon credits or REC rights were traded, and at what price.

By referring to changes in major factors or specific figures based on the period or branch, the buying decision makers can plan purchase strategies, and sellers can plan sales strategies, rather than making decisions based on simple prices. However, since the decision tree can grasp the correlation between the independent variable and the target variable, excessive causal analysis needs to be avoided.

Implications and conclusion

Through decision tree analysis, a model with excellent performance by the algorithm and parameter combination was first selected. As a result, the random forest generally shows higher performance than C4.5. However,

parameters were adjusted in order to utilize C4.5, which has strengths in the schematization of decision trees compared to random forests, and a model with a predictive rate comparable to that of random forests was selected. This paper suggests a schematic decision tree of KAU and REC in the preliminary experiment and could derive some decision rules to get optimal decisions.

In the main experiment, compared to the preliminary experiment, the performance of the decision tree analysis was generally improved. However, in some experimental results, the prediction rate for the algorithm and parameter combination rather decreased. In addition, unlike the previous experiment, performance evaluation was additionally conducted for reverse elimination and data balancing. First, as a result of applying SMOTE as a data balancing technique, the prediction rate of the random forest algorithm was improved, so there was an improvement effect on the data imbalance problem. However, in the case of C4.5, when the minimum number of instances was without combining specific parameters, the prediction rate dropped significantly after the introduction of SMOTE. In conclusion, the possibility of improving the predictive rate of the predictive model by data balancing was partially confirmed.

The final results of this study show that automatic linear modeling, which is a method for developing a causal predictive model, shows a model improvement effect such as a decrease in the mean absolute error according to keyword variables, while the decision tree, which is a method for developing a correlational predictive model for data mining, shows a clear effect. No performance improvement was found. It is judged that the input of many variables that reflect the external environment, called keyword variables, causes a difference in the degree of improvement depending on the analysis technique. These results make it difficult to draw a clear conclusion that a particular hypothesis is supported in the form of either the efficient market hypothesis or the heterogeneous market hypothesis.

Nevertheless, this study has contributions in the following points. Several independent variables that affect carbon credits and REC price fluctuations were found. From this, we could draw the influence relationship between the target variable and the main independent variables. In addition, we could draw schematic diagrams that derive major rules and patterns through the decision tree method, moreover, it was possible to conduct multi-dimensional analysis for price prediction rather than mathematical modeling techniques.

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The Influence of Perceived Value and Perceived Risk on Green Purchase Decision: A Moderated Mediation Effect of Perceived Consumer Effectiveness, Environmental Knowledge and Green Trust

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Abstract

Green purchase decision is the choices made by the consumers to buy products or services that are environmentally friendly or have a reduced impact on the environment. The decision to buy or not is effected by many factors. In this context the present paper intends to investigate the perceived value and perceived risk influence upon green purchase decision with a moderation and mediation effect of perceived consumer effectiveness, environmental knowledge and green trust. The study covered 222 Nepalese consumers using judgmental sampling method and criteria of selection was that consumers should have green purchasing history or perspective of green food, beverages or commodities and structured questionnaire survey was used to collect the data with the research design being descriptive and correlational. The study showed a significant influence of perceived risk on green purchase decision as well no effect of any moderators however, mediating effect of green trust was established.

Keywords

Green purchase decision, Perceived Risk, Perceived Value, Perceived Consumer Effectiveness, Environmental Knowledge, Green Trust

Introduction

Concern about environmental degradation is on the rise around the globe (Sharma, 2021). Following this, customers with a knowledge of significance of protecting the environment are in increasing trend in order to keep the preservation of nature ultimately resulting in rise of green consumption behavior (Baiquni & Ishak, 2019). Similarly, protective emotions have been rising among modern consumers towards the environment (Bei, 1995 as cited in Zaidi et al., (2019) and this awareness has led to increased concern about sustainability in our consumption pattern. In this line, consumers are inclined towards the use of the green product, including organic food, hybrid cars, and energy-saving appliances and the demand for green items in the worldwide markets has expanded, and the buyers are lean toward green items that are more secure and ecofriendly (Bhutto et al., 2019 as cited in Zaidi et al., 2019).

Green purchase decision by consumers refers to the process through which they evaluate and select environmentally friendly products over conventional alternatives and organizations tool often respond to the increased demand for ecofriendly products by incorporating green marketing strategies. Consumer behavior for green purchasing is generally evaluated in terms of their intention eventually transformed to their decision for such products in order to begin for environmental sustainability (Joshi & Rahman, 2015) which highlights the importance of intention in the buying decision. Number of studies have been carried out

in the field of green purchase decision, with green trust (Sh. Ahmad et al., 2022; Amoako et al., 2020; Sharma, 2021) similarly, green trust and purchase intention (Wasaya et al., 2021; Wang et al., 2022; Ajzen & Timko, 1986; Chairy & Alam, 2019; Lee, 2020), linked with green risk (Sharma, 2021; Wang, 2017; Harahap et al., 2018; Siyal et al., 2021; Chen & Chang, 2012) with perceived values (Chaudhary, 2018; Woo & Kim, 2019; Yadav & Pathak, 2017; Khoiruman & Haryanto, 2017; Amin & Tarun, 2021; Chen & Chang, 2012; Zaidi et al., 2019) link with knowledge (Zhou et al., 2021; Suki, 2013; Siyal et al., 2021; Chan & Wong, 2012; Eze & Ndubisi, 2013; Connell, 2010) link with perceived consumer effectiveness (Jaiswal & Kant, 2018; Mishal et al., 2017; Gleim et al., 2013; Gupta & Ogden, 2009).

Nepal like many other countries has been increasingly recognizing the importance of sustainability and environmental conservations, evidence of which can be found in the steps taken by government and various organizations to promote green practices and raise awareness about the importance of responsible consumption. The private sector in Nepal has also been showing a growing interest in sustainable and ecofriendly products and some companies are adopting environmentally friendly practices in their operation including sustainable sourcing, waste reduction and energy conservation. Furthermore, different NGO's and INGO's promote green awareness through different programs. For an example SEEM Nepal (Sustainable Environmental &

Eco System Management Nepal implements awareness program through different campaign and focuses in people who are directly connected to the environment management issues as farmers, students, stakeholder etc. Similarly, Cotton Mill Nepal uses 100% cotton to create all products and hire local women to design, stamp and sew the items. Dinadi, a manufacturer of shoes, bag and accessory is other example where they hire women with poverty and pay high wages with flexible working schedules with providing healthcare, counselling and education to worker's children and their product is made up from 100% natural, biodegradable materials and have zero waste. Number of market outlets for organic products has increased in Kathmandu and the consumers are willing to pay premium price for such products (Aryal et.al., 2009 cited as in Shrestha, 2018). In developed and developing countries marketers are promoting consumption of green brands thus winning hearts of green skeptics so as to become ardent green consumers and green brand advocates (Gil & Jacob, 2018). This shift towards green purchasing decisions is partly driven by consumer demand for eco-friendly products and services. The changing needs of consumers in relation to products and services that are more environmentally friendly have increased the importance of green marketing and firm's response to these needs positively influences green products and process innovation (Narula and Desore, 2016 cited as in Amoako et al., 2020).

In contrast, some consumers continue to exercise conscious judgement as their purchase behavior is influenced by experience and knowledge (Amoako et al., 2020). Osterhus cited as in Zaidi et al. (2019) reported that there is a decline of 59% regarding the overall environmental concern among the general population who are not even thinking to participate in environmentally friendly activities which is disappointing furthermore, mixed results reveal a challenging consumer environment for marketers of environmentally friendly consumer products. According to Wasaya et al. (2021) research to date has failed to answer the bewildering question regarding as why despite concern towards the environment (attitude) consumers fail to purchase environmentally friendly or green products (behavior)? so, the decision to buy (collective social gain) or not buy (self-interest) the green product despite positive attitude towards environmental conservation may be conceptualized as a social dilemma. Further to support, Sharma (2021) argues that green purchase behavior of consumers gets influenced by a variety of factors, which create a great deal of inconsistency. Studies conducted in Nepal has mostly focused on willingness to pay, marketing tools, demographics and environment information only (Shrestha, 2018; Thapa, 2019; Aryal et al., 2009; Bhatta et al., 2009). Following the notion the study aims at examining the influence of perceived value and perceived risk on purchase decision with a moderated Mediation

effect of perceived consumer effectiveness, environmental knowledge and Green Trust among consumers in Kathmandu, Nepal.

Literature sources and hypothesis development

As stated by Richarne, 2007 cited in as Sharma (2021) many theories that has been developed and used has authenticated consumer decision making is a long-discussed issue. Consumer theory stresses on the factors to predict the purchasing patterns of consumer and utility maximization as a factor says that consumers purchase the products that brings the greatest benefit otherwise known in economic terms as maximum utility which is also true for green purchase decision. Similarly, Black Box Model of consumer behavior states that customer purchase decision is an interaction between past experience, beliefs, desires and objectives. In addition, black box consists of individual's personal preferences and attitudes as well as the value creation process itself is considered. This also clears that despite the organization tries hard to use green marketing to influence the consumers to buy green products many factors seem to affect the buying decision. More companies have started to take care of the environmental protection which has resulted in the terms as green or eco to be well known in the process along with the term sustainable and earth friendly which further emphasizes that environmental impacts should be integrated into firm's marketing strategies, and they should also represent their environmental performance by their commitment (Sharma, 2021). As more attention of consumers has been focused to the environmental protection activities and the impact of pollutions, consumer environmentalism has become much popular in world as a result, consumers are more willing to purchase green products that are not harmful to environment (Chen, 2010 as cited in Chen & Chang, 2012). Similarly, consumers being more concerned with environmental issues has realized that their purchase decision directly influences the environment and the proof of this can be found as there are growing number of people who like to purchase environmentally friendly products (J. S. Lee et al., 2010). Moreover, many previous literatures also theorize that companies should embark on the green marketing strategies to know more about the customer's green needs, launch green products, to divide green market into different segments, to target one or several segments, to formulate green positioning strategies and to implement a green marketing mix program (Jain & Kaur, 2004). TPB (Ajzen and Fishbein, 1980) states that attitude, subjective norms and perceived behavioral control together influence purchasing intentions which in turn influence purchasing behavior (Mishal et al., 2017). Green purchase behavior represents a complex form of ethical decision making behavior and is considered a type of socially responsible behavior and as a socially responsible consumer, the green consumer

takes into account the public consequences of his or her private consumption and attempts to use their purchasing power to bring about social change (Jose & Moisaner, 2008).

Perceived value and purchase decision

Perceived value is a consumer's overall evaluation of the net benefit of a product or service based on a consumer's appraisal. According to Chen and Chang (2012) as cited in Chaudhary (2018) perceived value is consumers' opinion about worth of a product or service based on evaluation of its utility. It also determines the price consumers are willing to pay for the product. So, companies nowadays can enhance customer purchase intentions through product value (Steenkamp & Geyskens, 2006). Perceived value acts not only as a crucial determinant in maintaining long term customer relationships but also plays a significant role in influencing consumers purchase intentions (Zeithaml, 1988 cited as in Wang, 2017). More recently, researchers have revealed that green perceived value has a positive impact on consumer green purchase intentions (Chen & Chang, 2012). According to Hur et al. (2013) cited in as Woo & Kim (2019) GPV constructs as hedonic value, social value and functional value significantly effects customer satisfaction as well as states that consumer buying behavior to buy green products is connected to perceived values. Similar view was stated by Han et al. (2017) cited as in (Woo & Kim, 2019) that if perceived values meet their expectations they will have more positive attitude toward these products and then decide to purchase.

H1: Perceived value influences green purchase decision among Nepalese consumers.

Perceived risk and purchase decision

Green perceived risk is featured as an interpretation that is related to the possible impact on environmental efficiency of an incorrect decision (Siyal et al., 2021). It is a subjective evaluation by consumers which is associated with the possible of the consequences of wrong decisions. So, potential consequences of an improper judgement are thus associated with green perceived risk. Previous studies have identified different risks namely product performance, social aspects, psychological aspects, physical aspects and time/convenience loss (Mitchell, Davies, Moutinho, & Vassos, 1999; Schiffman & Kanuk, 1994 as cited in Wang, 2017). Pires et al. (2004) states that for each decision to purchase consumer will have a set of buying goals, or expected outcomes for the purchase due to which perceived risk is a measure of the possible or expected dissatisfaction with the purchase based on the buying goals of the consumer.

H2: Perceived risk impacts the purchase decision of green products among Nepalese consumers.

Mediating role of green trust

Trust is regarded as a mental condition that involves a

desire to embrace susceptibility focusing on favorable motives (Foroudi, Nazarian, & Aziz, 2020 cited as in Chen & Chang, 2012). Similarly, it is described as "a desire to depend on a commodity, resulting due to expectations regarding its environment friendliness features" (Chen, 2010). Trust plays a major role in mediating the relationship between perceived value, perceived risk and purchase decision by influencing risk reduction as it helps to mitigate perceived risk associated with a purchase decision when trust is established. Through interpersonal interactions, consumers establish a relationship of trust and cooperation with sellers (Wang et al., 2019). Similarly, Individuals have been found to differ in their willingness to believe that others are honest or dishonest and as a result trusting others is risky or not (Yamagishi, 1988 cited as in Gupta & Ogden, 2009). When trust is established it reduces concerns and provides assurance that product will deliver expected value making them inclined towards purchasing the products. This reduces the perceived risk of making a wrong decision or having a negative experience. It is suggested that such differences in trust has a strong bearing on the decision to cooperate or defect in social dilemmas, where, high-trusters are more likely to cooperate than low-truster's (van Lange et al., 1992 cited as in Gupta & Ogden, 2009). Also, Chen and Chang's (2012) analysis reveals that green trust mediates the connection between the antecedents of green purchase goals and buying intention.

H3: Green trust mediates the relationship between perceived value and purchase decision.

H4: Green trust mediates the relationship between perceived risk and purchase decision.

Moderating role of perceived consumer effectiveness

Perceived consumer effectiveness is defined as the consumer's perception of what extent to their actions can make a difference in solving environmental issues (Ellen et al., 1991 cited as in Jaiswal & Kant, 2018) or it is an individual's subjective judgement of how an individual can make efforts in the solution to the environmental problems faced by society and such effectiveness measure is directly related to the evaluation of the self in the context of ecological issue (Kim and Choi, 2005; Kim, 2011 cited as in Jaiswal & Kant, 2018). Locus of control has been attached with perceived consumer effectiveness if LOC is external the person is influenced by the acquaintance and of LOC is internal the person is not affected by the acquaintances (Mishal et al., 2017). Perceived consumer effectiveness can moderate the relationship between perceived value and purchase decision as when individuals feel effective as consumers their level of confidence and belief in their decision making abilities enhance resulting to an increased likelihood of making a purchase decision. Similarly, association between perceived risk and purchase decision can be moderated by perceived consumer effectiveness as confidence level in their own decision

making abilities mitigates risk and alternatively lack in confidence in their consumer effectiveness may amplify the risk leading to increased hesitation or avoidance of purchase.

H5: Perceived consumer effectiveness moderates the relationship between perceived value and purchase decision.

H6: Perceived consumer effectiveness moderates the relationship between perceived risk and purchase decision.

Moderating role of environmental knowledge

Environmental concern is an awareness of environmental problems combined with the perceived necessity of protecting the environment. Environmental concern plays an important role in green buying decisions (Schwartz & Miller, 1991 cited as in Matthes et al., 2014). Researchers have found positive association between ecological knowledge and environmentally responsible behavior and with it have asserted that better knowledge of environmental issues may lead to more positive ecological attitudes which can justify the expectation of the positive relationship between eco-literacy and green buying behavior (Eze & Ndubisi, 2013). Higher knowledge of environment can influence individuals to make purchase decisions based on environmental benefits and conversely lack of environmental knowledge may weaken the perceived value derived from environmental aspects.

H7: The relationship between perceived value and purchase decision among Nepalese consumers is moderated by environmental knowledge.

H8: Relationship between perceived risk and purchase decision among Nepalese consumers is moderated by environmental knowledge.

Research methodology

Sample and data collection

Quantitative approach utilizing a structured questionnaire survey methodology was used to test hypothesized relationship and research framework. The study concentrated on Nepalese consumers who have green purchasing history or perspective of green food, beverages or commodities and for the purpose the unit of analysis is consumers. Structured questionnaire survey was used to collect the data using judgmental sampling method. A pilot study was conducted to check for the understandability and validity of questionnaire beforehand and considering the suggestions some of the wordings and construction of sentences were changed to make it simple and understandable to the respondent. The study concentrated on educated consumers residing in urban area so they could well understand and easily respond to the questions and the reason behind is due to the fact that the concept of going green and its consumption is getting accepted more in individuals who are educated and residing in urban areas. Firstly, the questionnaire was distributed to almost

500 individuals using social media as Viber, Messenger, WhatsApp as well as posted in different institutions official group with the consent of the management. The questionnaire was self-administered only a valid response of 222 respondents was received. Respondents consisted of male (55%), female 45 %, age group up to 25 years 40.7%, 45.7% with the age group of 26 to 35 years, 10.4% belong to the age group from 36 to 45 years and least were within the age group of 46 and older. Masters level education (59.1%), bachelor's degree (32.3%) high school level (5%) and lowest was respondents having education of Mphil or Phd (3.6%). measured using 10 items and 2 items were taken from (Webster, Jr., 1975) and 4 sale items were used to assess environmental knowledge. Response on all the items were recorded on a five-point rating Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree).

3.3 Data Analysis

The data were analyzed using SPSS 23 and AMOS

23 following the guidelines of Anderson and Gerbing (1988) two step model was used: measurement model (to perform confirmatory factor analysis and check the reliability and validity among items and constructs) and structural model (for evaluating the model fit and hypothesis testing). Different indicators such as chi-square (χ^2), chi-square to degree of freedom ratio (χ^2/df), Tucker-Lewis index (TLI), comparative fit index (CFI), goodness-of-fit index (GFI) and root mean square error of approximation (RMSEA) and standardized root mean squared residual (SRMR) were used to measure model fit.

Table 1

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.919
Bartlett's Test of Sphericity Approx. Chi-Square	4530.205
df	703
Sig	0.000

Measures

The measures used for the constructs used in the study: perceived risk, perceived value, green trust, perceived consumer effectiveness, environmental knowledge and purchase decision were based on the validated measure of previous literature available in the field of environmental behavior. Perceived value was measured using 10 items and 3 items were taken from (Chen & Chang, 2012), 4 items 2 from (Chen, 2013) were used to assess perceived risk, 9 items out of which 2 items from Chen, 2010 were used to assess green trust, 6 items out of which 2 items from (Mishal et al., 2017) was used to assess green purchase decision, Perceived consumer effectiveness was measured

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root mean squared residual (SRMR) were used to measure model fit. An EFA was performed using a principal component analysis and varimax rotation. The minimum factor loading criteria was set to

0.50. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation. The results show that all communalities were over 0.50. An important step involved weighing the overall significance if the correlation matrix is through Bartlett's Test of Sphericity, which provides a measure of the statistical probability that the correlation matrix has significant correlations among some of its components. The results were significant, $\chi^2(n=222) = 4710.964 (p < 0.001)$, which indicates its suitability for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA), which indicates the appropriateness of the data for factor analysis was 0.916. In this regard, data with MSA values above 0.80 are considered appropriate for the factor analysis. Finally, the factor solution derived from this yielded factors for the scale, which accounted for 61.91% of variation in the data. Nonetheless, in this initial EFA PV1, PV2, PV3 from perceived value, PR5, PR6 from perceived risk, GT1, GT2, GT3 and PD4, PD5, PD6 were removed for further analysis as they loaded onto a factor other than its underlying factor. Further analysis after without the removed items yielded Kaiser-Meyer-Olkin MSA (0.919), 59.62% variance was explained by the factors, Bartlett's Test of sphericity proved to be significant for all communalities were over the required value of 0.50. (Table 2)

Table 2

Rotated Component Matrix

Component											
1		2		3		4		5			6
PCE1	.625	GT4	.765	PV4	.577	PEK1	.631	PD1	.670	PR1	.625
PCE2	.671	GT5	.740	PV6	.727	PEK2	.588	PD2	.723	PR2	.755
PCE3	.670	GT6	.702	PV7	.708	PEK3	.629	PD3	.659	PR3	.627
PCE4	.733	GT7	.657	PV8	.666	PEK4	.757			PR4	.585
PCE5	.711	GT8	.654	PV9	.759	PEK5	.746				
PCE6	.692	GT9	.686	PV10	.673	PEK6	.655				
PCE7	.617										
PCE8	.532										
PCE9	.524										

Results

Reliability and validity

Assessment of the standardized loading showed factor loading and its value between 0.535 to 0.803 which are beyond the suggested value of 0.5 (Hair Jr. et al., 2014). Internal reliability was assessed by using Cronbach alpha value and values varied from 0.701 to 0.909, exceeding the threshold of 0.7. Construct Reliability was assessed using Composite reliability, and values range from 0.725 to 0.863 of 0.70 to 0.90 representing high reliability (Sideridis et al., 2018), values of composite

Table 3

Internal Reliability and Convergent Validity

reliability/Cronbach alpha between 0.60 to 0.70 are acceptable (Ab Hamid et al., 2017). Hence, construct reliability was established for each construct. Convergent validity of scale items was estimated using Average Variance Extracted (Fornell-

Larcker criterion). The average variance extracted for two constructs perceived risk and environmental knowledge were not up to the threshold of 0.50 suggesting the lack of convergent validity in the constructs whereas, all other constructs AVE was up to the threshold which suggests that the scales used for the constructs of convergent validity. (Table 3)

Construct	Item Number(34)	Factor Loading Range	Average Variance Extracted(AVE)	Composite Reliability(CR)	Internal Reliability Cronbach Alpha
Perceived Risk(PR)	4	0.535 – 0.647	0.343	0.675	0.701
Perceived Value(PV)	6	0.676 – 0.803	0.532	0.872	0.897
Green Trust(GT)	6	0.663 – 0.749	0.519	0.866	0.861
Perceived Consumer Effectiveness(PCE)	9	0.658 – 0.788	0.515	0.905	0.909
Environmental Knowledge(EK)	6	0.612 -0.751	0.491	0.852	0.847
Purchase Decision(PD)	3	0.722 – 0.736	0.506	0.754	0.823

Note. Table 1 represents the average variance extract, composite reliability and Cronbach alpha values for the constructs.

Table 4

Descriptive Statistics and Discriminant Validity

Construct	Mean	SD	PCE	GT	PV	EK	PD	PR	
PCE	19.58	5.64	0.908	0.717					
GT	18.20	5.45	0.867	0.632***	0.720				
PV	19.91	5.76	0.876	0.709***	0.626***	0.729			
EK	12.25	3.67	0.857	0.701***	0.458***	0.465***	0.701		
PD	11.50	3.60	0.757	0.574***	0.463***	0.500***	0.635***	0.712	
PR	12.60	3.27	0.680	0.514***	0.441***	0.607***	0.431***	0.554***	0.586

Note. All the diagonal values in bold are root square of average variance extract

Discriminant validity in the study was assessed using Heterotriat- Monotrait (HTMT) Ratio as well as Fornell and Larcker criterion. According to Fornell and Larcker criterion, discriminant validity is established when the square root of AVE for a construct is greater than its correlation with the other constructs in the study. In table 4 square root of the average variance extracted for each construct is larger than the correlations between this construct and other constructs (Hair Jr. et al., 2014). Descriptive statistics like mean and standard deviation are also provided in Table 4 where, lowest mean value was seen for purchase decision and highest for green trust. The lowest and highest standard deviation was for perceived risk and perceived consumer effectiveness respectively. Table 5 shows Discriminant Validity using when using HTMT ratio, all ratios for constructs were less than the threshold of 0.85 or 0.90 (Henseler et al., 2015) confirming the discriminant validity.

Confirmatory Factor Analysis (CFA) was calculated using AMOS to test the measurement models. Due to low factor loading two items PR5, PR6 from perceived risk, PV1, PV2, PV3, PV5 from perceived value, GT1, GT2, GT3 from green trust, PCE10 from perceived consumer effectiveness, PD4, PD5, PD6 from purchase decision were removed. The model fit measures were used to assess the model's overall goodness of fit. CMIN/d.f = 1.755, RMR

= 0.041, GFI = 0.808, AGFI = 0.776, CFI = 0.892, TLI = 0.882, RMSEA = 0.058, SRMR = 0.0576. The model

fit for the construct yielded a moderate fit. (P.M.

Bentler, 1990; Bentler & Hu, 1998; Hair Jr. et al., 2014; Mia et al., 2019) using Heterotriat- Monotrait (HTMT) Ratio as well as Fornell and Larcker criterion. According to Fornell and Larcker criterion, discriminant validity is established when the square root of AVE for a construct is greater than its correlation with the other constructs in the study. In table 2 square root of the average variance extracted for each construct is larger than the correlations between this construct and other constructs (Hair Jr. et al., 2014). Descriptive statistics like mean and standard deviation are also provided in Table 4 where, lowest mean value was seen for purchase decision and highest for green trust. The lowest and highest standard deviation was for perceived risk and perceived consumer effectiveness respectively. Table 5 shows Discriminant Validity using when using HTMT ratio, all ratios for constructs were less than the threshold of 0.85 or 0.90 (Henseler et al., 2015) confirming the discriminant validity.

Measurement and Structural modeling

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Table 5

HTMT Ratio

1990;Bentler & Hu, 1998;Hair Jr. et al., 2014;Mia et al., 2019)

	PR	PD	EK	PV	GT	PCE
PR						
PD	0.55					
EK	0.431	0.773				
PV	0.6074	0.5	0.465			
GT	0.441	0.463	0.458	0.626		
PCE	0.514	0.535	0.701	0.7099	0.632	

Note. Heterotrait monotrait ratio calculation for discriminant validity

Table 6

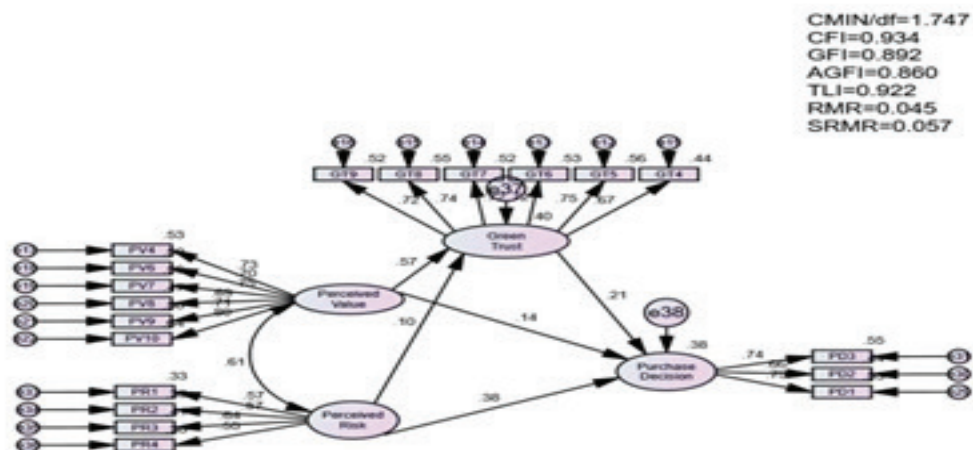
Structural Model and Goodness of Fit Model

Model	p-value	$\chi^2/df \leq 5.00$	GFI ≥ 0.80	AGFI ≥ 0.80	CFI ≥ 0.90	TLI ≥ 0.90	RMSEA ≤ 0.05 -0.08	SRMR ≤ 0.08
Measurement	0.00	1.755	0.808	0.776	0.892	0.882	0.058	0.056
Structural	0.00	1.747	0.892	0.860	0.934	0.922	0.058	0.057

Note. Adjusted Goodness-Of-Fit statistic; CFI = comparative fit index; TLI = Tucker-Lewis index; IFI = Incremental Fit Index;RMSEA = Root Mean Square Error of Approximation

Figure 1

Structural equation Model



A structural equation model generated through AMOS was used to test for the relationships. A good fitting model is accepted if the value of the CMIN/df is < 5 , the goodness of fit (GFI) indices is > 0.90 , the Tucker and Lewis index (TLI), Confirmatory Fit Index (CFI) is > 0.90 , an adequate

fitting model is accepted if the AMOS computed value of the standardized root mean square residual (RMR), 0.05 and the root mean square error approximation (RMSEA) is between 0.05 and 0.08. (Hair Jr. et al., 2014; Bentler & Hu, 1998). The fit indices for the given model were within their respective common acceptance levels. The model for the fit indices yielded an adequate fit for the data: CMIN/df = 1.747, GFI = 0.892, AGFI = 0.860, CFI = 0.934, TLI = 0.922, RMR = 0.045, SRMR =

0.057 and RMSEA = 0.058.

The squared multiple correlation was 0.38 for purchase decision which shows that 38 % variance in the purchase decision is accounted by perceived value and perceived risk with the mediation green trust. The structural model in the study was not found to have a perfect fit the reason being that maybe of inadequate sample size. For a chi square to be valid the most important assumption is sample size

(N) should be sufficiently large and it is believed that fitting a large SEM model (with many observed variables) to moderate or small samples results in biased estimate for chi-square i.e Type I error rate further, chi square test is not always the final word in assessing fit (Shi et al., 2019). It is difficult to get a non-significant chi-square for sample sizes over 200 or so even other indices suggest a decent fitting model (Usp & Winter, 2012). Table 7 shows the assessment of impact of

Table 7

Hypothesis testing

perceived risk and perceived value on green purchase decision. The impact of whereas, impact of perceived value on green purchase decision was non-significant ($b=0.145$, $t=1.168$, $p=0.243 > 0.05$) thus rejecting hypothesis 1. perceived risk on green purchase decision was positive and significant ($b=0.376$, $t=2.950$, $p=0.003 < 0.05$) supporting hypothesis 2.

Relationship	Standardized estimates	t stats	P-value	Decision
Perceived value influences green purchase decision	0.145	1.168	0.243	Rejected
Perceived risk influences green purchase decision	0.376	2.950	0.003	Accepted

R Square

Purchase Decision 0.38

Model Fit

CMIN/df = 1.747, GFI = 0.892, AGFI = 0.860, CFI = 0.934, TLI = 0.922, RMR = 0.045, SRMR = 0.057 and RMSEA = 0.058.

Mediation and Moderation Analysis

The study analyzed the mediating role of green trust on the relationship between perceived risk and purchase decision as well relationship between perceived value and purchase decision. No significant mediating effect of perceived value on purchase decision via green trust was found ($b=0.1093$, $p < 0.01$, VAF = 28.3%) accepting hypothesis H3. However, significant mediating effect of green trust from perceived risk to purchase decision was found ($b=0.2096$, $p < 0.01$), VAF = 34.3%) supporting hypothesis 4. Hence, partial mediation was found in perceived risk and purchasing decision via green trust as well as in perceived value and purchase decision via green trust. This implies that risk as perceived by consumers while buying green products are important but if companies create an environment of trust among consumers it has an impact over the buying decision similarly perceived value that is overall evaluation of net value of purchase is also effected by green trust created. (Table 8)

Table 8

Mediation Analysis

Relationship	Total Effects	Direct Effects	Indirect Effects	Confidence Interval		T-statistics	Conclusions
				VAF			
				0.283	Lower bound 0.0946	Upper bound 0.3601	
PR->GT->PD	0.6103 (0.000)	0.4007 (0.000)	0.2096			5.997	Partial Mediation
PV->GT->PD	0.3859 (0.000)	0.2766 (0.000)	0.1093	0.343	0.0248	0.1963	Partial Mediation

Note. Mediation analysis of green trust (GT), VAF(Indirect effect/Total Effect)

The study assessed the moderating role of perceived consumer effectiveness(PCE) and environmental knowledge (EK) on the relationship between perceived value(PV) and purchase decision(PD) as well as between the relationship of perceived risk(PR) and purchase decision(PD). For

the purpose zstandardized value was calculated in spss and interaction product term between predictor and moderators were calculated. The analysis failed to show any kind of moderating effect between perceived value and green purchase decision with the perceived consumer effectiveness as a moderator ($b = 0.164$, $t = 1.909$, $p = 0.058 > 0.05$) rejecting hypothesis 5, similarly, moderation effect of perceived consumer effectiveness in relationship of perceived risk and purchase Table 9

Moderation Analysis summary

Decision was also not significant ($b = -0.050$, $t = -0.534$, $p = 0.594 > 0.05$) rejecting Hypothesis 6. Similarly, moderating effect of environmental knowledge in relationship between perceived value and purchase decision ($b = 0.094$, $t = 0.969$, $p = 0.334$) was non-significant rejecting hypothesis 7, in relationship between perceived risk and purchase decision ($b = -0.099$, $t = -0.980$, $p = 0.328$) rejecting hypothesis 8. (Table 9).

Relationship	Beta	CR	p-value
PR->PD	0.204	2.884	0.004
PCE->PD	0.154	2.104	0.037
PR*PCE->PD	-0.050	-0.534	0.594
EK->PD	0.284	4.669	0.000
PR*EK->PD	-0.099	-0.980	0.328
PV->PD	0.200	2.394	0.018
PV*PCE->PD	0.164	1.909	0.058
PV*EK->PD	0.094	0.969	0.334

Note. Moderation of perceived consumer effectiveness(PCE) and environmental knowledge(EK)

Discussion and Conclusion

This paper has examined the effect of perceived value and perceived risk in green purchase decision in the presence of green trust as a mediating variable and perceived consumer effectiveness as well as environmental knowledge as

moderators among the Nepalese consumers. Perceived risk in the study showed a significant relationship with the purchase decision which means that the consumers don't have the knowledge regarding the effect of the green usage if the green products the result is inconsistent with of (Khoiruman & Haryanto, 2017; Kamaludin et al., 2012). Perceived value showed no significant impact in purchase decision inconsistent with the study of Chaudhary, (2018); Yadav & Pathak, (2017) that emphasized on the role of perceived value on purchase decision. No moderating effect of perceived consumer effectiveness and environment knowledge was found upon purchase decision that is inconsistent with the explanation provided by Fraj-Andrés & Martínez-Salinas (2007) supporting environment knowledge as a moderator however, study of Banget al., (2000) showed no influence of the knowledge on purchase decision. which shows that

Nepalese consumers decision whether purchase or not to purchase the product is not affected by whether they perceive their buying has a positive effect or not as well as even having the environment knowledge does not impact their buying decision. According to the study of Chen & Chang (2012) green trust as a mediator has an impact upon perceived risk and purchase decision relationship but the study conducted showed no relationship between perceived value and purchase decision but the relationship between perceived risk and purchase decision with a mediator of green trust was established. Hence it can be said that lack of consumer trust in green products in terms of risk acts as a barrier towards green purchase behavior.

Making green purchase decisions is crucial for promoting sustainability and mitigating the environmental impact of our consumer choices. By considering the environmental, social and ethical aspects of products and services individuals can contribute to a more sustainable future. However, most consumers, despite holding a positive attitude toward environmental conservation make purchase decisions to maximize self-interest because in their view, the costs of cooperation outweigh the uncertain utility obtained from it. Therefore, the

decision to buy (collective social gain) or not buy (self-interest) the green product despite positive attitude towards environmental conservation may be conceptualized as a

social dilemma (Khoiruman & Haryanto, 2017). However, it's important to note that individual actions alone cannot solve complex environmental challenges. Government, businesses and organizations must play a significant role by implementing and enforcing policies that promote sustainability, creating incentives for green innovation, providing consumers with transparent information about the environmental impact of products. By choosing environmentally friendly products and supporting sustainable businesses, we can collectively work towards a more sustainable and responsible global economy.

The study has used self-reported behavior for measuring consumer's green purchase behavior instead of the actual behavior so future researcher may consider actual behavior for study. The present research has measured the green products in general, whereas, it has been found that past studies have focused consumer behavior on specific areas as energy saving appliances, organic foods, green hotels etc which can limit generalizations of our findings. With it, as the attitude towards the green buying and actual buying has reported to be not similar as reported by many other researchers conducting interviews to obtain the reasons for the respondents green buying behavior would clarify the findings even more. Moreover, the study has focused only on limited number of variables increasing the number of variables as attitude, group influence, lifestyle, greenwash, confusion etc would be better.

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Treatment of Waste Water and Reclamation of Desert with Regular Application

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Abstract

This study is about my experience of converting sandy soil (desert) to fertile soil (fertile land).

Introduction

Background and rationale

The scarcity of water resources and the growing threat of desertification are global environmental concerns that pose significant challenges to sustainable development. In many arid and semi-arid regions, including Middle East, North Africa and even Deserts in China and Mongolia as well. The availability of fresh water is limited, while the expansion of deserts continues to degrade valuable land and ecosystems. These pressing issues necessitate innovative approaches to water management and desert reclamation.

The treatment and reclamation of waste water offer a promising solution to address both water scarcity and desertification. Waste water, which includes domestic, industrial, and agricultural effluents, is often discarded without adequate treatment, resulting in pollution and a waste of potential resources. However, when properly treated, waste water can be a valuable source for moisture enhancement in the deserts and ecosystem restoration in arid regions, supporting sustainable agriculture and mitigating desertification.

In the context of Middle East and North Africa (MENA), which experiences water scarcity and faces the risk of desertification, there is a need to explore the feasibility and effectiveness of waste water treatment and its application in desert reclamation. By conducting research on a test plot that simulates desert-like conditions, valuable insights can be gained into the potential benefits, challenges, and environmental impacts of utilizing untreated waste water for reclamation purposes.

The research aims at investigating the following key aspects:

1. Waste Water Treatment: The study seeks to explore various waste water treatment techniques suitable for the local context of MENA and evaluate their efficiency in conserving contents from waste water in the test plots. This will involve selecting appropriate treatment technologies and assessing the quality of treated waste water to ensure its safety for reclamation purposes.

- 2. Desert Reclamation:** The research will examine the impacts of continuous application of treated waste water on soil quality, vegetation growth, and ecosystem dynamics in a simulated desert-like environment. The study aims to evaluate the potential of waste water in promoting vegetation establishment and restoring degraded lands, thus contributing to the mitigation of desertification.
- 3. Sustainability and Environmental Impacts:** The project will consider the sustainability aspects of waste water treatment and reclamation, including the potential risks associated with the application of untreated waste water. This will involve assessing the long-term effects on soil fertility, water quality, and ecosystem resilience, as well as addressing any potential negative environmental impacts.

The outcomes of this research have significant implications for water resource management, land restoration, and environmental sustainability in arid and semi-arid regions facing similar challenges. The findings can inform policymakers, water managers, and environmental practitioners about the feasibility and benefits of integrating waste water treatment and desert reclamation strategies in the context of arid areas of this world. Ultimately, the research aims to contribute to the development of sustainable approaches for water utilization and land management, fostering resilience and combating desertification in arid regions.¹

Deserts are formed through a combination of various geological, climatic, and environmental factors. Here's a general overview of the processes involved in the formation of deserts:

- 1 Rain Shadow Effect
- 1 Subtropical High-Pressure Zones
- 2 Latitude and Atmospheric Circulation
- 3 Proximity to Oceans and Cold Currents
- 4 Tectonic Activity
- 5 Climate Change and Human Impact²

Research objectives and research questions

Research Objectives:

1. To assess the efficiency of different waste water treatment techniques in removing pollutants and contaminants from waste water in the context of deserts.
2. To evaluate the potential of treated waste water for desert reclamation by studying its effects on soil quality, vegetation growth, and ecosystem dynamics in a simulated desert-like environment.
3. To examine the long-term sustainability and environmental impacts associated with the continuous application of treated waste water for desert reclamation.
4. To provide evidence-based recommendations for the integration of waste water treatment and reclamation strategies in arid and semi-arid regions.

Research questions

1. What are the most suitable waste water treatment techniques for effectively removing pollutants and contaminants from waste water in the specific context of desert-like condition?
2. How does the application of untreated waste water influence soil quality parameters, including fertility, moisture content, and nutrient levels, in a simulated desert-like environment?
3. What are the impacts of continuous waste water application on vegetation growth, species composition, and biodiversity in the desert reclamation test plot?
4. What are the potential risks and environmental impacts associated with the application of treated waste water, and how can they be mitigated to ensure long-term sustainability?
5. How do the findings from this research contribute to the broader understanding of waste water utilization and desert reclamation, and what are the implications for policy, practice, and future research in arid and semi-arid regions?

Significance of the study

The proposed study on waste water treatment and reclamation of deserts with continuous application of waste water in a test plot simulated as desert in Kathmandu, Nepal holds significant importance due to several reasons:

Addressing Water Scarcity: Deserts, like many arid and semi-arid regions, face water scarcity issues. By exploring the potential of waste water treatment and reclamation, this study offers a sustainable approach to augment water resources. It can contribute to reducing the strain on freshwater sources and provide an alternative water supply for agricultural, industrial, and environmental purposes.

Combating Desertification: Desertification poses a severe threat to ecosystems, livelihoods, and biodiversity in arid regions. By focusing on desert reclamation using treated waste water, this study aims to mitigate desertification processes and restore degraded lands.

Sustainable Land Use and Agriculture: The emphasis of this study on utilizing raw waste water for reclamation of desert-like conditions is significant in promoting sustainable land use practices.

Policy and Decision-making: The findings of this study can inform policy and decision-making processes related to waste water management, desert reclamation, and sustainable water resource utilization.

Knowledge Gap and Research Contribution: The study aims to fill a knowledge gap by conducting research specifically focused on waste water treatment and desert reclamation.

The significance of this study lies in its potential to offer practical solutions for water resource management, land restoration, and sustainable development in arid regions.

Scope and limitations

Scope

Geographic Scope: The study is being conducted in Kathmandu, Nepal, as the research site for investigating waste water treatment and reclamation of deserts. It involves the selection and establishment of a test plot that is prepared simulating desert-like conditions within the test area.

Waste Water Treatment Techniques: The study explores various affordable waste water treatment techniques suitable for the desert-like conditions. Although, it is less important objective.

Desert Reclamation: The study assesses the potential of raw waste water for desert reclamation by examining its effects on soil quality, vegetation growth, and ecosystem dynamics. It aims to provide insights into the viability and success of utilizing untreated waste water for land restoration in arid environments.

Sustainability Considerations: The study addresses the long-term sustainability aspects of waste water treatment and reclamation..

Limitations of the study

Generalizability: The research findings and recommendations may have limitations regarding their generalizability to other regions or contexts beyond Kathmandu, Nepal. The specific environmental, climatic, and socio-economic conditions of the study area may, somehow, influence the results and a customized approach should be adopted when applying the findings to different climatic and geographic locations.

Time Constraints: The study may face limitations in terms of the time available for research activities and

data collection. Conducting long-term experiments and monitoring processes are essential for capturing the full effects of waste water application on desert reclamation.

Scale of Implementation: The research focuses on a test plot of just 1 square meter area within Kathmandu, Nepal owing to the cost of construction of a larger test plot. Consequently, the findings may not fully represent the potential outcomes and challenges associated with implementing waste water treatment and reclamation on a larger scale. The scalability and practicality of the proposed approaches should be further evaluated in the context of broader implementation scenarios, i. e. at the desert itself.

Despite these limitations, the study offers valuable insights into waste water treatment and reclamation of deserts in a desert- like simulated test- plot in Kathmandu, Nepal. It contributes to the existing knowledge base on sustainable water resources management, land restoration practices, and the potential of waste water utilization in arid environments.

Literature Review

Overview of waste water treatment and reclamation

Over the years, there have been significant advancements in waste water treatment and reclamation practices worldwide. Efforts have been made to develop efficient and sustainable techniques to treat waste water and harness its potential for various beneficial purposes. Here is an overview of some notable waste water treatment and reclamation approaches, with focus on land application, implemented in different parts of the world:

Land Application Techniques: There are various land application techniques employed depending on factors such as soil type, climate, vegetation, and the specific needs of the receiving environment. The two primary methods are surface irrigation and subsurface irrigation.

Surface Application: This method involves distributing the effluent over the land surface using gravity flow or sprinklers. The effluent is applied in a manner similar to traditional irrigation practices, allowing it to infiltrate into the soil.

Subsurface Application: In this method, the treated wastewater is applied directly below the ground surface through perforated pipes or other distribution systems. This technique helps reduce water loss due to evaporation and minimizes contact with the atmosphere

Municipal Waste Water Treatment: Municipal waste water treatment is a common practice aimed at removing pollutants and contaminants from domestic sewage. This typically involves several treatment stages, including physical, chemical, and biological processes such as screening, sedimentation, activated sludge, and disinfection. Treated municipal waste water is often discharged into rivers or reused for irrigation, industrial processes, and non- potable uses.

Other existing but, not relevant to the research are as following;

1. Industrial Waste Water Treatment
2. Constructed Wetlands
3. Advanced Treatment Technologies
4. Water Reuse and Desalination
6. Managed Aquifer Recharge
7. Industrial and Agricultural Applications

These are just a few examples of waste water treatment and reclamation approaches that have been implemented globally. The advancements in technology, regulations, and awareness have led to significant progress in maximizing the value of waste water while protecting the environment and human health. Continued research and innovation in this field are essential for addressing water scarcity, promoting sustainable development, and mitigating the impacts of pollution and climate change.³

Deserts and desertification processes

Deserts are vast, arid regions characterized by extremely low precipitation levels, sparse vegetation, and harsh environmental conditions. Desertification refers to the process of land degradation, transforming non-desert areas into deserts or semi-arid regions. Here are some notable deserts and desertification processes observed around the world:

Sahara Desert- Africa, Gobi Desert- Asia, Atacama Desert- South America, Thar Desert- Asia, Sonoran Desert- North America, Australian Outback, Australia

These examples highlight the diverse desert ecosystems and the complex processes leading to desertification worldwide.⁴

Previous research on desert reclamation and waste water utilization

Previous research on desert reclamation and waste water utilization in and around desert areas has focused on understanding the potential benefits, challenges, and environmental impacts of utilizing waste water for land restoration in arid regions as following:

Soil Improvement and Vegetation Establishment: Studies have investigated the effects of *treated waste water application* on soil properties, such as nutrient content, organic matter, and moisture retention capacity.

Water Use Efficiency and Sustainable Agriculture: Researchers have examined the water use efficiency of utilizing waste water for agricultural purposes in desert areas.

Environmental Impacts and Risk Assessment: Previous research has assessed the potential environmental risks associated with waste water utilization in desert reclamation projects.

Economic Feasibility and Socioeconomic Factors: Researchers have examined the economic feasibility and socioeconomic aspects of waste water utilization in desert reclamation.

Technological Innovations and Engineering Solutions: Previous studies have focused on developing and optimizing waste water treatment technologies suitable for desert conditions.

The previous research on desert reclamation and waste water utilization has provided valuable insights into the potential of using treated waste water as a resource for land restoration in arid regions.

It has identified the benefits, challenges, and risks associated with waste water utilization and has contributed to the development of sustainable strategies for desert reclamation.⁵

Knowledge gaps and research opportunities

While significant progress has been made in understanding desert reclamation and treated waste water utilization, there are still knowledge gaps and research opportunities that can further advance this field. Some key areas that warrant further investigation include:

Long-term Impacts: Understanding the long-term impacts on soil fertility, potential soil salinization, biodiversity, and ecosystem services will help develop comprehensive management strategies and ensure the long-term sustainability of reclamation projects.

Water-Energy-Food Nexus: Research should focus on exploring the interdependencies and trade-offs within the water-energy-food nexus in the context of waste water utilization for desert reclamation.

Climate Change Resilience: Given the increasing impacts of climate change, there is a need to investigate the resilience of waste water-based desert reclamation projects under changing climatic conditions.

Social Acceptance and Stakeholder Engagement: Understanding the social acceptance, perceptions, and attitudes towards waste water utilization in desert reclamation is crucial for the successful implementation of such projects.

Emerging Contaminants and Health Risks: Research should address the presence of emerging contaminants, including pharmaceuticals, micro-plastics, and chemicals of emerging concern, in treated waste water used for desert reclamation.

Technological Innovations and Efficiency: There is a need to further explore and develop innovative waste water treatment technologies that are cost-effective, energy-efficient, and tailored to the specific needs of desert reclamation.

Policy and Governance Frameworks: Research can contribute to the development of robust policy and governance frameworks for waste water-based desert

reclamation.

Addressing these knowledge gaps and pursuing these research opportunities will help enhance our understanding of **untreated waste water utilization for desert reclamation**, improve the effectiveness and sustainability of reclamation efforts, and guide policy and practice in arid regions facing water scarcity and desertification challenges.

Methodology

Research design and approach

The research was designed to be conducted in 2020 but, the COVID 19 pandemic (late 2019- beginning of 2023) delayed the research at field level. The researcher tried to find out a place in nearby deserts of India to conduct the research at field level. But, the regulations of the Government of India were very difficult to a foreigner to fulfil. The researcher even presented this idea to United Nations' Convention for Combatting Desertification (UNCCD).

This UN Agency is custodian of Sustainable Development Goal (SDG) target 15.3: "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world." In the beginning they were very much interested. But, it could not, somehow, materialize.

The researcher floated this idea through LinkedIn to garner support and funding. A Professor of South Africa was interested and she passed on a contact for further discussion. But, that contact person did not respond properly.

So, this research was a quite late to start with.

Study area description and selection of the test plot

A continuous supply of waste water was needed for this research and thus, the research plot was selected just next to the inlet portion of Bagmati Sewerage Treatment Plant of Kathmandu Valley, Nepal- near the international airport.

Simulation of desert-like conditions

A desert is a barren and arid region characterized by a lack of significant vegetation and limited precipitation. It is a geographical area that typically receives very little rainfall, making it difficult for plants and animals to thrive. Deserts often have extreme temperature variations, with scorching hot days and cool nights.

Deserts are generally classified based on their specific characteristics and location. Some common types of deserts include: Hot deserts, Cold Deserts, Coastal Deserts and Polar Deserts. The research is focused to the Hot Deserts only.

These Hot deserts, such as the Sahara Desert in Africa

and the Arabian Desert in the Middle East, experience high temperatures during the day, often exceeding 100°F (38°C). These have sparse vegetation and are normally composed of sandy or rocky terrain.

Aridity because of high temperature, sand as the bed and no vegetation cover at the surface were the three characteristics to be simulated. The experimental set up is described below.

Waste water treatment techniques and processes

The main treatment parameters for a waste water are Bio- chemical Oxygen Demand (BOD), Total Suspended Solids (TSS) and Nitrogen (N).

The waste water treatment technique adopted was surface application of waste water on the sand bed of the test plot.

With the passage of time it would percolate down to the sub- surface and get treated naturally. The suspended organic matters would get retained by the sand media and that would turn into humus like substance. With passage of time the humus would turn into clay- like formation. The suspended inorganic substance (mostly silt) of the waste water would also get retained in the sand media and help the sand turn into soil with passage of time.

Some portion of the waste water would get evaporated because of high temperature maintained in the test plot in the day time to simulate summer temperature condition of the hot deserts. The Nutrients (Nitrogen, Phosphorous and Potassium- popularly known as N, P, K) would also partially get retained in the sand media and make the sand rich of nutrients that could be helpful to the vegetation later.

Experimental setup and data collection methods

3.5.1 Experimental Set up: One square meter pit was created by excavating (Length = 1.092075 m and Breadth = 1.092075 m) of earth surface near the inlet of the waste water treatment plant up to a depth of 27 centimeters i. e. 0.27m with single brick cemented wall on the periphery.

Desert soil consists of almost 90- 95% of sandy soil in low-rainfall regions. The nitrogen content is low and organic matter is also negligible but, is rich in calcium carbonate and phosphate and that makes it infertile. The lower layer consists of 10 times more calcium than the upper topsoil. If nitrogen could be available in the form of nitrates from fertilizer and proper irrigation, in addition to the already-present phosphates makes it useful in growing crops such as barley, rape, cotton, wheat, millets, maize, and pulses.⁶

An Iron frame (Length = 1.5 m, Breadth = 1.5 m and Height = 2.0 m) made of angles and MS flats with four legs was fabricated and erected to cover the test plot with polyethylene sheet of 500 micron thickness as roofing and top wall material.

Data Collection Methods: Two types of data have been collected as following:

Initial Characteristics of Waste water: The main parameters that are collected are as shown in the following Table 3.1:

Table 3.1: Daily Characteristics of applied Waste Water

Raw Sewage (Composite)						
Date	pH	BOD5	COD	TSS	NH3-N	O & G
	-	mg/L	mg/L	mg/L	mg/L	mg/L
Method	Digital pH meter (Hach)	APHA 5210-B	EPA Method 410.4	APHA 2540 D	EPA Method 350.1	APHA 5520 B
05/21/23	6.96	389.4	818	415	62.7	63
05/22/23	6.87	374	1119	395	34.7	78
05/23/23	7.26	463.9	1158	495	48.2	53.5
05/24/23	6.89	449.1	987	460	78.4	40.5
05/25/23	7	554.3	1204	650	58.8	73
05/26/23	7.24	404.1	941	460	51.5	55.5
05/27/23	7.01	433.9	1039	470	73.4	42
05/28/23	7.21	388.9	1081	400	55.4	74.5
05/29/23	6.87	479.4	1260	585	57.7	54.5
05/30/23	6.73	299.6	1198	335	47	43.5
05/31/23	7.16	434.1	1044	485	69.4	30.5
06/01/23	7.18	344.6	914	375	67.8	58
06/02/23	7.08	419.3	1063	455	80.6	75.5
06/03/23	7	419.5	1158	460	57.1	76.5
06/04/23	7.44	418.9	1112	445	78.4	69
06/05/23	7.35	418.9	1064	430	57.7	60.5
06/06/23	6.92	374.4	1002	480	69.4	76
06/07/23	7.2	449.6	1080	490	47	70
06/08/23	7.02	524.1	823	595	72.8	62
06/09/23	7.15	254.4	814	290	53.2	52
06/10/23	7.21	434.2	1088	485	58.8	40.5

Source: Bagmati Sewerage Project Daily Records

Composition of the sand media of the test plot: The initial sample of the sand was tested for its composition and the media content is being tested for its composition each month to see if there are changes in the concentration of its content with daily application of waste water. The following 2 figures (Figure 3.1 and 3.2) show the initial and 1 month composition of the sand bed media:



Figure 1: Initial composition of the sand media



Figure 2: Composition of the sand media after 1 month

Waste Water Treatment Techniques

Overview of waste water treatment technologies

Waste Water Treatment is a complex major sector that involves many technologies, machines, materials and various types of human resources. There are basically 3 types of treatment; Physical, Chemical and Biological needed to make the waste water safe to human health and environment. Exceptionally, Radio- active pollutions have also to be treated if there are accidental radioactive leakages. The physical impurities consist of floating materials, grits and suspended physical particles mainly identified as inorganic Total Suspended Solids (TSS). The chemical impurities may be Ammonia, Nutrients (N, P, K), chlorides, pH, and other heavy metals. The biological impurities include the dissolved organic matters raising BOD & COD and suspended or attached living micro-organisms like; bacteria, virus, helminthes etc.

Almost all types of waste water treatment technologies are defined in section 2.1 above. The process adopted in this research is Surface Land Application of Waste Water.

Selection and implementation of specific waste water treatment techniques for the study

'Land Application of waste water' is the method of treatment that was selected for this research. The land application can be done either at surface or sub- surface for treatment purpose. The waste water was applied on surface of the sand bed prepared for research every day just to fill it. The surface application method was selected as the condition of treatment would be more aerobic then anaerobic. The anaerobic process produces many foul gases like Hydrogen Sulphide- H₂S, Ammonia- NH₄ and Methane- CH₄. Methane is also a potential greenhouse gas and thus, it had to be avoided as well. The aerobic process produces only Carbon Dioxide- CO₂ which is nearly 40 times less harmful than methane. Production of Nitrogen gas is not a problem for the environment- rather beneficial.

Description of waste water treatment processes applied in the test plot

The process of wastewater application on the surface of the test plot (sand bed) and the measurement of wastewater constituents and changes in the sand composition after daily application involve several steps. Here's a detailed description of the process:

Preparation of Test Plot (Sand Bed)

A suitable area for the test plot was selected to ensure it was representative of the desert landscape.

The area was cleared of debris and vegetation that could have interfered with the experiment.

- A test pit of volume Length (L= 1.092075 m) × Breadth (B= 1.092075 m) × Depth (D= 0.27 m) =

0.322 Cubic meter or 322 liters was excavated.

- A single brick masonry wall of 5 layers of bricks was constructed around the excavated pit to make the inner dimension up to ground level as $L = 1\text{ m}$, $B = 1\text{ m}$ and $D = 0.27\text{ m}$ giving a volume of 0.27 Cubic meters or 270 liters.
- Sand was filled up to a height of 4 brick masonry layers i. e. up to ground layer to keep one brick masonry layer as free board.
- The sand bed was levelled up to the 4 layers of bricks to create a consistent and uniform surface.
- A sample of the sand was collected in a plastic bottle and sent to the laboratory for analysis for its different composition like; Nitrogen (N), Phosphorous (P), Potassium (K), Organic Matter, Total Organic Carbon (TOC), Clay and Silt that are required to see the changes necessary for this research.
- A roofing cover was provided to the test pit to avoid rainfall. The roofing cover consists of Iron frame covered by 50 micron thick plastic sheets on top and half of the sides. The lower open portion is fenced with Chicken wire mesh to avoid animals from tampering the test site.
- The enclosure thus prepared is provided with 10 nos. of 200 Watts capacity bubs hanging from the frame at a height of 30 cms. From the sand surface to make the environment as hot as the desert. The temperature measured in different times varied from 45°C to 55°C . The temperature range exactly simulates the thermal condition of the deserts of India, middle-east and North Africa.

A photograph is shown below in figure 4.1:



Figure 4.1: The test model during preparation and later with all the bulbs lit

The following Figure 4.2 shows the temperature measurement:



Figure 4.2: Temperature measured to be $130.5^{\circ}\text{Fahrenheit}$ = 54.72°C

Wastewater Collection and Characterization

- The source of wastewater that is applied every day to the plot is the inlet site of the *Guheyswori* Waste Water Treatment Plant (WWTP) and the sample taken for test from this point ensures that it represented the type of wastewater being applied for reclamation.
- The laboratory of the WWTP characterized the collected wastewater to determine its physical, chemical, and biological properties. This included testing for pH, Total Suspended solids (TSS), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Nitrogen content ($\text{NH}_3\text{-N}$) and Oil & Gas.
- The waste water characteristics were recorded for various constituents as mentioned above to monitor any changes over time. The recorded daily data are arranged in table 3.1 above.

Daily Wastewater Application

- The motor used for pumping waste water to apply has a discharge capacity of 10,000 liters per hour. An average time of 1 minute and 21 seconds took to fill

the test plot. The maximum time taken was 1 minute and 30 seconds and the minimum was 1 minute 10 seconds. The average volume applied every day was 222 liters. The volume will depend on factors such as the plot size, desired application rate, and the ability of the sand bed to absorb water.

- The wastewater was evenly applied over the entire test plot's surface every day. An electric motor connected to a plastic pipe was used manually for pouring the wastewater.
- It was ensured that the application was consistent and uniform to maintain the reliability of the experiment.

Measuring Changes in Sand Composition

- Monthly periodic (June 20 and July 20 of the year 2023) soil samples from the test plot were collected to analyze the changes in the composition and characteristics of the sand media. The result of July 20 has not been received yet and hence not included here.
- The soil samples were analyzed for their physical and chemical properties. Important parameters include; pH, Temperature, NaCl content, Total Nitrogen, Total Phosphorous, Potassium, Organic Matter, Total Organic Carbon, Clay and Silt contents.
- The obtained test data from the laboratory were tabulated and bar charts were worked out for the changes in concentrations of these parameters. The changes over time (each month) were compared to the previous records.

Data Analysis and Interpretation

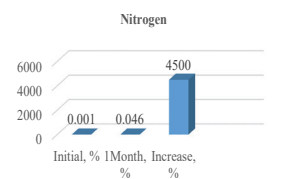
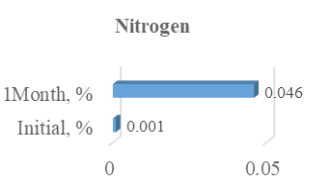
- All the obtained data from wastewater characterization and soil analysis are analyzed in a systematic manner in the following paragraphs.

The following table 4.1 shows the test records of the sand

after a month of waste water application

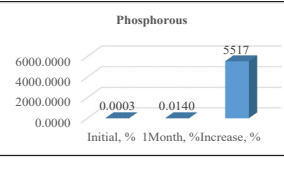
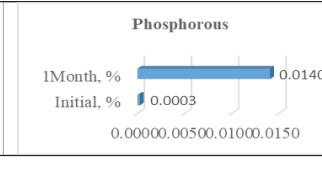
The following tables 4.2 and corresponding Figures 4.2 (bar charts) clearly show the changes in the individual constituents of the sand bed after regular application of waste water to it.

Parameter	Initial, %	1Month, %	Increase, %
Nitrogen	0.001	0.046	4500

Nitrogen has increased by 4500% in a period of one month of waste water application.

Parameter	Initial, %	1Month, %	Increase, %
Phosphorous	0.0003	0.0140	5517

media in 1 month time interval each:

Parameters	Initial, %	1Month, %	Increase, %
Nitrogen	0.001	0.046	4500
Phosphorous	0.00025	0.014043	5517
Potassium	0.45643	0.5281	16
Organic Matter	0.06	0.532	787
TOC	0.035	0.31	786
Clay	0.015	0.023	53
Silt	0.023	0.031	35

Table 4.1: Test results of the sand media from the Lab

- MS Excel sheet has been used to analyze the data to identify trends and patterns related to changes in the sand sample of the bed. Bar charts have been drawn to see the changes of concentration of various recorded parameters.

The corresponding Bar chart of the table 4.1 is shown below in figure 6.1:

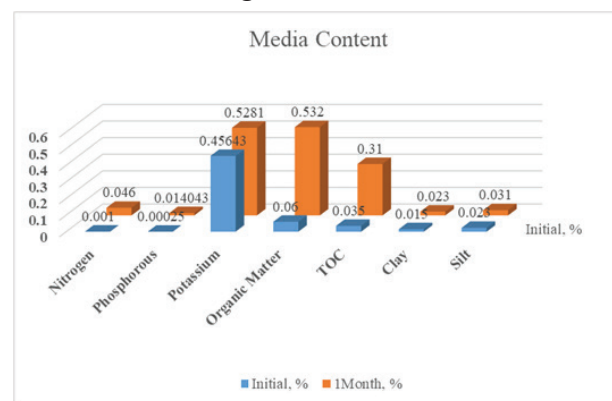
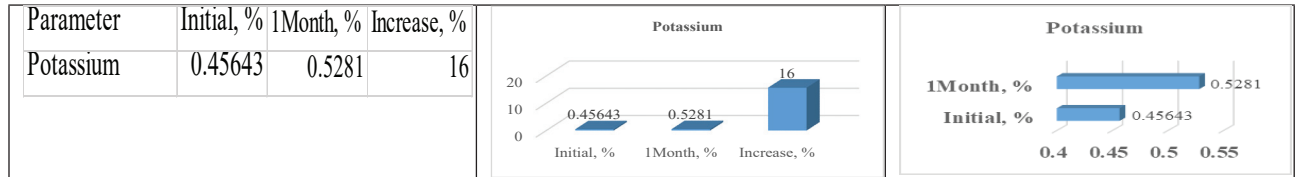
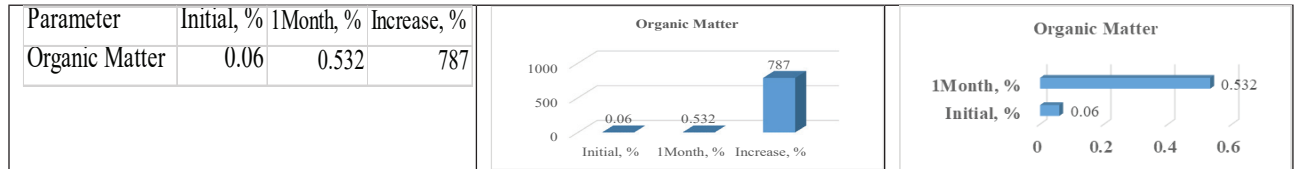


Figure 4.1: Cumulative Changes of all the parameters

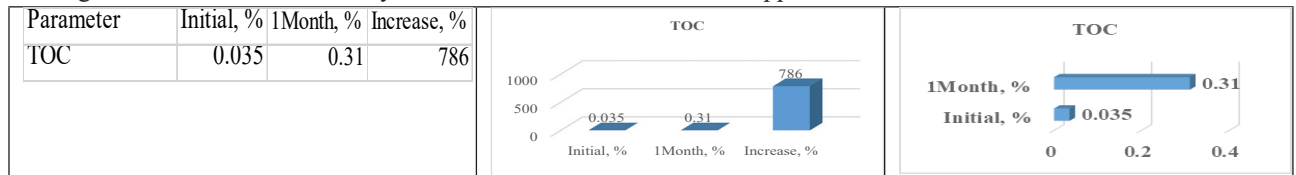
Phosphorous has increased by 5517% in a month of waste water application



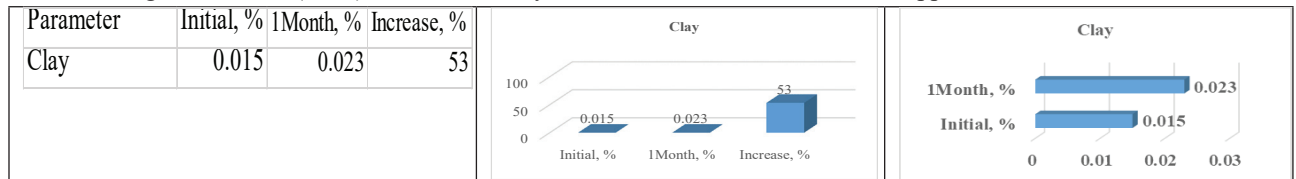
Potassium has increased by 16% in a month of waste water application.



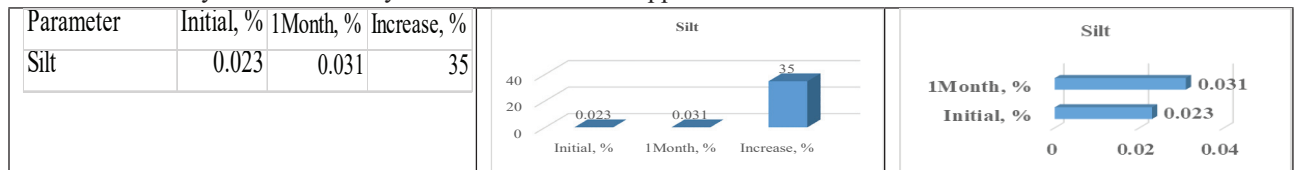
The organic matter has increased by 787% in a month of waste water application.



The Total Organic Carbon (TOC) has increased by 786% in a month of waste water application.



The content of clay has increased by 53% with a month of application of waste water.



The content of silt has increased by 35% with a month of application of waste water.

Tables 4.2 and Figures 4.2: showing the changes in the constituents in the sand bed

- Interpretation of the results to draw conclusions about the impact of daily wastewater application on the properties of sand bed and its potential for desert reclamation are explained as following:
- Nitrogen:** The initial concentration of Nitrogen (N) was a mere value of 0.001% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.047% and that is a huge rise of 4500%. Such a level of increase in first prime nutrient for plant growth is definitely a positive sign for the reclamation of sand mass.
 - Phosphorous:** The initial concentration of Phosphorous (P) was only 0.00025% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.014043% and that is a huge rise of 5517%. Such a level of increase in second prime nutrient for plant growth is definitely a positive sign for the reclamation of sand mass.
 - Potassium:** The initial concentration of Potassium (K) was 0.45643% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.5281% and that is a rise of 16%. Such a level of increase in third prime nutrient for plant growth is a positive sign for the reclamation of sand mass.
 - Organic Matter:** The initial concentration of organic matter was just 0.06% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the

concentration became 0.532% and that is a rise of 787%. Such a huge level of increase in organic matter is a very positive sign for the reclamation of sand mass as the cohesive property of the sand will increase and it will be able to hold the roots of plants.

- E. Total Organic Carbon: The initial concentration of Total Organic Carbon (C) was only 0.035% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.31% and that is a rise of 786%. Such a huge level of increase in organic carbon is a very positive sign for the reclamation of sand mass as the cohesive property of the sand and the health of the soil will increase and it will be able to hold the roots of plants.
- F. Clay: The initial concentration of Clay was only 0.015% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.023% and that is a rise of 53%. Such a level of increase in Clay content is a positive sign for the reclamation of sand mass as the cohesive as well as binding property of the sand will increase and it will be able to hold the roots of plants.
- G. Silt: The initial concentration of Silt was 0.023% in the total content of the sand sample tested in the lab. Within a month of application of waste water daily the concentration became 0.031% and that is a rise of 35%. Such a level of increase in Silt content is a positive sign for the reclamation of sand mass as the cohesive as well as binding property of the sand will increase and it will be able to hold the roots of plants.

Adjusting the Experiment (if needed)

- There was no need of adjustment in the experimental set up as the desired results were obtained.

Continuation and Long-Term Monitoring

- Daily application of wastewater shall be continued and data collected over an extended period of 4 consecutive months to understand the long-term effects of wastewater application on the sand bed.

- The data shall be regularly reviewed and analyzed to monitor changes and validate the conclusions of the study.

It's essential to maintain consistent and accurate data collection throughout the experiment to ensure the reliability of the study's findings. Additionally, adherence to ethical and environmental guidelines is crucial to minimize potential negative impacts on the surrounding environment during the experimental process.

Conclusion and recommendations

Summary of the study's major findings

The results of the tests obtained so far has shown increase in all the parameters (N, P, K, Organic matter, TOC, clay and silt) that were measured. Three more samples shall be taken and measured in a monthly basis and the results shall be analyzed to conclude finally.

Contributions to the field of waste water treatment and desert reclamation

The result so far is very promising and it could have a great impact in reclamation of deserts in future.

Implications for future research and practical applications

Future research can be done in the desert itself and the results observed in this research shall be able to guide the field research.

Recommendations for policy and practice related to waste water management and desert reclamation

The countries that are located near or within deserts should make a policy of utilizing vital resources present in the waste water and reclaim the deserts for beneficial purpose both to humans as well as the environment.

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Measure for redefining traditional homestays making people able to sustain their lives in the technological advance era of Nepal

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Abstract

Homestays in Nepal which were mostly located in remote areas are now fond of crises due to the development of the transportation system. In recent years this practice has been threatened because of the development of transportation systems that made long-distance traveling possible. This article tries to explore the new ways and means for the people who were depending on such homestays.

The source of information is primary and secondary. Data were gathered by making quarries of possible solutions. The research is ongoing.

Keywords

homestays, sustaining lives

Introduction

Despite lots of prospects for tourism-led development, the tourism sector still holds a meager share in Nepal's GDP. The tourism benefits have also not reached up to the grass-root levels. A cause for this is that tourism has been mostly sought in and around the major destinations and trekking trails only. A broader view on tourism is required to promote it beyond mainstream areas. As an effort, alternative forms of tourism are growing in the country since last few years. One of them is homestay tourism.¹



Figure 1: Traditional homestay

According to Homestay.com, a homestay is when you are offered a spare room in a house that someone lives in. You stay there with the family. Whilst this may rank top on Google for obvious reasons (the website name), this is in reality a load of rubbish.

Homestay have popped up all over the globe in recent years, and most of the time you are not staying with the home owner (or renter), the homeowner does not live there and it is not the deep cultural experience that some might expect.

A homestay is essentially the commercialisation of the home. This commercialisation has disrupted economies

throughout the world, resulted in gentrification and globalisation, and is largely anything but 'cultural tourism'.

The objective of this article is to examine does the homestay in Nepal practice what and how the homestay have been defined traditionally. And to examine can these homeowners sustain their livelihood this way.

Homestays are a form of lodging for tourists where guests stay overnight in private homes along with their hosts (Bhatt, 2012; Jamaludin et al., 2012; Shukor et al., 2014). They are unique from other lodgings in that homeowner, and their families host guests while they reside in other parts of their residence (Ogucha et al., 2015). Local foods, insights into daily life, interactions with locals, and more authentic experiences are typical of homestays compared to other forms of tourism lodging in the world (Chang, 2006; Jiang et al., 2018). Tourists who prioritize homestays often seek out and enjoy authentic experiences with local culture (Jamal et al., 2011; Mura, 2015).

Community-based homestays (CBHs) are managed by local communities or organizations that function to equitably distribute guests among members (Anand et al., 2012; Tavakoli et al., 2017). CBHs also collect revenue, distribute earnings, and provide necessary management functions (e.g., training; standards for accommodations, foods, and services; certification; guest services such as cultural activities, nature hikes, local interactions, and welcome and farewell events) to help ensure the success of homestays in the area (Anand et al., 2012; Jamaludin et al., 2012; Reimer & Walter, 2013). CBHs not only provide unique, affordable, and authentic places for tourists to stay but also supply a substantial, direct source of income for community residents from tourism happening in or near their communities (Ogucha et al., 2015; Tavakoli et al., 2017).

Homestays are prioritized in Nepal to provide employment and alternative income sources to the rural, disadvantaged, and indigenous people (Acharya & Halpenny, 2013; Bhandari, 2019; Biswakarma, 2015). There are two types of homestays in Nepal: a private homestay and a CBH. For a homestay to be registered as a CBH, there should be at least five members/households managed by a committee at a community level. The distribution of guests, organization of nature hikes and cultural activities, collection and distribution of revenue, and mobilization of community funds are done by a management committee. The local tourism officials inspect whether the criteria set up in the homestay operation procedure are followed or not during the registration process and at regular intervals thereafter (MCTCA, 2010). Involving the community provides ownership of tourism to the local community (Bhandari, 2019). These homestays help towards the sustainable development of the local community (Regmi & Walter, 2017) by supporting the economy of native people (Acharya & Halpenny, 2013). It has encouraged indigenous, poor, and disadvantaged people living in different parts of the country to be involved in tourism activities (Bhandari, 2019). To qualify as a homestay, there should be a safe and hygienic room with a neat and clean toilet, a hygienic environment, and safe water to drink. As of 2017, there are 283 homestays under record in Nepal, with the availability of 554 rooms and 948 beds (MCTCA, 2017).

There are several beneficial impacts of homestay tourism in terms of environmental, socio-economic, and cultural aspects (Acharya & Halpenny, 2013; Dahal et al., 2020; Walter et al., 2018). In CBHs, local communities work together to maintain personal hygiene and keep

Materials and methods

The method adopted is observation of some homestays and base the analysis whether these traditional definitions are being observed in reality.

Results

Traditionally a homestay is home where you stay with the family, you take part in the meals and the daily life. Over the years this has changed and everything is called a homestay these days but it's actually just something between an inn in the old fashioned sense and a small hotel.

Generally speaking it's cheaper than a hotel, and they usually offer meals as well. Many cheap hotels in Vietnam don't offer breakfast at all.

Traditionally home stays were available for travelers in villages and small towns. The Vietnamese however are very adept at copying good ideas so now you can home stays in the middle of mega cities.

Hotel is as you would expect and they range from 0 to 6 stars depending on a lot of things such as quality, staff education, location and amenities.

hotels normally are the higher building with more rooms while homestay here means lower building and normally less rooms. Most of homestays will be inside the resident area and most of them run by local people (they may live inside your building) while most hotels will be on the big road and they have staffs to serve travellers (the owners normally not stay there).

Some homestays advertisement in Nepal by indicating best homestays in Nepal

Hotel Vintage Home, Bhaktapur: Hotel Vintage Home is a cozy homestay in Nepal that serves its guests with great hospitality and warmth. Every room in the homestay comes with a balcony so the guests can enjoy the charming views of the Bhaktapur town. Bhaktapur is popular for bike rides and you can hire a bike from this homestay.

Bicky Homestay, Pokhara: Bicky homestay is a splendid homestay in Pokhara Nepal known for its prime location and courteous host. The value for money homestay is located just 100 m from Fewa Lake and boasts scenic views of the Himalayas right from the window. The friendly owner goes to a great length to ensure a comfortable stay for the guests.

Subha Guest House, Bhaktapur: Enjoy a comfortable stay at Subha Guest House which is located right in the heart of Bhaktapur town. The spacious rooms are cleaned and furnished with all the basic amenities. It is one of the best homestays in Nepal because of its top-rated location and welcoming staff. Enjoy the mesmerizing views of Surya Binayak Mountain right from the balcony.

Peace Eye Guest house, Pokhara: The dreamy homestay in Pokhara Nepal lives up to its name by providing you a serene atmosphere. Its snugly bedrooms are perfect for spending a night after an exhausting day of sightseeing around. Enjoy your mornings in the garden basking in the sunlight and when the evening comes you can just enjoy your dinner in the lit balcony. One of the cheap homestays in Nepal, get more than value for money at this guesthouse.

Swayambhu View Guest House, Kathmandu



Figure 2: Modernized homestay

This is one of the 10 Best Homestays in Kathmandu Nepal because of its prominent location and the spectacular views from the window. The spacious rooms are decorated so well that you wouldn't want to leave even after your holiday is over. There is no better accommodation in Kathmandu other than this guest house. Get all the amenities you would expect in a hotel at this homestay.

Discussions

The above homestays are to be examined from the perspective of several questions. These are: (1) traditional lifestyle of Nepali people in the villages, (2) You will get to eat the food made in fire woods with locally grown vegetables and cereals. They will also serve the foods prepared during the festivals and occasions if you make the special request, (3) In a homestay, you can not only observe the local men and women wearing unique dresses, you can also try them on. Different parts of Nepal have distinct customs as per their caste. You can make queries to your host about those dresses and also ask if you could try them. (4) Homestay in Nepal aids to uplift the local economy. While tourism has been a significant source of Nepalese revenue, the local economy hasn't been the one benefit from those programs. But homestay ensures the promotion of the local economy. (5) The locals in villages have a simple life in a peaceful community that is untouched of any fabrication. (6) While your basic comforts won't be comprised in a homestay, they are rather cheap. Your host will provide you the best they can offer to assure your comfort in their home. (7) You cannot just learn the Nepali language; you can also learn a few ethnic languages. Homestay in Nepal can be great places to learn local language. (8) make new friends and involve yourself in their community (9) children will also get an opportunity to get exposure to the outside world. (10) indirectly lead them to become responsible towards the environment, safety and hygiene.

As British photographer Martin Parr once said, "The thing about tourism is that the reality of a place is quite different from the mythology of it." Nepal's diverse population with an equally unique traditional and cultural way of life can best be explored through homestay tourism. It would further revive local cultures by showcasing real Nepal to the rest of the world.²

Sustainability issues of real homestays³

At present, the practical threat to homestay tourism is its sustainability. Taking the case of some successful community homestay models, such as Ghale Gaun and Sirubari, these homestay programmes have been facing the generation doom. Most of the homestays are operated by old, uneducated and women's groups while the young generation has migrated to the cities or foreign lands in search of greater opportunities. Particularly in Sirubari, the elderly people are engaged in homestay tourism activities.

Homestay is still taken as a passive business for the uneducated, unemployed and dependent members of a family. If this trend continues, then homestay tourism can collapse within the next generation. Likewise unprofessional tourism management and absence of government initiatives in research and planning of homestay tourism further put its sustainability on the vulnerable edge. Issues of poor groundwork, such as roads, health facilities in rural tourist places and research and plans are often overlooked. Also the government has not exercised proper caution to protect indigenous cultures and heritage, the backbone of homestay tourism in Nepal. Similarly in the management of community homestay practice, the issue of benefit sharing among the community members remains a problem. Therefore, a collective distribution system should be planned in such a way that every stakeholder involved in this sector gets his or her share. Also establishing a community fund to invest in infrastructure and service can further improve this sector. There is urgent need for digital promotion and creation of genuine homestay tourism database so that visitors can easily explore, choose the package and book their stay. Administrations like the Nepal Tourism Board and Village Tourism Promotion Forum Nepal should take initiatives.

Despite some challenges, homestay programmes are growing. Namely Kavrepalanchok has registered more than 26 such homes while Makwanpur has at least 11 and Chitwan and Nuwakot have around 10 and 12 respectively. Gorkha, Ilam, Palpa, Syangja, Kailali and Chitlang too are on the bandwagon. The particular initiative will serve the government's sustainable tourism development policies by building the capacity in the rural community.

Nepal can transform the inherent blessings of nature into tourism potentiality in the rural areas via homestay. Considering that the country lacks extensive infrastructural investment but possesses rich assets to attract tourists in the remote communities, homestays can function as an alternative ground. It's a rare type of lodging practice that has evolved under tourism to contribute to the development of sustainable tourism practice in Nepal. Likewise it also thrives as a progeny of eco-tourism and village tourism, which aim to solidify the local economy by consuming local resources and encouraging local entrepreneurship. This type of tourism practice usually stands on three bases, which include attraction, service and promotion. Till date Nepal holds strong in attraction only whereas it lacks investment in the other two domains.

This particular hospitality industry must expand its offerings to move on. While upgrading homestay services, the stakeholders should strive to blend the domestic lifestyle with basic international standards, that is, offering the local experience in modern ways for international tourists. This would add more welcome doors at many virgin tourist destinations.

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Planfulness ability as a Mediator of the Relationship between Learning from Supervisor and Readiness for Change: Empirical Evidence from India

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Abstract

The present research aims to examine whether learning from the supervisor influences readiness for change with the mediating impact of planfulness. Drawing upon the theory of planned behavior, it is hypothesized that learning from the supervisor positively impacts planfulness ability in individuals, which in turn enhances the readiness for change. Through using convenience sampling, the sample of 451 was collected from employees working full-time in the manufacturing and I.T. service organizations in India. Structural equation modeling and regression analysis indicate that learning from the supervisor is positively associated with readiness for change and planfulness. Additionally, planfulness fully mediated the relationship between learning from the supervisor and readiness to change. The findings of the present research highlight that continuous support and learning from the supervisor enhances the planfulness ability of the individual and consequently enhances individual readiness for change. The current research is pioneering in testing the hypothetical model associating learning from the supervisor, planfulness, and readiness for change.

Keywords

Learning from the Supervisor; Supervisor Support; Readiness for Change; Planfulness; Theory of planned behavior; India

Introduction

In the VUCA environment of the twenty-first century (Acharya, 2016), the question of how businesses might successfully achieve strategic change or transformation has acquired relevance among management practitioners, scholars, and experts. However, the fact that “about 70% of all change attempts fail” (Beer & Nohria, 2000; Dobrovič & Timková, 2017) authors Michael Beer and Nitin Nohria describe two archetypes—or theories—of corporate transformation that may help executives crack the code of change. Theory E is change based on economic value: shareholder value is the only legitimate measure of success, and change often involves heavy use of economic incentives, layoffs, downsizing, and restructuring. Theory O is change based on organizational capability: the goal is to build and strengthen corporate culture. Most companies focus purely on one theory or the other, or haphazardly use a mix of both, the authors say. Combining E and O is directionally correct, they contend, but it requires a careful, conscious integration plan. Beer and Nohria present the examples of two companies, Scott Paper and Champion International, that used a purely E or purely O strategy to create change—and met with limited levels of success.

They contrast those corporate transformations with that of UK-based retailer ASDA, which has successfully embraced the paradox between the opposing theories of change and integrated E and O. The lesson from ASDA? To thrive and adapt in the new economy, companies must make sure the E and O theories of business change are in sync at their own organizations.” (Beer & Nohria, 2000; Dobrovič & Timková, 2017) indicates our failure to comprehend how the change process is implemented successfully. Whatever the cause for the failure of change initiatives, mishandling the change process can contribute to individual stress, reducing motivation, commitment, trust, & work satisfaction (Elias, 2009) and whether ATOC mediates the relationships between these antecedents and affective organizational commitment (AOC). As a result, organizations must manage the change process successfully (Dobrovič & Timková, 2017). Therefore, research on ‘individual readiness for change’ has proven particularly important in advancing our knowledge of how change processes are implemented successfully (Armenakis et al., 1993; Cunningham et al., 2002). Readiness for change is termed “as the cognitive precursor to the behaviors of either resistance to, or support for, a change effort” (Armenakis et al., 1993, p.

681). To be more precise, people's reactions to change vary; some view it as positive and enjoy and support it, while others regard it as a menace and reject it by reacting adversely (Cole et al., 2006). Recent findings asserted that enhancing individuals' readiness for change made employees and organizations both agile and flexible in times of crisis and uncertainty (Adikaram et al., 2021).

The ability to design the appropriate change management process in an intelligent, proactive, and behavior-centered manner will eventually distinguish successful change initiatives from failures. According to Deloitte's 2021 report, organizations showing change readiness and maturity in change practices are more likely to meet 1.4 times more financial targets, 2.7 times retain high performers; 3.9 times more engage their workforce. Furthermore, an organization's ability to be ready for change is its most significant competitive advantage (Deloitte, 2021).

Though the literature on organizational change and change management is substantial, it does contain a gap that has largely been unnoticed until lately (Alqudah et al., 2022). Most of the studies related to organizational change management, in particular, have concentrated on organizational-related dimensions rather than individual-related dimensions (Oreg et al., 2011; Vakola, 2014)183 employees of a technological company based in Greece completed a questionnaire. This company was implementing a large scale restructuring change project. Findings: The results show that perceived impact of change mediates the relationship between the pre-change conditions and work attitudes and individual readiness to change. Practical implications: Employees who are confident about their abilities they experience high levels of readiness to change and therefore managers may want to examine this variable when selecting people for jobs entailing change. Creating a climate of trust and enhance positive communication also have an influence on individual readiness to change. Satisfied employees are more ready to change because they weigh the positive consequences of changing as significant and therefore decide to embrace change. Originality/value: This research addressed the need for a more person-oriented approach in the study of change, exploring the concept of individual readiness to change and the perceived benefit of this change. © Emerald Group Publishing Limited.”,abstract”:.”This study reviews quantitative empirical studies of change recipients' reactions to organizational change. The authors reviewed studies published between 1948 and 2007, out of which 79 met the criteria of being quantitative studies of change recipients' reactions to an organizational change. Through an inductive review, the authors unravel a model of (a. As a consequence, whereas management practitioners and scholars have gained a considerable understanding of macro-level factors affecting organizational growth

and change, we have acquired far less understanding related to micro-level variables. This is problematic since organizational change throws a lot of strain on employees (Rusly et al., 2012; Vakola & Nikolaou, 2005)a new “Organizational Screening Tool”, which, among other things, measures workplace stress and organizational commitment and a measure assessing attitudes towards organizational change. Findings - The results were in the expected direction showing negative correlations between occupational stressors and attitudes to change, indicating that highly stressed individuals demonstrate decreased commitment and increased reluctance to accept organizational change interventions. The most significant impact on attitudes to change was coming from bad work relationships emphasizing the importance of that occupational stressor on employees' attitudes towards change. The results did not support the role of organizational commitment as a moderator in the relationship between occupational stress and attitudes to change. Research limitations/implications - A limitation of the research design could be that all measures originated from the same source resulting in possible contamination from common method variance. Further, the cross-sectional research design adopted in the present study, as opposed to a longitudinal or experimental methodology, does not allow affirmative causal explanations. Originality/value - The present study showed that good and effective work relationships are very important in organizational change. Handling conflicts, building supportive work relationships and communicating effectively all contribute to the formulation of positive attitudes to change and, therefore, to the success of a change programme. In addition, organizations need to examine the extra workload which organizational change may create. Increase in workload is not only easily attributable to the change but it also makes change unattractive and problematic leading to non-supportive attitudes. © Emerald Group Publishing Limited.”, This paper aims to propose a conceptual model for understanding the influence of change readiness on knowledge management processes and knowledge management effectiveness. It is suggested that change readiness should be assessed as a multidimensional construct consisting of psychological and structural facets. Furthermore, as the process of managing organizational knowledge requires interaction among members of the organization, a holistic view of readiness at individual and organizational levels is presented. Design/methodology/approach: A comprehensive literature review results in the development of the conceptual model that depicts potential relationships between change readiness and knowledge management processes. It also postulates the effects of different knowledge management processes on effective knowledge management implementation. Findings: Potential implications of change readiness from both psychological and structural dimensions for knowledge acquisition, creation and sharing processes

are put forward. Further, it offers possible fruitful areas for continuous research of knowledge management effectiveness from a change perspective. Research limitations/implications: This article puts forward a number of potential relationships among the construct that are empirically testable to further understanding of multidimensional change readiness influences on the various types of knowledge management processes and its effective implementation. Practical implications: Through a conceptualisation of the relationships between change readiness, knowledge management processes and knowledge management effectiveness, this paper offers a number of practical guidelines for the development of knowledge management policy and a road map from a change management perspective. Originality/value: Previous literature on knowledge management focuses on understanding organizational readiness to promote successful knowledge management implementation in terms of the structural dimension. This paper proposes understanding of change readiness from a more comprehensive perspective comprising both psychological and structural readiness and its influences on knowledge management processes, which could affect overall effectiveness of knowledge management implementation. © Emerald Group Publishing Limited.”Vakola & Nikolaou, 2005 and neglects to address the psychological requirements of employees during the execution of a change effort, which might lead to an unsuccessful change initiative (Stanleigh, 2008). In light of the above arguments, it is clearly discovered that further empirical examination is needed to determine the antecedents to enhance the individual readiness for change. To fill this gap, authors propose and hypothesize learning from the supervisor as a predictor on the one hand and planfulness as a mediator on the other hand, and both to be associated with individual readiness for change. According to existing findings, organizational change initiatives are more likely to succeed if employees feel supported during the change process (Jung et al., 2020; Men et al., 2020).

In line with past studies, the supervisor role in change management literature has been found to be a key change agent in the planning and execution of new change initiatives (Eisenberger et al., 2002; Hon et al., 2014; Neves & Caetano, 2009). Employees are less defensive and more eager to participate and involve in change initiatives when they obtain learning and support from their supervisor. Employees who are supported and rewarded at work for their readiness for change are found to be willing to support and contribute to organizational change vision and mission, impacting the overall business success (Srivastava & Agrawal, 2020).

Studies have validated that individual readiness to change is also enhanced by personal-growth initiative behaviors such as planfulness ability, which has been investigated as the crucial measure of individuals' ability

to make progress towards implementation of change and achievement of goals in the contemporary world (Ludwig et al., 2019). Robitschek et al. (2012) asserted that employees who are proficient in planfulness ability are found to be taking change initiative proactively and intentionally. Furthermore, past studies have found planfulness as a conducive factor to enhancing autonomy, reducing psychological distress, and fostering readiness for taking initiatives for personal development (Franklin, 2014; Weigold et al., 2014). In view of the above arguments, we establish the following objectives; (i) to investigate the influence of learning from the supervisor on planfulness, (ii) to evaluate the influence of learning from the supervisor on readiness for change, (iii) further, to explore the mediating influence of planfulness in the association between learning from supervisor and readiness for change.

The present research further adds to the scholarship on change readiness in numerous ways. First, the authors indicate the significance of learning and support from supervisors to enhance the employees' readiness for change. The current study contributes theoretically by empirically testing the pivotal role of planfulness in understanding how learning and support from supervisor influence employees' readiness for change and consequently contribute to our understanding of the process through which individual readiness for change can be enhanced. Furthermore, the implications of the present study can be used to constitute HR processes and policies that stimulate an encouraging organizational culture for change and enhance the possibility of implementation of change successfully.

Literature review and hypotheses

Development

Learning from supervisor

Learning is the process by which individuals adapt and alter their way of thinking and doing, and it is the practice through which individuals develop their competencies, especially when learning is work-integrated (Döös, 2007) this chapter deals with issues that may be assumed to confront several OECD countries. The underlying problem concerns which opportunities for everyday learning and competence development are offered in working life. A reorganisation at one's work-place during the last year is the reported experience of 45-50 per cent of the Swedish workforce in various sectors. The organisational changes have, to a decisive extent, been poorly executed in light of their consequences for the competence and learning of employees and the organisation. The aim of this chapter is to contribute to the forming of concepts and actionable understanding from an organisation-pedagogic stance. A distinction is made between arranging learning occasions and organising for learning in everyday settings. Relatronics is a concept that raises the concept of relations

to an organisational level and takes argumentation to the level of the core task of the organisation and organisational learning. Workplace relationality is defined as the overall existence of the interactive processes between the human beings who bear the competencies of the workplace. Increased understanding is created of the importance of organising work for learning, and the dangers of frequent reorganisations are highlighted. The concepts also aim at facilitating interdisciplinary exchange. [Author abstract]”, which is applicable across various occupational settings. Based on a comprehensive literature review, we establish four theoretically relevant dimensions of work-based learning, which together constitute the learning potential of the workplace. The psychometric characteristics of our instrument were examined among a sample of Dutch employees working in different organizations (N. =. 1013 emphasized the importance of learning through interaction at the workplace and defined “learning from the supervisor as the process of acquiring new or expanding existing Knowledge, Skills, Abilities, and other characteristics’ (KSAOs) through interacting with the direct supervisor” (p. 14). Similarly, Kim et al. (2021) suggested that employees’ interactions with their direct supervisors have a positive impact on their knowledge, skills, and abilities since supervisors are a critical source of information for workers and so contribute to their workplace learning. Further, Senge (1990) explored the position of the supervisor as a teacher in his influential work “The Fifth Dimension”, whose principal task is to facilitate learning for his followers. According to Russ-Eft (2002), the foundation of supervisory support is providing encouragement to workers for their attempts to learn on the job. Likewise, Choi and Jacobs (2011) suggested in their studies that a supportive management approach is a critical work environment attributes that promote individuals’ learning processes & results (Cooper et al., 2019) this article examines the relationship between well-being-oriented human resource management (HRM). Similarly, Coetzer (2007) highlighted a few of the supervisor or seniors support practices as essential to employee learning, i.e., cooperation in the solution process, engaging in dialogues about employee performance, reviewing employee task-related challenges, and engaging employees in the planning for learning and knowledge processes and also implementation for the same (Na-Nan & Sanamthong, 2020) motivation to transfer (MT). In the present study, supervisor support and learning from a supervisor have been used interchangeably.

Planfulness

The term “planfulness” states to the degree to which an individual’s conduct and mode of thinking are “goal-oriented” and it points out the individual’s ability to establish and manage strategies that enable his or her self-development (Robitschek et al., 2012).

Furthermore, it refers to the ability to set, maintain, and achieve goals through planning and persistence. In self-regulation research, planfulness is composed of three interconnected factors that correspond to the broad cognitive approaches that have been shown to be consistently “associated with improved goal outcomes in experimental settings: temporal orientation (TO) to the future implications of current behavior, mental flexibility (MF) in contextualizing one’s actions in terms of one’s goals, and cognitive strategies (CS) to anticipate and deal with potential obstacles” (Ludwig et al., 2019). Ludwig, Srivastava, and Berkman (2018) define “Planfulness—that captures a person’s proclivity to adopt efficient goal-related cognition in pursuit of their goals”.

Planfulness ability is especially advantageous when tasks are ambiguous or uncertain, and the decision-maker cannot depend on experience or habit (Kane et al., 2021; Linden, 2021). Creating a plan mediates the link between intention and action by specifying where and when to act in order to accomplish the desired goal (Gollwitzer & Brandstätter, 1997). When complex and complicated operations are conducted in the face of ambiguity, individuals struggle to choose the optimal course of action. Planfulness ability enables individuals to comprehend the link between action and performance, therefore reducing the effects of misdirected effort (Campbell, 1988 & Shane and Delmar, 2004).

Readiness for change

Readiness for change is likely one of the most crucial aspects influencing an individual’s early support for change efforts (Wang et al., 2020). Although Jacobson (1957) originated the notion of readiness for change, further, the foundation of readiness for change as a distinct variable has been implanted through numerous theoretical foundations of the procedure by which change or transformation occurs. The concept of readiness is seen to be consistent with Lewin’s concept of unfreezing, and it is demonstrated in the behaviors of those participating in the change process (Armenakis et al., 1993; Bernerth, 2004; Schein, 1996). According to researchers and practitioners, many change initiatives failed due to a lack of executing unfreezing phase successfully (Rafferty & Minbashian, 2019; Reinholz & Andrews, 2020) as it relates to systemic change projects in STEM higher education. A theory of change is project-specific and related to evaluation. It makes the underlying rationale of a project explicit, which supports planning, implementation, and assessment of the project. In addition, a theory of change is often required by funding agencies as part of grant proposals. In contrast, change theories represent theoretical and empirically grounded knowledge about how change occurs that goes beyond any one project. Ideally, a theory of change is informed by change theories. This essay describes the connections between a theory of change and change theory and provides examples of how change theory

can inform a project's theory of change. Grounding projects in change theory allows change agents to draw on existing knowledge and to better contribute to our collective knowledge about how to achieve meaningful change in STEM "Research has focused on individuals' beliefs about change when considering the antecedents of employee change readiness. Our study is unique as we identify beliefs and positive emotions about change as proximal antecedents of change readiness. In Study 1, a cross-sectional study of 252 government workers, measures of change beliefs, positive emotions about change and change readiness were developed and tested. Study 1 examined relationships between these constructs. In Study 2, we collected data at two time points separated by 3 months from 199 employees. Study 2 examined the direct and indirect relationships among change beliefs, positive emotions about change, change readiness and change-supportive behaviors. Structural equation modeling results provided support for the validity of our measures. In both studies, cognitive beliefs about change and positive emotions about change were significantly associated with change readiness. Study 2 provided support for indirect and direct relationships between change beliefs and positive emotions and change behaviors. An implication of this research is that failure to consider positive emotions about change means ignoring a key source of variation in change readiness. Practically, results suggest a need to develop both change beliefs and positive emotions about change to enhance employees' change readiness and change-supportive behaviors." (Rafferty & Minbashian, 2019; Reinholz & Andrews, 2020. As a result, several scholars and researchers (Madsen et al., 2005; Schlesinger & Kotter, 2008) emphasized the importance of developing and sustaining change readiness among individuals before trying to enact and implement any sort of transformation and change.

Theory of Planned Behavior

To examine the mediating influence of planfulness between learning from a supervisor and readiness to change among full-time employees, the current research deliberates the "theory of planned behavior (TPB) given by" (Ajzen, 1985) Heider, 1958 ; Lewin, 1951. The premise of an individual's purpose in undertaking a particular action is central to this theory. The current research centered on employee intentions as the primary focus, as they are considered to encompass the underlying factors that motivate and drive an employees' behavior. They contend that the stronger the intent to be involved in an activity, the better the performance will be. Three components drive this intention: perceived behavior control, attitudes, and subjective norms.

The present study employed the theory of planned behavior as the foundation for constructing a theoretical framework that aimed to elucidate the interconnection

between learning from supervisor, planfulness and readiness for change.

Linking learning from supervisor and readiness for change

Supervisors play a critical role in learning organizations because they inspire commitment to change (Senge, 1996) and help employees develop their capacity for learning and change. Supervisors act as the organization's representatives and are frequently engaged in the both communication and execution of change (Eisenberger et al., 2002). Furthermore, supervisors may be viewed as change representatives in implementing organizational change efforts since changes flow downward through the organization and must be implemented at lower levels of the hierarchy (Neves & Caetano, 2009). Moreover, learning from a supervisor entails knowledge transfer which will become an organization norm among members that facilitates the formation of changing behavior and innovative achievement (Buono & Kerber, 2010; Reid, 2019) often unpredictable environments, the underlying conception of the change process remains relatively simplistic in nature. The paper explores the need for a diagnostic orientation to conceptualizing and implementing change and the concomitant challenge of building organizational change capacity. Emphasis is placed on an intervention strategy focused on the: 1.

Sukoco et al. (2022) collected a sample from heads of the department and found that supervisors or heads act as change agents in the organization and will have an impact on employees' change capacity. Furthermore, supervisors' cordial relationship with their employees always encourages them to experiment and embrace the change positively (Dechurch et al., 2010).

Additionally, Supportive supervisors acknowledge the employees' perspective and encourage initiative ability at the workplace, which can further stimulate employees' engagement and interest to take risks and develop new ideas and readiness ability (Gilson et al., 2012). In a recent study of empirical findings, Blanco-Donoso et al. (2019) and Charoensukmongkol & Phungsoonthorn (2020) which has affected organizations worldwide, there is a lack of research on the organizational factors that affect the psychological wellbeing of the employees of an organization affected by the crisis. This research uses the case of employees at two international universities in Thailand that have been directly affected by the COVID-19 crisis. Grounded in social support theory and the job-demand resource model of job stress, this research examines the role of supervisor support in explaining the degree of perceived uncertainties and emotional exhaustion that employees experience due to the COVID-19 crisis. Moreover, this research examines whether the effect of supervisor support on the perceived uncertainties of employees can be moderated

by organizational intransigence, that is, a prevailing climate of resistance to change at the workplace. The questionnaire survey data were obtained from a sample of 300 employees at two private international universities, and the partial least squares structural equation model was used for data analysis. The results significantly confirm that supervisor support has a negative effect on the perceived uncertainties of employees. Perceived uncertainties also significantly mediate the negative effect of supervisor support on the employees' emotional exhaustion. More importantly, the moderating effect analysis shows that the negative effect of supervisor support on the perceived uncertainties of employees presents only for employees who work in a workplace climate where there is low intransigence; in a workplace climate where there is high intransigence, supervisor support does not lower the perceived uncertainties of employees. "One of the job resources most strongly associated with nurses' well-being and motivation is social support. However, the psychosocial mechanisms that would explain this relationship have not been sufficiently researched. Thus, the main aim of this study was analyze whether this relationship could be mediated by two variables: role ambiguity and psychological flexibility. A total of 196 nurses from various Spanish hospitals and primary health care centers participated in this cross-sectional study. A multiple mediation analysis was run using the "PROCESS" macro script in SPSS 23.0. The results showed that co-worker support was related to higher levels of vigor and vitality through role ambiguity (Estimate = .158, 95% CI [.050, .298], and Estimate = .212, 95% CI [.076, .390], respectively researchers found that the supportive role of the supervisor reduces the degree of influence of uncertainties and ambiguity and makes the employees ready for change. Furthermore, Neves (2011) found that employees are more likely to embrace change when they found their supervisor to be supportive and welcoming of new initiatives.

Cunningham et al. (2002) performed a study at a hospital undergoing significant restructuring, randomly surveyed 654 hospital staff members discovered that employees in active roles, or roles that comprise challenges and demands and greater support from supervisors, exhibited higher readiness for change and implemented new change strategy effectively (Kraft et al., 2018). Similarly, Rafferty & Jimmieson (2010) we examined whether change climate strength moderated relationships between change climate level and team outcomes. We examined relationships among aggregated change information and change participation and aggregated team outcomes, including two role stressors (i.e., role ambiguity and role overload undertook empirical research and found that confidence in peers, learning from superiors and senior leaders, system support, and self-efficacy all had significant positive associations with readiness to change. Heyns et

al. (2021) psychological safety, and work engagement in a restructuring mining organisation. Participants were 253 employees of a South African mining organisation (male = 65%; African = 57%; skilled supervisory technicians = 44%; and employees with 10–15 years' experience = 23% asserted that during the change process, the supportive role of the supervisor provides a psychologically safe environment, consequently enhancing the employees' readiness to change.

We argue that the extent to which a supervisor supports an employee has the potential to influence their emotions, mindset, and individual frames of reference and, eventually, their perspective towards change, so leading to the establishment of favorable change assessments through the resolution of perceptual inconsistencies linked with fear of change (Bovey & Hede, 2001). Thus, we hypothesize that if employees are getting appropriate learning support from their supervisors and seniors, they are found to be more ready for the change. We, therefore, hypothesize the following:

H1: Learning from the supervisor will have a positive association with readiness for change.

Linking learning from supervisor and planfulness

A supervisor has been found to be supportive and assist employees (Tierney & Farmer, 2004) in planning and initiating change projects (Oldham & Cummings, 1996). An earlier study has discovered a positive association between supervisor support and the desire to learn (Switzer et al., 2005; Paterson et al., 2014). These results indicate that employees who felt a greater degree of support from their supervisors are more likely to develop planfulness ability. Furthermore, when it comes to providing feedback (Lancaster et al., 2013; Worsfold et al., 2004) and allocating resources to build planfulness ability and skills, supervisor support is critical (Brinkerhoff & Montesino, 1995; Lim & Johnson, 2002). It is crucial when workers are confronted with difficulties in planning and setting priorities and goals for attaining training and information (Dermol & Čater, 2013) and the relationship between the latter and company performance. Design/methodology/approach: The authors propose and test a model linking constructs related to training (the volume and quality of training, supervisor support, peer support, and organisational incentives. Supervisors also enact a significant part in the planning and preparation for continuous learning and development of their employees (Dermol & Čater, 2013) and the relationship between the latter and company performance. Design/ methodology/approach: The authors propose and test a model linking constructs related to training (the volume and quality of training, supervisor support, peer support, and organisational incentives and boosting vitality and learning at the workplace. Mushtaq et al. (2017) claimed

in their studies that a supportive and learning environment nurtured by the supervisor could be immensely encouraging and motivating for the employees who are more inclined to recognize constructive job resources, for instance, opportunities for developing planfulness ability (Xanthopoulou et al., 2009). In this respect, there are past empirical findings such as (Mensmann & Frese, 2019) which is a key behavior for successful entrepreneurship. Although personal initiative training has been shown to promote personal initiative, little is known about how this proactive behavior can be maintained over time and what the consequences are. The training transfer literature suggests that training effects usually decline with time. It is not clear, however, which factors contribute to personal initiative maintenance and which benefits go along with it. In a randomized controlled field experiment with 912 microentrepreneurs in Lomé, Togo, we investigate the influence of need for cognition—a cognitive factor driving proactive behavior—on personal initiative maintenance after training. In addition, we examine the effect of need for cognition on the well-being consequences of personal initiative maintenance. We show that people high in need for cognition tend to maintain posttraining personal initiative longer than those low in need for cognition. However, contrary to our predictions, need for cognition has no effect on the level of well-being that results from personal initiative maintenance. Our findings contribute to a better understanding of personal initiative and its maintenance and could be used to increase training effectiveness.” (Mensmann & Frese, 2019 found that motivation drives the employees’ personal-growth initiative abilities such as planfulness, a sample taken from micro-entrepreneurs. However, there is a dearth of literature in this regard; the association between learning from supervisors and planfulness ability has not been sufficiently addressed. Therefore, we hypothesize that;

H2: Learning from the supervisor will have a positive association with the planfulness ability of the individual.

Linking learning from supervisor, planfulness, and readiness for change

The above empirical findings indicate that a learning and supportive environment from the supervisor makes it possible to enhance the goal orientation and planfulness ability of the individual (Duriez, 2011). Therefore, we claim that employees’ planfulness ability may act as a potential mediating mechanism to illuminate the association between learning from supervisors and readiness for change. Past studies indicate that those who are strong at planning or making objectives are more likely to be able to deal with difficult situations cheerfully (Coote & Macleod, 2012). Locke & Latham (2006) described goal-setting as a commonly recommended method for fostering desirable behaviors in organizations and believed to enhance the individual readiness to change (Holt et al., 2010; Locke & Latham, 2006). According

to the literature on goal-setting, forming precise, challenging targets, rather than just telling individuals to “do their best,” may strongly impact driving behaviors and increase performance (Locke & Latham, 2002, 2006). Consequently, planfulness ability has been recommended and fostered during periods of change and transformation since it has been found to be effective in stimulating behaviors related to change efforts, such as minimizing resistance (Schlesinger & Kotter, 2008) and getting buy-in (Johnson, 2004). Furthermore, People with high planfulness ability have been found to be associated with goal-oriented behavior, finding appropriate solutions, overcoming difficult times, and being ready to adapt to new changes and initiatives (Blackie et al., 2015; de Freitas et al., 2016; Weigold et al., 2014).

Huang & Hsieh (2015) collected samples from 324 supervisor-employee pairs from different eleven organizations and indicated that supervisors are found to be positively associated with proactive career behaviors such as planfulness ability. Furthermore, Bindl & Parker (2011) asserted that supervisors can play a significant role in fostering employees’ proactive behavior, such as planfulness, by providing them with learning support.

Planning addresses three issues raised by the (Milliken, 1987) model for uncertainty: “first, what is happening out there? (State uncertainty); second, how will it impact me? (Effect uncertainty); and third, what am I going to do about it? (response uncertainty)” (Shepherd et al., 2007, p. 135). Planfulness ability minimizes all three states of uncertainty and enhances individuals’ behavioral control beliefs (Ajzen, 1991a) 1985, 1987, which in turn raises the individuals’ perception of the feasibility of participating in the new change initiatives. Past empirical findings indicate that a learning and supportive environment from the supervisor makes it possible to enhance the goal orientation and planfulness ability of the individual (Duriez, 2011). Therefore, we claim that employees’ planfulness ability may act as a potential mediating mechanism to illuminate the association between learning from a supervisor and individual readiness to change. Grounded on the following argument, we hypothesize that;

H3: Planfulness ability of the individual will have a positive association with readiness for change.

H4: Planfulness mediates the relationship between learning from the supervisor and readiness for change.

Proposed hypothesized model

The hypothesized model of the present research has been anticipated to examine the role of learning from the supervisor on the outcome variable, i.e., readiness for change. Also, we investigated the influence of learning from a supervisor on planfulness. Furthermore, the hypothesized framework aimed at investigating the mediating influence of planfulness on the association

between learning from a supervisor and readiness for change (see figure 1).

Insert Figure 1

Research methodology

Data and Sample

The respondents in the present research were full-time working professionals in 12 manufacturing and service organizations in India. We contacted employees through training programmes and through email for voluntary involvement in the study. Employees were informed and asked to respond to a self-rated structured questionnaire that comprised items measuring the learning from the supervisor, planfulness, readiness for change, and demographic variables. All items were written in the English language as the target populations were fluent in English. A sample of 640 employees received a survey questionnaire form, and their confidentiality was ensured. From the total participants, 451 final responses were obtained, resulting in a response rate of 70.4%. Among the 451 respondents, 293 were males, accounting for 65%, while 158 (35%) were females. Overall, 76.6% of the respondents fell within the age range of 21-35 years, and 60.4% held postgraduate degrees. Out of the 451 respondents, 313 (69.4%) were employed in private organizations, while the remaining 138 (30.6%) worked in the public sector. Additionally, 153 respondents held junior level positions, 243 (53.8%) were at middle-level positions, and 55 held senior level positions in their respective organizations. The sample size of 451 taken in the present study is adequate according to the guidelines given by Hair et al. (2010), who suggested that sample respondents should be between five to ten times the number of observations taken under the present research.

Measures

Learning from Supervisor

Learning from supervisor-based learning was assessed using a scale consisting of three items developed by Nikolova et al. (2014) which is applicable across various occupational settings. Based on a comprehensive literature review, we establish four theoretically relevant dimensions of work-based learning, which together constitute the learning potential of the workplace. The psychometric characteristics of our instrument were examined among a sample of Dutch employees working in different organizations ($N = 1013$). The sample items for learning from supervisor are “My supervisor helps me see my mistakes as a learning experience” and “My supervisor tips me on how to do my work”. For this study, a Likert scale was utilized, employing a seven-point response scale (“strongly disagree” = 1, “strongly agree” = 7). Higher scores on the scale indicate a greater degree of learning from the supervisor. The internal consistency of the scale, as measured by alpha coefficients, was found to be 0.91 for the Indian samples.

Planfulness

The scale of planfulness, consisting of a five-item instrument, was created and validated by Robitschek et al. (2012), was employed to assess the planfulness ability of the individual. The sample items for planfulness are “I set realistic goals for what I want to change about myself” and “I know how to set realistic goals to make changes in myself”. In this study, the researchers administered a Likert scale with a seven-point response format (“strongly disagree” = 1, “strongly agree” = 7), and high scores indicate high planfulness ability. The alpha coefficient of this scale was recorded at 0.92 for this study.

Readiness for change

To assess readiness for change, a sub-scale consisting of a four-item instrument, developed and validated by Robitschek et al. (2012), was employed. An example item from this sub-scale measuring readiness for change is “I can tell when I am ready to make specific changes in myself”. In this study, the researchers utilized a Likert scale with a seven-point response format (“strongly disagree” = 1, “strongly agree” = 7) to measure readiness for change. Higher scores on the scale indicate a greater level of readiness for change. The internal consistency of this scale, as indicated by the alpha coefficient, was found to be 0.88 in this study.

Control variables

To examine the association between studied variables, work experience, gender, and age were incorporated as control variables. Previous research has demonstrated a negative correlation between age and work experience and readiness for change (Wiersema & Bantel, 1992). Gender was measured categorically (0 = female and 1 = male).

Analytical Strategy.

In the initial stage of this statistical analysis, the discriminant and convergent validity of the present research were assessed using confirmatory factor analysis conducted in R Studio software. Once the discriminant and convergent validity were established for our sample, the hypothesized model was tested through hierarchical regression and structural equation modeling (SEM). The standardized path coefficients and fit statistics were calculated and reported. To examine the mediation effect, bootstrapping was employed, utilizing 5000 iterations. Bootstrapping is widely considered a robust technique for testing indirect effects (Williams & MacKinnon, 2008).

Analysis and results

Descriptive statistics

Table 1 of the descriptive statistics presents various measurements, including means, inter-item correlations, squared correlations among variables, and average variance extracted. The results clearly indicate significant correlations between learning from supervisor and

readiness to change ($r = .220$; $p < 0.01$), learning from supervisor and planfulness ($r = .263$; $p < 0.01$), as well as planfulness and readiness for change ($r = 0.588$; $p < 0.01$). The mean and standard deviation for all three study variables ranged from 5.44 to 5.63 and 0.99 to 1.42, respectively. Notably, the bold diagonal values in Table 1 demonstrate that the average variance extracted varies between .72 to .82. These values are higher than 0.50 (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.

“author”: [{“dropping-particle”: “”, “family”: “Fornell”, “given”: “Claes”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}, {“dropping-particle”: “”, “family”: “Larcker”, “given”: “David F.”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}], “container-title”: “Journal of Marketing Research”, “id”: “ITEM-1”, “issue”: “1”, “issued”: {“date-parts”: [[“1981”, “2”]] }, “page”: “39”, “title”: “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error”, “type”: “article-journal”, “volume”: “18” }, “uris”: [“http://www.mendeley.com/documents/?uuid=3c59e74b-c29c-3ccf-b0fc-4e5ebcfde398”] }, “mendeley”: {“formattedCitation”: “(Fornell & Larcker, 1981 to prove the convergent validity. Moreover, these values surpass the squared inter-item correlations of the examined constructs (Hair et al., 2010).

Insert Table 1 about here

Measurement Model

We established a measurement framework consisting of three factors: learning from the supervisor, planfulness, and readiness for change. Table 2 provides details on the alpha coefficients, CR (Composite reliability), standardized factor loadings, and corresponding t-values. The alpha values for all constructs ranged from 0.83 to 0.90. It is worth noting that the accepted criterion for alpha reliability is 0.70 or above (Hussain et al., 2019) medical equipment, distance from the hospital, and physical infrastructure influenced patient satisfaction at public hospitals in Southern Punjab, Pakistan. An exploratory research technique was used. We distributed 700 questionnaires through a random method, and 579 provided proper responses. A confirmatory factor analysis (CFA). The standardized factor loadings for all 12 items ranged from 0.76 to 0.94. Since these values exceed 0.50, they provide evidence of convergent validity

as well (Asif et al., 2019) administrative quality (AQ). Similarly, the composite reliability (CR) is more than 0.60 (Bagozzi & Yi, 1988) critiqued, and illustrated. An overall program for model evaluation is proposed based upon an interpretation of converging and diverging evidence. Model assessment is considered to be a complex process mixing statistical criteria with philosophical, historical, and theoretical elements. Inevitably the process entails some attempt at a reconciliation between so-called objective and subjective norms.

© 1988 Academy of Marketing Science.”, “author”: [{“dropping-particle”: “”, “family”: “Bagozzi”, “given”: “Richard P.”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}, {“dropping-particle”: “”, “family”: “Yi”, “given”: “Youjae”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}], “container-title”: “Journal of the Academy of Marketing Science”, “id”: “ITEM-1”, “issue”: “1”, “issued”: {“date-parts”: [[“1988”]] }, “page”: “74-94”, “title”: “On the evaluation of structural equation models”, “type”: “article-journal”, “volume”: “16” }, “uris”: [“http://www.mendeley.com/documents/?uuid=89a6f415-56a8-3440-b7c7-c5bcfefb57d2”] }, “mendeley”: {“formattedCitation”: “(Bagozzi & Yi, 1988, ranged between 0.86 to 0.92.

Insert Table 2 here

Confirmatory Factor analysis

The model fit was assessed and analyzed by conducting confirmatory factor analysis (CFA) using the R studio software version 1.4.1717. Before performing mediation analysis, CFA (Confirmatory factor analysis) is commonly employed to assess the model fit. The three latent factors learning from supervisor, planfulness, and readiness for change hypothesized model values fulfill the standard criterion ($\chi^2 [51] = 69.498$, $p < 0.01$, RMSEA = .037, CFI = .999, SRMR = .036, GFI = .998, TLI = .999 (table 3) suggested by 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.

© Academic Conferences Ltd.”, “author”: [{“dropping-particle”: “”, “family”: “Hooper”, “given”: “Daire”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}, {“dropping-particle”: “”, “family”: “Coughlan”, “given”: “Joseph”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}, {“dropping-particle”: “”, “family”: “Mullen”, “given”: “Michael R.”, “non-dropping-particle”: “”, “parse-names”: false, “suffix”: “”}], “container-title”: “Electronic Journal of Business Research Methods”, “id”: “ITEM-1”, “issue”: “1”, “issued”: {“date-parts”: [[“2008”]] }, “page”: “53-60”, “title”: “Structural equation modelling: Guidelines for determining model fit”, “type”: “article-journal”, “volume”: “6” }, “uris”: [“http://www.mendeley.com/documents/?uuid=54cfbb42-5aea-35f6-bef3-643d6c5c08bb”] }, “mendeley”: {“formattedCitation”: “(Hooper et al., 2008. As evidenced from Table 3, model fit indices clearly show that the

measurement model of our study variables is a better-fit model.

Insert Table 3 here

Structural model paths and mediation tests

We used PROCESS macro (Hayes, 2013) model-4 to analyze the model assumptions. This method not only gives the parameter estimates for specific structural routes, even the ranges of the confidence interval to analyze the vitality of indirect effects (i.e., mediation). Bootstrapping with 5,000 random resamples with 95% confidence intervals was performed to test the mediation hypotheses. The application of these confidence intervals was used to examine indirect effects for simple mediation hypotheses.

Hypothesis testing

Table 4 indicates the path coefficients, z-value, and 95% confidence interval. Table 4 clearly shows that learning from a supervisor is found to be insignificantly associated with readiness to change ($\beta=0.144$; $t=1.6790$; $p>0.0941$), thus accepting hypothesis 1. Furthermore, learning from the supervisor is found to be positive and significantly related to planfulness ($\beta = 0.225$; $t = 4.10$; $p< 0.01$), thus supporting hypothesis 2. Additionally, planfulness is also found to be associated positively with readiness to change ($\beta= .579$; $t=12.49$; $p <0.01$), thus confirming hypothesis 3.

Insert Table 4 about here.

Furthermore, we applied to bootstrap procedure with a 95 percent confidence interval. Also, five thousand iterated samples were computed with the upper and lower limit value and Z-value to measure the indirect effect to check the mediation (Preacher & Hayes, 2008). Table 4, showed the bootstrapping results, which demonstrate the significant indirect effects of planfulness on learning from supervisor-to-readiness for change relationship [$H4=0.130$, (0.060, 0.206) at 95 % CI]. And the direct path value from learning from the supervisor to readiness for change ($\beta = 0.053$; $p> 0.01$) was found positively insignificant. Furthermore, we found the total effect of learning from the supervisor on readiness for change significant and positive ($\beta = .144$; $p> .0941$; .060, .206) at 95 % CI). These results validate the mechanism of full mediation and prove hypothesis 4. Figure 2 represents the outcome of mediating the association between variables. Planfulness mediates the relationship between learning from the supervisor and readiness for change (hypothesis 4).

Discussion

Organizations and their employees operate in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) environment, in which they must deal with a variety of political, technical, economic, and societal developments. The majority of the changes occur at the same time,

leaving little time for adaptation. The VUCA world presents an organization with many challenges and changes, and properly absorbing the huge boom of these transitions has become a critical determining element in the game of victory vs. failure. It has become pivotal for an organization to establish and develop the change management process to make their employees competent and ready enough to face unforeseen circumstances assertively. Moreover, enhancing the readiness for change at the employees' level has become important for an organization to surpass the nasties in the environment.

Insert Figure 2 here.

As learning has become an essential element in coping with organizational changes. It is relevant to study the association between learning and readiness for change. In this context, the present research focuses on an important source of learning, i.e., learning from the supervisor with readiness to change. Additionally, the mediating influence of planfulness in this context has also been studied.

The present research found a positive association between learning from supervisors and readiness for change. It clearly indicates that if there is a supportive culture in an organization in which supervisor helps, guide, and support their employees, in such an organization, employees are found to be more flexible and ready for change. Recent empirical findings supported the present research findings and suggested that supervisor or managers found to positively influence the change capacity of employees (Sukoco et al., 2022), and increased employees' readiness for change (Kirrane et al., 2017; Thakur & Srivastava, 2018) mediating variables in this relationship are rarely examined. This paper presents the findings of an investigation into the mediating role of psychological capital (PsyCap). Furthermore, employees who showed flexibility and readiness ability found to be more engaged in the workplace (Ugargol & Patrick, 2018).

Furthermore, the relationship between learning from a supervisor and planfulness has also been examined, and it is found that with positive support and guidance from the supervisor, employees become more planful and are able to establish realistic goals for their personal and career/professional development. It implies that if given the supportive and right guidance from the supervisor, employees become more receptive towards learning from training and implementing the learning outcomes in the organization.

Subsequently, the study also highlights the mediating impact of planfulness in the association between learning from the supervisor and readiness for change. The findings showed that supervisor support becomes less significant for readiness for change when planfulness is introduced as a mediator between learning from the supervisor and readiness for change. It signifies that those employees who are more proactive in setting up

their realistic plans and goals tend to be more accepting of uncertainty and the change process. These findings corroborated the findings of (Armstrong, 2014; Ludwig et al., 2019). The present research findings also revealed that even if these employees get less or negligible support from supervisors still, they show a high level of readiness for change. Inversely, it can be deduced that people who are less planned do not set realistic goals proactively and require a more supportive environment and guidance from a supervisor.

Theoretical implications

The results of the present research provide evidence to confirm and back the theory of planned behavior. As already mentioned, the intention of a person to do behavior is at the heart of this theory. In the purview of that, the role of enhancing readiness for change is to understand how individuals can be motivated to engage in behavior changes. This could be achieved by understanding the major component of the theory of planned behavior, i.e., attitude and perceived behavioral control that drive their behavior, as well as creating an environment of learning and support from the supervisor in order to motivate the employees to make any necessary changes. Additionally, providing training resources and opportunities for developing planfulness ability can help an individual become more confident and able to sustain any changes they make. Ajzen (1991) claimed that the greater a person's intention to participate in behavior, the more likely they are to do so, which also correlated with our study that where the intention is planfulness the performance is readiness for change. Hence more will be planfulness and higher readiness for change.

Practical implications

The practical implications of this research may help the organization to understand the role of supervisor support in the change process. Also, it can help to understand the employees' behavior towards the change process. Consequently, by comprehending and evaluating the level of planfulness among employees, organizations can enhance the acceptance of their change process and minimize resistance. This understanding will enable the organization to create a supportive system that facilitates effective and successful implementation of the change process.

The findings of the present research suggest that employees will be more open to change if they have a positive learning experience with their supervisors. Supervisors should emphasize the value of change and provide encouragement and support for employees to embrace it rather than resist it. The supervisor should strive to create an environment that fosters trust, cooperation, and respect for employees. Doing this will help employees understand the importance of change and their role in making it happen. Furthermore, research

suggests having a supervisor who is supportive and provides guidance and feedback can lead to employees being more planful. Through things like providing clear direction and helping to identify individual strengths, the supervisor can help facilitate the development of planfulness ability in employees. Moreover, planfulness has been found to be an important factor in an individual ability to successfully adopt changes. Planful individuals understand the importance of change and can provide valuable insight and direction in times of transition.

Importantly, the findings of this study could specifically be useful for organizations in the South Asian region. A recent world bank report also indicated that south Asian economies showed signs of growth amidst uncertainties of technological and structural changes made in response to the pandemic (World Bank, 2021) and highlighted the crucial role of learning and adopting new technologies. Such changes will demand both the planfulness and change readiness of employees. Moreover, recent studies with a focus on south Asia have also emphasized the importance of developing employees' readiness to change in order to survive and thrive in the future (Jain & Maheshwari, 2020; Sivaraman, 2020). This could include training in new technologies and processes, learning how to manage stress effectively, and understanding how to adapt to different cultural norms. Training in readiness for change can also help employees feel more confident and resilient when faced with change, which allows them to create a supportive environment where change is understood and accepted.

Limitations and future research direction

Though the current study has its practical and theoretical contributions concerning the role of learning from supervisors in readiness for change, it also suffers from a few limitations. Firstly, the study utilized a cross-sectional research design, which limits the ability to establish causal relationships between variables, as there may be other factors associated with the variables in question. Therefore, it is recommended that future studies be conducted to identify and establish relationships between these variables. A longitudinal study would provide a more comprehensive understanding.

Secondly, this research has explored novel areas in terms of conceptualization and underlying factors influencing individual readiness for change in the workplace, as well as examining the relationship between learning from supervisor, planfulness, and readiness for change. However, further quantitative research can strengthen the intuitive and theoretical value of the findings from this study.

Lastly, it is important to note that the current study focused on employees in India, primarily in the manufacturing and IT industries. Consequently, the results cannot be generalized to individuals working in other sectors

or with diverse cultural backgrounds. To broaden the scope of this research, it is recommended to replicate longitudinal studies in different cultural settings and with varied backgrounds.

Conclusion

The present research found a positive relationship between learning from a supervisor and readiness for change in the south Asian context. This showed that learning support from a supervisor enhances an individual's self-efficacy and motivation, which leads to an increased likelihood of taking action on a desired change. Therefore, supervisors play an important role in promoting change within an organization. Furthermore, this study also found empirical support for full mediation of planfulness ability in the association between learning from the supervisor and readiness for change. Individuals with a high sense of planfulness ability are better prepared to accept and implement change in the workplace. Planfulness ability comprises several aspects, such as having the foresight to anticipate challenges and the ability to take action in order to promote and implement change. Therefore, having a planfulness ability can help individuals to be more ready and prepared for the change in South Asian organizations.

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Table 1 Descriptive Statistics

		Mean	S.D.	CR	Correlations								
S.no.	Factors				1	2	3	4	5	6	7	8	9
1	Age	---	---	---	---								
2	Gender	---	---	---	.042	---							
3	Education	1.99	.600	---	.264**	-.129*	---						
4	Job position	1.16	.687	---	-.246**	-.095	-.050	---					
5	Experience	.25	.520	---	.792**	.072	.128*	-.230**	---				
6	Organiza- tion status	.22	.414	---	.004	.044	.144*	.162**	.002	---			
7	Learning from Super- visor	5.44	1.42	0.93	-.090	-.027	.009	-.021	-.073	0.064	0.82	0.07	0.05
8	Planfulness	5.45	1.14	0.94	-.036	-0.26	-.077	-.009**	.003	0.024	.263**	0.77	0.35
9	Readiness for Change	5.63	.99	0.91	0.008	.085	-.078	-.047	.061	-.049	.220**	.588**	0.72

Note: M=Mean; S=Standard Deviation. N=451; CR = Composite reliability of the measurement model; and α =Cronbach alpha. The average variance extracted from each construct (No. 7, 8, 9) is represented in **bold** along the diagonal. Values above the diagonal (i.e., AVE) are squares of correlations; Values below the diagonal represent inter-construct correlations.

* $p < 0.05$ (2-tailed). ** $p < 0.01$ (2-tailed).

Table 2 Analysis of measurement model

Construct	No. of items	α	Items	Factor Loadings	Standard Error	t-value	Composite Reliability
Learning from Supervisor	3	0.91	LEXP1	.90	-	-	0.930
			LEXP2	.93	0.018	56.145(***)	
			LEXP3	.88	0.022	45.246(***)	
Planfulness	5	0.92	PLAN1	.83	-	-	0.943
			PLAN2	.85	0.026	38.945(***)	
			PLAN3	.88	0.024	43.562(***)	
			PLAN4	.90	0.025	42.896(***)	
			PLAN5	.92	0.026	42.498(***)	
Readiness for Change	4	0.88	READY1	.73	-	-	0.913
			READY2	.85	0.044	26.411(***)	
			READY3	.91	0.045	27.876(***)	
			READY4	.90	0.045	27.142(***)	

Note: α = Cronbach alpha; SE: Standard Error; Significance: *** $p < 0.001$ (2-tailed)

Table 3 Baseline Model Fit Measures

Fit Measures	Value	Cut-off criteria	Remarks
χ^2 /degree of freedom	1.36	< 3	Yes
SRMR	0.036	< 0.08	Yes
RMSEA	0.037	< 0.06	Yes
IFI	0.99	> 0.95	Yes
CFI	0.99	> 0.95	Yes
GFI	0.99	> 0.95	Yes

Note: SRMR: standardized Root mean square residual; RMSEA: Root mean square error of approximation; IFI: Incremental Fit Measures; CFI: Comparative Fit Index; GFI: Goodness of Fit Index

TABLE 4
Beta (β) coefficient for Hypothesis 1 to 4

Hypothesis	Path	Beta	Standard Error	t-value	95% C.I.	Significance
H1	Learning from supervisor → readiness for change	0.144	0.031	1.6790	[0.062, 0.234]	<0.10
H2	Learning from supervisor → Planfulness	0.225	0.042	4.101	[0.091, 0.277]	<0.01**
H3	Planfulness → Readiness for change	0.579	0.040	12.499	[0.430, 0.591]	<0.01**
Hypothesis 4			Bootstrapping			
	95% Confidence Interval (Bias-Corrected)					
Path	Indirect effect	Standard Error	Z-value	Sign.	LLCI	ULCI
LSUP → PLAN → READY	0.130	0.037	7.930	<0.01**	.0609	.2061

Note: LSUP: Learning from supervisor; Plan: Planfulness; Ready: Readiness for change

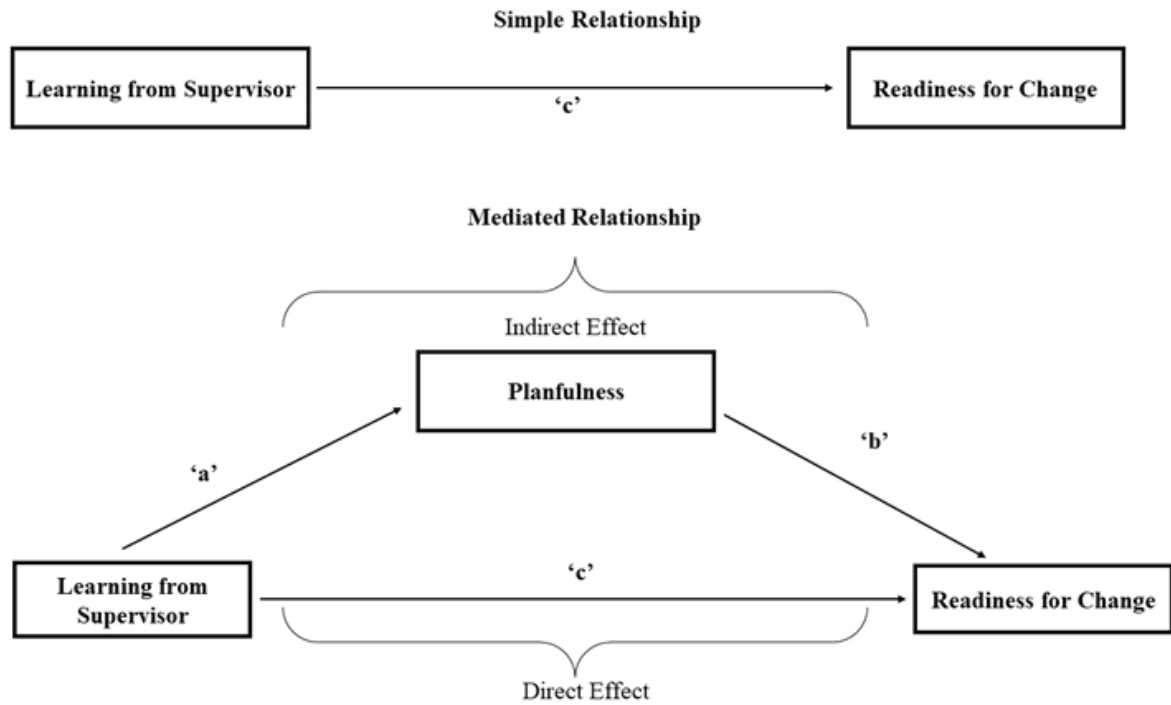


Figure 1: Proposed framework for the present study

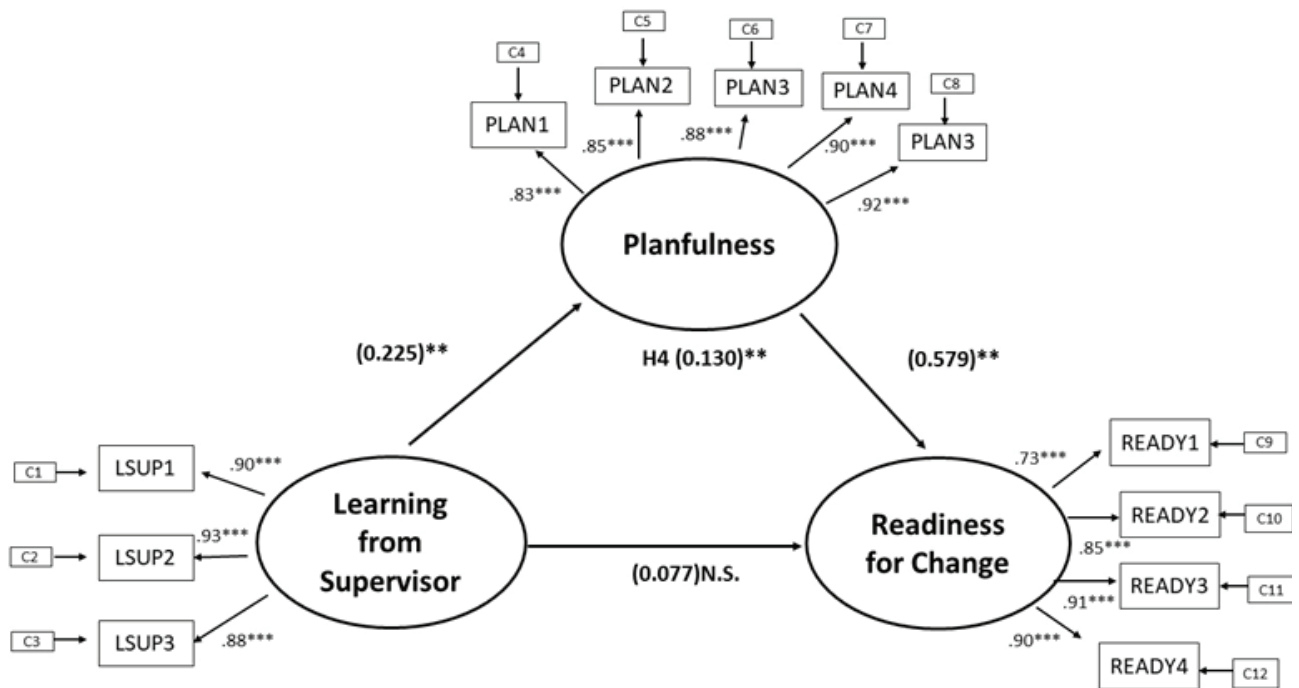


Figure 2: Structural Model Results

Factors Affecting Determination of Stock Price and Current Scenario of Stock Price in Nepal

Hari Kumar Karki

Abstract

The purpose of this study is to draw ideas related to the determinants of stock price. This research work will provide vital information about the factors influencing Market price of stock. This study focus on return of assets, earning per share, transaction volume, size of total assets and net profit. The research design that has been adopted for this study was descriptive based on secondary data. Empirical finding from the regression analysis shows a positive relationship between EPS and MP. It shows that dividend yield has an inverse relationship with that of market price.

Background of the study

The stock market plays an important role in economic development by promoting capital formation and raising economic growth. Trading of securities in this market facilitates savers and users of capital by fund pooling, risk sharing, and transferring wealth. Economic activities can be created by flow of reserves to the most productive investment. Investors take decisions to invest in particular shares of companies, keeping in view their share prices. Theories suggest that there is an association between changes in share prices and changes in financial fundamental variables (Nisa, & Nishat, 2011).

Athanasoglou, Brissimis, and Delis (2008) found that all bank-specific determinants, except the size of the bank significantly affect the profitability of bank. Similarly, the Anbar, and Alper (2011) found a significant impact of assets size, non-interest and the real interest rate on the performance of bank. Furthermore, the empirical study conducted by Olweny, and Shipho (2011), Ongore, and Kusa (2013), Yesmine, and Bhuiyah (2015) and Al-Homaidi, Tabash, Farhan and Almaqtari (2018), and Gwachha (2019) also concluded that various internal factors such as assets quality, liquidity, credit risk, operational efficiency, cash reserve ratio, assets size, and external factors such as gross domestic product, money supply, interest rate and inflation etc. makes significant impact on the financial performance of bank. If the bank management and regulatory authorities identifies the factors affecting the financial performance of bank and takes proper actions then they can achieve their goal and contribute to the economy of the Determinants of Financial Performance of Nepalese Commercial Banks: Evidence from Panel Data Approach 47 nation. Therefore, this paper aims to identify the factors affecting the financial performance of Nepalese commercial banks. Though the financial performance is affected by both internal and external factors, in this paper the effect of internal factors (bank specific factors) is only analyzed.

This paper considered the effect of bank specific factors such as management efficiency, liquidity, credit risk, assets quality and operational efficiency only

Many empirical studies have been conducted to find out the determinants of share prices in different markets. As a result, various internal and external factors have been identified and are expected to impact the share prices. So, both the internal factors such as Net Profit, Graham Value, Non-performance lone, Reserve, Bonus Share taken as independent variables which are expected to influence the Stock Price of Nepalese commercial banks, which is the dependent variable.

The equity market has become an essential market playing an important role in economic prosperity, capital formation and sustained economic growth. There can be different micro-economic/fundamental factors. The present study analyses the various fundamental factors that affects the market price of shares which will provide a yardstick and a parameter for long term investors to decide about their investment

Since large numbers of people are directed toward stock market and we are also aware about the volatility in stock market, so to safeguard the investors' investment on stocks this research will be directed toward identifying the factors affecting the stock price. Several researchers have conducted research in this particular topic but only focusing on single or few sectors. So, the present study also aims to investigate the factors affecting the stock price by focusing on several sectors like commercial banks, Development banks, Finance, Micro finance, Investment, Hydro power and Hotels of Nepal etc. For this, the present researcher considered single statement of the problem that reads as- if there is any relationship between return on assets, earning per share, transaction volume size of total assets and net profit? The purpose of this study is to analyze the influence of earning, volume of trade, Book Value on stock price.

Statement of the Problem

The purpose of this study is to draw ideas related to the determinants of stock price and to see what new contribution can be made and to receive some ideas, suggestions in this relation. In this context, the previous studies can't be avoided because they provide the base line to the present study. In other words, there has to be continuity in research. This continuity in research is ensured by linking the present study with the past research studies. The various financing decision are vital for the financial welfare of the company. Stock price is one of the major decisions to be made. Many studies have been done in the context of Nepal.

There are different views regarding the Performance of commercial Bank and their stock price. Those who think Garam value and Bonus share have more impact in determining share price, argues that shareholder prefers current return rather than future return and Bonus share distribution is an indicator of earning capacity in future. The other views are based on the importance of retained earnings. They argue that retained earnings are indicator of future investment opportunities. The shareholders can enjoy tax advantages in retained earnings. For tax purpose, retained amount is not treated as income until it is realized.

There is a need to conduct a survey of financial executives. In order to find out more facts on Performance of commercial bank at present status when bank has merged and become only 27 so to finally factor influencing the market price of stock and how merger and acquisition has impacted. Besides the analysis of secondary data this study attempts to make an opinion survey among the financial executives of different commercial banks in Nepal.

So, finally in this respect, the present researcher observed it is essential to establish a relationship between factors influencing market price of stock price. This research work will provide vital information about the factors influencing Market price of stock. Hence, it is necessary to establish clear conception about the return resulting from investing in the stocks. This thesis will help to overcome this gap to some extent and has considerable importance. It is aimed at providing important information to the investors and respective commercial banks.

Wangui and J K. Wangui (2015), This research was set to establish whether time period of retail investors in the stock market, cost of the stocks, profits declared by listed companies, investor's income, availability of stocks, investment returns and prior advice influence demand of stocks by retail investors in the stock market. It revealed that increase in investor's income, investment returns, profits of listed companies, prior advice, time period, and availability of stocks have a positive relationship with the demand for stocks by retail and market maker who also

investors, while cost of stocks has a negative relationship with the demand for stocks by new investors in the stock exchange market.

Hence, the study is perhaps the first of its kind in Nepal. To sum up, the study basically deals with following issues:

- How sensitive are the stocks of the commercial banks with changes in the fundamental and technical factors changes?
- What are the major determinants of the stock price in NEPSE?
- Are the investors aware of influencing factors, which affects the stock price of the company?
- What is the current scenario of stock price?

From the various articles see their relationship between microeconomic variable and the market performance, but this paper represent both fundamental factors and technical factors of the selected stock of the market.

This study focus on return of assets, earning per share, transaction volume, size of total assets and net profit where as other research focus many other microeconomic variables. So the gap between this study and previous study is number observation are different for the purposes of study. The study restricted itself to new investors in the Nepal Stock Exchange (NEPSE) in the Nepalese market specifically within the current situations. It was aimed at establishing the factors that determine how much new investors put in the stock market in Nepalese markets.

For more study for Nepalese stock market development determinants and some factor are affect them from study in Nepalese stock market performance:

To investigate the relationship of fundamental factors with stock market.

To identify the impact of technical factors on stock price.

To know the impact of mediating variables on the investment decision making.

The following hypotheses has been developed to examine the impact of specific variable on Nepalese stock market performance.

Null Hypothesis (H01): there is no any significant relationship between fundamental factors and stock price.

Null Hypothesis (H02): there is no any significant relationship between technical factors and stock price

Null Hypothesis (H03): there is no any significant relationship between mediating factors and stock investment decision.

Literature review

Fundamental analysis (FA) is a method of measuring a security's intrinsic value by examining related economic and financial factors. The end goal is to arrive at a number that an investor can compare with a security's current price in order to see whether the security is undervalued

or overvalued. All stock analysis tries to determine whether a security is correctly valued within the broader market. Fundamental analysis is usually done from a macro to micro perspective in order to identify securities that are not correctly priced by the market. For stocks, fundamental analysis uses revenues, earnings, future growth, return on equity, profit margins, and other data to determine a company's underlying value and potential for future growth.

Technical analysis

Technical analysis is the other primary form of security analysis. One of the basic tenets of technical analysis is that the market discounts everything. All news about a company is already priced into the stock. Therefore, the stock's price movements give more insight than the underlying fundamentals of the business itself.

Technical analysis is the study of historical market data, including price and volume. Using insights from market psychology, behavioral economics, and quantitative analysis, technical analysts aim to use past performance to predict future market behavior. The two most common forms of technical analysis are chart patterns and technical (statistical) indicators.

Sadeghzadeh (2018) this study has result of the analyses made, it was found that the rise in stock turnover rate and net profit to total assets ratio affected positively share earnings both in the short term and in the long term and it was seen that the effect in the short term was higher. It was designated that total sales increased share earnings of growth of increase rate and increases in the growth of total assets in the long term. It was determined that increases of on current ratio, on the ratio of equity capital ratio to tangible assets, on the ratio of own capital to assets, on accounts receivables turnover rate, net profits, on the ratio of equity, the marketing values of companies, on the ratio of book value increased share earnings in a short term and increases of on the ratio of debt to tangible assets and asset turnover decreased share earnings in a short term significantly.

I.Shittu , A. C. Ahmad and Z. Ishak (2016) found that study utilized data from 100 randomly selected listed firms in the Nigerian Stock Exchange. The research covered the period of 2009 to 2013. A random effect estimation model was used to estimate the regression. The result reveals significant positive relationship between, price to book value, price to sales multiples and the stock price. The implication of the positive relationship between the dependent and the independent variables implies that, price to book value and price to stock value, are significantly and positively associated to stock price. While the implication for low R square is that, stock prices are not explained only by P/B and P/S multiples but by mixture of several variables.

Bhatt and Sumangala (2012) collected data about earning

per share and market value of equity share of 50 companies from 2006–2007 to 2010–2011 and concluded that EPS impacts the market value of an equity share in the Indian context. By applying multiple regression models, Jadhav and Badade (2012) researched the role of fundamental factors on the market share price of 10 selected sectors. The result disclosed significant and positive association of earning per share, dividend per share, price to earning ratio and dividend yield in the health care sector. Furthermore, earning per share, dividend per share, price to earning ratio and dividend yield reported to have significant association of IT sector with market price per share.

Borhan, S. and Ghazali, M. Z. (2017) empirically investigate the effect of microeconomic variables on stock return with moderating role of money supply (MS). The selected firm specific variables in this study are debt-to-equity ratio (DE), dividend per share, and quick ratio. Firm size and book-to-market value are considered as controlling variables which mean they are influence then it correct them.

Nirmala and Sanju (2011) This study identified the determinants of share prices in the Indian stock market. The study focuses on three sectors viz. auto, health care & public sector undertakings over the period 2000–2009. They employed panel co -integration test and fully modified least squares to examine the effect of dividend, profitability, price earnings ratio and leverage on share prices. The empirical findings showed that dividend per share and price earnings ratio are influenced positively to share price of all three sectors. The results further indicated that debt equity ratio is a significant factor influencing share prices for all the three sectors and that it exerts a negative relation with share price.

Anshika1 (2017) the purpose of empirical analysis related to the study, index values have been taken to be dependent variable, and other factors (Book Value Per Share, Earning Per Share, Price Earning Ratio, Dividend Yield, D-E Ratio, Market Capitalisation to Sales, Price/Book Value Ratio, Cash EPS, ROE and Beta) have been taken as independent variables. Factor Analysis is carried out to identify the critical factors and a detailed analysis of the effect of various factors on stock market. Subsequently regression analysis is undertaken to identify the nature of relationship between index value (dependent variable) and that factors (independent variable). This firm specific variables were found significantly explain the variance in the S&P BSE Bankex during the period from April 2000 to Mar 2014 : a) Return on Equity b) Debt to Equity. The factors. These firm specific variables impact the stock prices.

Malhotra and Tandon (2013) have presented a study with an attempt to determine the factors that influence stock prices in the context of National Stock Exchange (NSE) 100 companies. A sample of 95 companies was selected for the period 200712- and using linear regression model

the results indicate that firms' book value, earning per share and price-earnings ratio are having a significant positive association with firm's stock price while dividend yield is having a significant inverse association with the market price of the firm's stock.

Gupta (2016) This study is undertaken with an objective to analyze various fundamental accounting variables that affects the movement in stock prices of Vardhman Textiles Limited. For the purpose of the study, secondary data was taken from the Annual reports of the selected company and website of Bombay Stock Exchange. Study pertains to the period of sixteen years starting from 2000 to 2015. Using linear regression model, the study indicates that firms' Earning per share (EPS), Price-earnings ratio (P/E) and Dividend per share (DPS) are having a significant positive association with firm's stock price.

Adebisi and Lawal (2015) reviewed various variables affecting stock prices of listed companies. On the basis of the researches reviewed, it was found that Dividend per share, Earnings per share, Book value per share, Dividend payout, Price earnings ratio, and Size of the firm are the significant factors impacting the firm's equity share price.

Avdalovic and Milenkovic (2017) This research is an instrument for the identification of the main determinants of stock prices on the Belgrade Stock Exchange. The panel data regression analysis includes 42 companies that represent the composition of the BelexLine index for the period from 2010 to 2014. The paper looks at the impact of specific (internal) variables of companies, such as company size, return on assets, return on equity, earnings per stock, book value, price-earning ratio, price-to-book ratio and leverage and the stock price of companies that compose the Belex Line index. The results indicate that variables such as the size of the company measured by assets, return on assets, leverage, earnings per stock, book value and price-to-book ratio provide a unique contribution to a statistically significant predictor of stock prices.

Sundaram and Rajesh (2016) studied the impact of fundamental factors on the stock prices of the listed companies. Fundamental factors such as: Dividend per Share, Earnings Per Share, Book Value, Size in terms of sales, Dividend Yield, Dividend payout, Return on Net worth and Price to Earnings ratio for the period of 200304- to 201213- were used for the purpose of study to study the impact. The study was conducted on twenty companies listed on BSE across different sectors namely- Agri-Chemicals, Cement, Hotel and Steel using Pearson's correlation and multiple regression analysis.

Sharif, Purohit and Pillai (2015) investigated that determinants of stock price of 41 companies listed on the Bahrain Stock Exchange. The empirical findings reveal a positive and significant relationship between return on equity, book value per stock, ratio dividend paid

and number of stock outstanding, ratio stock price and earning per stock and market capitalization, suggesting that these factors act as active determinants in shaping the market price of stocks. However a significant negative relationship was found between dividend yield and stock price. This suggests that dividend decisions are made in order to attract different clienteles.

The conceptual framework developed to test the effect of these variables on the market price per share of listed investment sector of Nepal in this study is portrayed in Figure 1.

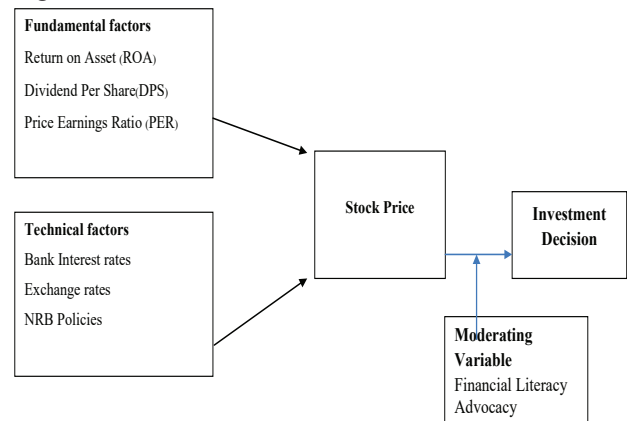


Figure-2,1 Conceptual Framework

Research methodology

The research design that has been adopted for this study was descriptive based on secondary data.

Descriptive statistics have been used to describe the general status and position regarding the knowledge management practices. Descriptive statistics include a measure of central tendency, variability and frequency distribution are used here. F-test, an important measurement is used to find the variance analysis. F-test and its P-value were obtained to test the significant difference of average values of all items. Similarly, to try the significant difference of average values of all items among the six hotels, the F-test and its corresponding P-values are obtained

Another important tool of correlation analysis is used to describe the degree to which one variable is linearly related to another. This technique was used to ascertain that the degree of association between two or more variables. Correlation measures the relationship between stock market and its influencing factors.

The relationship among variables can be measured through multiple regression and it is used to know the relationship and the extent to which they are linked and explain the dependent variable. For this, multiple regression analysis is used to test the model fit. Multiple Regression analysis, adjusted R' value, the F-statistics and its significance level are known, and results were interpreted after the test.

Descriptive statistics

Findings from the descriptive statistics as presented in Table 2 shows that, mean value of MP is Rs. 1451.494 over the study period. This variable has minimum value of Rs.107 and maximum one at Rs. 6,830 during the study period. However, in terms of standard deviation it is Rs. 963.012 during the study period

Table: *Descriptive Statistics*

Descriptive Statistics					
	Scale	Minimum	Maximum	Mean	Std. Deviation
MP	Rupees	107	6830	1451.494	963.012
DPR	Ratio	0.000	0.739	0.300	0.248
DY	Ratio	0.000	0.049	0.012	0.013
EPS	Rupees	1.540	175.840	49.937	39.567
P/E	Ratio	10.070	242.540	34.212	30.114
Bank Assets	Ln	22.283	25.192	24.023	0.631

Note. Secondary data Excel 2021

Correlation analysis

The Pearson co-efficient of correlation is used to assess the relationship between market price of share and dividend payout ratio, dividend yield, earnings per share, price earnings ratio, size of the bank at 1% and 5% level of significance. The Pearson correlation analysis results have been presented in Table below.

Table: *Correlation Analysis*

Variable	MPS	DPR	DY	EPS	P/E	BS
MPS	1					
DPR	.429**	1				
DY	-.012	.361**	1			
EPS	.838**	.593**	.291**	1		
P/E	.046	-.332**	-.374**	-.214	1	
BS	.261*	.521*	.353**	.441	-.297**	1

Note. Secondary data Excel 2021

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

It is quite clear from table that the share price is significantly positively related to DPR, EPS and SIZE, which means that this variable move together with share prices. However, share price is significantly negatively related to dividend yield.

Regression analysis

In statistical modeling, regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent

variables. The study relies on secondary data analysis based on the regression model specified on chapter III. It basically deals with the regression results from various specifications of the model to examine the estimated relationship of independent variables i.e. MPS, DY, DPR, P/E Ratio, EPS and BS. The regression coefficients of model were estimated using multiple regressions analysis. Findings from the regression analysis for the selected banks are depicted in Table 4.

$$MP = \beta_0 + \beta_1 DPR_{it} + \beta_2 DY_{it} + \beta_3 EPS_{it} + \beta_4 P/E_{it} + \beta_5 SIZE_{it} + \epsilon_i$$

Table: *Regression Results on the Determinants of Share Price*

Model	Beta	T	SIG
Constant	1985.743	.569	.571
DPR	166.15	.369	.693
DY	-23854.884**	-3.709	.000
EPS	34.664**	14.196	.000
P/E	7.843**	2.784	.007
Bank Assets	-.95.556	-.647	.520

** indicates significant at the 0.01 level (2-tailed).

Dependent variable: Market share price

Note: Annual report of sample companies and results are drawn from SPSS-16

The R-Square which is often referred to as the coefficient of determination of the variables is .797. The R-Square which is also a measure of the overall fitness of the model indicates that the model is capable of explaining about 79.7% of the variability in the share prices of banks. This means that the model explains about 79.7% of the systematic variation in the dependent variable. That is, about 20.3% of the variations in market price of the sampled banks are accounted for by other factors not captured by the model. This result is complimented by the adjusted R- square of about 78.3%, which in essence is the proportion of total variance that is explained by the model. Similarly, findings from the Fishers ratio (i.e., the F-Statistics) which is a proof of the validity of the estimated model as reflected in Table.4, indicates that, the F is about 58.756 and a p-value or F(sig) that is equal to 0.000, this invariably suggests clearly that simultaneously the explanatory variables are significantly associated with the dependent variable. That is, they strongly determine the behavior of the market values of share prices.

Table shows that dividend yield has an inverse relationship with that of market price. This result basically means that with the influence of other variable held Combined Issue constant, as firm's dividend yield will have negative impact on market price. The result is supported with the findings of Zahir and Khanna (1982), Zahir (1992), Irfan and Nishat (2002), Malhotra and Tandon (2013). In

essence, it could be deduced from this result that the DY of banks has a significant negative impact on the MP of listed banks in Nepal.

Empirical finding from the regression analysis shows a positive relationship between EPS and MP. This is evident in the t-statistics value of (t-statistics = 14.196 and the p-value < .01). The results can be explained as that an increase in earnings per share will in variably bring about a significant increase in the market prices of equity shares. Importantly this outcome is consistent with the findings provided in AL-Omar and AL-Mutairi (2008), Somoye et al. (2009), Uddin (2009), Malhotra and Tandon, (2013), Jatoi, Shabir, Hamad, Iqbal, and Muhammad (2014) where it has been observed that earning per share is a major determinant of stock prices.

Another empirical finding from the regression analysis shows that there is positive relationship between P/E ratio and MP. The coefficient of P/E ratio is 7.843 which mean that when there is 1-unit increase in price to earnings ratio, the share prices will increase by Rs.7.843. This outcome is consistent with findings of Oyama (1997), and Malhotra and Tandon (2013) that P/E ratio has a significant positive impact on share prices. Finally, other variables (DPR and SIZE) have insignificant impact on MP. This indicates that DPR and SIZE have no explanatory power toward stock price movement.

Results of hypothesis

This section includes discussion related to the acceptance and rejection of the hypothesis. In this study, significance level P-value is interpreted from the output of regression analysis will be tested to see whether there is a significant impact of independent variable on the dependent variables. Usually the level of significance taken is 1 percent (0.01).

Table: *Hypothesis Result*

Variables	Description	Expected sign	Actual Sign
DPR	Dividend Payout Ratio	-	Positive
DY	Dividend Yield	-	Inverse
EPS	Earnings Per Share	+	Positive
P/E Ratio	Profit Earning Ratio	+	Positive
Size	Size of Banks	+	Positive

Note. Secondary data Excel 2017

Based on regression analysis shows a dividend yield has an inverse relationship with that of market price. This result basically means that with the influence of other variable held Combined, as firm's dividend yield will have negative impact on market price.

There is a positive relationship between EPS and MP. This is evident in the t statistics value of (t-statistics = 14.196 and the p-value < .01). The results can be explained as that an increase in earnings per share will invariably bring about a significant increase in the market prices of equity

shares. Another empirical finding from the regression analysis shows that there is positive relationship between P/E ratio and MP. The coefficient of P/E ratio is 7.843 which mean that when there is 1unit increase in price to earnings ratio, the share prices will increase by Rs.7.843. DPR and SIZE have insignificant impact on MP. This indicates that DPR and SIZE have no explanatory power toward stock price movement.

There are a few other studies on the explaining stock market performance, mainly from micro perspectives. For example, Joshi (2012) examined the impact of dividends on stock price in the context of Nepal and found the impact of dividends is more pronounced than that of retained earnings on stock prices in Nepal. Dangol (2008) studied the reaction of Nepalese stock market to announcements of unanticipated political events using the event analysis methodology. His analysis covered the period from 2001 to 2006. He found that good-news (bad news) political announcements generate positive (negative) abnormal returns in the post-event period. This finding suggests that there is a strong linkage between political uncertainty and common stock returns in Nepal.

In another study of Dangol (2008) examined the random walk behaviour on daily market returns of the Nepal Stock Exchange for the period between July 2000 and January 2010 and found that the Nepalese stock market does not show any characteristics of random walk and thus, is not weak form efficient. Findings of Bhatta (2010) are also similar. This means news affects the movement of the stock market index. Further, Pradhan & Saraswari (2010) assessed equity share price behavior in Nepal and tested the hypothesis that share price changes are independent using weekly data of 26 listed companies from mid-July 2005 to mid-July 2008. They found that random walk hypothesis holds for less frequently traded stocks but do not hold for highly traded stocks at NEPSE (Subedi, 2014).

Conclusion and future implications

The Nepalese capital market is in growing stage. The stock price of the scripts is volatile. Only one factor is not responsible to change the price of the stock. Different factors play role to change the price including investors psychology also. Average citizens and investors have not proper ideas about the capital market, share, book value, par value, market price, pricing mechanism and the factors affecting the market price of shares. They are willing to invest, but are not able to do so due to lack of knowledge, in this subject. In spite of that, the listed companies in the capital market are suffering. The policy and view of every major party who ruled the government have different towards capital market. Hence, policy and priority has also changed with changed in government.

The study is focused on the determinants of stock price in commercial banks. The major objectives of the study

are to identify factors affecting share price, to analyze correlation among various financial indicators and to identify qualitative factors affecting the stock price listed in NEPSE

To meet the desired objectives, the correlation of the quantitative factors, EPS, DPS, and DY, P/E, BS with MPS by correlation analysis is identified. The regression of factors EPS, DPS and BS with MPS were employed for the analysis and interpretation of the collected secondary data. Whereas, to identify the qualitative factors affecting the market price of shares, the primary data has been used that was collected from the research questionnaire. From the secondary data analysis, it is known that there is not consistent performance in the relationship of MPS with EPS, DPS and BS for the 9 sampled banks.

Based on regression analysis shows a dividend yield has an inverse relationship with that of market price. This result basically means that with the influence of other variable held Combined Issue constant, as firm's dividend yield will have negative impact on market price. There is a positive relationship between EPS and MP. This is evident in the t-statistics value of (t-statistics = 14.196 and the p value < .01). The results can be explained as that an increase in earnings per share will invariably bring about a significant increase in the market prices of equity shares. Another empirical finding from the regression analysis shows that there is positive relationship between P/E ratio and MP. The coefficient of P/E ratio is 7.843 which mean that when there is 1-unit increase in price to earnings ratio, the share prices will increase by Rs.7.843.DPR and SIZE have insignificant impact on MP. This indicates that DPR and SIZE have no explanatory power toward stock price movement.

Recommendation for the future research

The researcher needs to analysis carefully by using business knowledge before making investment decision. The investors should also interpret the market and economic indicators since they influence the performance of the share on the market. All the variables should be evaluated so that when they decide to invest they can decide fast and give suggestion to others. The research outcomes also conveys that the few of market participants could not be considered as matured investors as they may not possess an adequate knowledge about the capital market. Sometimes market might be manipulated as the market is dominated by powerful investors.

Hence, in future Nepalese stock market will have more number of both small as well as large investors as many youth are interested in capital market. The youth who do not have knowledge about capital market are taking classes and investing. Public awareness can be through any media, but the awareness can be through the customers of the capital market by advertisement which will reduce the promotional cost.

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Analyzing of opinions of stakeholders and the model developed by Laureates Dybvig and Diamond regarding financial and liquidity crisis

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Abstract

This article critically tries to analyze the recent liquidity crisis in Nepal. The basis of the analysis is the analysis of opinions given by the International Monetary Fund, Bankers, some opinion builders and stakeholders related to the economy including university professors, parliament members looking at Finance Committees, and Laureates Dybvig and Diamond.

Keywords

liquidity crisis, financial crisis, Dybvig, and Diamond Model

Introduction

It is heard time and again about the liquidity crisis of banks. The crisis brings insecurity among the lenders and deposit holders. In the last few years, Nepalese banks have faced liquidity crisis. Despite bank managers' efforts, liquidity crisis take place so this article is written to analyze the differing opinions on the causes of liquidity crisis. If the crisis is not controlled timely then it reaches to liquidation level of the banks. Liquidation is the process of permanently closing a bank and its branches, selling off any assets, and using the proceeds to settle as many of the bank's remaining liabilities as possible. Typically, customer accounts are closed and checks are mailed to account holders for the amount of their insured deposits[1]. A liquidity crisis occurs when there is an increase in money demand but a decrease in the supply of money balance, called liquidity, which happens across many financial institutions or other businesses and the probability of controlling is low.

The root cause of liquidity from the expert's point of view is strong mismatching among banks and other businesses, which need funds to operate and the consequence is the shortage of funds and other liquid assets when they are needed.

Liquidity crisis bring very negative impacts and effects on the economy because the needed sector does not get funds and more than sufficient funds are lying in unneeded areas. The urgency of research is so high that in 2022 even the Nobel Prize was awarded to the contributor who was involved in finding the causes of liquidity for a long time [2].

Material and methods

The method adopted is the analysis of the options given by bankers, the International Monitoring Fund, Stakeholders from different sectors of the economy and Nobel Laureates

Dybvig and Diamond on the liquidity crisis.

Results

Some research opinions in this direction show many reasons for the current liquidity crisis. Nepal's banking industry is not mature and operates with very short-term goals, even the regulatory bodies are incompetent, bank's governance is not proper. The supervision side is very weak. The Monetary policy is not satisfactory. Enough precaution is not maintained[3].

International Monetary Fund

Research conducted to find the reasons for the liquidity crisis in Nepal by the International Monetary Fund has identified many reasons for it. They are lack of supervisory practices and roles by the major monetary authorities, causing the improper assessment of assets quality that will be sufficient to manage risk effectively. It has also indicated Nepal Rastra Bank's failure to understand the philosophy of establishing different classes of banks. It has failed to collect and handle the supervisory Information System aimed at class A (commercial) banks and proceed to the second stage and extend it to class B (development banks) and class C (finance companies).

Industries and productive sectors are decreasing one after another, but banks are increasing one after another then the question in this case is it possible? The report has demonstrated that over the years, Nepal's financial sector has substantially expanded. According to the latest Nepal Rastra Bank data, Nepal's financial system has 27 commercial banks, 17 development banks, 17 finance companies, 67 micro finance financial institutions, and one infrastructure development bank under the central bank's supervision radar. The number of bank branches excluding those of microfinance institutions is 6,154, or more than 50 percent. Timely and effective supervision of them all, particularly on-site, is indeed a Herculean

responsibility for an under-automated supervisor like Nepal Rastra Bank with only 50 percent officer-level staff among some 1,000-plus employees.

From time to time there arises the question about the role of the central bank- how far it can play nonpolitical roles since the government appoints a governor from those who have an interest in politics rather than economics. whether Nepal's central bank has positioned itself and behaved as a fully autonomous institution[4].

Bankers

Bankers' opinion of liquidity crisis is towards imports of goods in one and remittance drops in another. At the time of remittances drop we import goods then there is only the result is a liquidity crisis.

At a time when a business suffers, they show less stock and less profit chance At the time they might need more money but banks lend them looking at their balance sheet, it means cartels. This further brings liquidity crisis. If this practice flows for a long time then massive liquidity is inevitable.

Stakeholders

This study tries to analyze the opinions of different stakeholders about liquidity crisis and their solutions for mitigating the issues of crisis.

Min Man Shrestha, Chairperson at Urban Development Committee of Federations of Nepalese Chamber of Commerce and Industry (FNCCI)

Min Man Shrestha, Chairperson at the Urban Development Committee of Federations of Nepalese Chamber of Commerce and Industry (FNCCI), pointed out the greatest weakness in the relationship between the government, central bank and banks. He stressed that institution depositors need not be given interest on deposits.

Min Man Shrestha speaking at the program.

Shrestha suggested that the government shall allow foreign nationals to buy and sell apartments, billions of dollars can be brought into Nepal every year. Because the cost of living in Nepal is very low. He asserted that many foreigners want to come to Nepal and stay in Nepal in their retired life. The cost of living is very low in Nepal compared to the western countries and is low.

Naresh Shrestha, Director at Institute for Strategic and Socio-Economic Research (ISSR)

Likewise, Naresh Shrestha, Director at ISSR, gave his observation and remarked that it was time to be vigilant in addressing the future economic crisis due to the lack of liquidity in Nepal. He opined that the concerned bodies should be interested in resolving the issue. He also questioned the action of the Central bank for its action "why the central bank is auctioning treasury bills when the government's spending is low to non-existent"[7].

Ravindra Prasad Pandey, Director at ISSR

Ravindra Prasad Pandey, Director at ISSR, questioned the relation of increased banks and financial institutions to the status of the economy of the country, and why the economy is not functioning well despite the increase in business in Banks and Financial Institutions (BFIs). He emphasized that the country's banks and financial institutions are now short on loanable cash and that the private sector is experiencing difficulties obtaining credit[7].

He emphasized increasing employment inside the country, by discouraging youth from going outside. Further, he pointed out that the country will not develop unless employment is created inside the country and youths are discouraged from fleeing abroad. He attributed the decline in liquidity to the economy as imports outweighed exports.

As a result, the trade deficit increased by 58.3 percent to Rs. 413.47 billion during the review period(2021). He emphasized that the country's imports have increased at an exponential rate while its remittance has decreased.

Tara Prasad Pokharel, Vice-President, Cement Manufacturers' Association

Tara questioned how in a short period situations are changed so vast. There was an ample amount of lending money in Nepali Banks and Financial institutions (BFIs) till April-June, 2021. But, in a time of 6 months period, BFIs have faced a liquidity crunch and are unable to lend a minimum of Rs 10 million to their customers[7].

He emphasized that concerned bodies should monitor and find out the situations in how the BFIs have faced the liquidity crunch.

He pointed out that the crisis is hampering the development works stating that development work has been operating in the country but the government has not paid the contractors. Had the government paid up the amount, the problems would have been resolved somehow.

The liquidity crisis is due to a problem in the internal system. The country has become self-reliant in cement and electricity and has to be self-reliant in other sectors as well.

BFIs have been changing the premium amount every three months. Instability in interest amounts has led to the closure of the Industries.

The country can develop only after the establishment of industries, and the government must be responsible for coming up with relevant policies and on-time implementation.

Naresh Lal Shrestha, Executive Member, Federation of Nepalese Chambers of Commerce and Industry (FNCCI)

Naresh emphasized the disrupted smooth functioning of the business is the reason for crisis because it disturbs the rolling of money and brings crisis. The business sector is

in trouble as banks have not been able to give even loans that BFIs have committed to the customers. Yet, BFIs have been increasing interest rates[7].

The country has faced a deficit in trade as import is higher than exports. Due to this, Nepal has faced a liquidity crisis.

If the import rate goes higher than this, the economy of the country will collapse. The disappearance of money from the market has created a crisis.

Ambika Prasad Poudel, President, Capital Market Forum

Ambika pointed out the reason for crisis to the coordination of organizations in the country stating the current situation has been created due to the lack of coordination among the internal government organizations[7].

The country is facing this situation now as the Ministry of Finance is merely focused on an increment of revenue. After the post-COVID situation, the share market has given energy to the economy. However, there is a need for further reforms in the capital market.

Anjan Shrestha, Vice President (Commodity), Federation of Nepalese Chambers of Commerce and Industry

Anjan pointed out the faulty policies stating that it is unclear when the economy of Nepal will go in a balanced line and who will find the way forward to take the surplus economy. There is policy-level corruption in Nepal. Unfortunately, political parties and government employees did not pay attention to the policy method and system[7].

Nepal has been facing a liquidity crisis after Dashain simultaneously, for the last few years.

Similarly, Nepal is graduating to the status of a middle-income developing nation from the category of a least developed country (LDC) by 2026.

It is said that the Government of Nepal has completed strategic efforts for graduation.

This is an opportunity for the country to raise its image in the international forum by creating structures for its economy within the next five years. But, the problems, like the liquidity crisis, we are facing now may affect the graduation process.

Nepal had met the criteria for its graduation between 2015 and 2018. However, it had been affected and postponed citing that its economy was threatened due to the 2015 earthquake.

Nepal was incorporated into the list of LDCs in 1971.

Although the recent data shows an increase in exports, it is actually due to the increase in the logistic cost of exports.

Rohit Gupta, Vice President, Confederation of Nepalese Industries

Rohit pointed to the negligence of authority to keep money on track. He stated that the credit deposit (CD) ratio has

to be increased from 80 percent to 90 percent. Recently, around Rs 100 billion seems to have disappeared from the system[7].

It has become necessary to find out how it disappeared. Similarly, a liquidity crisis needs to be controlled and a solution has to be found out.

Kiran Kumar Shrestha, CEO, Raastriya Banijya Bank

Kiran pointed out the ability of the bank managers to forecast stating that banks had estimated that this year's deposit would be the same as last year. Unfortunately, BFIs could not receive the deposit similar to the last year. This is one reason for the liquidity crisis[7].

The government fails to make expenditures due to cumbersome processes. It seems that remittances have to be brought through a complete banking process.

A liquidity crisis can be solved if 40 percent of the people who are not in the banking process are connected with the banks.

ShovaKanta Poudel, Director General, Inland Revenue Department

Shova argued that financial institutions need to be reformed stating that the rules, regulations, and policies that the government has formulated are relevant but unless the institutions are reformed, the problem will remain the same as it is now. He also showed the distribution of economic resources in the country stating that 100 people in Nepal have contributed more than 60 percent of the revenue. We have termed our economy as a socialist economy, but the control of Nepal's economy is in the hands of very few people.

Nepal will never be prosperous unless the attitude of Nepali changes. Similarly, the capital market needs to be regulated as well.

Out of 4 million service recipients of the share market, 2 million people are incurring daily losses[7].

Kamlesh Kumar Agrawal, Senior Vice President, Nepal Chamber of Commerce

Kamlesh pointed the dearth of finance in the productive economic sector has caused problems in the economy. He opined that Nepal still needs 20 to 25 percent refinancing for the mobility of the economy.

There is a need to improve the monetary policy issued by the NRB recently. Similarly, if the liquidity crisis goes on for the long term, Nepal's currency will be depreciated and may become the worst-performing currency in Asia[7].

Gunakar Bhatt, Executive Director, Nepal Rastra Bank

Gunakar pointed out that management weakness in the expansion of loans by banks and the trade deficit is the reason for the crisis. He said lately, loan expansion seems to have increased by Rs 0.9 trillion. Similarly, credit has been extended by 12 trillion rupees in 15 months (end of FY 2020/21)[7].

Similarly, the outstanding debt stood at Rs 4.4 trillion. Imports in the last four months stood at Rs 650 billion. Comparing imports and exports puts Nepal's economy in an alarming position. Three years ago, the lending rate was 12.5 percent. At present, the rate has come down to 8.5 percent[7].

When the remittances in-flow decrease, foreign investment, and government debt decrease, and foreign investment in the private sector reduces then interest rates are likely to go up.

We need to study how low interest rates can work in Nepal's current economy. This is also a matter of concern. We have to find a way out of a fixed interest rate rather than a low interest rate.

He exemplified his points that a year and a half years before COVID-19, fixed interest rates were applied in Nepal. At present, Nepal Rastra Bank has issued 200 billion to manage the liquidity crisis. Out of this, 110 billion is used for refinancing billion and Rs 90 billion for accelerating the economy. Along with this, the accumulated amount and payments have been going into deficit lately. This is also a terrible situation.

The United States also has an inflation rate of 6.2 percent. As a result, the world economy is going beyond expectations. It has also been said that we are looking for an economic solution for the non-economic problems.

For some time now, Nepal's economy has looked very challenging.

The Npse index had recently reached 3200 points, after which there has been a liquidity crisis in Nepal. In 2015, Npse had reached from 900 to 1800 points. Two years after that, there was a lack of liquidity in Nepal.

Looking at the latest statistics, Npse has increased by 135 percent.

In the last 15 months, Nepal has imported vehicles worth Rs 200 billion. We need to think holistically about this situation. To solve this problem, it is necessary to increase the capital expenditure of the government and also bring in foreign investment.

Similarly, external debt also needs to be expanded. When the banking sector issues dividends, this problem may be solved somehow. If the BFIs issue a 25 percent debenture with priority, the problem of liquidity crisis will be minimized. If the business sector continues to issue commercial papers and bonds, that can be a solution[7].

Mukunda Subedi, Deputy General Manager, NCC Bank

Lately, deposits in Nepal's banks have been declining day by day. Institutional deposits in banks are 40 percent[7].

Even institutions have deposited for interest, if this deposit is added then the problem might get worse.

Mukunda Subedi speaking at the program.

Contradictory to their commitments, banks have not been able to lend Rs 150 billion. This problem is because banks lend more in the first five months of the fiscal year whereas the government does not spend in the first five months.

Anil Kumar Upadhyay, President, Nepal Bankers Association

Anil The liquidity problem is often interpreted wrong. It seems the government only collects revenue but does not spend it[7].

Although the liquidity problem has appeared every year for the last 10 years, no solution has been found for it.

We do not discuss any problem on a short-term, medium-term, or long-term basis.

Jitendra Upadhyaya, Associate Professor, TU

The current lack of liquidity is due to trade deficit, inflation, and institutional depositors.

Similarly, monetary liquidity can be reduced by taking to goods and products instead of petroleum products. Nepal is currently wasting 400 MW of electricity. When we can consume more electricity, the problem will be solved to a large extent. This problem can be solved by issuing debentures[7].

Krishna Prasad Dahal, President, Finance Committee

The current liquidity crisis in the market is still solvable. This problem has resulted due to the standstill of the tourism sector, foreign investment, and foreign loans.

It seems that investment should be made only in that area that remittance can contribute. There is a need to look for overall growth rather than just looking at only one sector. At present, there is a problem due to policy corruption[7].

Diamond and Dybvig's Structure of the Model

In 2022 three authors Diamond and Dybvig, along with Ben Bernanke received the Nobel Prize for their contribution to the reason of bank and liquidity crisis over a long time. The Diamond–Dybvig model is an influential model of bank runs and related financial crisis. The model shows how banks' mix of illiquid assets (such as business or mortgage loans) and liquid liabilities (deposits that may be withdrawn at any time) may give rise to self-fulfilling panics among depositors[1,5,6].

While writing the review of this model Anil K. Kashyap, Professor of Economics and Finance at Chicago Booth, states that the basic structure of the model has become a platform on which hundreds of other banking-related models have been built. That is a testament to the fact that Diamond and Dybvig's model appears to be simple, but can be extended to deliver insights about much more complicated environments.

Diamond and Dybvig's paper points out that business investment often requires expenditures in the present to obtain returns in the future. Therefore, they prefer loans with a long maturity (that is, low liquidity). The

same principle applies to individuals seeking financing to purchase large-ticket items such as housing or automobiles. On the other hand, individual savers (both households and firms) may have sudden, unpredictable needs for cash, due to unforeseen expenditures. So they demand liquid accounts that permit them immediate access to their deposits (that is, they value short-maturity deposit accounts).

The banks in the model act as intermediaries between savers who prefer to deposit in liquid accounts and borrowers who prefer to take out long-maturity loans. Under ordinary circumstances, banks can provide a valuable service by channeling funds from many individual deposits into loans for borrowers. Individual depositors might not be able to make these loans themselves, since they know they may suddenly need immediate access to their funds, whereas the businesses' investments will only pay off in the future (moreover, by aggregating funds from many different depositors, banks help depositors save on the transaction costs they would have to pay to lend directly to businesses). Since banks provide a valuable service to both sides (providing the long-maturity loans businesses want and the liquid accounts depositors want), they can charge a higher interest rate on loans than they pay on deposits and thus profit from the difference.

In practice, due to fractional reserve banking, banks faced with a bank run usually shut down and refuse to permit more withdrawals. However, Diamond and Dybvig argue that unless the total amount of real expenditure needed per period is known with certainty, suspension of convertibility cannot be the optimal mechanism for preventing bank runs. Instead, they argue that a better way of preventing bank runs is deposit insurance backed by the government or central bank. Such insurance pays depositors all or part of their losses in the case of a bank run. If depositors know that they will get their money back even in case of a bank run, they have no reason to participate in a bank run.

Thus, sufficient deposit insurance can eliminate the possibility of bank runs. In principle, maintaining a deposit insurance program is unlikely to be very costly for the government: as long as bank runs are prevented, deposit insurance will never actually need to be paid out. However, an IMF working paper has questioned the effectiveness of deposit insurance in a crisis.

Liquidity crisis : A Nepalese Experience

Nepalese Financial System:

Besides Nepal Rastra bank (Central Bank), There were 4 Banks and Financial Institutions (BFIs) only in the year 1983, of which 2 was commercial banks and 4 development banks. But now number of BFIs has reached 118 in mid July 2023. Hence Nepalese financial system has grown significantly over a period of 40 years.

Business volume of Commercial Banks: (In Billion Rupees)

Year	Total asset	Total deposit	Total credit
1983	7.8	6.3	2.6
2022	5956.	4541.	4155.
2023	6159	4828.	4331.
Annual Growth		3.4%	6.3%

Liquidity Crisis in Nepal:

A liquidity crisis is a situation when BFIs experiences shortage of liquid assets to meet its financial obligation, in other words, BFIs become unable to pay its depositors as and when it becomes due or cannot fulfill its financial commitments or borrowers cannot utilize their approved credit limit due to lack of fund or many other factors. If this situation continues for a longer period, it may lead to bank liquidation thereby economic crisis in the country.

Nepalese financial system is experiencing a problem of liquidity crisis since last 10 years. And the reason for such crisis is listed below;

- a) It was mainly due to Monetary policy of NRB of F/Y 2015/16. In order to mobilize required resources for long term development and for promoting financial sector stability by strengthening capital base of BFIS, NRB decided to increase paid up capital of commercial banks by 4 times from Rs 2 Billion to Rs 8 Billion in 2 years time. Raising capital by 4 times was easy job but implementing it was very challenging. All commercial Banks have complied this regulation with no choice basis. But increasing business accordingly to ensure reasonable return to the shareholders was not an easy job. So Bank Management were compelled to put their best efforts to increase business, hence extended credit to a greater extent without considering the amount of deposit mobilized by them. In the mean time, to cope with this sort of issues, NRB amended its regulation on credit deposit (CD) ratio allowing banks to include the amount of core capital and debentures in deposit while calculating CD ratio. It was done by NRB on the request and recommendation of Bankers, which was not a prudent banking practices.
- b) NRB has been following a very conservative monetary policy giving priority to Stability over Growth of financial sector since last few years,
- c) NRB has supported a gentlemen agreements of BFIs to fix the same interest rate.
- d) No practical coordination between Fiscal policy of the Government and Monetary policy of the Central Bank due to political reasons.

Deposit Insurance Scheme:

Nepal has one Deposit Insurance corporation, which insures deposit of BFIs to the extent of Rs 5 hundred

thousand per depositor irrespective of their type of deposit.

Bank Run cases:

Nepal has experienced few cases of Bank Runs. This was mainly due to insider lending that means Director of the BFIs had borrowed themselves from their own Institution against the prevailing Nepalese law. This was detected during NRB's onsite supervision. And When this information was leaked in media, depositors rushed to the concerned bank and financial institution to withdraw their deposits. In that situation, NRB took over the management of Such BFIs, resolved the issue in few months in most of the cases and handed over the Management to the newly elected Board of Directors from Annual General Meeting. But in few cases of Development Banks and Finance companies, they were ultimately ordered by the Court for their liquidation.

Discussion

Based on the opinions portrayed by the International Monetary Fund, Nepalese Bankers, different stakeholders, and Douglas Diamond and Philip Dybvig are economists and winners of the 2022 Nobel Memorial Prize in Economics some insights have been generated and some measures have been developed.

The reasons for liquidity crisis are hard to define exactly. And the extent of impacts to different sectors of the economy which could be brought by crisis is also very hard to anticipate. However, the impact is sure.

Some actions that seem necessary in the banking and financial sectors are given below to ensure the stability of the financial sector and promote healthy economic growth.

1. NRB should adopt a liberal Monetary policy allowing a balanced approach of Stability Vs Growth of Financial sector giving priority to the growth of economy.
2. NRB should liberalize its interest rate policy giving liberty to BFIs to fix their interest rate, Fees and commission.
3. Mitigating risk of liquidity crisis is not possible merely by central banks and commercial banks only. The role of the Government is equally important.
4. There should be a proper and prudent liquidity management policy and credit policy in place.
5. The central bank should strengthen its supervisory capability in order to ensure sound and efficient financial system.

6. Commercial banks, and financial institutions should carry out research to find out feasible and not feasible projects and preferred sector of Investment that are less risky. This will help to reduce the non-performing assets of BFIs.
7. A secondary market for Government securities like Treasury Bills and Development Bonds should be in place in order have a better liquidity management of BFIs

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Factor influencing employee turnover in Construction Industries Concerning Nepalese construction companies

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Abstract

Labor (Employee) are the major assets of any construction business. The construction business succeeded on the basis of the labor performance at site. In Nepal there is a huge labor turnover in any construction company and this is creating different types of problems in the project. Some of the problems can be illustrated as the delay in the completion of projects, workmanship problems, labor shortage etc. The main objective of this study was to investigate the major factors that influence the labor turnover in the construction business in context to Nepal. The construction companies considered for the research are the different A and B class construction companies in Nepal. There was 111 worker who responded to the survey. The data examination carried out utilizing SPSS revealed that the absence of social safety measures within the construction firms. The research analysis of relative importance index showed Job Commitment as the foremost influential factor among the determinants, closely trailed by Work Environment and Colleague relation. The study results provide insights into the construction field and aid as evidence to bring changes in the policies of the company and labor act.

Keywords

Labor (Employee), Construction Industries, Turnover and workmanship.

Introduction

The construction industry is recognized as a sector with great contribution to the economic and social development of a country, particularly due to the number of direct and indirect jobs generated and its influence on several other sectors which produce materials, equipment, and services in its production process. In construction industry, having skilled, honest, and dedicated employees who remain with the company for an extended period is essential for achieving project goals successfully within the specified time frame and desired quality. However, frequent employee turnover poses a significant challenge to completing projects successfully. The 2017 Automatic Data Processing (ADP) Workforce Vitality Index highlighted a significant yet often overlooked issue plaguing construction firms and contractors: the substantial employee turnover rate.

The staff turnover has resulted in a depletion of 20% from the payroll due to recruitment, training, and diminished productivity (Wehelmina Rumawas, 2022). According to a study by the Overseas Development Institute (ODI), Nepal has a tendency to have a labor shortage of 3.6 million by 2030, potentially impeding the nation's aspirations of achieving middle-income status. (labor issues, 2018). Therefore, developing effective employee retention strategies is crucial to address the labor market

challenges.

The factors influencing turnover rates in the construction industry generally include job satisfaction, organizational commitment, work benefits, work environment, colleague relationships, organizational politics, and person-organization fit. However, the relationship between these factors and turnover rates has not been thoroughly studied in Nepal.

Having an understanding of the factors contributing to employee turnover and its statistical relation can assist the human resource manager and policy maker in seeking improved strategies to decrease the rate of employee turnover, ultimately leading to enhanced productivity within Nepalese construction firms. This research aims on finding the factors affecting turnover in construction and to determine the relationship between the factors and employees' turnover intention. While the scope is confined, the study serves as a foundation for future research to explore the broader context of employee turnover in the Nepalese construction industry, considering diverse regions and factors.

Literature review

Construction

The construction industry holds significant importance in the Nepalese economy, consistently contributing

between 5% to 8% of the total GDP of the country over the last decade. In the fiscal year 2078/79, it accounted for 6.17% of the national GDP, amounting to approximately 681 billion Nepali rupees or US \$5.5 billion. With such a substantial contribution, the construction sector plays a vital role in the country's economic growth and development

The Federation of Contractors Association of Nepal (FCAN) serves as the umbrella organization representing construction entrepreneurs in Nepal, playing a vital role in advocating for the interests of the construction industry and promoting professional standards and practices.

As of the available data, the number of registered contractors in Nepal is as follows: Class A: 266, Class B: 267, Class C: 1,102, and Class D: 13,365. These classifications help differentiate contractors based on their capabilities and resources, enabling clients and stakeholders to identify suitable contractors for various construction projects.

Turnover

Employee turnover, as described by (Phillips, 2009), refers to the departure of employees from an organization for various reasons, such as seeking new opportunities, dissatisfaction with their current roles, or personal circumstances. (Albassi & Holman, 2000) provide a broader definition, encompassing the movement of employees not only between jobs but also between firms, different occupations, and even between states of employment and unemployment in the labor market. This movement of human capital has garnered significant attention from personnel researchers, behavioral scientists, and management practitioners (Mobley et al., 1979).

Retaining employees has become a critical challenge for organizations in today's competitive business landscape. As (ALLEN, 2003) points out, high turnover rates are prevalent across various industries, and addressing this issue has become a priority for ensuring organizational stability and success. High employee turnover can have both positive and negative consequences for organizations.

Factors affecting turn over

There are several factors that are the determinants of turnover intention. Based on extensive literature review, the following several major factors are identified that contribute to the turnover intention of construction professionals in Nepali construction industry:

1. Job satisfaction is a critical psychological variable extensively studied in relation to turnover (Mobley et al., 1979). (Saeed & Farooqi, 2014) emphasizes that positive feelings and pleasure derived from one's job contribute to job satisfaction, as well as the alignment between expected and actual job benefits, where a larger disparity leads to lower satisfaction. It can be defined as a pleasant emotional state resulting from the favorable evaluation of one's job

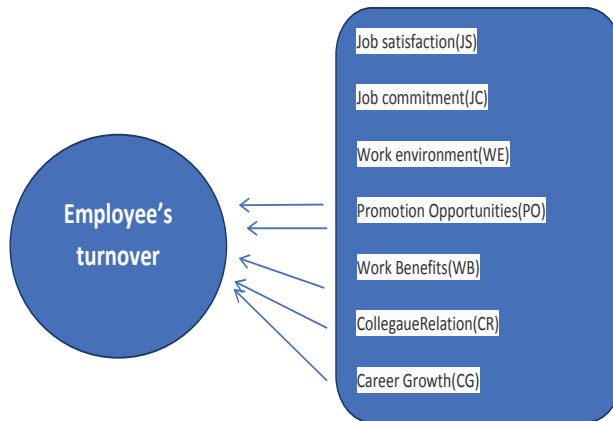
experiences or the level of positive attitude towards the job.

2. Job commitment is a significant aspect of employee retention and organizational loyalty. It refers to the emotional and psychological attachment that employees feel toward their job and the organization they work for. When employees have a strong sense of commitment, they are more likely to feel invested in their work and dedicated to the success of the company. This commitment goes beyond mere job satisfaction and involves a deeper level of loyalty and engagement.
3. Work Environment :Work environment encompasses the entirety of the physical, social, and organizational factors that surround an individual in their workplace. As defined by the source, it includes the materials and equipment used, the surrounding physical environment, the working strategies adopted, and the overall working conditions both as an individual and as part of a team.
4. Work Benefits: It is the work compensation given to an employee. With respect to employee compensation, there are two components. The first is the direct financial payments and the second one is the indirect payment . Direct compensation includes "salary, wages, bonus, incentives etc." whereas indirect compensation includes "medical facilities, insurance, retirement schemes, holidays etc."
5. Colleague Relation: It means the relationship with the people that an individual works with in an organization. Colleague relationship within the work environment can be watched through their qualities such as trust among each other, participation, and so on . The relationship between the colleagues may influence the work enjoyment since large amount of time is spend with the co-workers during the work hour. If one has a great relationship with colleague, he/she makes delight out of the work and stay committed to the work.
6. Organizational Politics: It is the work behavior of employees working in an organization or a workplace. perceived organizational politics as an attitude that is not under the formal authorization of the employer, clashes and disputes that may develop within the workplace setting by contrasting people or their groupism against each other.
7. Person-Organization Fit: It is defined it as the compatibility between employees, their job title and the workplace in which they work for. Several studies concerning the P-O fit have indicated that if an employee is deemed job-fit in the job, it increases the chance of the employee to stay in the same job.

Research methodology

Research Design: Quantitative methodology has been employed in this approach, based on the subject matter. This study has employed the methods of descriptive and correlational analysis for its research approach. The descriptive analysis tool includes the sample population and the correlational analysis tool to demonstrate the relationship of the dependent variable with the independent variables. Self-administered questionnaire was applied in this research distributed to Class A and Class B construction companies via email.

Conceptual Framework Based on the dependent and independent variables framework for the research was made as shown in figure.



Data Collection From the secondary sources like journals, articles information was collected and with the reference questionnaire were deployed and the responses was used as a source of primary data. Questionnaire was designed in easy and comprehensive for setting in mind the comfort to the respondents to answer the questionnaire. In this questionnaire design process, the entire form was divided into three sections i.e. Section I: Demographic, Section II: Turnover Intention Scale and Section III: Determinants of Turnover Intention. and Five Point Likert scale were used in the questionnaire form.

Population and Sample size : The respondents in this research includes Assistant sub engineer, Sub engineer, Engineer and Architect working in Class A and Class B construction companies in Nepal. In order to avoid biasness in data, two construction professionals from one Construction Company were provided with the questionnaire form. There are a total population of 100 Class A and 50 Class B contractors in Nepal (FCAN souvenir, 2020). Thus the population size is worked out to be 150. Using Cochran's formula, a sample size of 111 was obtained. Probability sampling was used in this research as the respondents were chosen through random sampling technique.

Data Analysis : The Spearman's correlation coefficient analysis and Relative Importance Index (RII) analysis

were conducted to identify the factors affecting turnover intention, show their relationship with turnover intention and determine their relative importance. Before conducting correlation and RII analysis, reliability and internal consistency test was done to make sure the questions in Five Point Likert scale were internally consistent.

Validity and Reliability: Three construction experts, each with over 15 years of experience in hiring and managing employees within Class A construction companies, were selected to participate in the survey. Their expertise and insights were sought to validate the identified variables and make necessary improvements to the questionnaire. In this case, the pilot test involved 15 construction professionals who were selected because they have a similar profile to the target population of the study. These participants were full-time employees working for Nepali construction contractors other than class A and class B contractors. To check this, Cronbach's Alpha analysis used in statistical software like SPSS. The results of alpha test for each independent variables involve for Job Satisfaction- 3items 0.865, Job Commitment-3items 0.831, Work Environment -3items 0.763, Promotion opportunities -2items 0.760, Work benefits-2items 0.860, Colleague Relation- 2 items 0.811, Career Growth -2items 0.679, Work life balance- 1 items 0.776, Supervision- 1 item 0.734, Organizational politics -1items 0.882 and Person-Organizational fit -1item- 0.832. After that the questionnaire was send through email. After the final collection of data, a total of 111 responses was collected from deployed tools.

Results and discussion

Demographic Results

Initially, the analysis focused on the demographic segment of the questionnaire in order to ascertain the characteristics of the respondents participating in the survey. The findings, presented in Table 1, highlight that the majority of participants were male, accounting for 87.4% of the total 111 respondents. In contrast, the representation of female participants was comparatively low, constituting only 12.6% of the overall respondents. Among the age groups, the 41-50 years emerged as the largest, comprising 77.5% of the total respondents, followed closely by the 31 to 40 years age group, which constituted 61.3% of the participants. Conversely, the least represented age groups were those aged 20 years and lower.

Further examination revealed that a significant proportion of respondents were married, making up 66.7% of the total. Within the professional roles, engineers dominated the sample at 54%, with sub-engineer representing the 28.8% and the lowest coverage is of assistant sub-engineer that is 8.1%.

Analyzing work experience, the study revealed that the 34.2% had more than 5 years of experience in their current

job. Similarly coverage results with that of 3-5 years by 24.3% of respondents. However, a lesser portion (10.8%) had only 1 years and less experience as an employee in different profession within the construction field.

Table 1: Demographic Analysis

Demo-graphic	Compo-nents	Number of Respondents	Percent-age
Gender	Male	97	87.4
	Female	14	12.6
	Others	0	0.00
Age	20 years and Below	10	9.00
	21-30	16	14.4
	31-40	42	37.8
	41-50	18	16.2
	51 and Above	25	22.5
Marital Status	Married	74	66.7
	Un- Married	37	33.3
Pro-fes-sion	Assistant Sub-Engineer	9	8.2
	Sub-Engineer	32	28.8
	Engineer	10	54.1
	Architect	111	9.0
Years of Expe-rience in Cur-rently Work-ing Com-pany	Less than 1 Year	12	
	1-3 Years		
	3-5 Years		
	5-10 Years		
	Above 10 years		

Years of Ex-peri-ence as Con-struction Pro-fes-sion-als	Less than 1 Year	7	11.48
	1-3 Years	27	44.26
	3-5 Years	13	21.31
	5-10 Years	11	18.03
	10-20 Years	4	6.56
	More than 20 Years	3	4.92

Spearman's Correlational Analysis

The Spearman correlation coefficient determination is a statistical test utilized to assess the extent of association between two variables. It is particularly suitable for measuring the correlation between variables measured on an ordinal scale, like the Likert scale employed in this research

The interpretation of the significance value in the context of the study is significant. If the significance value falls below 0.05, it indicates that a significant relationship exists between the independent variables and the dependent variable. Upon examination of Table 2, it becomes evident that all the identified independent variables yielded significance values below 0.05. This outcome reinforces the notion that a meaningful and statistically significant association exists between these independent factors and the turnover intention of construction professionals. Thus, the entire array of independent variables examined in the research, encompassing aspects like Job Satisfaction, Job Commitment, Work Environment, Work Benefits, Promotion, Colleague Relations, Career Growth, Work-Life Balance, Supervision, Organizational Politics, and Person-Organization Fit, have been determined to significantly impact the turnover intention among construction professionals in Nepal.

The Spearman correlation coefficient values, as illustrated in Table 2, further demonstrate that all the independent variables exhibit a significantly negative correlation with the turnover intention of professionals within the Nepali construction sector. This negative relationship, in the context of positively stated questionnaire items, implies that higher scores in the independent variables are associated with lower turnover intention among construction professionals. The Spearman correlation analysis has been instrumental in affirming the presence of strong, statistically significant negative relationships between various identified independent variables and the

turnover intention of construction professionals in Nepali construction companies. The non-parametric nature of this method, coupled with its suitability for ordinal data, has contributed to robust and insightful findings in understanding the interplay of factors influencing turnover intention.

Table 2: Spearman's Correlation Analysis

Dependent Variable	Independent Variables	JS	JC	WE	PO	WB	CR	CG	WLB	S	OP	PF
Turnover Intention	Spearman's Correlation Coefficient	-0.520	-0.428	-0.469	-0.031	-0.627	-0.579	-0.854	-0.584	-0.285	-0.793	-0.766
	Sig. (2-tailed)	0.000	0.000	0.000	0.746	0.000	0.000	0.000	0.000	0.002	0.000	0.000
	N	111	111	111	111	111	111	111	111	111	111	111

Factors Affecting Turnover Intention

Table 3 presents a concise overview of the analysis conducted to determine the relative importance of the factors influencing turnover intention among construction professionals within the Nepali construction industry. This summary underscores that the Work Environment emerges as the most pivotal set of variables impacting turnover intention, evidenced by a Relative Importance Index (RII) of 69.64%. Following closely is the Work Benefits category, ranking second with an RII of 69.23%. Organizational Politics secures the third position, boasting an RII of 68.20%. Succeeding these, the hierarchy of influence is determined by Career Growth, Promotion, Job Satisfaction, Job Commitment, Work-Life Balance, Supervision, Colleague Relation, and Person-Organization Fit, each characterized by RIIs of 68.01%, 66.03%, 56.33%, 51.77%, 50.56%, 45.70%, and 45.57%, respectively.

Consequently, this analysis underscores the paramount importance of the work environment, which takes precedence over work benefits and organizational politics in terms of its impact on turnover intention. Additionally, the research reveals that job satisfaction holds greater significance among construction professionals compared to job commitment. Notably, colleague relations carry a higher weight than person

organization fit in influencing turnover intention. Conversely, the study establishes person-organization fit as the least influential variable among those examined.

The findings from this analysis highlight the varying degrees of influence that different factors exert on turnover intention among construction professionals in Nepali construction industries. The comprehensive ranking provided by the Relative Importance Index offers nuanced insights into the relative significance of each determinant, thereby contributing to a more nuanced understanding of their collective impact on turnover intention.

Table 3: Relative Importance Index Analysis

Factors of Turnover Intention	RII Percentage	Rank
Job Satisfaction (JS)	88.18	6
Job Commitment (JC)	73.87	1
Work Environment(WE)	83.24	2
Promotion Opportunities(PO)	86.84	5
Work Benefit(WB)	89.72	9
Colleague Relation(CR)	81.17	3
Career Growth(CR)	89.99	10
Work Life(WL)	88.99	11
Supervision(S)	77.47	7
Organizational Politics(OP)	73.87	4
Person-Organizational Fit	83.24	8

Conclusion

The research sought to investigate the pivotal factors influencing turnover intention within the realm of construction professionals employed by construction companies in Nepal. The primary objective was to identify the determinants that underlie turnover intention among these professionals and subsequently establish the nature of their relationship with this intention. Notably, the analysis of relative importance index highlighted Job Commitment as the foremost influential factor among the determinants, closely trailed by Work Environment and Colleague relation. Evidently, these aspects—Job Commitment, Work Environment and Colleague relation—emerge as the central determinants predominantly driving turnover intention within the construction professionals' domain. Concurrently, the Spearman's correlational analysis demonstrated the statistically significant interplay between all eleven identified factors, including Job Satisfaction, Job Commitment, Work Environment, Work Benefits, Colleague Relations, Career Growth, Work-Life Balance, Supervision, Organizational Politics, and Person-Organization Fit, and the turnover intention of construction professionals.

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Influence of Pharmaceutical Marketing on Prescription Pattern of Physicians of Kathmandu Valley

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Abstract

Pharmaceutical marketing aims to increase awareness about the benefits and use of specific drugs, as well as to drive sales to pharmaceutical company. In this perspective this study tends to study the influence of pharmaceutical marketing on prescription pattern of physicians of Kathmandu valley. A total of 215 respondents were collected using a self-administered questionnaire. The research design used was correlational and sampling technique convenience. The studies showed that the promotional tools and strategy had a significant effect on the prescription generated whereas, the attitude of physicians didn't affect significantly on prescription provided.

Keywords

Promotional Strategy, Attitude, Prescription Generated

Introduction

Marketing is the process of promoting products or services to target customers through various channels to create awareness, generate interest, and ultimately drive sales or achieve specific business goals. Pharmaceutical marketing is the practice of promoting and advertising pharmaceutical product, medications and medical devices to health care professionals, patients, and consumers. It aims to increase awareness about the benefits and use of specific drugs, as well as to drive sales to pharmaceutical company. Pharmaceutical marketing often involves targeted advertising, direct to consumer advertising (DTCA), physician detailing (sales representative visiting healthcare provider to promote products), medical conferences and digital marketing. Pharmaceutical marketing is subject to strict regulations and guidelines to ensure the responsible promotion of drugs and medical products, prioritizing patient safety and accurate information dissemination.

Pharmaceutical company usually involve themselves in direct marketing activities to promote their products to healthcare professionals. The goal of direct marketing activity in pharmaceutical industry is to ensure that their product is sold to generate maximum revenue and profit. This is done by targeting the specific customer segments. (Corstjens, 1991) Classified four major stakeholders for prescription drugs: Prescriber, Influencer, Consumer and Financier. For prescriber the prescribing rights vary internationally and this category may include physician, dentists, pharmacist, nurses and optometrists. Influencers include hospital nurses, professors, reimbursement agencies. Consumers are the patients' parties and financier are partly patient, partly government or third party (varies

by country), managed health care organization (hospital, health Maintenance Organization etc.) In context of Nepal, financier is usually the patient party of the insurance: that may be government or private insurance facility.

The majority of the big pharma marketing budget is targeted at doctors and others with prescribing power, who are effectively the gatekeepers to drug sales. Lidstone (1999) suggests that the goal of pharmaceutical companies is to encourage individuals to start using their product or continue using it. To do this, companies must use a range of marketing techniques to target healthcare professionals at different stages of the buying process. The initial stage involves creating awareness of the product among healthcare professionals who may not be familiar with it. In the subsequent stage, the aim is to generate interest among the healthcare professionals by showcasing the product's unique features, appearance, or innovative aspects. After this customer shifts from phase of interest to evaluation, under which the professional will consider the effect of product upon his motivation i.e., lifestyle or image. The healthcare professional will analyze, rationalize and look for advantages with the new product depending on what the healthcare professional needs, such as improved efficacy, cost of treatment, the uniqueness of drug and safety. Once the healthcare professional becomes interested in a pharmaceutical product, the evaluation phase begins, which involves assessing the product's potential benefits and side effects. If the healthcare professional finds the product satisfactory, they may then move on to the trial phase, where they test the product to determine if it meets their expectations. At this stage, the pharmaceutical company must identify usage opportunities and suggest the product's usage to healthcare professionals. After the

trail phase, the health care professional may begin using the product by prescribing it to patients. At this point, the pharmaceutical company should provide reminders of essential elements such as the brand, therapy area, and the product's benefit to reinforce its usage. The final stage in the consumer cycle is the repeat usage- this is the final objective for marketing. When the health care professional moves from the occasional prescribing to regular prescribing, the move into the stage of automatically selecting the particular prescription drug. At this stage the major challenge for the pharmaceutical company is they have to maintain the environment that has led to satisfaction, keep a satisfactory image and keep confirming and reminding the healthcare professional of the unique benefits of the product.

During different stages of pharmaceutical marketing, a pharmaceutical company in their pursuit of increased profits, may use unethical methods to push their products. From the first stage of introducing the product, right to the final stage of prescribing and regular prescribing, the company may try to influence the healthcare professionals' choice in choosing particular drug.

In recent years, there has been a growing concern worldwide regarding the influence of pharmaceutical marketing on prescription practices of physicians. In Kathmandu valley, Nepal, pharmaceutical marketing is prevalent, and it is common for pharmaceutical companies to provide various incentives to physician to influence their prescription practices. However, there is a lack of research on the extent and nature of this influence, as well as its potential impact on overall healthcare system. Therefore, the purpose of this article is to investigate the influence of pharmaceutical marketing on practices of physician in Kathmandu valley.

As per the Association of Pharmaceutical Producers of Nepal (APPON), there are more than 100 Nepalese Pharmaceutical companies listed who manufacture, sell and distribute medicines all over the Nepal. All these pharmaceutical company have different marketing strategies with different goals. All of them have same customers who are doctor patients, retailers and wholesalers. The differentiating factor is their segmentation, targeting and positioning in market. (W.J, 2015)

The unique feature of pharmaceutical industry is the customer and the final decision maker for the use of product or the service is different than in other industry. Here, both the segments are dominated by physicians. The patients are the end users but they are not the direct customer to the company. Hence, pharmaceutical companies focus on physician to promote their product with using specific technique of promotion. And, these marketing strategy and promotional technique are seen to have significant effect on prescribing behavior. This create a question if there is really the need for physician

to prescribe the specific brand. This article aims to investigate the influence of pharmaceutical marketing on prescription generated in Kathmandu along with the attitude of physician towards the marketing and promotional activities of pharmaceutical company.

According to Campbell (2007), it is essential to comprehend the psychology of healthcare professional to gain their attention and increase the chances of them prescribing a specific brand. This study highlights the crucial variables that can help pharmaceutical companies optimize their marketing strategy and invest their resources efficiently to achieve consistent business performance throughout the year. Additionally, the paper provides fundamental insights into pharmaceutical industry in Nepal and sheds lights on physician perception of branded drugs. Different tools used by pharmaceutical company to promote their product are:

- Detailing (Korenstein, 2011)
- Sampling (Riccardi, 2022)
- Regular meeting of medical representative and relation enhancement (Komesaroff, 2002)
- The use of key opinion leaders or the senior clinicians and medical educator as speakers at learned conferences (Lerer, 2002)
- Scientific papers (Swarbrick, 2007)
- CME: Continuing medical education
- Sponsorship of conferences and educational events (Burton, 2003)

Literature review

Theoretical review

In the pharmaceutical industry, the end consumers and final decision-makers regarding the use of drugs are distinct from those in other industries. The patients are the ultimate consumers, while the primary customers of pharmaceutical companies are the doctors. The motivation of the doctor as an individual to prescribe a medical product is affected by multiple factor which can be related to personality trait theory.

Personality trait theory

Personality trait theory is a psychological theory that suggests that an individual's personality can be defined and understood by identifying and measuring a set of enduring characteristics or traits. These traits are relatively stable over time and are thought to be consistent across different situations. The idea of personality traits dates back to the ancient Greeks, but the modern trait theory was developed in the mid-20th century by psychologists such as Gordon Allport, Raymond Cattell, and Hans Eysenck. They identified a number of fundamental dimensions of personality that could be used to describe an individual's personality, including extraversion/introversion, neuroticism/stability, openness

to experience, agreeableness, and conscientiousness. Following their lead, other psychologists such as Robert McCrae and Paul Costa created the Five Factor Model (FFM) of personality, which is now widely recognized as a model for personality traits. This model divides personality into five broad dimensions, including openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism.

According to John, Robins, and Pervin (2010), "Personality trait theory is based on the assumption that individuals have certain characteristic ways of thinking, feeling, and behaving that differentiate them from others and that remain relatively stable over time and across situations". This theory has been widely used in research on personality and has practical applications in various fields, including psychology, education, and organizational behavior. Personality trait theory has been used in a variety of contexts, such as in the workplace to select employees or in clinical psychology to understand and treat mental health disorders. It can also help individuals gain a better understanding of themselves and others, as well as provide a framework for predicting behavior and making decisions. This theory suggests that an individual's personality traits can influence their behavior including decision making. When it comes to doctors and their choice of prescription brand, several personality traits may play a role in their decision-making process. (John O, 2010).

For example, doctors who score high in conscientiousness may be more likely to prescribe established brand name medications because they are perceived as being more reliable and trustworthy. They may also be more likely to follow established treatment guidelines and protocols. Doctors who score high in openness to experience may be more likely to prescribe newer, innovative medications or medications that are off-label for certain conditions. They may also be more open to alternative or complementary treatments. Doctors who score high in agreeableness may be more likely to take their patients' preferences and concerns into account when choosing a medication. They may also be more likely to consider the potential side effects and risks of a medication and weigh them against the potential benefits. Doctors who score high in neuroticism may be more risk-averse when it comes to prescribing medications, opting for medications that have a proven track record and lower risk of side effects. They may also be more likely to monitor their patients closely for adverse reactions or complications.

Overall, personality trait theory can provide some insights into the decision-making process of doctors when it comes to prescribing medications. However, it is important to note that doctors' decisions are also influenced by many other factors, such as the activity of the pharmaceutical company, patient characteristics, the nature of the condition being treated, and the availability of different

medications.

Personality traits can influence a variety of behaviors and decision-making processes, including the choices doctors make when prescribing medications. For example, research has suggested that doctors who score high in conscientiousness may be more likely to follow established treatment guidelines and protocols, which may influence their choice of prescription brand. Doctors who score high in openness to experience may be more likely to prescribe innovative or off-label medications. Those who score high in agreeableness may be more likely to take patients' preferences into account when prescribing medication.

However, it is important to note that doctors' decisions are influenced by a wide variety of factors, such as patient needs and medical evidence, in addition to their personality traits. Additionally, doctors receive training and follow ethical guidelines that require them to prioritize their patients' health and safety above their own personal preferences. So while personality trait theory may provide some insights into the decision-making processes of doctors, it should be considered alongside other factors that influence their decisions.

In the thesis titled "Influence of Pharmaceutical Marketing on Prescription Patterns of Physicians of Kathmandu Valley", the dependent variable is the prescription patterns of physicians of the Kathmandu Valley. The dependent variable is the outcome or response variable that is being measured or observed in the study. The independent variable is the pharmaceutical marketing activities being carried out in the Kathmandu Valley. The independent variable is the variable that is being manipulated or changed in the study to see its effect on the dependent variable. In this study, the researcher is investigating how pharmaceutical marketing activities influence the prescription patterns of physicians. The independent variable, pharmaceutical marketing activities, is being manipulated to see how it affects the dependent variable, prescription patterns of physicians in the Kathmandu Valley. The independent variables are listed as following.

- Detailing: Pharmaceutical sales representatives, commonly referred to as "detailers," engage in carefully planned and executed educational activities. These activities entail providing scientific information to healthcare professionals about a product's potential uses, benefits, and adverse effects. To facilitate productive discussions about a drug, these sales representatives use a detail aid or visual aid, which can be in the form of a print piece such as a booklet or brochure, or an electronic document containing comprehensive product information.. (McGraw, 2002)
- Sampling: The act of distributing drug samples to physicians and patients can create a dependence on

expensive medications that may not be more effective than other options on the market. The Dictionary of Modern Medicine from 2002 defines a sample as a unit of a prescription drug that is not intended for sale but is instead provided in smaller, non-prescription quantities to promote the drug's sales.

- **Scientific papers:** In this context, the term “scientific papers” refers to a range of promotional materials provided by pharmaceutical manufacturers or distributors, including brochures, booklets, mailings, detailing pieces, file cards, bulletins, slides, sound recordings, exhibits, and reprints. These materials contain drug-related information that is intended for use by medical practitioners, pharmacists, or nurses, and they are disseminated by or on behalf of the manufacturer, packer, or distributor. (Swarbrick, 2007)
- **Regular meeting of the doctors:** Connected Formal or informal deliberative assembly of individuals called to debate certain issues and to take decisions. Formal meetings are held at definite times, at a definite place, and usually for a definite duration to follow an agreed upon agenda.
- **Use of key opinion Leaders:** These are senior Consultants and Physicians usually the older and the most experienced ones. In the world of medicine, “key opinion leader” is the somewhat Orwellian term used to describe the senior doctors who help drug companies sell drugs (www.pharmamkting.com/glossary/keyopinionleader.htm). These influential doctors are engaged by industry to advise on marketing and help boost sales of new medicines. Across all specialties, in hospitals and universities everywhere, many leading specialists are being paid generous fees to peddle influence on behalf of the world's biggest drug companies.
- **CMEs-Continuing medical education:** Continuing medical education (CME) defines to a specific form of continuing education that helps those in the medical field maintain competence and learn about new and developing areas of their field. These activities may take place as live events, written publications, online programs, audio, video, or other electronic media. Content for these programs is developed, reviewed, and delivered by faculty who are experts in their individual clinical areas.
- **Sponsorship of Conferences:** There are a lot of national and international conferences regarding various fields of medicine around the globe. Certain registration fee is required for the participation. Pharma Companies sponsor such registration fees for conferences or any other educational events sometimes including the travel fares and accommodation.

Empirical review

In the present era, the influence of pharmaceutical marketing on the prescription practices of physicians has become a major concern in the healthcare industry. Pharmaceutical marketing refers to the promotional activities used by pharmaceutical companies to promote their products to physicians. In recent years, the increasing influence of pharmaceutical marketing on prescription practices has been a subject of debate among healthcare professionals, policymakers, and scholars. This literature review aims to explore the existing literature on the influence of pharmaceutical marketing on prescription practices of physicians in the Kathmandu valley.

Hurley, Lane and Stafford have conducted the research describing the relationship between the availability of free prescription drug samples and physicians prescribing patterns on a national scale (Hurley, 2014). This can help inform policy guidelines on the use of free samples in a physician's office. Its objective is to investigate the relationships between free drug samples and physicians' local and national prescribing patterns and between the availability of free drug samples and prescription costs.

Zahrani (2014) attempted to examine the impact of drug representatives on physicians' prescribing behavior, as well as their attitudes toward these representatives, and other factors that may influence their prescribing habits. Similarly, Khosru and Sultana (2011) sought to analyze the promotional techniques employed by pharmaceutical companies, physicians' attitudes and reactions to such activities, and the effect of gift-giving as a promotional tool on physicians' prescribing practices. Many research studies have examined the impact of pharmaceutical industry marketing on the prescribing habits of doctors. A study conducted by Ghimire et al. (2014) in Nepal found that 81.4% of physicians reported receiving gifts from pharmaceutical companies, and 76.3% reported attending conferences or seminars sponsored by pharmaceutical companies. The study also found that physicians who received gifts or attended conferences or seminars were more likely to prescribe the sponsor's products.

Pharmaceutical marketing efforts directed to physicians are getting more and more attention over the years. There are many tactics adopted by pharmaceutical companies (Chiu, Selling drugs: marketing strategies in the pharmaceutical industry and their effect on healthcare and research., 2005) such as physicians-targeted promotions which are free samples, journal advertisements (Marco CA, Gifts to physicians from the pharmaceutical industry: an ethical analysis., 2006), printed product literature and other gifts that helped them to increase the acceptability of their products (Goyal R, 2013). On average, pharmaceutical companies spent 20% or more of their sales on marketing which made them a lot of money, and they had little incentive to stop those tactics (M., 2008). It was estimated that 84% of pharmaceutical

marketing efforts are directed toward physicians because from the manufacturer's point of view, physicians are the key decision makers (Gönül FF, 2001), (Al-Areefi MA, 2013) the gatekeepers to drug sales (J., 2004). The structure of pharmaceutical markets differs from country to country because it has a national character. However, the pharmaceutical industry has an international nature. To the best of our knowledge, few published studies addressed the situation in the developing world, and very few were those in the middle-eastern countries.

Pharmaceutical marketing is a complex and multifaceted concept that involves various promotional strategies used by pharmaceutical companies to influence the prescription practices of physicians. These strategies may include free drug samples, gifts, meals, conferences, seminars, and symposia, among others (Sah et al., 2017). These marketing strategies are designed to create a positive image of the company's products and influence physicians to prescribe their products.

This finding is consistent with other studies that have shown that pharmaceutical promotion can influence the prescribing practices of physicians. For instance, a study conducted by Al Ameri et al. (2018) in Qatar found that pharmaceutical promotion had a significant influence on prescribing practices of physicians. The study found that physicians who had interactions with pharmaceutical representatives were more likely to prescribe the promoted drugs. A study conducted by Shrestha et al. (2018) in Kathmandu valley found that pharmaceutical marketing had a significant impact on the prescribing practices of physicians. The study found that physicians who received gifts or attended conferences or seminars sponsored by pharmaceutical companies were more likely to prescribe the sponsor's products.

Pharmaceutical promotion is a common practice that can influence the prescribing practices of physicians. The study by Satyal et al. (2019) aimed to investigate the influence of pharmaceutical promotion on the prescribing practices of physicians in Kathmandu Valley, Nepal. The study found that most physicians reported receiving promotional materials from pharmaceutical companies, with drug samples being the most common form of promotion. The study also found that physicians who received promotional materials were more likely to prescribe the promoted drugs than those who did not receive any promotional materials. Furthermore, the study found that there was a lack of awareness among physicians about the potential negative impact of pharmaceutical promotion on their prescribing practices. The British Medical Journal published a special edition in May 2019 that focused on the connection between doctors and pharmaceutical companies. The issue was titled "time to untangle doctors from drug companies" and included articles and discussions on the relationship between the medical profession and the pharmaceutical industry (Big

Pharma).

A study conducted by Sisay et al. (2019) in Ethiopia found that pharmaceutical promotion had a significant influence on the prescribing practices of physicians. The study found that physicians who received promotional materials were more likely to prescribe the promoted drugs than those who did not receive any promotional materials. Another study conducted by Satyal et al. (2019) in Kathmandu valley found that 94% of physicians reported receiving gifts from pharmaceutical companies, and 86% reported attending conferences or seminars sponsored by pharmaceutical companies. The study also found that physicians who received gifts or attended conferences or seminars were more likely to prescribe the sponsor's products. The pharmaceutical industry is a highly competitive global industry that has its roots in the chemical industry of the late nineteenth century in the Upper Rhine Valley near Basel, Switzerland. During this time, it was discovered that dyestuffs had antiseptic properties, which led to the emergence of modern pharmaceutical companies. Many of these companies, such as Hoffman-La Roche, Sandoz, Ciba-Geigy, and Novartis, started as family dyestuff and chemical companies in the Rhine region and are still thriving today. (Kumar, R., et al. (2020)

Pharmaceutical marketing is a global issue that affects prescribing practices of physicians worldwide. A systematic review by Fabbri et al. (2020) found that pharmaceutical marketing had a significant impact on prescribing practices of physicians in low- and middle-income countries. The study also found that most of the promotional activities were not adequately regulated, which increased the risk of biased prescribing practices.

In 2006 article "Pharmaceutical Marketing - Time to Change," published in the Electronic Journal of Business Ethics and Organization Studies, Buckley discusses two marketing strategies used by pharmaceutical companies: pull and push. The pull strategy is more prevalent in countries like the United States and New Zealand, where pharmaceutical companies are allowed to advertise their products directly to consumers through mass media, known as direct-to-consumer advertising (DTCA). However, this has been a controversial issue among medical professionals and health-related agencies. Proponents of DTCA argue that it helps consumers become better informed and more aware of the therapeutic options available to them, thus allowing them to make more equitable decisions about their healthcare. Mintzes' research supports this view, finding that consumers who learn about drugs through advertisements are more likely to choose those drugs and persuade their physicians to prescribe them. This strategy is opposed to the push strategy, which is used in many countries that do not allow direct advertising to consumers. In the push strategy, pharmaceutical companies rely on marketing to healthcare professionals to influence them to prescribe

their drugs over others. This approach is seen as a more viable and reliable method for pharmaceutical companies in countries where direct advertising to consumers is not permitted. (Buckley. J, 2016)

Multiple studies, including those conducted by Wazana in 2004 and Chren in 1989, have established a strong connection between the prescribing behavior of doctors and the receipt of gifts, sponsorships, or unrelated payments. These studies highlight the impact of gifts on doctors' prescribing practices. (McInney WP, 1990), (Banks, 1992) A review of 29 empirical studies examining the relationship between the medical profession and the pharmaceutical industry found that doctors are more likely to prescribe drugs based on factors such as the pharmaceutical company's detailing skills, product sampling, scientific materials, relationship with the doctor, and participation in continuous medical education (CME) meetings conducted by pharmaceutical companies as a promotional tool.. (Wazana, 2004)

While reviewing the above literature it was found that there is phenomenal relationship among the recommendation of the drug versus promotional strategies implemented by the pharmaceutical companies. Hence, the researcher is looking to identify the Influence of Pharmaceutical marketing strategies on prescribing pattern of physicians of Kathmandu valley Lexchin has conducted an analysis of the impact of three types of interactions between physicians and pharmaceutical companies, namely company-funded clinical trials, company- sponsored continuing medical education (CME), and information provided by pharmaceutical detailers to physicians. The analysis examines the influence of these interactions on the quality and focus of clinical trials, the content of CME courses, and the prescribing behavior of physicians. (Wu, Y., et al. (2021). Pharmaceutical companies aim to create a competitive edge for their products by developing better formulations than those of their competitors. To achieve

this, they engage in extensive promotion of their drugs to healthcare providers. Medical representatives use visually appealing presentations and highlight the benefits and advantages of their products to entice doctors.

The literature reviewed suggests that pharmaceutical marketing has a significant impact on prescription practices of physicians in the Kathmandu valley. The studies indicate that physicians who receive gifts or attend conferences or seminars sponsored by pharmaceutical companies are more likely to prescribe the sponsor's products. The studies suggest that exposure to pharmaceutical promotion is associated with biased prescribing practices, higher costs, and lower prescribing quality. There is a need for stricter regulations and ethical guidelines to address these concerns and ensure evidence-based and cost-effective prescribing practices. This raises several ethical concerns, and policymakers and healthcare professionals should take necessary measures to address these concerns.

Research framework and Hypothesis

The key concepts needed to be dealt with while studying the influence of pharmaceutical marketing on prescription practices are: pharmaceutical marketing, prescription generated, patient health outcome, along with their relationship and interaction.

Pharmaceutical marketing includes various promotional strategies employed by pharmaceutical companies, such as direct to physician marketing, advertising, detailing, samples, conferences and sponsored events. Prescription practices refer to the decision-making process of healthcare providers when prescribing medications, which can be influenced by factors beyond clinical

consideration, such as marketing efforts. The most important aspect in this system is patient health outcome. The impact of prescription practices on patient health and wellbeing including the affordability is a critical aspect to consider.

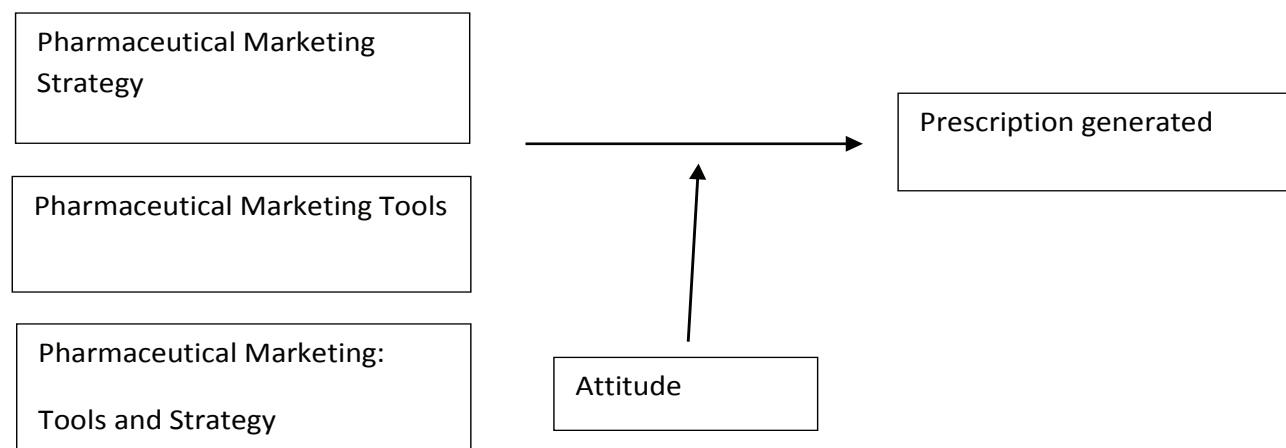


Fig: Influence of pharmaceutical marketing on prescription

The conceptual frame work provide visual representation of the variables and their hypothesized relationship:

Hypothesis 1(H1): The marketing strategy used by pharmaceutical company enhance the prescription of the specific brand being promoted.

Hypothesis 2 (H2): The marketing tools used by the company enhance the prescription of the particular brand being promoted.

Hypothesis 3 (H3): There is positive attitude of physician towards pharmaceutical marketing.

The main components of the conceptual framework and postulated hypothesis are independent variable and dependent variable.

Independent variable: Pharmaceutical marketing, that consist of different market strategy and tools used by pharmaceutical company, to place their product in market. Marketing strategy should be well defined that address the targeted customer, their needs and align with the regulatory requirements. In other hand the tools used should complement the strategy and

provide the appropriate and efficient medium for communicating about the brand also providing the information about their safe and responsible use.

Strategy used in pharmaceutical marketing:

- Market Segmentation
- Brand positioning
- Key Messaging
- Marketing channels
- Compliance and regulations

Tools used in pharmaceutical marketing:

- Doctor calls made by sales representative
- Use of most appropriate digital medium
- Organizing medical educational program to physicians and also to patients
- Distribution of sample and promotional materials like: brochures, posters
- Gifts (nominal and high value)

Dependent variables: This variable represents the prescribing behavior of physician in Kathmandu valley, including the type of medication prescribed, the frequency of prescription, and the cost of production.

Moderating Variable: The attitude of physician towards pharmaceutical marketing directly or indirectly effects the prescription generated.

Research methodology

Research design

The research, influence of pharmaceutical marketing on prescription pattern utilize a quantitatively approach as its primary goal is to investigate the factors that significantly affect the prescription generated. The study examined

the relationship between the independent and dependent variables using statical methods. Based on the initial data analysis, it was determined thar the survey method is the most appropriate approach to gather information for the study. According to (Hawkins et al., 1983), suitable method for collecting information for the study is through survey, as it is a quantitative approach. A questionnaire was formed that included the information including basic demography of the participant, to gather theirs' background. The questionnaire included the question to access the effect of different marketing strategy and tools of pharmaceutical company and tried to analyze their effect on prescription generated.

Sample and Procedure

The population of the study were physician practicing at Kathmandu, those who has obtained the NMC number, that is the unique identity number given by Nepal Medical Council on clearing the qualifying exam, after clearing MBBS. The sample unit consisted of physician working in different private and public hospitals of Kathmandu valley. Physicians, included all the practicing doctors of different specialties like consultant physician, diabetologist, endocrinologist, neurologist, general practitioners, who has completed MBBS, cleared NMC qualifying exams and above. The total number of physicians approached were 400 but only 215 responded the questionnaire. Convenience sampling procedure were used to come to the sample size. Questionnaire were distributed by electronic media using whatsapp, viber, gmail.

Among the responded, there were 78% of male and 22% of female. Among these responded 35.6% had an experience of less than 5 years, 39% had an experience of 5-10 years, 18.6% had an experience of 10-15 years where as 6.8% had an experience of 15 years and above.

Measures

The influence of pharmaceutical marketing on physician can be through their various promotional strategy targeted to prescriber or pharmacist or patient themselves, as direct advertising is not allowed on main stream media or any social media. Pharmaceutical company uses different strategies and tools to create brand value, make relationship with physician thus generate the prescription.

Interaction of physician with pharmaceutical company

At present context the primary point of interaction between the pharmaceutical company and physician are medical representatives, sales calls and the sales team behind them. According to NMSRA, Nepal Medical Sales Representative Association there are around 5000 sales representatives, representing 212 companies (domestic and foreign) affiliated to them under their 15 different

units. They make a regular sales call, stay in touch with individual physician and make sure of prescription generation and that these prescriptions are honored from chemist of pharmacist end. Thus, a successful sales call is completed. The medical representative or sales team are the direct point of contact between company and prescriber.

In the study, the physician is asked about their individual experience and the effect of the activities of pharmaceutical company on their practice. Majority of the physicians readily answered the questionnaire. Their view towards marketing strategy and tools were measured on Likert scale. Along with it, the physicians were asked about the intensity of effect of each marketing strategy and tools on prescription habit.

Result and discussion

Table 1 shows mean and standard deviation calculation for effect of pharmaceutical marketing strategy toward prescription generated, effect of marketing tools towards prescription generated and attitude of physicians towards

pharmaceutical marketing in Kathmandu. The analysis shows that mean value is highest with promotional tools, which shows that various mentioned tools of pharmaceutical marketing have highest effect on the amount of prescription generated. While the attitude of physician towards marketing activity has lower value, with 9.73 which shows that physicians in Kathmandu have relatively unfavorable inclination towards the marketing activities. The standard deviation value shows how spread the data set is, the highest S.D is 3.76, which indicate the data for promotional tools is most spread out.

Table 1 Descriptive Statistics

	Mean	Std. Deviation	N
Promotional Strategy	11.75	2.97	213
Promotional tools	12.50	3.76	213
Attitude	9.73	2.56	213

Table 2 shows the relationship between the promotional strategy, promotional tools with prescription generated and attitude of the physician towards the promotional activities of pharmaceutical company in Kathmandu. Pearson correlation analysis showed that promotional strategy and promotional tools has positive effect on prescription generation ($r=0.217$, $p<0.05$) and (0.285 , $p<0.05$). Similarly, the relation of pharmaceutical promotion with attitude of physician is found to be positive ($r=0.285$, $p<0.005$).

Table 2 correlation between marketing strategy, tools and prescription generated

		Promotional Strategy	Promotional tools	Prescription Generated
Promotional Strategy	Pearson Correlation	1	.217**	0.13
Sig. (2-tailed)			0.001	0.059
N		213	213	213
Promotional tools	Pearson Correlation	.217**	1	.285**
Sig. (2-tailed)		0.001		0
N		213	213	213
Attitude	Pearson Correlation	0.13	.285**	1
Sig. (2-tailed)		0.059	0	
N		213	213	213

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the reliability analysis or Cronbach's alpha value of each item being tested in the study, it shows the listed items: promotional strategy, promotional tools, and attitude of physician are moderately related to each other and the data collected is consistent. During the analysis two cases were removed by SPSS showing total of 213 sample out of 215 collected, that also increased internal consistency of the data.

Table 3 Reliability Testing

	Cronbach's Alpha	N of Items
Promotional Strategy	0.536	5
Promotional Tools	0.654	5
Attitude	0.654	5

Testing of Hypothesis

Through the t-test we can see that the marketing strategy used by pharmaceutical company has an influence on prescription generated ($t=8.271$, $p=0$) by physician for the specific brand. Thus, hypothesis 1 is accepted.

Similarly, value of t-test for influence of promotion tools on prescription generated of the specific brand shows that, there is significant influence ($t=1.055$, $p=0.293$) of the promotional tools on prescription generated for the specific brand. Thus, hypothesis 2 is accepted.

It is found that the attitude of physician towards the pharmaceutical marketing, both tools and strategy have significant influence on prescription generated ($t=3.99$, $p=0$). Thus, hypothesis 3 is accepted.

Conclusion

Pharmaceutical company harbor a high degree of social responsibility through their product i.e., medicines and medical devices. Access and selection of these product is critical choice and can make a significant difference in quality of life and sometimes life or death of an individual. So, the study of the factors that affect the choice of medicine or therapy is of utmost importance. Through the analysis of the different strategy and tools used by pharmaceutical company in market, it is found in the study that these promotional strategy and tools used by pharmaceutical company has significant influence on the prescription generated by the physician. It is also concluded the attitude of physician towards pharmaceutical marketing in Kathmandu is positive.

Drug promotion is essential both for pharmaceutical industry and physician for business sustainability and dissemination of medical information about medicines and devices. Thus, there is a need to take a path ahead that lies in the middle ground of supporting industry and ensuring the practice strictly adhere to guideline laid down by regulatory body.

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Parental Participation in children's teaching learning process of institutional schools in Kathmandu

Dr Yashodham Tripathi & Prof. Dr. Sateesh Ojha

Abstract

The purpose of this study was to explore the parental participation in teaching learning process of institutional schools. This study focused on the perception of school management body (head teachers, chairpersons, and members of the SMC) and beneficiaries (students and parents) on the parental participation in school teaching learning process. The study included the exploration of the examination of the readiness of the school management body on the parental involvement in school teaching learning, examination of the readiness of the parents to participate in this mission, diagnose of the factors, affecting and corrective measures of the parental participation and identification of the main areas of the parental participation and expected outcomes.

I used the qualitative research methodology for this study that included interview, discussion and focus group discussion and observation of the sample schools. I generated data required for this study form review of relevant literature and intensive field work in five institutional schools of Kathmandu.

During the study I came to know that there are several factors that influence the parental participation in school teaching learning process. The factors are related to home, society, school and education act rules and regulations. I found that the current parental participation is in terms of attending the school on the students' progress report card distribution day, visiting to school if invited, visiting to school to pay fees and participating in the educational activities organized by school. I found the participation of parents in teaching learning process is low. The reasons are : the schools do not have clear policy, and program to involve parents, the school management does not have adequate knowledge of making parental participation in school program, parents are busy with their work, parents cannot afford time to attend school, parents depend more on school, parents do not have knowledge of the need of their participation in school teaching learning process and the communication system between parents and school is weak to facilitate parental participation in school teaching learning process.

Based on the finding of my study, there is a need of developing policy and program for parental participation in school teaching learning process. MOEST and concerned agencies should take initiative for these policy related activities and program. There is need of creating awareness of the parents about the need of their participation in school teaching learning process. There is need of providing training to school management teachers, students and parents to increase the parental participation in school teaching learning process by developing effective training modules, learning materials and sensitization parental education materials .

The finding of this study would help to develop school parental program to improve teaching learning process. The identification areas of parental participation and perception of key informants need to be considered while designing parental program.

Keywords

Institutional School, School management committee, Parental participation, Qualitative research. MOEST, teaching learning activities.

Introduction

School community is a complex that consists of several stakeholders. The stakeholders are parents, students, professional educators, political legislatures, religious leaders, social workers, business persons etc. all of them may or may not have interest in the educational activities of the school. However, almost all the parents look closely at the school educational activities and services extended to the communities. School provides educational services to the children of the community under certain educational norms of the state. Parents are the integral partners of schools who can help schools in different ways to manage school system effectively and improve the education delivery process. It is essential for parental involvement in education planning, implementation, monitoring, and assessment of student's learning process and feedback phases. For this, there is need of parental participation in the school education process, especially in school learning process. There could be a number of approaches for making effective parental participation in school education system but which are the effective to improve the system. This need to be explored. The school management should provide opportunities to the parents to take part in school educational process through dialogues, meeting and communication each other about the school management system and children's teaching learning process.

Parental participation in school system is essential to develop their attitude towards school that will be translated directly or indirectly to the school support. Their participation help develop their support to the school program and to improve the teaching learning situation in the school. It means that the parents can play a key role in school education system for bringing improvement in the management and teaching learning process. They are the most important stakeholders in school management system if they are consulted properly and their suggestions are incorporated into the system. They receive information from the school in oral or written form from the school about their children and in turn, their children communicate about the school activities in a formal or informal ways to the parents. This communication mechanism requires for strengthening and interlinking with school management systems for effective management. Parents can act as educators and learners in the school education systems. They may serve as non instructional volunteers and instructional volunteers for all or for some subjects being taught at schools. For the improvement of the school education system there is need of proper utilization of parental force in the management of teaching learning situation at the school. The school management should take this as a positive force in the management of school education and for delivering quality education to the children.

Regarding school teaching learning process and its effects

on learning, Bista (2004) has identified that there exists positive correlation between the parental involvement and children's test scores and class attendance. The scholar has remarked that the parental participation in school education may help leverage communication, collaboration, support, sharing expectations and interests to each other and understanding the stand-points of each member directly or indirectly involved in the mission of education.

In this context, different scholars have expressed their convictions differently. At the same time, there exists some sort of consensus among them that the school management itself is one of the hindrances against active parental participation in teaching learning process. For example, a recent online article reads as:

Besides the parents' belief, school administrators and teachers discourage parents' participation. They believe that parents' involvement in school decision may interrupt the regular flow of decision making and parents will achieve too much power and create conflict in school organization. They have a threat to parents' authority in decision making. These two main obstacles – the parents' and teachers' mind-sets -- prevent parental participation although the researches have revealed that the parental roles can be an effective resource of school improvement (Robertson, 2005).

Statement of the problem

The role of school management and parents may be fundamental to deliver quality educational services to the students. One of the major aspects related to quality services would be to produce better students' performance by making effective teaching learning process in school. Effectiveness of teaching learning process may be dependent on a number of factors such as school management, teaching personnel, parents and students. Without their collaborative effort, it may be difficult to make an effective teaching learning process in school. Therefore, participation of parents may be taken as an essence of teaching learning process in schools.

In the case of institutional schools, the situation should be viewed further different. My twenty five years' experience in managing an institutional school as a head teacher has encouraged me to undergo a self-inquiry to identify a number of facets related to the present status of parental participation in institutional secondary schools and perceptions of the school management (head teachers, teachers and SMC) and beneficiaries parents and students on the parental participation in school teaching learning process. For this, I have framed a single statement of the problem- How do the school management and beneficiaries perceive the need of parental participation in institutional secondary schools of Nepal so as to contribute for improving school teaching learning process? Therefore, my problem statement was that what

role parents' participation plays on children learning process.

Purpose of the study

The purpose of the research was to explore the perceptions of the school management and beneficiaries on the parental participation in school teaching learning process.

Literature review

Structure of Teaching Learning Factors.

Teaching and learning are interconnected. There are different factors that influence school teaching learning process, as it has been discussed earlier. Bernard (1962) has developed a paradigm of teaching learning relationship. This paradigm consists of four aspects of education, viz. teacher, student, learning process, and learning situation. The author has considered the learning process as an interaction between teachers and students. The learning situations may include teacher-taught interactions and other educational programs within or outside the schools. The following framework presents with the patterns of interactions in teaching learning process (as cited in Sharma, 2004, p. 218) For the purpose of the present study too, this model may be useful to replicate the parental participation as an additional environmental factor to harmonize the teacher's contribution in teaching learning process. Home and school environment are the leading factors of parental participation in school teaching learning process. Bronfenbrenner (1979) (as cited in Devi, 2003) has stated that there is need of application of system theories that consist of interactions between the developing person and the environment.

The scholar has used two broad terms: home and school that interacts each other to make the participation in teaching learning process. This interaction takes place in certain social and physical setting or environment which refers to the school or home. The developing person is viewed as growing and active individual. The interaction between the developing person and the environment is viewed as a two directional or reciprocal relationship. In other words, there exists a process of mutual accommodation to which both person and environment make contributions. The environment that is relevant to human development is not limited to a single, immediate setting (e.g. the home, school, or work). Rather, the ecological environment is much broader and includes immediate settings, interaction between immediate setting (e.g. the relationship between home and schools or home and work place) and larger settings, including the culture (which influences specific settings).

The above discussions include a number of factors related to school teaching learning process. Among these factors, home and school environment may be the vital aspects which cannot be ignored during the study of parental participation in school teaching learning process and programs. Taking these aspects into consideration, I

reviewed the literature related to school environment as described in the sub section:

School Environment

School is a learning place that accommodates the parents and students having different backgrounds. School environment is one of the major factors related to parental participation in school teaching learning process and program. School management has to play a vital role in developing a learning and educating environment in school. Stern (2003) has said, "Schooling is about the whole of life, and teachers need to draw on the outside world, including the world of pupils' families". This statement clearly indicates that the school is an important place for students where teachers and school management should consider equally their families and environment of home and school for making betterment in teaching learning process.

On the basis of above reviews, it may be referred that parental participation is one of the crucial issues in the context of Nepalese school education. Since the concerned of parental participation has been newly addressed in the context of Nepal, further studies on parental participation in teaching learning process, school management, continuous assessment, school educational program planning and others are essential qualitative setting. For this purpose, the next chapter presents with the alternative courses of actions opted by the present researcher to make this study more scientific as well as qualitative.

Research approach and design

The present research study has been primarily based on qualitative approach. I have extensively relied on exploratory design of the data collection since most of the data were gathered through a series of in-depth interviews, participant observations, and content analysis of the existing documents supporting the inquiry in relation with parental participation in school teaching learning process. My personal discussions and in-depth interviews with the various participants of this research survey contributed significantly to diagnose the above concerned of the study and exploration of suitable solutions for better parental participation in school teaching learning process.

Selection of the study schools

The entire study was conducted in Kathmandu district-based five institutional secondary schools. Initially, I made a list of 25 institutional secondary schools of the core city of the Kathmandu. Then I made contact to the principal of these institutional schools and explained my purpose to them. Among them only 18 schools were found ready to accept my proposal to visit and conduct my research study in their schools. Then after, I classified the schools with respect to size of students (nursery to class ten) into three groups: 300-400, 401 to 500 and 501 and above. As mentioned above, the study sample units comprised of five head teachers from five selected institutional

secondary schools of the valley, ten teachers representing two from each study school, ten SMC (C & M) members representing two from each study school, fifteen students and fifteen parents representing three from each school. Table 1 The Distribution of the Key Informants of the Study.

Number of Study Schools					
Schools	Principals	Teachers	Students	Parents	SMC (C&M)
Academy School	1	2	3	3	2
New Horizon School	1	2	3	3	2
Kuleshwar School	1	2	3	3	2
Gyanakunj School	1	2	3	3	2
Dhaulagiri School	1	2	3	3	2
Total	5	10	15	15	10

Source of primary data

The sources of data were the head teachers, teachers, students, parents and SMC (C & M) of the selected institutional secondary schools. Similarly, a number of school-based documents were also used as the sources of data to be used for the purpose of the present study.

Data analysis and presentation

To explore the perceptions of the school management body and beneficiaries on the research areas, I made appointment with head teachers of the sample five institutional schools by telephone call and also requested to arrange for meetings with teachers, chairpersons, members and students for the same purpose. When I visited the schools I firstly explained the purposes of the visit, the topic and objectives of the dissertation to make them ready to answer the research questions. Then, I started personal interview and in order to make the interview successful, I even translated the questions hoping that they would answer qualitatively in order to motivate them to answer my questions. I offered them a bottle of fanta each to quench their thirst, made them sit comfortably and started asking questions to them. Their perceptions have been presented below:

Perception of the head teachers

Involving the Parents

There were a series of questions to ask the key informants. I started from the first question, "What is your opinion on involving parents in school teaching learning process?" One of the participating head teachers reported that the parental involvement in school could be an important endeavor if they can give time to school teaching learning

activities. But they are not ready to give time to the school for this purpose. In this connection, one of the respondents expressed as:

Parents should be positive to their children's learning pace at home rather than in school. They should encourage their children's learning process. They can do these things at home. What they can do attending the school about the teaching learning process.

From the above quotation, I found that head teacher was willing to invite the parents to take the responsibility of assisting their children for doing home assignments and providing encouragement in teaching learning process at home. He is not well prepared to involve the parents in school teaching learning process. Another participating head-teacher during the discussion directly objected on the possibility for the parents to go to schools and observe the teaching learning process to know what it is going on and what should be improved in the process. However, he suggested that the parents could better support the school management and subject teachers as well by providing suggestions frequently. He also suspected on the level of support provided by the parents saying, "They do not pay adequate attention to their children; I am tired of suggesting the parents to take care of their children's studies while they are at home."

The perceptions of head-teachers indicated that they expected the parents' supervision of the children's learning at home to improve school teaching learning process. The head teachers were found dissatisfied with the present support provided by the parents to their children's learning process at home. They were found not fully ready to bring the parents to observe the classroom teaching learning process.

In the researching process, I visited third sample institutional school to interview and discuss personally with the head teacher. He states that:

Parents are the responsible persons for education of their children. However, they generally do not visit the school for making inquiry of the progress of their children unless they are invited. Their support to their children at home will be better to improve the teaching learning process.

I found that this participating head teacher emphasized the roles and responsibilities of the parents at home rather than in school teaching learning process. It was also known that the parents generally do not visit the school to ask their children's learning except at the time of fee paying. At that time they meet teachers to know the progress of their children.

During the conversation the head teachers told me that most of the parents expected the school to be able to manage all learning difficulties of the children. He added that the parents expected the school to take full responsibility of their children's study. He expressed, "Parents would like to be free from the tension of study of

their children. They generally do not give time to school teaching learning process."

Initiative Action

I asked second question to one of the participating head teachers, "Have you ever initiated any action of the parental involvement in the process of teaching learning?" The head teacher confused to some extent to reply this question. He tried to escape from exact answer. He told that the parents do not have time to attend the school why should we waste our time and their time. In this regard, another head teacher replied without hesitation that he had not taken any effort so far but we call parents if needed to discuss student's progress. Then, I interviewed another participating head teacher. He said, as "We do not have time to plan and carry out such parental involvement activities and but we call parents of the weak students in the meeting."

Then, I interviewed and discussed with, another head teacher he told that he had not taken any new initiative except inviting the parents in some parents meetings. In this regard, another head teacher also gave similar reply. I really agree with Hillagard (1972) who says that learning is the process as well as the product. In this connection parents are one of the important elements in teaching learning process of their children. Their children's better performance greatly depends on care, concern, love, participation of their parents to their study.

Main occasions of inviting parents and reasons

As a researcher, I put the third leading question to the head teachers, "What are the main occasions in which parental involvement has been emphasized? And why?" The participating head teacher replied directly that he used to invite the parents to attend the progress report distribution day to review their children's progress. They also invite the parents to attend the parents day and sport day to give information about school activities. He added that sometimes the parents of weak students were called separately to discuss their learning difficulties with subject teachers. Another participating head teacher said that they invite the parents to take the progress report of their children and to attend the cultural activities of the school to inform the school progress. He further added that the parents were busy with their work and did not afford time as needed for school. Then he expressed as, "Though the parents do not attend the parental meetings, we should continue to invite them and should not drop the process of inviting them, and should continue dialogues with them about the school programs and teaching learning process of the children".

I interviewed another head teacher who replied that the school invites the parents as and when needed to support the school to help in teaching learning process, especially to discuss about the students' learning difficulties and misbehaviors. He added that the school generally calls the

parents to attend the cultural program if organized. Then, I continued interviewing another participating and gave similar replies to the research question. The participating head teachers expressed that the parents should be committed to school teaching learning process through assisting their children in doing homework and assisting them whenever needed in the learning process.

Almost all the head teachers perceived that there is no need of direct involvement of parents in school teaching learning process but the parents can help by providing comments on their children's progress to the school management. They invite the parents to attend the progress report card distribution day, parents' day and cultural program day. They also invite the parents of the weak students to discuss the learning difficulties. The teachers perceived that the school management is not ready to involve the parents and they should consider this issue.

Perception of the smc chairpersons and members

After completion of the interview with the head teachers, I requested the head teachers to arrange the meeting of SMC chairpersons and one of the members to discuss on the parental participation in school teaching learning process. In this regard, I developed a schedule of interview and discussion with chairpersons and members of SMC. I conducted the meeting of chairperson and one member of SMC in each study school separately. On my request each head teacher of the study school cordially invited the SMC chairperson and member on their convenient time to the school. I gave a brief orientation on what I am trying to do to the chairpersons and members of the SMC. Then, with their permission I interviewed chairpersons and members together in the sample schools on the research questions. Their perception has been presented below:

In this regard, another chairperson told that it is duty of school management to involve parents in teaching learning process. Similarly, during the discussion, the chairperson strongly expressed, "Without the involvement of the parents in school teaching learning process the school teaching would not be better." Then, I discussed with another SMC member who told that school can provide effective teaching services to students if the school can involve the parents in this process. Then, I interviewed another chairperson and member of another sample school as per schedule and interviewed them. I continued the process of meeting and discussion with SMC chairpersons and members. Then, on the next schedule, I interviewed another chairperson. He told that the parents cannot be isolated from the school teaching learning process for good management of school. The participating member of SMC also supported the chairperson's statement and added that parents could be a better vehicle for providing creative suggestions for school so that their involvement is vital for effective teaching learning process.

Perception of the teachers

As a researcher, I requested the head teachers to select two secondary level teachers to discuss about the parental participation in school teaching committee. Altogether there were ten teachers representing two from each sample school.

I planned to conduct a pair interview and discussion with the sample teachers in schools to find out their perceptions towards the research questions. Firstly, I asked the leading question to the teachers, "What is your opinion on the readiness of the school management to involve the parents in school teaching learning process? The teachers were in pair so that I gave enough time to each of them to speak about this subject. They reported that the school management is not fully ready to involve the parents in school teaching learning process though there is need of involvement of parents in teaching learning process. Another pair of teachers told that the headteachers should be active to involve the parents in this process rather than chairperson and members of SMC. One of the teachers expressed as:

The chairperson and members of SMC do not know the details of school and do not have time to consult the parents and students. So, head teachers and teachers are responsible for involving parents in school program. Teachers should push the management to invite the parents to school.

Perception of the smc chairpersons and members

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The chairperson and members of SMC do not know the details of school and do not have time to consult the parents and students. So, head teachers and teachers are responsible for involving parents in school program. Teachers should push the management to invite the parents to school.

Conclusions

On the basis of the overall findings of the study I concluded that the chairpersons and members of the school management committee (SMC) are fully committed to involve the parents in the school teaching learning process. Unlike this, the head teachers were found not fully ready to involve the parents in school teaching learning process though they were committed to involve the parents in assisting for carrying out children's homework and supervision of their learning at home. The teachers are more committed to involve the parents in school teaching learning process if the school management provides favorable environment for this purpose.

The school does not have policy and program for parental participation in school teaching learning process that need to be designed and implemented for effective parental participation in the school under the framework of the parental background and expectations.

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Study on the owner driven approach for the reconstruction of damaged houses; a case study of Nepal earthquake response 2015

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Abstract

Nepal lies in earthquake prone area. Nepal experienced big magnitude of 7.8 Richter scale earthquake in 25th April 2015 recently which occurred after 81 years of the deadly earthquake. The wild earthquake was responsible for significant economic loss which was estimated seven million USD¹ and large number of infrastructures damage with 755,549 individual houses. Government of Nepal, various donors including international communities worked together for rehabilitation and reconstruction of damaged infrastructures and individual houses. This study aims to know the completion rate of reconstruction of individual houses which was done through the cash transfer modality.

Government of Nepal formed Nepal reconstruction Authority to lead reconstruction and decided to provide conditional cash grant (CCG) shelter re-construction to the eligible beneficiaries.

Keywords

Reconstruction, Nepal Reconstruction Authority, conditional cash grant, CLPIU, DLPIU

Introduction

Nepal is most vulnerable country in terms of multi hazard and earthquake risk. It ranks 4th, 11th 20th and 30th in terms of climate change, earthquake, multi-hazard and flood risk respectively.² As the country lies in the high seismic zone, large-scale earthquakes were frequent in the country in the past including the earthquake of 25th April 2015 and 15th January 1934. The recent earthquake adversely affected the country and it's economic growth.

Nepal Reconstruction Authority (NRA) was leading reconstruction efforts until January 2022 which is now taking responsibility by Nepal Disaster Risk Management Authority (NDRRMA). Reconstruction of individual house is being carried through conditional cash grant (CCG) and technical assistance. Beneficiaries were selected as per criteria set by NRA and project agreement (PA) was done with eligible beneficiaries to provide financial and technical assistance. As of December 2021, it is reported that 741,031 houses were reconstructed as NRA had conducted conditional cash grant agreement with 827,340 beneficiaries. There is an increment of beneficiaries by 9% during the agreement time as compared with baseline.

Department of Urban Development and building Construction (DUDBC) provided technical support and monitoring whereas Ministry of Federal and Local Development (MoFaLD) was responsible for community mobilization and facilitation. District level project implementation unit (DLPIU) of both ministry level provided technical support at the district level.

Methods

Literature review was carried out to perform this study as a first step. Both primary and secondary data were collected to do detailed analysis. Below mentioned steps were followed to conclude this study.

Literature review on the Nepal earthquake 2015 and reconstruction related policies, guidelines, and documents

Nepal earthquake 2015 related documents such as news, video documents, post disaster need assessment (PDNA) and other facts were collected and reviewed. Guidelines, policies, and directories as well as technical manuals also reviewed. The theoretical part of each document were used to enhance knowledge on reconstruction and other sections were used to know detailed procedures for house construction specially on cash grant disbursement and monitoring.

1 PDNA 2015, Government of Nepal

2 UNDP/ BCPR, 2004

Questionnaire preparation

Questionnaires were prepared to collect primary data from field. District level information was collected from District Administration Office (DAO), District Coordination Committee (DCC previously known as DDC), Nepal Red Cross Society (NRCS), Non-Government organizations (NGOs) and Municipalities. The purpose of information collection was to know how beneficiaries were selected, what kinds of documentations were needed to include in agreement with Government, how beneficiaries were received and utilized conditional cash and; how did beneficiaries build their houses.

Secondary data was collected from various sources such as project implementation units (CLPIUs), National Reconstruction Authority, Nepal Disaster Risk Reduction Management Authority (NDDRM) and Housing Recovery and Reconstruction platform (HRRP)

Study on procedure of reconstruction

Local level Government unit selected beneficiaries for shelter assistance as per NRA guidelines and did agreement with eligible households (HHs). Department of Urban Development and Building Construction (DUDBC) prepared sets of prototype design of houses with different designs. Beneficiaries were asked to select one of the type and model of house from the catalogue. Trained construction workers were providing technical assistance along with NRA Engineers during the construction time. NRA was releasing first tranche which is NPR 50,000. First tranche is estimated for site clearance and construction work upto plinth level. Once beneficiaries utilized first tranche, they are eligible to receive second tranche. After the technical report verified by Engineers, such beneficiaries are eligible to receive NPR 150,000 as second tranche which is provided for superstructure work. After utilization of second tranche, beneficiaries are subjected to complete latrine construction. After the technical verification, such families are eligible to receive third tranche which is NPR 100,000. All the transactions are made through bank transfer.

Housing reconstruction guideline is explaining the process and requirement followed by monitoring checklist. NRA has prepared technical monitoring manual for common understanding and uniformity.

Gap analysis.

Based on the primary and secondary data, gap analysis was done to know the reasons of delays in house construction. Data analysis and presentation

Study data and analysis technique

Both primary and secondary data was collected, quantified, and analyzed. Identified beneficiaries, number of grievances, project agreement (PA) signed, first/second/third tranches disbursement, number of house completion and verification related data was collected.

Secondary data collection and analysis.

Beneficiaries, fund disbursement and house completion data is mentioned below.

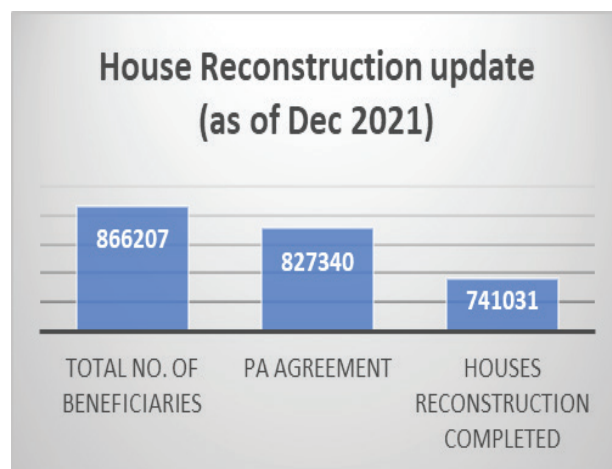


Figure 1: House reconstruction update.

Figure 1 shows 866,207 families are eligible to receive shelter grant for house reconstruction however NRA has made conditional cash grant agreement with 827,340 HHs only which is 95.5% total beneficiaries. Total number of beneficiaries has been increased by 9% as compared with post disaster need assessment (PDNA) report.

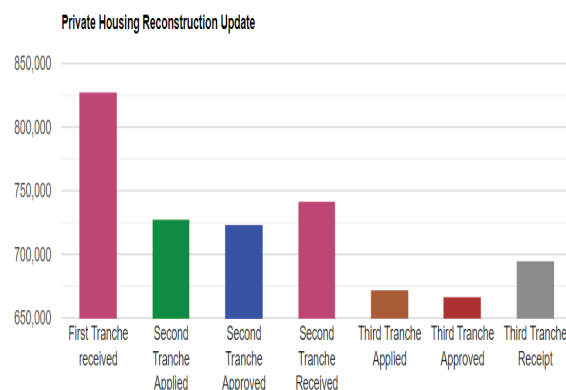


Figure 2: Fund disbursement status for house reconstruction

Figure 2 above shows number of beneficiaries who received first, second and third tranches. Beneficiaries are eligible to receive first tranche immediately after the agreement signed. Hence, high number of beneficiaries received first tranche. To receive second and third tranches, beneficiaries are needed to utilize cash for house construction as per agreed design and specifications. It takes time for construction, verification, submission and approval. So, less number of families are receiving subsequent tranches slowly. Some families are also not starting construction after receiving first tranche which resulted drop out in the beneficiaries list.

Table 1 shows district wise progress against beneficiaries who has signed in agreement and completed house. 75% of the beneficiaries completed house as of December

2021 in 31 districts. Reconstruction rate is more than 85% in eight districts and less than 50% in five districts.

Table 1 : District wise reconstruction progress

SN	District	Total No. HHs	Agreement	completed	Percentage
1	Sindhupalchok	90573	88617	79885	90%
2	Nuwakot	78518	76537	68536	90%
3	Dhading	82598	80322	59565	74%
4	Dolakha	72388	69409	62161	90%
5	Gorkha	70363	68593	59251	86%
6	Ramechhap	55576	54221	41275	76%
7	Kavre	80743	77124	54609	71%
8	Sindhuli	40308	38936	20860	54%
9	Makwanpur	38443	31035	22721	73%
10	Okhaldhunga	26336	25787	24555	95%
11	Kathmandu	48235	43534	19227	44%
12	Rasuwa	12934	12274	10905	89%
13	Lalitpur	29485	26849	10097	38%
14	Bhaktapur	28648	25153	11104	44%
15	Lamjung	14887	14294	6899	48%
16	Tanahun	14856	18688	12367	66%
17	Solukhumbu	12779	12444	11334	91%
18	Khotang	9977	9622	6056	63%
19	Chitwan	8443	7478	6401	86%
20	Gulmi	4723	4469	3309	74%
21	Syangja	9421	9070	5170	57%
22	Kaski	6602	6043	4322	72%
23	Palpa	5104	4576	2391	52%
24	Bhojpur	6735	5848	3456	59%
25	Parbat	5928	5665	4185	74%
26	Dhankuta	3460	3186	1896	60%
27	Nawalparasi	1077	1071	1009	94%
28	Baglung	2553	2374	1965	83%
29	Arghakhanchi	1225	1100	705	64%
30	Sankhuwasabha	2224	2067	968	47%
31	Myagdi	1065	954	713	75%
Total		866207	827340	617897	75%

Similarly, Table 2 shows only 95.51% of beneficiaries conducted an agreement with National Reconstruction Authority for housing grant. Such 38,867 HHs are not taking participation in the reconstruction process. There are seven districts where less than 90% beneficiaries signed the agreement for house construction.

Table 2: District wise agreement status

SN	District	Total No. HHs	Agreement	Agreement Completed
1	Sindhupalchok	90573	88617	97.84%
2	Nuwakot	78518	76537	97.48%
3	Dhading	82598	80322	97.24%
4	Dolakha	72388	69409	95.88%
5	Gorkha	70363	68593	97.48%
6	Ramechhap	55576	54221	97.56%
7	Kavre	80743	77124	95.52%
8	Sindhuli	40308	38936	96.60%
9	Makwanpur	38443	31035	80.73%
10	Okhaldhunga	26336	25787	97.92%
11	Kathmandu	48235	43534	90.25%
12	Rasuwa	12934	12274	94.90%
13	Lalitpur	29485	26849	91.06%
14	Bhaktapur	28648	25153	87.80%
15	Lamjung	14887	14294	96.02%
16	Tanahun	14856	18688	125.79%
17	Solukhumbu	12779	12444	97.38%
18	Khotang	9977	9622	96.44%
19	Chitwan	8443	7478	88.57%
20	Gulmi	4723	4469	94.62%
21	Syangja	9421	9070	96.27%
22	Kaski	6602	6043	91.53%
23	Palpa	5104	4576	89.66%
24	Bhojpur	6735	5848	86.83%
25	Parbat	5928	5665	95.56%
26	Dhankuta	3460	3186	92.08%
27	Nawalparasi	1077	1071	99.44%
28	Baglung	2553	2374	92.99%
29	Arghakhanchi	1225	1100	89.80%
30	Sankhuwasabha	2224	2067	92.94%
31	Myagdi	1065	954	89.58%
Total		866207	827340	95.51%

Construction progress and Challenges

Findings and recommendation

Main findings of the study are listed below:

- a. Owner driven approach is one of the best and widely accepted approach for reconstruction of shelters in all earthquakes affected districts: It is found that ownership feeling is high in the cash transfer modality as it created flexibility for procurement and construction worker selection.
- b. Delays in reconstruction: The country is still in recovery phase as eight years already completed when reconstruction phase started. It is found that 95.51% of total selected families agreed to rebuild the houses whereas only 75% of the houses were built so far. It is learnt that country has spent more time for beneficiary selection and tedious paperwork also made delays in starting construction work. It is also known that NRA has conducted beneficiary selection process multiple time which consumed resources and time.
- c. Frequently changing policies and regulations: Due to political instability, Government has changed key personals at the top level frequently in National Reconstruction Authority (NRA) and such turnover made significant changes in reconstruction policies. These changes made confusion at the district level and at the beneficiary level. Initially, Government announced NPR 250,000.00 as total cash grant for house reconstruction and later new Government made changes on amount and increased to NPR 300,000.00. NRA also made significant changes on cash disbursement conditions, technical supervisions checklist and deadline.
- d. Less community participation: The reconstruction process has been conducted in owner driven approach however it is learned that community people and local stakeholders are consulted less in the reconstruction process. NRA is only focusing on conducting agreement with beneficiaries and technical supervision.
- e. Lack of Capacity development of local construction workers and beneficiaries: Community meetings, one to one technical meeting and technical orientations were not provided to beneficiaries. NRA and different Government and Non-Government organizations conducted training to construction workers at limited only. Many families brought construction workers from outside the community and districts for reconstruction. If NRA could identify, train and capacitate local construction workers in all working communities, construction works could be completed quicker than this. Beneficiaries could be mobilized for construction followed by 1 or 2 lead masons to make house faster and stronger.

- f. Inconsistency on data management: It is observed that data is not managed in structured and uniformed way. There are many raw data is available in different leading Government Offices which is creating confusion and inconsistency.
- g. Substantial paper works and documents: Beneficiaries were asked to complete many paper works such as agreement, inspection checklist, technical recommendation papers, application for the fund request, acknowledgement receipts and other paper works which made the delays in construction work, difficulties on managing huge volume of paper works.

Conclusion

From the above analysis, it is concluded that reconstruction of houses is going very slowly. Due to rapid changes in policies and management, involvement of many Government and non-Government organizations and slow fund disbursement process resulted delays in house construction. It is known that only 75% of individual houses were completed in eight years.

Recommendations:

Policy level intervention

Government of Nepal needs to prepare reconstruction and rehabilitation policies immediately after such disaster. Once prepared, Government should make amendments after certain interval not the replacement. Such policies should be prepared in consultation with affected families by including people with disabilities (PWDs), women and children to make inclusive.

High level of community participation

Community groups at the local level should be formed with 20-30 households in each group to train and mobilize for owner driven approach. Members of such groups will learn from each other and can also make exposure visit to other groups. It will help to complete reconstruction in very short period with quality construction.

Capacity Development

It is strongly recommended to conduct various types of capacity development activities at different level during construction process which includes; orientation to beneficiaries on build back safer, mass awareness on safer construction, training to construction workers at the community level, advanced training to lead construction workers at village level and Training to community supervisors at municipality level. Standard type of tool kits should be provided to construction workers and basic tool kits should be provided to beneficiaries to start construction.

Continuation of cash transfer modality

It is recommended to continue cash transfer modality as it gives flexibility to the beneficiaries on procurement and construction.

Further study is recommended on the reconstruction process and quality of houses.

It is strongly recommended to know the reasons of delays in reconstruction of individual houses in the deeper level. It is also recommended to do study on the quality of construction to know the compliance of National building code.

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Orphanage operating practices in Nepal: An Evaluative Study

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Abstract

This article intends to uncover the performance of existing orphanages operating in the country. Sources of the data were primary as well as secondary, for the primary data organizers of the orphanages were contacted and conducted interviews. The samples were from the orphanages running in Kathmandu, Dolakha, and Nuwakot Districts Nepal.

The preliminary findings made from this ongoing research are orphanages are getting more financial and non-financial support than in the earlier days. Such supporters are donor agencies, governments of different levels, the general public, communities, etc. However, areas for support are basically directed to proactive them from vulnerable conditions rather than enhancing their education and health.

Keywords

orphanage, orphans, supporting agencies, government

Background of the Study

Children who have lost one or both of their parents due to a variety of reasons fall under the general category of “orphanhood,” which describes their social situation. (Abehe, 2005). Children who are orphaned are typically categorized as AIDS orphans or non-AIDS orphans. (Ennew, 2005). It was believed that there are subtypes of orphaned children within these broad categories. One of these divisions is for African AIDS orphans. (Abehe, 2005). The average age of these orphans is typically lower than that of other orphans; according to UNAIDS, one in three AIDS orphans is under the age of five. Their guardians are typically grandparents since the aunts and uncles who would typically assume that responsibility have frequently passed away from AIDS. (Sachs & Sachs, 2004).

Orphanages support children who have lost parents or been abandoned, often lacking essential needs like food, shelter, clothing, and education. Wars have historically contributed to the rise in orphans, but humanitarian organizations, governments, and religious institutions have built secure environments to ensure every child meets their basic needs for a healthy life. (UNICEF, 2016). Alternative care options like foster care and adoption have emerged for orphaned or abandoned children, providing a family-like atmosphere. Nepal has developed various types to accommodate the growing number of orphans and vulnerable children. (Weisman, 2011).

Orphanages have a long history, dating back to the fourteenth century in Europe. In America, few orphanages existed before the 19th century, with religious groups

founding them in response to wars and epidemics. (Whitney, 2014). He further stated that, From the 1920s, Western charities closed orphanages due to protests about institutionalization based on religious, cultural, or racial lines. Governments have since controlled the welfare of orphans and vulnerable children through social services. UNICEF reports over 163 million orphans worldwide, with over eight million living in institutions like orphanages. These institutions aim to create a safe and beneficial environment for children to grow, providing an alternative to the foster care system or private adoption. . (Whitney, 2014).

Every child, whether orphaned or not, is entitled to an education. (Bagunywa, 2006) that a human right to education. In the same vein, it is also said that a fundamental human right, education, is a crucial tool for overcoming the many obstacles that lie ahead and striving to realize the goals of social justice, freedom, and peace. (Hirst and Peters, 2012). highlight the idea that education should be viewed as a set of processes that help people develop a commitment to what is worthwhile in a way that is enlightened by a breadth and depth of learning.

Moat and Palmay (2002). revealed that in 1999 in South Africa. According to their survey, 42% of children under the age of seven lived in single-parent, female-headed households. They stressed that many South African youth do not grow up in families where they are taught respect. There are still young people who survive extremely painful childhood circumstances and go on to become successful and well-adjusted members of society despite warmth and positive interpersonal relationships. With the

use of this research, a program was created to help stop youth crime.

Gathering data from kids, teachers, and communities that are dealing with mortality but appear to be surviving might help create techniques for building the resilience of orphaned students. Two kids were admitted to an orphanage where they started “living a semi-normal life,” according to a recent item in the Newcastle and District newspaper (Mlotshwa, 2004. p.l). In this article, a semi-normal existence was defined as one in which kids reside with an unfamiliar person who serves as their guardian. When the parents were still living, the child was cut off from their friends, siblings, and extended family as well as the neighborhood where they had grown up.

In Nepal Paropakar Pathshala, a children’s shelter in Nepal, was established in 1953 to support abandoned or orphaned children. Other unofficial charity organizations, such as Handi Khane Pathshala in 1914, and Dudh Khane Bachcha Palne Adda in 1919, Orphaned children in Nepal face challenges due to poverty, requiring individuals, non-profit organizations, and government efforts to adapt and provide facilities. The management of vulnerable and orphaned children and orphans has been an important part of children’s day-to-day activities (Weisman, 2011). Managers oversee organizations, ensuring resource adequacy, community participation, and monitoring, considering socioeconomic factors for improved project performance in Nepal. (Schutt, 2009) Orphans and vulnerable children’s projects aim to improve electorate living, but slow progress is hindered by funding abuse, patronage, technical capacity issues, and poor planning. (Shair, 2012) Project managers need technical expertise, interpersonal skills, and leadership for success in planning. A child’s development requires parental love, care, and protection; the family environment is crucial for nurturing and trust. (Gaventa and Blauert, 2016), Disadvantaged groups, like vulnerable children and orphans, face devaluation and ridicule. (UNICEF 2016). High living costs cause families to place children in orphanages, providing essentials like food, housing, education, and healthcare, resulting in a significant number of orphans. (Latif et al., 2016). Orphans in Pakistan face financial burdens due to parental deaths, unmarried couples, and societal opposition to adoption, relying on public or private charities.

Attention and remedies are needed for AIDS-related orphaned children, but focus on AIDS has obscured other causes. AIDS-related orphan children prioritize donor and charity initiatives, while extended family structures offer coping mechanisms. Early parental loss can negatively impact children’s education, well-being, and females’ first assignments, causing increased anxiety and sadness. (Richter, 2004). Orphaned children may lose familiar surroundings and social networks. (UNICEF, 2008). Orphans can be defined epidemiologically,

legally, socially, or culturally, depending on individual and country context. Examples include extended family systems, children lost to parents, and various age groups, such as maternal, paternal, or double orphans. (Skinner, 2004).

In the formative years, a child’s immediate family and surroundings significantly impact their growth and development. These settings provide nourishment, love, acceptance, belonging, safety, and security. However, the general public often disregards and undervalues disadvantaged groups, including vulnerable or orphaned children, due to a lack of socioeconomic support. (Gaventa, and Blauert, 2016).

Children in Africa, including Ghana, often live on the streets due to factors like parental deaths, poverty, sexual abuse, domestic violence, neglect, and family dissolution. They often lack family support and work as household helpers, sellers, or laborers without adult supervision or employment. (Orme, and Seipel, 2010).

South Africa’s orphanage rate rose from 7.9% in 1993 to 18% in 2005, causing psychological issues like low self-esteem and stress. (Case & Ardington, 2006). Early caregiver loss can negatively impact academic performance, emotional trauma, and emotional damage to children, potentially affecting school performance. (Sharma, 2006),

Academic success is influenced by social and home environments, with poor living conditions hindering intellectual advancement. (Matseke, 1981). Parental death increases a child’s inability to write by 15% and orphaned by 27%, negatively impacting middle childhood education and well-being. (Rozana, 2009).

Statement of the Problem

In Nepal, orphans are becoming more common due to abuse, underage labor, exploitation, and HIV infection, resulting from calamities and social, economic, cultural, and internal issues. Nepal faces challenges in providing care for orphans and vulnerable children due to its high poverty levels. The government’s National Plan of Action on Orphans and Vulnerable Children (OVC) does not improve families’ ability to protect and care for OVC, provide economic support, or mobilize community interventions. This has led to poor performance in Kathmandu. (Nzioki, 2014). The country’s high proportion of street children and orphan dropouts demonstrates the ineffectiveness of these programs. Management struggles to provide essential needs, leading to children sleeping on floors, limited access to food and healthcare, and attending informal school classes on mud walls with minimal equipment. (Nzioki, 2014).

Orphans are vulnerable populations in communities with adoption systems that prefer families to care for them. However, Africa faces rising orphan numbers, disintegrating kinship systems, and a lack of adoption

regulations, making it more vulnerable. Research on orphanage management has advanced, but areas require more attention. Understanding long-term outcomes, alternative care options, quality, cultural factors, child participation, transition, and reintegration can inform policies and practices for childcare and well-being. (Magampa, 2014). Orphanage relies on donations and charitable giving for employment, lacking a set income, and competitive wages and benefits, making management challenging. This study aims to fill this gap in the literature.

Nepali orphanages face challenges in terms of resources, facilities, infrastructure, and quality of care. Cultural and environmental factors, limited participation, and transitional difficulties affect children's well-being. Further research and interventions are needed to improve children's well-being and advance them. The extended family system in Africa is changing and serving as a safety net for orphans and vulnerable children. Modernization has led to a loss of obligation to distant family members, and the perception of a family primarily consisting of the mother, father, and children is changing. Orphans may be shunned by extended families because of poverty. (Ahiadeka 2003). Local community organizations and NGOs collaborate to develop diverse solutions. Organizations providing financial transfers to orphans and vulnerable children face difficulties in paying donors for health and educational products, timely treatment, and access to healthy food. The report suggests examining policy initiatives and guidelines for their implementation and enforcement. (Sanganyi, 2012).

Orphans and vulnerable children initiatives in Kathmandu struggle with poor results due to inadequate funding, resulting in a significant increase in dropouts and a lack of quality services. This study examined the academic performance of orphaned primary school students in Nepal, highlighting home-related relationships and the need for further research. (Jakachira, 2013) Academic success is influenced by social environment and home environment, with poor living conditions hindering intellectual advancement. A global study found that 35% of orphans were aged five-9, and 50% were aged ten-14. (Fredison & Kanabus, 2005). Orphans significantly impacted elementary school students, while research on self-concept and academic achievement in high school students showed a weak positive association. (Mooketsi, 1998).

The danger of trauma persists when children are removed from their parents. Using the example of a disgruntled child who queries a border official: "How can I better understand the trauma faced by children who are separated from their parents?" The danger of trauma is ongoing when children are taken away from their parents. Uses the example of a disgruntled kid who queries a border official: "How can I better understand the trauma faced by children who are separated from their parents?" "Will

I ever see Mommy again?" (Borjas, 2013). Children without a primary caregiver face traumas that haunt them throughout their lives, which can also affect their parents, who blame themselves for exposing them to such troubles. The separation actions do not benefit anyone, as children struggle to grow up and understand the world around them. Hollywood actor, Gina Rodriguez echoes this sentiment, stating that children fleeing violence and unrest deserve better and should be protected from their families." (HerIs Gina, 2018). Ensure children's unity with their parents and prevent further separation. Purpose of the Study.

This study examines orphanage management in homes and schools, addressing diverse orphan needs in Nepal's educational, professional, economic, cultural, and social endeavors.

Objectives of the study

The Main Objectives of the Study Areas are below:

- I. To explore nutrition and food provided by orphanages to orphans.
- II. To explore special attention to medicine and health for orphans
- III. To explore education and skill being provided to orphans.
- IV. To address the challenges of providing skilled personnel and training.

Research questions

The Main Issues Raised in This Research Question are as Follows.

- I. How the food and nutrition provided to orphans by orphanages?
- II. How to provide special attention to medicine and health for children?
- III. What kinds of education and skills need for children?
- IV. Which trainings need for staff and managers of the orphanages?

Research design and procedures

The researcher used a descriptive, cross-sectional research design, including interviews, surveys, and observations, to understand these occurrences. Data were collected from branch managers, founders, and institutions of Institutions 1,2,3, and 4, from three districts, who work with orphans, vulnerable children, and the general population. The study design was ideal because it was intended to obtain data on orphanage administration and its consequences on orphaned students' academic performance. (Mugenda & Mugenda, 2003). Qualitative research is a methodological approach in academic and social sciences that uses non-numerical data, such as interviews, observations, and textual analysis, to understand human behavior, experiences, and attitudes.

This study investigated the needs of orphaned learners using interactive methodologies, involving interactions with managers and orphans and extracting social activists' responses.

The study used semi-structured interviews to gather participant data on events and societal phenomena. These interviews provided insights into participants' goals, assumptions, moral principles, and justifications, enabling the discovery of similarities. The qualitative research approach collected descriptive information and behavior from individuals, focusing on societal phenomena and human problems. (Creswell, 2009). The qualitative research methodology gathers descriptive data from the subjects and the observed behavior.

Research instrument

Primary data were collected using a questionnaire. Both open- and closed-ended questions were included in the questionnaire. Open-ended questions were used to encourage respondents to provide an emotional and in-depth response without feeling constrained in illuminating any information, while closed-ended questions allowed respondents to choose from a limited set of options that had been stated. Open-ended or unstructured questions allow respondents to provide more in-depth responses, whereas closed or structured questions are typically simpler to evaluate. Questionnaires were used to save time and money and to make the analysis easier. Additionally, an interview guide was used to gather information about the study's subject from the project managers and staff members working on the unbound project. (Sauders, 2011).

Operational framework

Orphanage management is a child-centered approach that addresses the complex needs of orphaned or abandoned children. It employs qualified staff; ensures physical health through checkups, vaccinations, and access to medical facilities; and maintains a nutritious diet. Education is crucial for enrolling children in formal schools and providing resources for those unable to attend external schools. Skill development programs equip children with practical abilities to successfully transition to independent living or higher education.

The framework prioritizes children's psychological well-being and offers counseling, therapy, and mental health services. This fosters creativity, social skills, and positive peer interactions through recreational activities and extracurricular pursuits. The staff underwent continuous training in the nurturing environment. The orphanage management framework prioritizes the physical, emotional, and psychological welfare of orphaned and abandoned children. It involves continuous monitoring, evaluation, and individualized care planning. It relies on financial management practices, partnerships, and stakeholder collaboration.

Data collection and analysis

Most of the orphanages reported that the source of food and nutrition was collected from international donors, INGOs and INGOs, government officials, regional organizations, local municipalities, charities, women's society, individuals, communities, and stakeholders, but some orphanages did not receive any support from INGOs and INGOs, except the Nepal government and citizens of Nepal. The health of orphans and vulnerable children is monitored by medical doctors who visit institutions to treat orphans. Some children are sent to hospitals for treatment and some hospitals offer sick beds to orphanage residents. In addition, a small percentage of the cost has been discovered that when orphans were ill, treatment facilities were able to care for them more quickly than other patients; numerous local groups, organizations, district hospitals, and community hospitals provided a certain number of medications to orphanages, and they used to normal treatment if they had more problems they were sent to the hospital for further treatment.

The orphanages facilitated preliminary education in orphanages following the curriculum according to the Nepal Government; however, greater emphasis should be placed on both student interests and children's daily lives. They focus on technical education, which should benefit children and secure their future lives. Managers and staff employees frequently work with children; thus, they must be knowledgeable about all facets of child development. Hence, they must offer them training. On the other hand, managers and employees are the parents of the children. All the children depended on these members.

Finding and discussion

Children's basic needs include food, water, clothing, sanitation, a safe place to sleep, and safety. Orphanages receive varying levels of support from donors; some of the orphanages have more donors, which provide more facilities, whereas, with fewer donors, orphanages provide fewer facilities. Every orphanage has aimed for social service rather than financial support, but some of the orphanages provide social services with financial benefits. The population and geography of Nepal do not all have equal access to opportunity. Because there aren't enough hospitals in some areas to care for orphans, and because some orphanages are located far from hospitals, there are transportation issues. Because of this, orphans did not receive timely care.

Education is important for building children's future, providing opportunities and knowledge, fostering personal development, and uplifting society. It fosters critical thinking, creativity, and social engagement, enabling children to navigate the complexities of life. Education also helps close gaps in social spheres, promoting a more egalitarian environment. It also stimulates curiosity and flexibility, enabling personal growth in an ever-changing

world. Orphans should be given the opportunity to receive an education, but due to a variety of issues, they may not be able to do so on time. Some of the orphanages lack an educational facility, have poor road conditions, and have transportation issues; therefore the children did not attend school each day as scheduled.

As these orphanages are merely empty static idols, they lack knowledge, and they are merely new products, it is extremely difficult for the staff and managers to care for the orphans and vulnerable kids. As a result, running them requires a strong work ethic, endurance, and compassion. Because of the sorrow of being apart from their parents, good employees and managers are required who can stay committed to helping others. Where they were born and where they spent some of their lives, they faced many hardships; since they are children born in different places, communities, customs, and cultures, it is necessary to create a comfortable environment to manage them like children born from the same mother, so it is mandatory to train managers and employees according to time.

The administration of the orphanage has an effect on the academic achievement of the orphan pupils in the institution, according to the study's findings. Because the manager establishes the budget and supervises the efficient use of the different resources, his job is defined as the source of direction for the organization. It is crucial because it makes sure that orphaned pupils' basic and educational requirements are satisfied. Orphan students' academic performance has been found to be negatively impacted by growing up in an orphanage. Despite the difficulties they face, orphan students are capable of outperforming other students if they are provided with the proper care, nutrition, and education. This calls for active participation and teamwork from all parties involved to solve the issues.

Conclusion

The study found community participation, security concerns, public dialogue, satisfaction, and the performance of orphans and vulnerable children programs in Nepal. Socio-cultural factors, gender involvement, and traditional values also impact program success, with community priority having a low impact. Donor funding, funding consistency, transport infrastructure, financial allocation, and availability significantly impact the performance of orphan and vulnerable children programs in Nepal. Monitoring and evaluation, along with stakeholder integration, also play a crucial role in a program's success.

The government is responsible for managing citizens, but some non-governmental organizations in Nepal provide services without government approval. Some ashrams provide excellent services, whereas others focus on economic opportunities. This leads to malnourished children being deprived of culture and education. It is

crucial to draw attention to proper nutrition, education, and health in these organizations and find that orphanage management impacts educational performance by guiding budgets, ensuring proper utilization, meeting needs, and coordinating with donors, the government, volunteers, and foreign stakeholders.

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Distributed Data Use for Internationally Distributed Learning

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General Commerce Intelligence: Glocally Federated NLP-Based Engine for Privacy-Preserving and Sustainable Personalized Services of Multi-Merchants

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Working Draft

Abstract

We present a novel method for creating a commerce intelligence engine that caters to multiple merchants. This is intended for the UB Platform, a system managed by Harex InfoTech, an e-payment company. One of the most crucial capabilities in the commercial sector is the personalized prediction of a customer's next purchase. To cultivate this intelligence, we utilize payment receipt data. To accommodate multi-national and multi-merchant trade, we created an NLP-based commerce model, which is based on Transformer. Our model, dubbed General Commerce Intelligence (GCI), derives an array of services to merchants, including product recommendations, product brainstorming, product bundling, event promotions, collaborative marketing, target marketing, and demand forecasting etc. To bolster user privacy and foster sustainable business collaboration especially among micro, small and medium enterprises (MSMEs), the GCI model is trained through federated learning especially with glocalization. This paper delves into the structure, development, and assessment of the GCI, showcasing its transformative capacity to implement a user-centric AI and reshape the global commerce landscape to the benefit of MSMEs.

explores the innovative approach of developing a commercial intelligence engine for multi-merchant platforms, referred to as the General Commerce Intelligence (GCI).

The GCI was conceived with the objective of creating a GPT-like model tailored for the commerce industry. While the GPTs utilize publicly available data (Brown et al. 2020), GCI relies on customer purchase data, not publicly accessible. Customers and companies involved in transactions are reluctant to disclose their data. Nonetheless, robust AI cannot be developed using only individual customer data or the data of a company. Federated learning (FL) emerges as a crucial approach to address this challenge. Zhou et al. (2021) and Fernandez et al. (2023) emphasize the increased competitiveness that FL can offer to data-scarce MSMEs.

Existing recommendation systems for single merchants may rely on customers' demographic data and utilize collaborative filtering based on product IDs. However, when aiming to develop a scalable AI for commerce encompassing multi-merchants, relying on individual, specific taxonomies

GCI: Glocally Federated NLP-Based Engine for Privacy-Preserving and Sustainable Personalized Services of Multi-Merchants

- **Personalized prediction of next purchase is the key intelligence for commerce.**
- **GCI is a solution for multi-national & multi-merchant trade.**
- **Data Source: Payment receipt data.**
- **Model: NLP-based, built on Transformer architecture.**
- **GCI Engine derives a variety of services**
 - **Recommendations, brainstorming, bundling, Promotions, collaborative & target marketing, Demand forecasting**
- **Privacy & Collaboration: Federated learning with glocalization.**
- **Empowerment of MSMEs.**
- **Reshaping global commerce for MSMEs.**

The Need for AI Democratization in Business: Addressing the Data Discrepancy between MSMEs and Big Tech

- **AI's Promise:** Biz performance, Personalized services, & Increased sales.
- **Challenges in AI Implementation:**
 - Independent AI requires substantial data resources.
 - Large tech platforms demand access to business data.
 - Growing discrepancy between businesses and big tech.
- **Democratization of AI: A pivotal direction in AI R&D** (Seger et al. 2023; Björkegren 2023; Perrigo 2023)
 - Promotes AI accessibility for smaller businesses and emerging markets.
- **Concerns with Current AI Platforms:**
 - Businesses may lose autonomy over data and operations.
 - MSMEs become heavily reliant on large platforms.
- Empowers MSMEs with AI capabilities without compromising data autonomy

GCI: Create a GPT-like model for commerce

- **GPT:** Publicly available data vs. **GCI:** Customer purchase data (private)
- **Data Privacy Concerns:**
 - Reluctance from customers and companies to disclose transaction data.
 - Need for robust AI without compromising individual or company data.
- **Federated Learning** offers competitiveness to data-scarce MSMEs.
- **Existing Recommendation Systems:**
 - Rely on demographic data and collaborative filtering.
 - Use product IDs specific to single merchants.
 - Company-specific identifiers lack unified standards.
 - Integration across multi-merchants is challenging.
- We employ NLP-based model for flexible data interpretation.
 - To overcome the limitations of existing recommendation systems.

GCI: NLP Model for Forecasting a customer's next purchase

- Leverage NLP data from receipts.
 - **International** and **multi-vendor** commerce focus.
- **Continuous improvement:** Enhanced GCI leads to better derivative services.
- **Challenges in GCI Development:**
 - Securing training data & Sustainably delivering services to end users.
- **Data Privacy Concerns:**
 - Users and MSMEs apprehensive about data misuse.
 - Desire for high-quality AI vs. reluctance to share data.
- **Solution: Federated Learning (FL):**
 - Balances AI capabilities with data privacy.
 - Safeguards user privacy and business data assets.

Dates, merchants & product names from receipt data

Merchant Name 비비비비비비

Transaction Date 2023-05-02 21:20

Product Name 반반반반반반

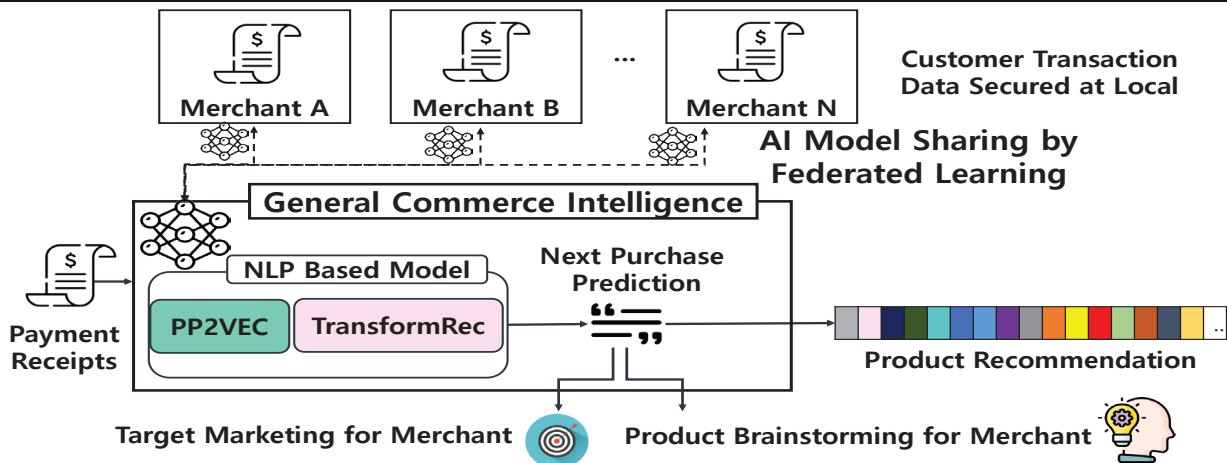
➔

Transaction Date	Merchant Name	Product Name
2023-05-02 21:20	ABC Chicken	Half & half boneless chicken
2023-05-20 18:24	DEF Gimbap	Cheese Gimbap
2023-05-27 18:27	GHI Korean Food	Galbi-tang
2023-06-04 15:27	JKL Chinese Food	Jajangmyeon
2023-06-21 11:22	MNO Burger	Bacon Cheese Burger
2023-07-03 18:34	PQR Korean Food	Jeyuk-bibimbap
2023-07-11 14:36	ABC Chicken	Half & half boneless chicken
2023-07-15 12:40	STU Cafe	Iced Vanilla Latte
...	...	...

GCI's Data Approach

- **Data Source for GCI: Anonymized purchase receipt records.**
 - Essential for returns, refunds, partial exchanges
 - Details products, services, transaction time, and location
- **Privacy First Approach: Predictions without compromising privacy**
 - No customer ID or personally identifiable information in training data.
- **GCI vs. Standalone Recommendation Systems:**
 - Standalone systems: Use customer ID, demographics, product ID.
 - GCI: Does not use customer demographics or product IDs.
- **GCI's Forecasting : Relies on natural language data**
 - Uses product/service names, descriptions, past purchase history.
 - Forecast a customer's next purchase without compromising privacy.

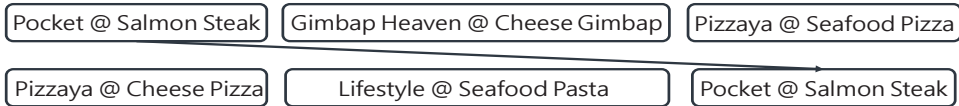
User-Centric General Commerce AI Engine and its Derived Services



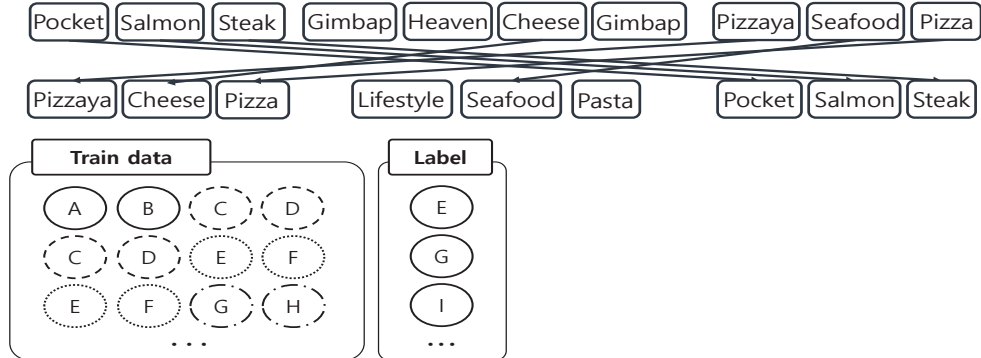
Merchant Discovery
 Product Bundling
 Collaborative Marketing
 Event Promotion
 Demand Forecasting

Tokenizing & Preprocessing Product-Merchant Names in Transactions

without Tokenizing



with Tokenizing



Merchant's Interface for Target Marketing

Partner BackOffice Target Marketing ▼

Genesis BBQ (Ulsan Pedal Franchise)

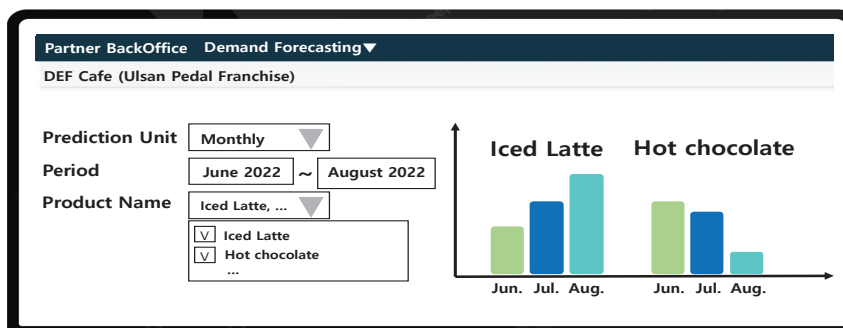
Product: Half & half Boneless Chicken ▼

Marketing Detail Settings

☒ Alarm Settings	Message
☐ Coupon Settings	Coupon Type ☐ Discount Amount 1,000 ☐ Discount Rate 20 % ☐ Gift Voucher Use Limit ☐ None ☐ Minimum Amount 10,000 ☐ New User Coupon Expiration Date 23-06-16 10:00 ~ 23-06-18 10:00

Registration **Close**

Vendor's Dashboard Displaying Demand Predictions



A Product Bundle Based on Recommendation Lists

(User B) Product Recommendation list



(User C) Product Recommendation list

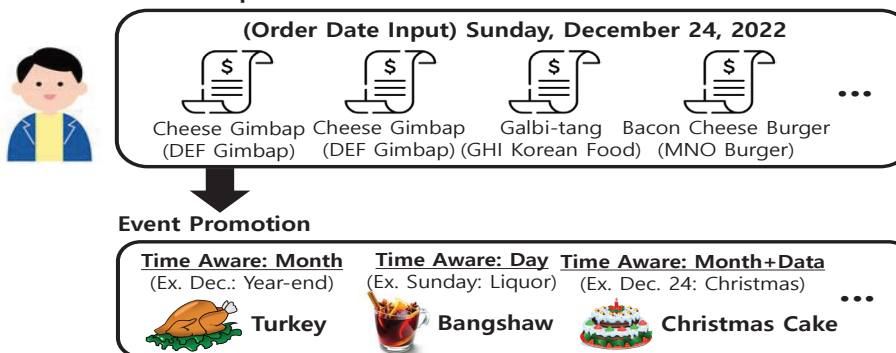


(User A) Product Bundling list



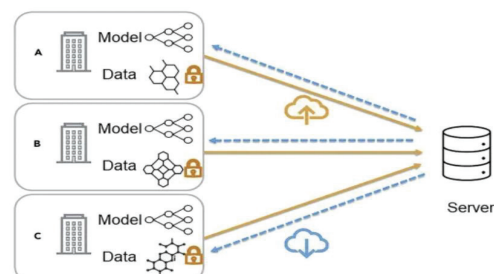
Promotion Incorporating Date in Natural Language

User A's Recent Receipts + Order Date as Context



Federated Learning in Neural Networks and Transformers

- **FL in Medical Field:** Used for convolutional neural network models.
 - Dayan et al. 2021, Bai et al. 2021, Kaissis et al. 2021, Liu et al. 2022, Pati et al. 2022
- **FL in Transformers:** Park et al. 2021 & Thwal et al. 2023
- Lin et al. (2021): First to apply FL to Transformer models for NLP tasks.
- Federated Learning's efficacy is well-documented across various fields and models.



Let's stop talking about "data sharing"

16

Unlocking Greater Insights with Data Collaboration

BRIEFING PAPER
JANUARY 2022

WORLD
ECONOMIC
FORUM

Lesson 1: Let's stop talking about "data sharing" – it makes people think they are forced to share the data itself. Instead, let's talk about "data collaboration".

The New York Times

TECHNOLOGY | A.I. Here, There, Everywhere

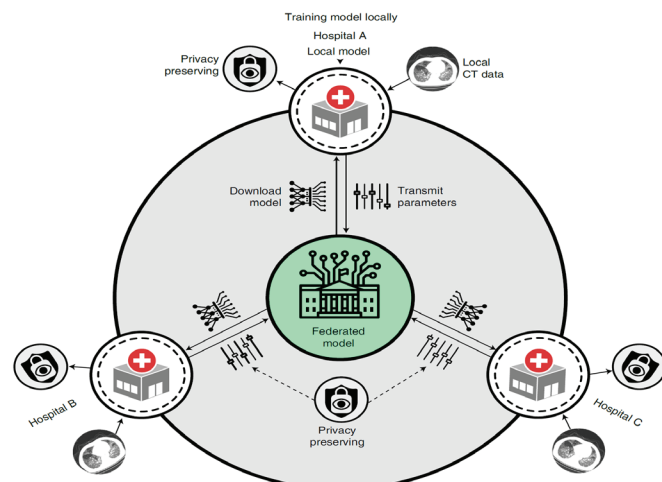
Privacy remains an issue, because artificial intelligence requires data to learn patterns and make decisions. But researchers are developing methods to use our data without actually seeing it — so-called federated learning, for example — or encrypt it in ways that currently can't be hacked. Feb. 23, 2021

Simple Architecture for Federated Learning

Better Performing & Privacy-Preserving Collaboration

1. Model Download
2. Model Learning
3. Parameter Transmission
4. Model Integration

The integrated/federated model outperforms each local model!



Bai, X., Wang, H., Ma, L., Xu, Y., Gan, J., Fan, Z., ... & Xia, T. (2021). Advancing COVID-19 diagnosis with privacy-preserving collaboration in artificial intelligence. *Nature Machine Intelligence*, 3(12), 1081-1088.

Federated Learning to Fight Money Laundering

THE WALL STREET JOURNAL.

RISK & COMPLIANCE JOURNAL

U.S., U.K. Collaborate to Spur Innovation in Tech Used to Combat Money-Laundering

June 13, 2022

New program aims to develop more robust machine-learning technologies to help governments and financial institutions tackle money laundering and other crimes while retaining data privacy

Though governments have encouraged financial institutions to create information-sharing partnerships to improve their reporting activity and make the data more meaningful, data-privacy rules create challenges for doing so.

The U.S. and the U.K. said they want to improve technology that will allow machine-learning models to be trained on data from multiple sources without that data leaving a safe environment—a method known as federated learning.

Aug. 18, 2020

RISK & COMPLIANCE JOURNAL

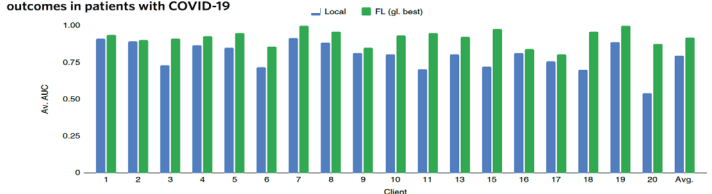
THE WALL STREET JOURNAL.

Partnerships to Fight Financial Crime Gain Momentum

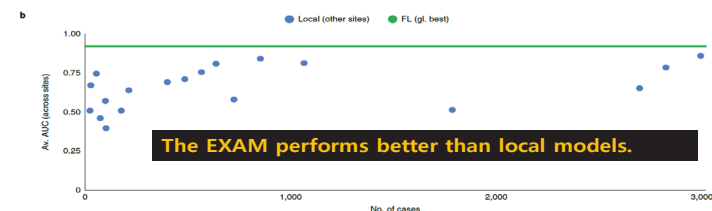


Banks have teamed up with governments in nearly 20 countries to more directly share real-time information on suspicious activity

Federated learning for predicting clinical outcomes in patients with COVID-19



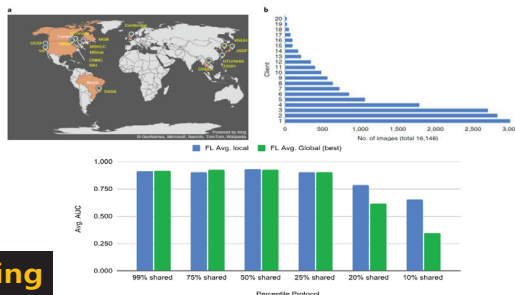
Client	1	2	3	4	5	6	7	8	9	10	11	13	15	16	17	18	19	20	Avg.
Local	0.910	0.892	0.731	0.869	0.848	0.716	0.916	0.887	0.816	0.803	0.702	0.805	0.722	0.812	0.735	0.696	0.889	0.542	0.785
FL (gl. best)	0.938	0.902	0.912	0.929	0.950	0.857	1.000	0.961	0.849	0.930	0.950	0.925	0.979	0.839	0.806	0.958	1.000	0.875	0.920



Benefit for client sites with small datasets arising from participation in federated learning is substantial.

A Case of Federated Learning

- Collaboration without data exchange
- Generalized model across heterogeneous, unharmonized DBs for prediction of clinical outcomes in patients with COVID-19
- Rapid, secure, and potentially incentivizing federated learning without the usual privacy and data ownership hurdles of conventional collaborations



nature communications



Article

<https://doi.org/10.1038/s41467-022-33407-5>

Federated learning enables big data for rare cancer boundary detection

This study describes the largest to-date global FL effort to develop an accurate and generalizable ML model for detecting glioblastoma sub-compartment boundaries, based on data from 6314 glioblastoma patients from 71 geographically distinct sites, across six continents (Fig. 1a). Notably, this describes the largest and most diverse dataset of glioblastoma patients ever considered in the literature. It was the use of FL that successfully enabled our ML model to gain knowledge from such an unprecedented dataset. The extended global footprint and the task complexity are what sets this study apart from current literature, since it dealt with a multi-parametric multi-class problem with reference standards that require expert clinicians following an involved manual annotation protocol, rather than simply recording a categorical entry from medical records^{16,32}. Moreover, varying characteristics of the mpMRI data due to scanner hardware and acquisition protocol differences^{33,34} were handled at each collaborating site via established harmonized preprocessing pipelines^{35–39}.

Received: 7 April 2022

Accepted: 16 September 2022

Published online: 05 December 2022

Check for updates

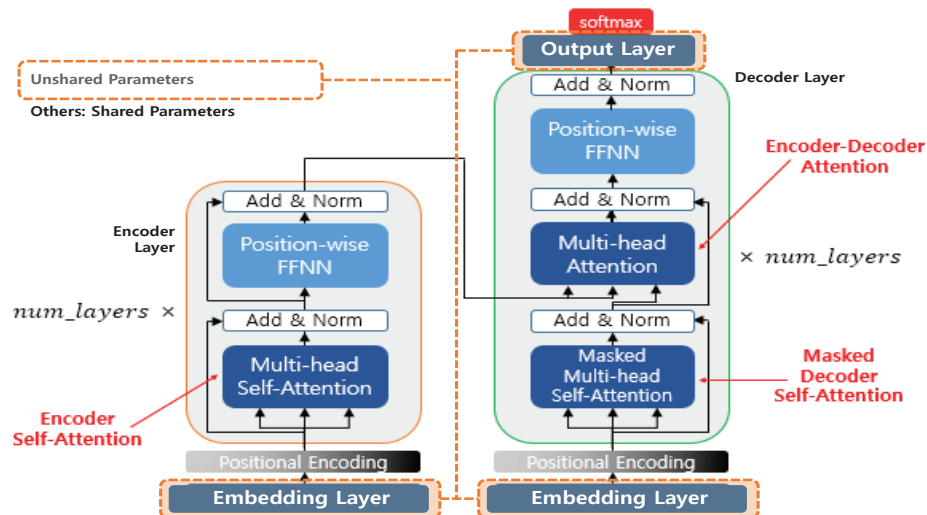
A list of authors and their affiliations appears at the end of the paper

Although machine learning (ML) has shown promise across disciplines, out-of-sample generalizability is concerning. This is currently addressed by sharing multi-site data, but such centralization is challenging/infeasible to scale due to various limitations. Federated ML (FL) provides an alternative paradigm for accurate and generalizable ML, by only sharing numerical model updates. Here we present the largest FL study to-date, involving data from 71 sites across 6 continents, to generate an automatic tumor boundary detector for the rare disease of glioblastoma, reporting the largest such dataset in the literature ($n = 6,314$). We demonstrate a 33% delineation improvement for the surgically targetable tumor, and 23% for the complete tumor extent, over a publicly trained model. We anticipate our study to: 1) enable more healthcare studies informed by large diverse data, ensuring meaningful results for rare diseases and underrepresented populations, 2) facilitate further analyses for glioblastoma by releasing our consensus model, and 3) demonstrate the FL effectiveness at such scale and task-complexity as a paradigm shift for multi-site collaborations, alleviating the need for data-sharing.

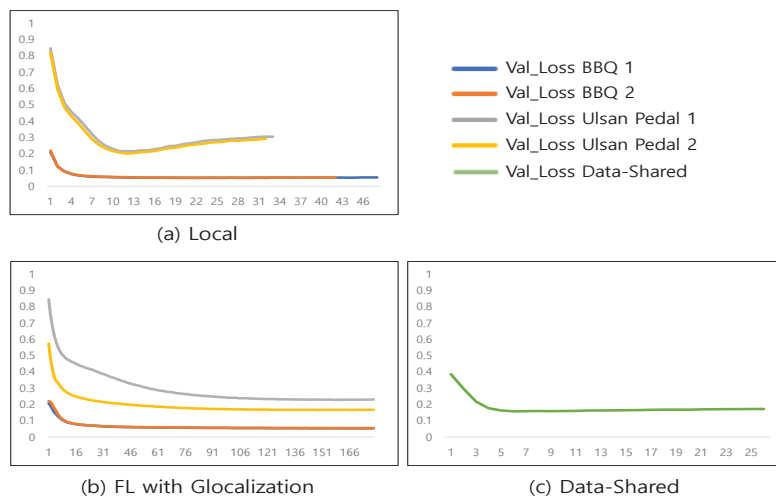
Implementing FL with Glocalization in GCI

- **Glocalization:** Sharing select layers of the Transformer model.
- **Selective Inclusion:** Based on properties and roles of layers.
 - **Excluded:** Embedding layers of Encoder and Decoder. Output layer.
 - **Reason for Exclusion:** Highly influenced by vocabulary size.
 - **Fluctuating parameter counts inconsistent across FL clients/nodes.**
 - **Included:** Internal layers within Encoder and Decoder.
 - **Designed to share consistent parameters across different clients/nodes.**
- **Glocalization ensures efficient and consistent Federated Learning**
- **Exclusion of certain layers maintains model integrity across diverse data sources.**

Federated Learning of Transformer with Glocalization



Validation Loss Trends for the Three Approaches



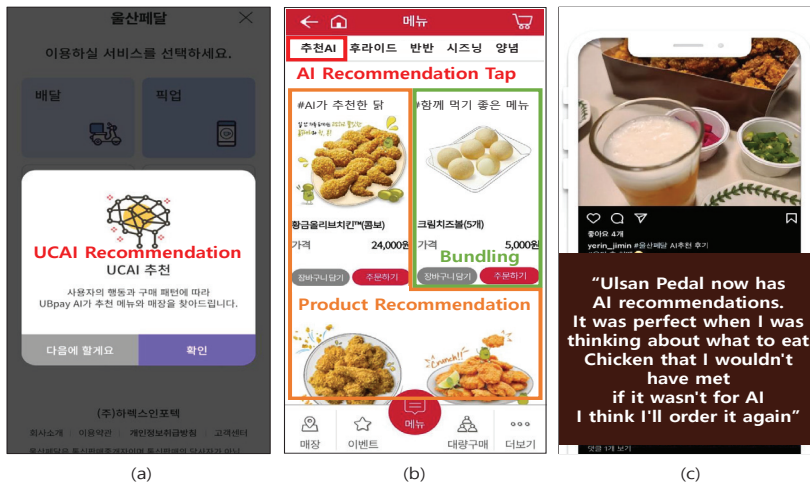
Glocalized FL (in NLP): Enhancing Autonomy & Data Security

1. Tailored for clients with varying vocabulary sizes.
2. Ensures clients don't disclose individual tokens.
 - **Client Autonomy & Data Security:** Clients maintain control over their proprietary data.
 - Enhanced data security by not disclosing entire models.
 - **Increased Collaboration:** More willing to collaborate without full model disclosure.
 - Encourages active participation in FL initiatives.
 - **Protection of Central Platforms:** Retain their initial model investment.
 - No need to share the entire model with all participants.
 - **Glocalization Approach:** Clients contribute only select portions of their model.
 - Focus on the parts trained on proprietary data.
 - Avoids sharing the entirety of the model.
 - Glocalized FL fosters collaboration, protects data, & ensures client autonomy.
 - A win-win for both clients and central platforms.

Glocalized FL: Addressing Free-Riders & Vocabulary Expansion

- Circumventing "Free-Riders":
 - Glocalized FL prevents entities from benefiting without equitable contribution.
- Ensures collaborative integrity.
 - Seamless Vocabulary Expansion:
 - Facilitates vocabulary growth for platforms.
 - Clients can selectively share specific tokens.
 - Augments model vocabulary without compromising data security.
- Previous Research on Selective Parameter Federation:
 - Mishchenko et al. 2023, Liang et al. 2020, Sun et al. 2021, Kalra et al. 2023, Qi et al. 2023
- Distinction: None addressed token information exchange or standardization.
- Glocalized FL offers unique solutions to collaboration challenges.
- Stands distinct from previous research in addressing token standardization.

GCI service screens and service testimonials



UCAI (User Centric AI)

- 1) Pursuing the sustainability of AI in the process of achieving user centered goals as much as possible
 - Focus on achieving user-centered goals.
 - Ensure the longevity and relevance of AI providers.
 - 2) Data and services are handled with the convenience and benefits of the user in mind, not the perspective of the AI provider.
 - Prioritize user convenience and benefits.
 - Move away from an AI provider-centric perspective.
 - 3) Protect the privacy of individual users and business users as much as possible.
 - Safeguard individual and business user privacy.
 - Minimize data exposure and risks.
- UCAI is a holistic approach that prioritizes users while ensuring the sustainability of AI providers.
 - A paradigm shift towards a more user-centric AI landscape.

UCAI's Vision Beyond Commerce: The AMPER Structure

- UCAI's Broader Vision: Beyond commerce: Managing personal lives.
- Digital Me: AI-based system for real-time management.
 - Focuses on health, financial, and psychological states.
 - Maximizes user's state improvement.
- AMPER Structure (Lee et al. 2022)
 - Aim: Define user's goals.
 - Measure: Assess user's current state.
 - Predict: Foresee user's future state.
 - Evaluate: Analyze the predicted future state.
 - Recommend: Suggest actions to reach the target state.
- Healthcare & Data Sensitivity:
 - Challenges: Sensitive nature of healthcare data.
 - Solution: Personal Federated Learning (PFL).
 - Result: PFL Model outperformed Local Model by 31.36%.

9,908 PFL vs. 1,000 PFL

29

9,908 Person - Personalized FL Experiment: ARIMA+BERT Model

	Personalized Federated Learning(PFL)				Data Sharing
	Total 9,908 persons				
	Local Model		PFL Model (Global_weight)		Total 2,065,091 Data (Total 9,908)
MAE	Average	Std-Dev	Average	Std-Dev	7.15mmHg
	11.70mmHg	10.06mmHg	8.03mmHg	7.65mmHg	

1,000 Person -Personalized FL Experiment: ARIMA+BERT Model

	Personalized Federated Learning(PFL)			
	총 1,000명 대상(Randomly selected among 9,908 persons)			
	Local Model		PFL Model (Global_weight)	
MAE	Average	Std-Dev	Average	Std-Dev
	15.33mmHg	14.55mmHg	14.42mmHg	13.93mmHg

The more in PFL, the more accurate prediction!

UB Platform: Realizing the Vision of User Centric AI

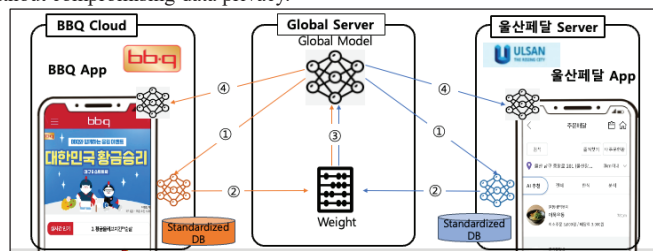
- A User Centric Artificial Intelligence (UCAI) sharing platform.
 - Serves individual consumers and MSMEs.
- Traditional: Platforms acquire and control user data.
- UB Platform Provides AI models & Users and MSMEs retain data ownership and control.
- Privacy & Data Ownership:
 - Encourages wider participation in AI platforms & Enhances platform sustainability.
- Reduced Societal Polarization:
 - Mitigates data control concentration.
 - Minimizes risks of societal divides due to AI.
- Democratization of AI:
 - Promotes equitable access to AI technologies & Ensures benefits are widespread.
- Takeaway:
 - UB Platform's approach revolutionizes AI data ownership.
 - Aims for a more inclusive and equitable AI future.

Development Methodology Scenarios: BBQ&Ulsan

Framework	Cross Device/ Cross Silo	Cloud/ Server	Domain	Encryption Methodology
Flower	Cross Silo	Cloud/Server	Commerce	DP, MPC, HE

In the business domain between a public delivery app and a chicken franchise company, ethical and effective outcomes have been achieved through AI sharing. In this scenario, the chicken franchise company BBQ adopted cloud infrastructure, while the public delivery app Ulsan Pedal used server infrastructure.

- Both parties leveraged the ADAP's Flower framework to facilitate AI sharing. By sharing AI capabilities instead of exchanging sensitive data, both the public delivery app and the chicken franchise company were able to protect user privacy while obtaining enhanced model performance. The ADAP's Flower framework played a crucial role in facilitating the AI sharing process. This framework ensures secure communication and coordination between the public delivery app and the chicken franchise company, ensuring that their respective AI models can collaborate without compromising data privacy.
- This approach prioritizes data privacy protection while harnessing the collective intelligence of multiple AI models.
- The ultimate result is an AI ecosystem where the performance of each model is enhanced through collaboration, providing better services and experiences for customers.



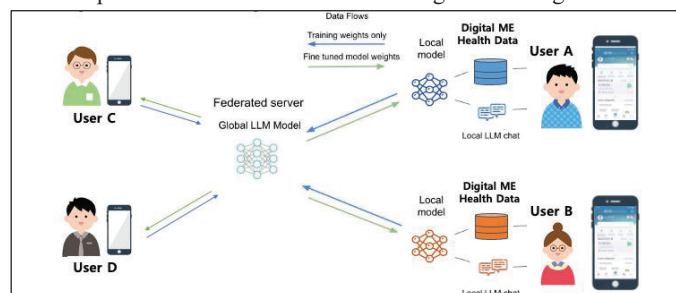
BBQ & Ulsan Scenario

Chapter5. Development Methodology: Case Study

Development Methodology Scenarios : Healthcare

In the healthcare field, Cross Device AI Sharing utilizes Digital Me Data and Conversational Data generated from personal devices for AI sharing.

- Digital Me Data refers to various digital data, such as personal health information, medical records, and biometric signals. This data contains important information related to an individual's health status and is generated and stored on personal devices.
- Conversational Data refers to the content of conversations between patients and healthcare professionals or AI-based virtual assistants in the medical field. This conversational data includes medical-related information such as diagnosis, treatment, and medical advice, and is generated on personal devices and utilized through AI sharing.
- Through Cross Device AI Sharing, these Digital Me Data and Conversational Data are shared with other devices or cloud-based AI models.
- Through AI sharing, these data can be connected to other devices or healthcare service providers to enable personalized healthcare services, diagnosis, prevention, and treatment.
- This allows for personalized services without using personal identity information.



Healthcare Scenario

Issues and Challenges in Data Collection and Use in International Context: Cases and Experiences

Yoshiki Matsui
The Open University of Japan

27th International Conference on IT Applications and Management
International Collaboration in the Data-centered World
Korea Data Strategy Society, Korea Chamber of Commerce
August 31 - September 2, 2023
Korea Chamber of Commerce, Seoul, South Korea

My Profile

- Professor at the Open University of Japan (April 2018- March 2024)
- Professor emeritus at Yokohama National University (April 2021-)
- Agency Theory / Transaction Economics
- Technology / Innovation Management
- Operations Management (OM)
- Supply Chain Management (SCM)
focus on manufacturing, recently also
- Service Management

2

Today's Topics

- My experience with international research collaboration called High Performance Manufacturing (HPM) Project: issues and challenges in the phase of data collection and analysis
- Recent developments and challenges in supply chain collaboration or supply chain integration and digital transformation in Japan

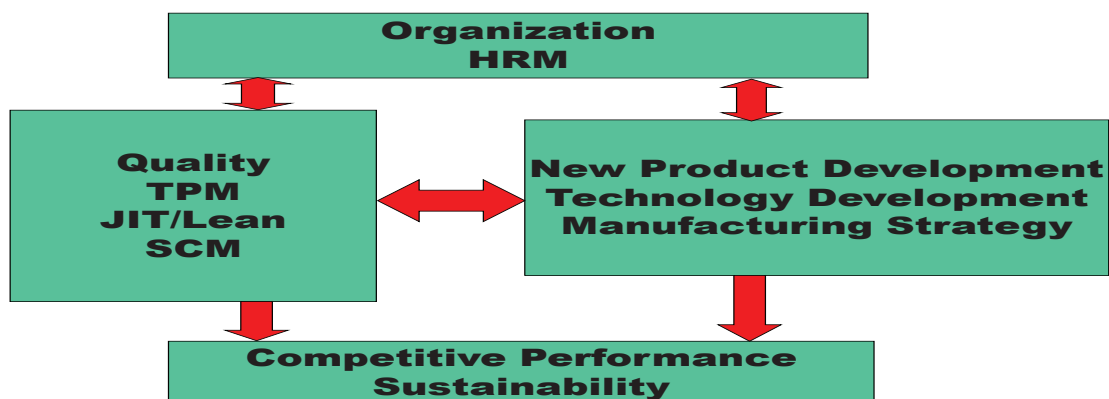
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High Performance Manufacturing (HPM): An International Research Collaboration

- Aim to empirically and comparatively discuss what are requirements for high-performing manufacturing business
- Construct the relevant measurement scales on HRM, QM, TPM, JIT/Lean, SCM, NPD, technology development, manufacturing strategy, performance indicators, etc.
- Develop questionnaire survey and collect and analyze the survey data from manufacturing companies in machinery, electric/electronics, and automobile sectors on the globe.

4

Analytical Framework of HPM



5

Collection of Data

- First in the 1980s: 42 plants from USA
- Second in the 1990s: 164 plants from 5 countries (USA, UK, Germany, Italy, Japan), 26 persons each
- Third in the 2000s: 238 plants from 8 countries (USA, Germany, Italy, Japan, Austria, Finland, Sweden, Korea), 19 persons each
- Fourth in the 2010s: 330 plants from 15 countries/regions (USA, UK, Germany, Italy, Japan, Finland, Sweden, Korea, Spain, Switzerland, Brazil, Israel, China, Taiwan, Vietnam), 24 persons each

6

6

Issues and Challenges of International Data Collection and Analysis

- **Translation from English into local languages**
 - No relevant words, time consuming
 - AI has solved a part of problems
 - Most of them remain for human intelligence
 - Definition and clarification of each concept
- **Quantitative data: Relatively easy to collect and analyze**
 - Gaps in definition of concepts
 - Issues on exchange rate
 - Same figure means different things for companies
 - Necessity of qualitative (perceived) data in social sciences

7

Issues and Challenges on Qualitative Data Collection

- **How to construct measurement scales for key concepts with multiple question items**
- **How many questions for each construct?**
- **How many respondents for each construct?**
- **Reflective or formative scale?**
- **Binary (Yes or No)? 5, 7, or 9-point scale? Likert scale?**
- **Validity and reliability**
- **Too long or complicated question items**
- **Method biases or variances**

8

Issues and Challenges of Large-Scale International Research Collaboration

- **Data Security**
 - Who are the authors of this paper using our data?
 - Should our dataset or questionnaire be opened? Who can access our dataset or questionnaire?
- **Maintaining Consistency in Data Analysis**
 - Same measurement scales?
 - Development of new scales?
 - Validity and reliability analysis for a part of pooled sample vs. for the pooled sample

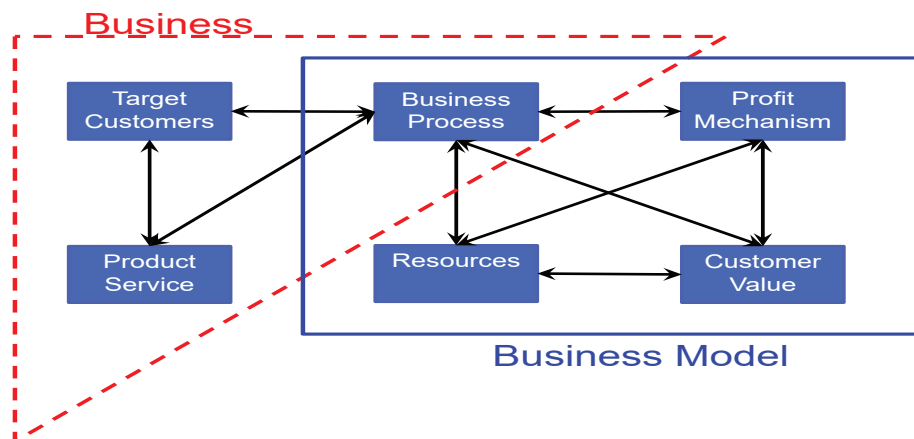
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SCM and DX in Manufacturing

- Supply Chain Management (SCM): art and science of integrating product, information and finance flows from the original supplier through to the consumer or the last user
- Supply Chain Integration (SCI): the tactical collaboration of manufacturers with all actors in its supply chain network with internal and external organizational functions
- Digital Transformation (DX): do the right thing the right way with advanced ICT and AI and execute business model innovation

10

Business Model



11

Manufacturing in Japan

Monozukuri White Paper 2022

- The business environment encompassing Japan's manufacturing industry is changing rapidly due to
- accelerating initiatives to achieve carbon neutrality and respect human rights,
- the increasing importance of DX (digital transformation) and strengthening supply chain resilience,
- soaring crude oil prices,
- Material shortages, in addition to
- the effects from COVID-19 spreading

12

Evolution of SCM and DX in Mfg

- 1970s	1980s	1990s	2000s -
JIT MRP	BPR ERP	SCM	Global SCM Resilient SCM
	Business Process Business Model	No-asset/ Coordination (Dell, Seven-Eleven, Li & Fung, Cisco)	AI Quantum Computing Platform Ecosystem
		Disintegration: Fabless+Foundry	Industrie 4.0
POS		ECR/CPFR VMI	Omni-channel
Apple		Amazon Google	Facebook
Spare Parts Management	Maintenance Management	Servitization (LTSA Contract, Performance- based Contract) Sharing/Leasing	Customer Outcome Solution Business

13

Selected Cases in Japan

- Wacoal: Omni-Channel, women's underwear
- Kubota: Ecosystem Platform, agriculture machine
- Hirata: Industrie 4.0, production system integrator
- Groovenauts Inc.: Quantum Computing + AI
- Miura: Maintenance Management, boiler
- OPTEX: Solution Business, sensor
- ASICS: Customer Outcome, sports shoes
- akippa Inc.: Sharing, parking space sharing

14

Wacoal Corp.

- Comfortable inside. Confident outside.
- Women's underwear, bra(ssiere)
- Underwear CX for Next Generation: new and unique (customized) via omni-channel for deeper, wider, and longer relationships
- Beauty, Health, Comfort, and Human Science Research as a core competence
- 3D smart & try to find best-fit underwear
- <https://www.wacoal.com/>

15

3D smart & try

- Digitize offline stores + online EC
- Measure by body scanner
 - Scanning 1.5 million body points in 5 seconds without any physical contact
- Check your own 3D avatar and body shape types in six categories on iPad
- Get recommendation based on size, body shape, age, request on iPad
- Contact beauty advisor + avatar counseling
- Apparel, exercise & dietary advice, healthcare

16

Kubota Corp.

- Manufacture and sales of agricultural machinery, construction equipment, engines, equipment for water purification, sewage treatment, air conditioning
- Coordination Platform for Agriculture by
 - Automated and unmanned GPS-equipped machinery under monitoring by people
 - Cloud service for managing agricultural field and operation data in each small square (Kubota Smart Agri System)
- <https://www.kubota.com/innovation/smartagri/index.html>

Hirata Corp.

- The Global Production Engineering Company
- Manufacture and sales of production systems, industrial robotics, and logistics equipment for automotive, semi-conductor, home appliances and others
- Industrie 4.0
- Mass-customizing production line building by standardized and modularized assembly cells
- <https://www.hirata.co.jp/en/>

10

Groovenauts Inc.

- Be Groovy
- A cloud-based platform transforming the value of smart devices and big data
 - Quantum annealing of D-Wave
 - MAGELLAN BLOCKS as a user interface
- AI × quantum computing × big data
- Solving combinatorial optimization problems with quantum annealing
- <https://www.groovenauts.jp/>

19

Example of Application

- Assembly lines for lunch boxes sold in convenience stores
- Optimization of production line and work assignment at Kewpie Corp. in one second
- Working to use collaborative robotics along side of human workers and optimize work shifts including both human assembly workers and robots

20

Miura CO., LTD.

- Maintenance Management and Servitization
- Manufacture, sales, and maintenance of boilers with the technologies of multiple integrated smaller boilers and water purification
- Long-Term Service Contract for boilers since 1972
- Online maintenance for boilers with sensors, PC, and telephone lines since 1989
- <https://www.miuraz.co.jp/en/>

21

OPTEX CO., LTD.

- Solution Business, Sensing Innovation
- Planning, development, and sales of sensors
- Security sensor: Intrusion detector for outdoor use
- Automatic door sensors
- Machine vision lighting: LED lighting for inspection
- Developing solution service using sensor technologies
- <https://www.optex.co.jp/e/>

ASICS Corp.

- Customer Outcome
- Manufacture and sales of sports goods, mainly shoes
- 3D measurement of foot and running movement
- Data analytics
- <https://www.asics.com>

23

akippa Inc.

- Sharing, Parking Anytime Anywhere
- Running parking space reservation app
- Matching app service for parking space users and owners
- Online reservation for the parking spaces that are not usually for short-term rent
 - Tentatively available parking spaces rent on monthly basis
 - Private parking garage
 - Vacant lots
 - Commercial parking facilities
- <https://www.akippa.com/>

24