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Learning and Usability of Accounting Information Visualization

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Abstract

Visual representations for concepts in business

Introduction

Inscription and pictograph are conceivably known

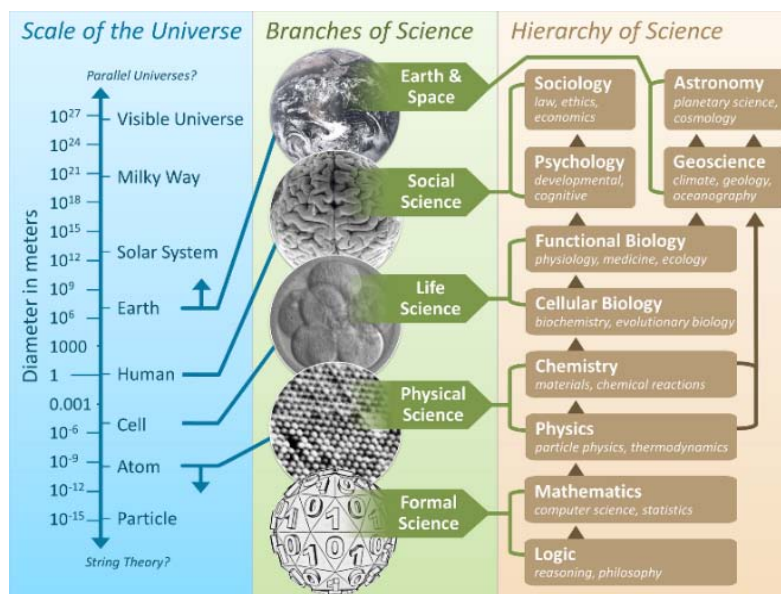


Figure 1: Branches and Hierarchy of Science by Efbrazil
(https://commons.wikimedia.org/wiki/File:The_Scientific_Universe.png)

management are quite challenging, especially those abstract concepts in Accountancy discipline. For example, there might not be a consensus on what to use to represent such abstraction as an asset, liability, or owner equity. This is because asset can be property, estate, resources, equipment, or any tangible or non-tangible valuables. Cognitive science concepts and behavior engagement have been used to develop visual representations for financial data. The concepts include spatial processing, big picture thinking, and metaphor. Review of past studies together with a brief research plan to test the usability for learning of four new augmented reality visuals are provided in the present paper.

Keywords:

Financial Data, Accounting Information Visualization, Augmented Reality, Usability for Learning

as an early form of information visualization. From primitive configurations of symbols and shapes to representations of physical objects and abstractions, mankind's thirst of visual representations as a means of communication has extended to all branches of science, physical science (Earth and Space), social science, life science, physical science, and formal science (Fig 1: depicted by Eric Fisk (Efbrazil) on 12 April 2013). Scientific visuals resemble physical, observable objects. In scientific visualization, the challenge of analyzing georeferenced data (i.e., Universal Transverse Mercator (UTM) coordinates between latitude and longitude of earth surface) has been addressed with respect to its big data nature [11]. The massive amount of data being collected posts an even more difficult task for scientists and statisticians to transform the data into understandable visuals and meaningful interpretation [26].

“While related fields such as scientific visualization involve the presentation of data that has some physical or geometric correspondence, information visualization centers on abstract information without such correspondences, i.e., information that cannot be mapped into the physical world in most cases” ([12], p.176). Once the scientific community took on to information visualization, researchers and practitioners in social science especially those users of financial data have followed the trail closely. To harness the power of human visual perception and cognition, social scientists rely on scientific metaphor to visualize the intangibility of the abstractions in their own field.

Accounting and Financial Information Visualization

Although the field of information visualization has focused on and came up with creative and intuitive approaches to convey abstract information, the visual representations of financial data still rely on typical geometry modeling graphs despite the lack of spatial coordinates of financial data. As Tegarden (1999) pointed out almost two decades ago, business decision makers have learned to treat business diagrams such as tables, outline, pie charts, line graphs and bar charts as “natural” metaphor for business visualization [24]. However, the author encouraged information visualization designers to extend their quest to deal with multidimensional nature of business data. The author also provided several examples of visual representations such as Kiviat diagram (radar chart or spider graph), Parallel coordinates (popular in the area of visual data mining), 3D Scatter gram (available in statistical packages), 3D Line graph (representing 4 measures), Volume rendering (from scientific visualization technique), Floors and walls (using room metaphor), Maps (natural, geographical representations), and Surfaces (appropriate for continuous data variables) [8].

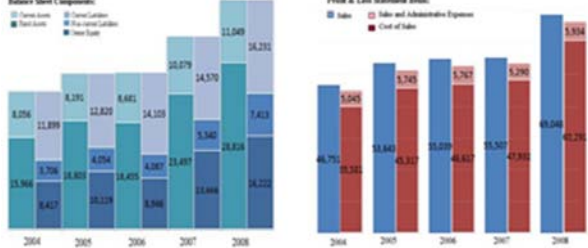
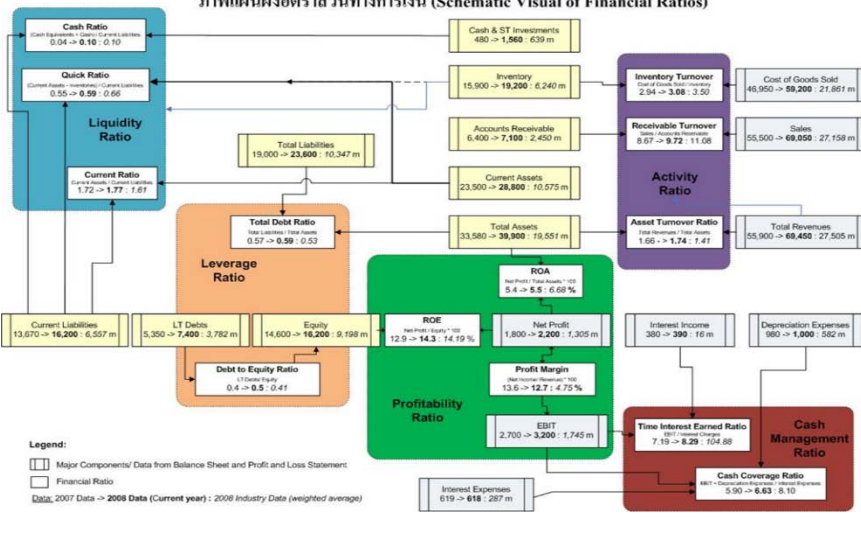
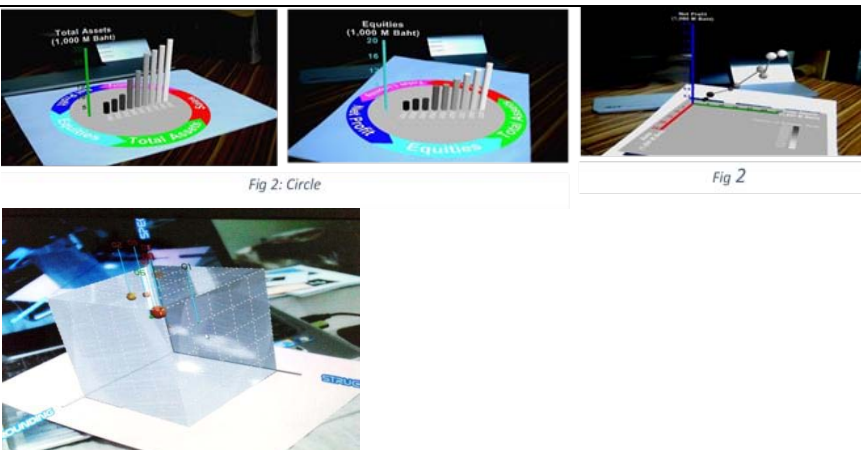
Visual representations for concepts in business management, accounting discipline in particular, are quite challenging [18]. For example, there might not be a consensus on what to use to represent such abstraction as an asset, liability, or owner equity. This is because asset can be property, estate, resources, equipment, or any tangible or non-tangible valuables. Some accounting and financial data are inherently spatial with geographical location (i.e., GIS coordinates). Also, these data are often collected and kept as time series data with various attributes and dimensions. While historical and up-to date financial data are important for performance management, live feeds data such as stock tick data (often shown as

candlestick chart) are critical to an investor’s decision. Thus, the design and use of accounting information visualization should not only address the visual and spatial skills of humans, allowing a person to recognize patterns, color and shape, as well as motion.

The advancement of information visualization technology has provided opportunities for new and effective design of accounting and finance visualization. Dilla et al. (2010) reviewed visualization of financial reporting and auditing context and indicated companies offering services from using financial market data visualization (i.e., Smartmoney’s TM Map of the Market FinVizTM, and various Financial Networks companies) and pointed out the research of Chang et al. (2008) who reported the use of interactive visual analysis to detect fraud from financial wire transactions by large financial institutions [7] [5]. Business Intelligence and Visual analytics tools such as Tableau, Microstrategy, Qlikview, etc. have long included popular graphs such as Heat maps, Treemaps, and Small multiples, Bullet graphs, Symbol maps, Filled maps, Box-and-whisker plot, etc. into their software packages. These visuals are inevitably shown up in the boardrooms of large corporations. However, Hierarchical tree and hyperbolic tree diagrams are still yet to work their way to top management’s arena. Nevertheless, they have spread contagiously in social network analytics and technology related domains [15] [6]. Appendix A shows some of these selected scientific information visualizations that might be applicable for accounting data. Accounting information visualization researchers may want to explore these visuals further.

Table 1 shows the earlier work from the author and associates on accounting information visualization. These visuals were developed and used in research quests, mainly on whether they are usable, acceptable and insightful; how they will reduce cognitive load, elevate higher learning level and achieve learning performance. Spatial representations of balance sheet and profit and loss statements were designed to give a quick glance of major components in the statements [22]. Plant metaphor was used to represent the ecosystem of various data elements of a financial statement [16]. Again, the visual representation was developed on the premise that viewers can easily comprehend the relationships between data elements in question. Likewise, big picture visual scheme was designed to see the whole system, its subsystems and their relationships as in data network or document flow diagram [23] [24].

Table 1: Finance and Accounting Information Visualization (1)

Accounting Data	Accounting Information Visualization	
- Statement of Financial Position -Income statement -Cash flow statement -Financial Ratios	Balance sheet visualization (Symbolic versus Spatial tasks) [22]	
	Plant Metaphor visuals (Nature Metaphor) [16]	
	Big picture visuals (data network and flow)[24]	
AR- circle and line, cube [19][20] [21]		

Originally two AR visuals, **circle** and **line**, were developed and used in the experimental study to assess the cognitive load and learning outcome of students. Tanlamai et al (2011) conducted a within-subject experimental study using 58 undergraduate

accounting students to compare the user's learning experience of traditional Excel tables of numbers versus AR FinViz developed for financial accounting data [19]. The results showed that AR outperformed tables in almost all cases. Also,

students using AR were able to assess the firm's financial performance similar to that of the experts. Later the **cube** were added to compare various accounting data of companies within the same industry [21]. Each ball represents certain accounting data (e.g., assets, sales, and profits) of a company and the size and color of the ball indicates the sign and magnitude of performance.

Learning and Usability of Accounting Information Visualization

Previous studies are based on different theories and their corresponding dependent and control variables. Figure 2 summarizes the constructs used in the studies by author and associates in the past many years. The main independent variable has

always been different accounting information visuals as shown in Table 1. Control variables such as learning style [10], self-efficacy, and various types of literacies are included. Existing research employs independent variables that compare traditional visualization such as symbolic accounting data in EXCEL tables and graphs with alternative visuals such as spatial graphs and accounting information visuals as shown in Table 1. Although some of the findings are inconclusive, what seems to be consistent is that users of accounting data prefer to mixed symbolic and spatial graphs; they found AR visuals to be interesting, useful and acceptable. However, these AR visuals do not increase their learning performance nor do they reduce the cognitive load of the users.

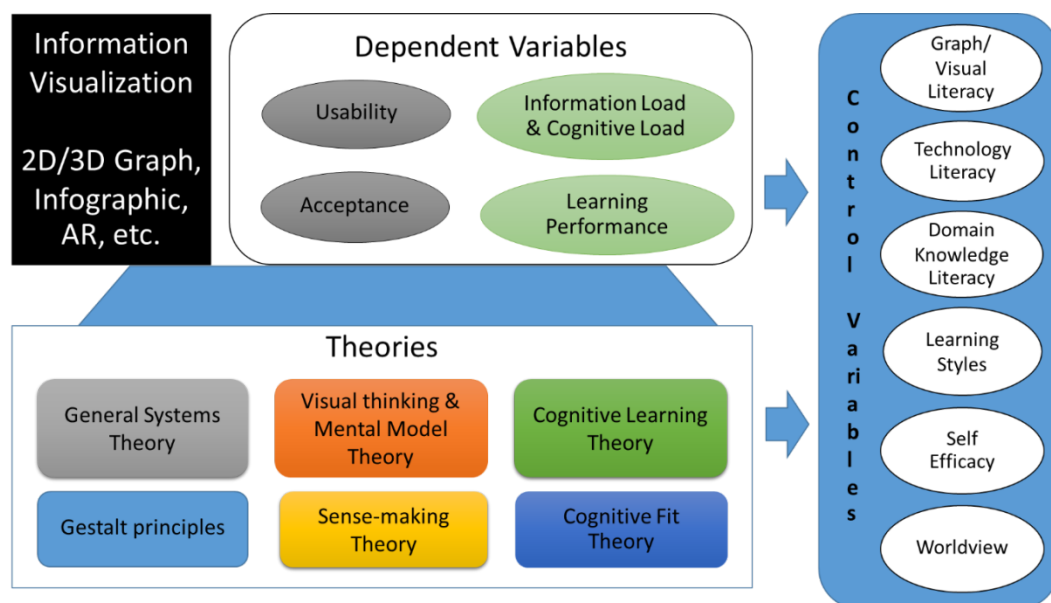


Figure 2: Theories and Variables Under Studied

Development of Accounting Visualizations Using AR Technology

One of the most difficult tasks for visual development is to be the master of the domain knowledge of which one want visualize [13]. Four accounting related topics were included in the development of new visuals: CSR (Corporate Social Responsibility), audit risks, Enterprise Risk Management (ERM), and financial statement analyses. They are chosen because hardly any information representations have been found on CSR and audit risks and even though there are numerous visual representations for ERM and financial statement analysis charts, the existing visualizations can be improved by enhancing a more natural way if interaction.

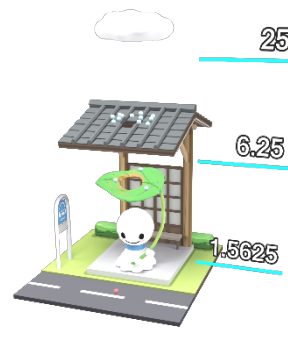
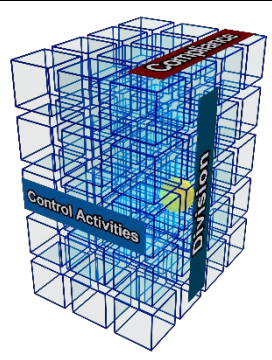
In the area of **CSR (Corporate Social Responsibility)**, previous research tended to focus

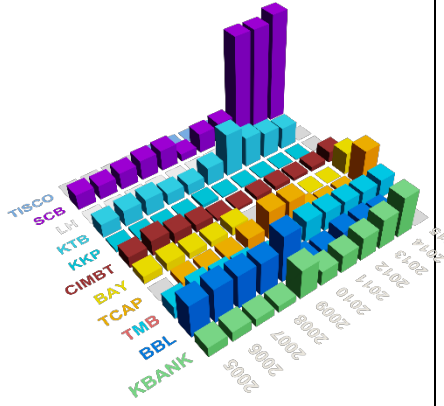
on reviewing disclosure of **CSR** information with benchmarking of CSR reports in various countries [27] [14]. None have examined the graphic representations nor any information visualization of CSR data. For **audit risk** visualization, previous academic and professional have presented the concept using table and geography modeling graphics. Also, the majority of information representations employ flowcharts to visualize compliance and audit processes [3] [9] [17]. There are plenty of COSO ERM research and the **COSO ERM Framework** together with the Risk Assessment Model (Risk Matrix or Risk Map) are perhaps the most used and redrawn pictures. COSO ERM information cube is one of the most classic representations of accounting information visualization. Finally, the most mundane information visualization of accounting figures is EXCEL generated charts (i.e., column, bar, line, and pie charts) of **financial statements**.

Augmented Reality has been chosen as the key visualizing technology because once the representation is used, the learners may be able to develop better cognition, perception, sense-making, and reasoning. The purpose of these AR representations is more of a descriptive diagram than as a call-to-action diagram. Users/learners are expected to find these newly developed information representations of the four accounting related topics to be usable and provide higher levels of learning (Bloom, 1956). Funded by the academic affair of a

large public university and designed by Larngear Technology (www.larngeartech.com), Table 2 shows the newly developed accounting information visualization. These AR visuals will be tested for their usability for learning these accounting topics. Think aloud technique of collecting data from purposive sampling will be used. Again Cognitive Learning Theory will be the basis for the upcoming studies. An e-book that incorporates these AR visuals will be also developed.

Table 2: Interactive Finance and Accounting Information Visualization – with AR technology

Accounting Data	Accounting Information Visualization – AR Technology	Representation model
CSR		Adapting from “ <i>Floor and Wall</i> ” metaphor with Circular view comparing 3 different aspects of CSR, including Economic, Social and Environment.
Audit Risk Management		Animated visual showing audit risk model used to do an audit plan. In order to determine the Planned Detection Risk(PDR), Acceptable Audit Risk (AAR), the Inherent Risk (IR), Control Risk (CR), and will be assessed.
COSO		The COSO ERM comprises 60 sub-cubes that are the combination of 5 components of internal control, 4 level of operations, and 3 types of objectives. Each sub-cube represents 17 principles and 2 evaluation processes, making a total number of 2,040 audit issues.

Financial statements		Comparison of time-series accounting data items in financial statements from each corporation (banks and security firms) are represented with “Floor and Wall” metaphor in order to resemble the peak and valley of “Surface” visualization as much as possible.
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The author believes that interacting with AR visuals should come naturally by learners because AR technology can integrate digital information with the user's environment in real time. Learners uses their own existing environment and overlay augmented reality visuals on top of it. The visual mappings of a learner starts with encode the representation. Then he/she can reconfigure the axes by manipulate the markers to get different views of data. The aforementioned interaction technique is expected to increase the comprehension of the large amount of underlying accounting data.

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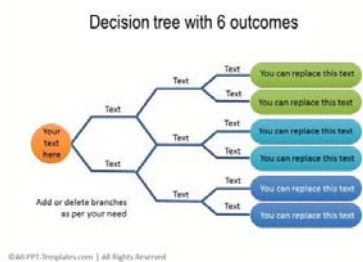
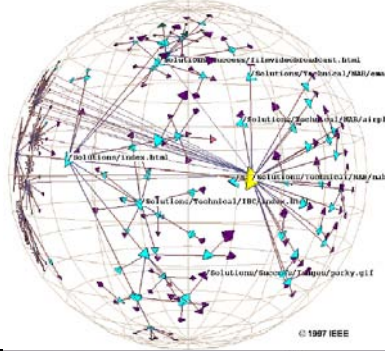
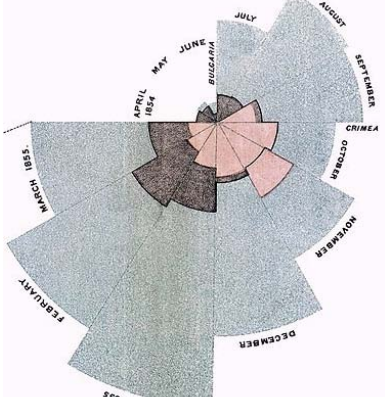
References

- [1] ALLABY, A., and M. ALLABY, "rose diagram: A Dictionary of Earth Sciences". Retrieved May 08, 2016 from Encyclopedia.com: <http://www.encyclopedia.com/doc/1O13-rosediagram.htm> 1999
- [2] Bach, B. "Unfolding Dynamic Networks for Visual Exploration (Dissertation Impact)". *IEEE Computer Graphics and Applications* (March/April), 2016, pp.74-82.
- [3] Bellamy, R. K., Erickson, T., Fuller, B., Kellogg, W. A., Rosenbaum, R., Thomas, J. C., and T. V. Wolf, "Seeing is Believing: Designing Visualizations for Managing Risk and Compliance. *IBM Systems Journal*, 46(2), 2007, pp. 205-218.
- [4] Bloom, B. *Taxonomy of Educational Objectives Handbook I: Cognitive Domain*. New York: McGraw-Hill. 1956
- [5] Chang, R., Lee, A., Ghoniem, M., Kosara, R., Ribarsky, W., Yang, J., and A. Sudjianto, "Scalable and Interactive Visual Analysis of Financial Wire Transactions for Fraud Detection". *Information Visualization*, 7(1), 2008, pp. 63-76.
- [6] Chen, I.-X., and C.-Z. Yang, "Visualization of Social Networks" (Chapter 27, 2010, pp.585-610). In B. Furht (Ed.), *Handbook of Social Network Technologies and Applications*. Springer Science + Business Media, LLC: DOI 10.1007/978-1-4419-7142-5_27.
- [7] Dilla, W., Janvrin, D., and R. Raschke, "Interactive Data Visualization: New Directions for Accounting Information Systems research". *Journal of Information Systems*, 24(2), 2010, PP.1-37.
- [8] Dull, R. B., and D. P. Tegarden, "A Comparison of Three Visual Representations of Complex Multidimensional Accounting Information". *Journal of Information Systems*, 13(2), 1999, pp.117-131.
- [9] Eppler, M. J. and M. Aeschmann, A Systematic Framework for Risk Visualization in Risk Management and Communication. (Bas), 11(2 (April)), 2009, pp. 67-89, doi:10.1057/rm.2009.1054.
- [10] Felder, R. M., and B. A. Solomon, (). Index of Learning Styles Questionnaire. <https://www.engr.ncsu.edu/learningstyles/ilsweb.html>. 1998, Retrieved 1 August 2008.
- [11] Griffith, D. A., *Spatial Autocorrelation and Spatial Filtering. Gaining Understanding through Theory and Scientific Visualization*. 2013
- [12] Kerren, A., and F. Schreiber, (Eds.). *Network Visualization for Integrative Bioinformatic*. Springer-Verlag Berlin Heidelberg 2014: DOI 10.1007/978-3-642-41281-3 7.

- [13] Lemieux, V. L., Fisher, B., and T. Dang, *The Visual Analysis of Financial Data* (Chapter 22, 2014, pp.279-325): Cambridge University Press, Cambridge, United Kingdom.
- [14] Lock, I., and P. Seele, "Analysing Sector-Specific CSR Reporting: Social and Environmental Disclosure to Investors in the Chemicals and Banking and Insurance industry". *Corporate Social Responsibility and Environmental Management*, 22(2), 2015, pp. 113-128 (March/April). doi:110.1002/csr.1338.
- [15] Pirolli, P., Card, S. K., and Van Der M. M. Wege, "The Effects of Information Scent on Visual Search in the Hyperbolic Tree Browser". *ACM Transactions on Computer-Human Interaction (TOCHI)*, 10(1 (March)), 2003, pp. 20-53.
- [16] Rungpaka, V., Savetpanuvong, P., and U. Tanlamai, "Preliminary Results--Nature as Metaphor: Innovative Visualization of Accounting Information with Lotus Flower Plants". *Proceeding of the International Conferences on Information Technology Applications and Management (ITAM)*, Wonju, Korea (19-20 December 2012).
- [17] Silveira, P., Rodríguez, C., Casati, F., Daniel, F., D'Andrea, V., Worledge, C., and Z. Taheri, "On the Design of Compliance Governance dashboards for Effective Compliance and Audit Management". *Proceeding of the Service-Oriented Computing. ICSOC/ServiceWave 2009 Workshop* (pp. 2010, 208-217), https://scholar.google.co.th/scholar?q=Audit+risk+information+visualization&btnG=&hl=en&as_sdt=0%2C5.
- [18] Tanlamai, U. "Understanding Business from Business Report Visualization". *The Journal of Digital Policy and Management, International Edition*, 7(1 (March)), 2009, pp. 57-71.
- [19] Tanlamai, U., Savetpanuvong, P., and W. Kunarittipol, "Mixed Reality Visualization of Financial Accounting Data. *Journal of Information Technology Applications and Management*, 18(1 (March)), 2011. Pp. 1-14.
- [20] Tanlamai, U., Savetpanuvong, P., and W. Kunarittipol, "Financial Data Assessment Using Table-Graph-Mixed Reality Visualization. *Journal of Information Technology Applications and Management*", 19(1 (March)), 2012, pp. 13-24.
- [21] Tanlamai, U., Savetpanuvong, P., Leelaphattarakij, P., and S. Choochaisri, "Usefulness of Mixed Reality Visuals in the Learning and Assessment of Financial Data". *Proceeding of the Business and Information*, Sapporo, Japan (3-5 July 2012).
- [22] Tanlamai, U., and O. Soongswang, "Learning Financial Reports from Mixed Symbolic-Spatial Graphs. *US-China Education Review B*, 1(6 (November)), 2011, pp. 797-808.
- [23] Tanlamai, U., and K. Tangsiri, "Business Information Visuals and User Learning: A Case of Companies Listed on the Stock Exchange of Thailand". *Journal of Information Technology Applications and Management*, 17(1 (March 2010)), pp. 11-33.
- [24] Tanlamai, U., and K. Tangsiri, "Learning from Schematic Visuals of Financial Ratios". *International Journal of Business and Information*, 7(2 (December)), 2012, pp. 250-276.
- [25] Tegarden, D. P. "Business Information Visualization. *Communications of the Association for Information Systems*", 1(4 (January)), 1999, pp. 1-38.
- [26] Tufte, E. R., *The Visual Display of Quantitative Information (2nd ed.)*. Cheshire, Connecticut: Graphics Press LLC. 2001
- [27] Yeshmin, F. "Visualization of Corporate Social Responsibility Information of Commercial Bank in Bangladesh". *World Journal of Social Sciences*, 2(5 (August Special Issue), 2012, pp. 114-127.

Appendix A

Selected Scientific Information Visualizations
Adapted from Tegarden (1999) [25] and Dilla, Janvrin, and Raschke (2010) [7]

Visuals	Description	Example Visuals
Heat map	This graphical representation depicts the individual data values in a matrix with different colors and magnitude information. Financial related representations include data of market capitalization, segmental financial performance, Risk map – probability and impact. For market capitalization application, the treemap can provide information in 3 hierarchical levels: the entire market, market sectors, and industries.	
Hierarchical tree diagram	This is one of the most commonly used methods in cluster analysis. The diagram provides effective visual condensation of the clustering results.	
Hyperbolic tree [15][2]	This type of tree employs hyperbolic space that has more room than Euclidean space in presenting data. By using radius of a circle, the tree will be less cluttered when trying to include many parents and nodes together. Financial related applications include social network transactions, navigation of financial data, and perhaps corporate ownership structure.	
Rose diagram [1]	A circular histogram plot which displays directional data and the frequency of each class. Originated with Nightingale's presentation of her mortality statistics of soldiers dying from infectious diseases, rose diagram has been used for example data such as wind direction, ocean current direction, and so on. Closely related to rose diagram is the EXCEL's radar chart or spider diagram.	

Open Government Data Assessment Framework: A Case Study of Public Organizations in Thailand

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Abstract

The advancement of internet becomes a driving force for governments all over the world to allow citizen access to their data for free and without restrictions. Recently, Thailand's Government releases the Digital Government Roadmap. The roadmap can be instrumental in driving the economy of the country. However, without an assessment framework, Thailand government will not be able to determine the extent of open government data. This present research reviews existing literature on open government data and come up with a workable framework to be used to assess and evaluate the degree of open government data of the country. Using digital government roadmap and relevant regulations in Thailand, four key perspectives are identified: Policy and Legal, Organization, Technological and Innovation. Detailed topics and subtopics in each perspective will be provided. This assessment framework will later be used to assess the degree of open government data of all public organizations in Thailand.

Keywords:

Open Government Data, Evaluate Open Government Data, Open Data Assessment, Open Data Benchmarking, Open Data

Introduction

The advancement of internet and rapid growth of social media becomes a driving force for governments all around the world to be more transparent especially social media such as Facebook, Line and twister which are two ways communication tool to increase the relationship between government agency and citizen. In recent year, governments all over the world release open government initiative which mainly aim to be more transparent [6]. Open Government concept is demonstrated under three components namely; participation, transparency and cooperation of citizens in public policies [15]. In this area, Open Government Data (OGD) concept is a working philosophy to enable citizens

to have access to public data for free and without restrictions so that the people can use, store, redistribute and integrate data which are generated by public organizations [15]. One of the main goal of Open government data is to encourage private sector to create products and services innovation that provide interactive access to the public data from government sector [8]. The initial open government ambition was to support government accountability and transparency through promoting successful business innovation [1].

Recently, Thai Government jumps on the bandwagon and releases the Digital Economy Plan of Thailand and Thailand's three years Digital Government Plan. The three years plan contains a plan for Open government data which can be instrumental in driving the transparency of the country. In these three years, Thai Government wants to move up Digital Government with four strategies as 1) government integration, 2) smart operation, 3) citizen-centric services, and 4) driven transformation [20].

However, there are various problems about open government in Thailand. Open government data will have to comply with existing degree of data privacy and data protection. The general perception that open government data is a tool that public agency release officially data for general public' use might not be possible at all causes [3]. The situation in Thailand differs from what had happened in the United States. On December 2009, President Obama issued a Memorandum on the Freedom of Information Act, as "the most prominent expression of a profound national commitment to ensuring an open government" [9]. These memoranda are seen as the Open Government Directive with which all Ministerial departments and public agencies had to comply [18].

Nonetheless, without an assessment model to evaluate open government data development, Thailand Government may not know when it has become a successful digital government. Thus, the purpose of this paper is to propose a new workable assessment model using four perspectives of open government data which relate to both the Digital

Economy Plan of Thailand and Thailand's three years Digital Government Plan. The four perspectives are Policy and Legal, Organization, Technology, and Innovation. The assessment model allows Thai government agencies to assess their current operations and trustable data during the development stage of digital government.

This paper is structured into five sections. In the next second section, a review of the existing background literature on open government data is presented, the third section will describe details of both the Digital Economy Plan of Thailand and Thailand's three years Digital Government Plan. In the fourth section, a new workable framework is presented. Finally, the last section concludes with research summary and proposed future research.

2. Literature Review on Open Government Data Assessment Model

One of the reason why researchers in each country all around the world tried to develop assessment model for open government data is because the lack of assessment framework suitable for specific country circumstances such as laws and regulations. Thus, it is imperative to develop an open government data assessment model that is workable for each country. Not only that it can help researchers better understand an open government data setting, the framework will serve as an important tool to benchmark the progress of open government from one country to another. In this section, the definition of Open Government Data and existing open government data frameworks in the literature will be reviewed.

2.1 The definition of Open Government Data (OGD)

Albeit, there are many published research on OGD, the definition of OGD is still imprecise. Open government

establishes a system of transparency, public participation and collaboration which allows citizen to access and use public data and improve public services [4]. Therefore, the term open government can be defined as follows [3]:

- A platform which transfers government data to citizens.
- It allows citizen to use, interact and license with those data.
- These transformations empower public agencies to approved official's data before release to citizen.

Another definition for open government data is the data that is produced by government agencies or government controlled entities that collect, store and disseminate so as to be reused for an innovation creation by private organizations [14]. In other words, Parycek et al., (2014) defined the open government data as "all data of the public sector which could be made accessible by government in a public interest without any restrictions for usage and distribution".

In this paper, the definition of open government data is the data which has been collected and stored by government agencies, especially public organization, which is consented by Official Information Act, B.E. 2540 (1997) in Thailand and is abide by related regulations including privacy, confidentiality and security principles. The data is to be made accessible to the general public through a single data portal. Also, an open government data only releases data that allows public to access through a data portal.

2.2 Open Government Data Assessment Model

Previous literature reveals that there are various perspectives being used to describe an Open Government Data Assessment Model (Table 1). Some perspectives in one model overlap with another model.

Table 1: Literature Review on Open Government Data

Authors	Perspectives
Bertot et al, (2012) " <i>Measurement of Open Government: Metrics and Process</i> "	1. Leadership, Government and Culture change including law, policies and regulations. 2. Transparency as role for information/data prioritization. 3. Participation and collaboration
Solar M et al, (2012) " <i>A Model to Assess Open Government Data in Public Agencies</i> "	1. Establishment and Legal 1.1 Strategy, Leadership and Establishment 1.2 Laws and Regulations and 1.3 Management 2. Technological Perspective 2.1 Safety and Availability 2.2 Access 2.3 Data Quality 3 Citizen and Entrepreneurial 3.1 Data reuse 3.2 Developers 3.3 Participation and Collaboration

Styrin E., Dmitrieva N. and Zhulin A., (2013) <i>“Openness Evaluation Framework for Public Agencies”</i>	1. Citizens and expert 1.1 Collaboration with agency’s community board 1.2 Collaborate with stakeholders 1.3 Collaboration with media and social networks 1.4 Processing citizen appeals 2. Accountability 2.1. Public declaration of the agency 2.2 Accountability in procurement, civil service and key areas of agency’s activities 2.3 Anticorruption expertise and public monitoring of law enforcement. 3. Information accessibility and openness 3.1 Information openness of the agency’s web-site 3.2 Comprehensible government including informing and consulting citizens on agency’s legislative activity 3.3 Open data
Almazan R and Garcia J., (2104) <i>“Towards an Evaluation Model for Open Government: A Preliminary Proposal”</i>	1. Legal Obligations described the evaluation of public organization policy including public policy rules and regulations. 2. Open Data evaluate development of technology in open data and use of data. 3. Collaboration assess tools which help to promote collaborate with developers and citizens. 4. Co-production assess applications process and feedback from citizens. 5. Institutional Arrangements involves internal organization activities such as transaction cost, agreement and process for open government.
Zuiderwijk A., Helbig N., García J., and Janssen M (2014) <i>“Special Issue on Innovation through Open Data – A Review of the State-of-the-Art and an Emerging Research Agenda”</i>	1. Open data policy, use and innovation 1.1 Policy 1.2 Process management 1.3 Innovation results on open government data application and creation 1.4 Stimulate use which significant factor to share and public government data to citizens 2. Open data infrastructure and technology 2.1 Infrastructure and functionalities 2.2 Interoperability 2.3 Metadata 2.4 Data quality

3. Thailand OpensGovernment Data

Last year, Thai government revealed her Digital Economy Plan to drive social and economy of Thailand by using digital technology. Thai government needs to transform the country into a sustainable digital economy and digital government. There are five main pillars of digital economy: 1) hard infrastructure, 2) service infrastructure, 3) soft infrastructure, 4) digital economy promotion, and 5) digital society and knowledge resource. It is necessary for the government to develop a “Digital Master plan” in order to provide clarity and consistent direction of development across all agencies. The Master plan includes a High-Level Capability Blueprint and a Roadmap to provide direction in developing Thailand’s digital capabilities in short, medium and long term horizons.

Thailand’s Three Years Digital Government Development Plan (2016-2018)

In general, the Digital Economy should trigger creativity and innovation in public services which are regarded as citizen and business-centric. It will allow all citizens to access information which will continuously lead to cumulative benefits for both the economy and the society.

However, public sector faces several obstacles in improving its digital capabilities.

There are five challenges in enhancing public sector’s digital capabilities. 1) Different government agencies lack a shared vision in the development of the digital government. 2) Various systems were developed separately, resulting in a lack of standard and inability for these system to work together. 3) Budget allocation is not continuously supported, leading to ineffective outcomes. 4) Lack of personnel who has appropriate IT expertise. 5) Laws intended to support the current electronics operations have not been put to practical use nor do they be used at the fullest capacity. In order to establish a clear and concrete Digital Government Master plan, it is necessary to learn the nature of current government services to understand their obstacles and challenges.

The Government Master plan requires genuine knowledge in adapting up-to-date technologies and best practices that can improve government services. Four visions which supposedly enhance the development of digital government within a three-year period have been identified.

Vision#1: Government Integration. This is to describe an integration among public agencies, including information

and operation, in order to provide a single point of services to citizens, share services as well as open data to public' needs.

Vision#2: Smart Operations. This vision entails the utilization of technology and digital equipment to connect all equipment that will support personal activities such as big data analytic tools and internet of things (IoT).

Vision#3: Citizen Centric Service. This is to elevate the service sector so that personalized service can be provided to an individual based on his or her needs.

Vision#4: Driven Transformation. This is to effect changes to different aspects of an organization such as technology, work process, human resource and regulations.

Thailand government analyzed a lack capability which should be developed and prioritized it into eighteen digital capabilities. Priority capability was conducted by two axes; 1) Readiness Assessment describes the readiness level of public agencies in Thailand which need to develop such as policy, vision, regulations, communication technology and infrastructure. 2) Capability gap analysis reflects the potential improving gap in each segment under Thailand digital Government Plan. Therefore, all capabilities should be developed following three years plan summarize as shown below in the figure 1.

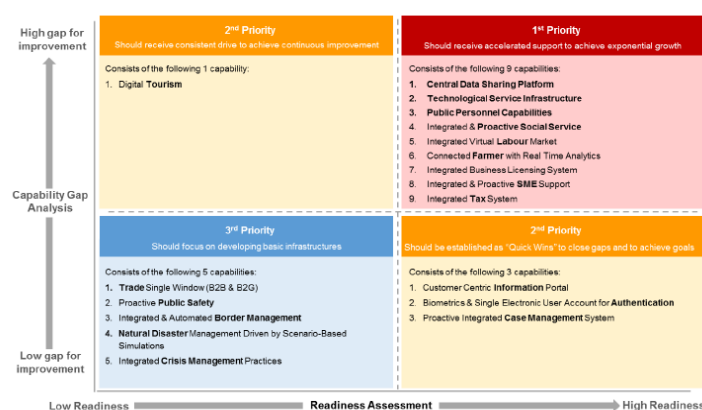


Figure 1: Eighteen digital capabilities and priority

Open government data is identified in the second priority. This initiative is part of the information with customer centric through information portal capability. The portal involves all public agency to share and publish information to a central portal (Data.go.th) that, in turns, allows citizens to access these data without any restrictions. Currently, there are 486 datasets published at the data.go.th website. The plan is to increase up to 550 datasets in June and to reach 600 datasets in December, 2016.

4. Proposed Open Government Data Framework

In order to come up with a proposed framework, two major steps are carried out.

Step 1: Review the existing status and progress of open government data assessment framework. This is to understand and analyze the applicability of the proposed framework for assessing open government data in Thailand. The review focuses on the open government data representation and availability based on the open data principles.

Step 2: Search different open government data assessment perspectives using the following keywords: "open data, Open Government Data, Evaluate Open Government Data, Open Data Assessment, Open Data Benchmarking and Open Data". The searching process is limited to general academic database such as Scopus,

SpringerLink and ScienceDirect.

Once the review and keyword search activities are done, similarity and difference between perspectives in previous literature are determined in order to conclude what model(s) and/or perspectives will be suitable to the context of Thailand. A new open government data framework is then proposed with four perspectives as follows: 1) Policy and Legal Perspective, 2) Organization Perspective, 3) Technological Perspective, and 4) Innovation Perspective.

4.1 Policy and Legal Perspective

This perspective describes high level activities of minister and his cabinet. This group will determine government responsibilities in order to identify directions of the open government data. As Solar M, et al. (2012) stated, policy and strategy establishment was supported by laws, regulations and training. Public policy and direction are usually implemented at all government agencies [3]. The context of open government data at national level includes policy from central government, legal and regulatory environment, political will, and leadership [5]. Zuiderwijk et al., (2014) pointed out that legislative perspective was significant because open data should comply with legislation, including freedom of information acts, open data policies, open government directives and statements. However, Veljković et al (2014) posited that policy could be important obstacles to the development of OGD. For

example, limit data transparency and copyrights may result in lack of clarity over restricting citizen right to access government data and having limitation to the re-use arising from copyrights and commercial usage. Thai Government should develop an open government strategy and guidelines to address and resolve common issues, problems, and conflicts that individual agencies face.

4.2 Organization Perspective

Driving open government data needs to change structure of an organization (Enterprise architecture) and to determine the roles that different units play in the open government data program [5]. Building organizational capabilities in this area need an ability to properly manage open government data programs with other agencies in different areas, for example, training, management activity, and performance assessment. Also, it is important to be able to measure open government maturity and to ensure appropriate internal and external coordination [15]. However, many governments are still struggling with a number of key organizational challenges. These are strategic elements which need to be understood and addressed at national level and in organizational strategies and plans [18]. Two-way communication between the public sector and private sector is the key for governments to focus on users' needs and for users to provide feedback on the datasets they would like to see and use by community [14]. Lack of raw data is more than technological challenges. This is a fundamental cultural change of a public sector from basic disclosure to proactive and smart disclosure [18].

4.3 Technological Perspective

The major characteristic of technology is infrastructure which is the basis of government agencies to release their data [12]. Open data platforms would be a central platform for enabling public organizations and citizens to use officially updated data [7]. However, some technical barriers may inhibit the open data stimulating innovation. Also, a lack of interoperability among metadata standards, processes, licenses, and data formats when the data is released to citizens can result in limited progress in open data interoperability [19].

Sayogo et al. (2014) reviewed ten principles that govern open data. Only eight principles are updated and discussed in open government data and open data assessment. Currently, open government data described the main technological approaches for disclosing their data [8]. Alexopoulos et al. (2015) defined main technological layers for the open government data for a web server, including content management system (CMS) or platform, user interface, data format, and data format application programming interfaces (API) known as web service interfaces [1].

4.4 Innovation Perspective

Accessing government data is a form of interactions between public agency and citizens in order to create an innovation by using social media technologies and application [18]. Open data can help service creation and product innovations [7]. The monetary benefits of open government data can be measured by its impact as the earning gained from using datasets but social benefits personal enhancement [5].

There are various types of measures in innovation perspective. For example, data access can be measured as access indicators or degree of involvement [10]. Reuse can be defined as another type of innovative assessment measure. Likewise are Complaints and Conflicts resolution [2]. Relative advantage over the existing alternative measures can be included if they serve the same purpose, easy to use, and comply with the policy formulation processes [11].

The applicability of the OGD assessment framework should also considers participation and collaboration. Participation in open government data is when a person uses the datasets or access to government data. Collaboration implies that the open government portal enables collaboration among government at all levels and private sectors [14]. The proposed open government perspectives and respective variables are summarized in Table 2.

Table 2: Open Government Data Proposal Model

Perspective	Variables
1. Policy and Legal Perspective	1. Open government plan 1.1 Government plan 1.2 Government vision and strategy. 2. Laws and regulations 2.1 External and internal Laws. 2.2 External and internal regulations.
2. Organization Perspective	1. Policy and Leadership 1.1 Enterprise policy statement 1.2 Leadership and management commitment. 2. Personal and Training 1.1 Personal capability 1.2 Training 1.2 Performance assessment. 3. Enterprise architecture and Change management.
3. Technological Perspective	1. Infrastructure and OGD platform 1.1 Infrastructures and functionalities 1.2 Interoperability and Metadata. 2. Open data principles
4. Innovation Perspective	1. Application with 1.1 Number of application 1.2 Other innovative output. 2. Citizen participation 1.1 Data Access 1.2 Complains and conflicts resolution

5. Conclusion

The concept of open government data is to enable citizens and allow them to have access to public data for free and without restrictions. Recently, Thailand's Government jumps on the bandwagon and releases a three-year Digital Government Plan which serves as the blueprint for Open government data. To assess the extent of open government data in Thailand, this research proposes a new workable open government data assessment model which has four perspectives. The model has been developed from both the Digital Economy Plan of Thailand and Thailand's three-year Digital Government Plan with four perspectives as follows: 1. Policy and Legal Perspective, 2. Organization Perspective, 3. Technological Perspective, and 4. Innovation Perspective. The assessment model allows a government agency to assess its digital government stage from operational level and trustable data.

References

- [1] Alexopoulos C., Loukis E., Mouzakitis S., Petychakis M and Y. Charalabidis., "Analysing the Characteristics of Open Government Data Sources in Greece" ©Springer Science+Business Media New York 2015
- [2] Almazán R., "The Two Door Perspective: An Assessment Framework for Open Government" JeDEM 3(2): 2011, pp. 166-181,
- [3] Almazan R and J., Garcia "Towards an Evaluation Model for Open Government: A Preliminary Proposal" IFIP International Federation for Information Processing: EGOV 2014, LNCS 8653, 2014, pp. 47-58,
- [4] Bertot J., McDermott P. and Smith T., "Measurement of Open Government: Metrics and Process" proceeding of 45th Hawaii International Conference on System Sciences IEEE, 2012
- [5] Caplan R, Davies T, Wadud A, Verhulst S, Alonso J. and H., Farhan "Towards Common Methods for Assessing Open Data: Workshop Report& Draft framework" GOVLAB The Governance Lab, New York University 2014
- [6] Huntgeburth J. and D. Veit, "Evaluating Open Government Initiatives" © Springer International Publishing Switzerland 2015

- [7] Kapoor K., Weerakkody V., and Sivarajah U., "Open Data Platforms and Their Usability: Proposing a Framework for Evaluating Citizen Intentions" © IFIP International Federation for Information Processing 2015: I3E 2015, LNCS 9373, pp. 261–271, 2015
- [8] Kalampokis E., Tambouris E. and Tarabanis K., "Open Government Data: A Stage Model" ©IFIP International Federation for Information Processing: EGOV 2011, LNCS 6846, pp. 235–246, 2011
- [9] Lee G. and Kwak Y., "An Open Government Maturity Model for social media-based public engagement" Government Information Quarterly, 29, 492–503 (2012).
- [10] Lin C. and Yang H., "Data Quality Assessment on Taiwan's Open Data Sites" MISNC 2014, CCIS 473, pp. 325–333, 2014. Springer-Verlag Berlin Heidelberg 2014
- [11] Loukis E., Charalabidis Y., and Androutsopoulou A., "Evaluating a Passive Social Media Citizensourcing Innovation" ©IFIP International Federation for Information Processing 2015: EGOV 2015, LNCS 9248, pp. 305–320, 2015
- [12] Lourenço R., and Serra L., "An Online Transparency for Accountability Maturity Model" © IFIP International Federation for Information Processing 2014: EGOV 2014, LNCS 8653, pp. 35–46, 2014
- [13] Parycek P., Sachs M., Sedy F., and Schossböck J., "Evaluation of an E-participation Project: Lessons Learned and Success Factors from a Cross-Cultural Perspective" © IFIP International Federation for Information Processing 2014: ePart 2014, LNCS 8654, pp. 128–140, 2014
- [14] Sayogo D., Pardo T. and Cook M., "A Framework for Benchmarking Open Government Data Efforts" 47th Hawaii International Conference on System Science© 2014 IEEE
- [15] Solar M, Concha G, and Meijueiro L., "A Model to Assess Open Government Data in Public Agencies" ©IFIP International Federation for Information Processing: EGOV, 2012 LNCS 7443, pp. 210–221
- [16] Stylin E., Dmitrieva N. and Zhulin A., "Openness Evaluation Framework for Public Agencies" ICEGOV'13, October 22–25, 2013, Seoul, South Korea
- [17] Ubaldi, B., "Open Government Data: Towards Empirical Analysis of Open Government Data Initiatives", OECD Working Papers on Public Governance, No. 22, OECD (2013)
- [18] Veljković N., Bogdanović-Dinić S., and Stoimenov L., "Benchmarking open government: An open data perspective" Government Information Quarterly © 2014 Elsevier Inc. All rights reserved
- [19] Zuiderwijk A., Helbig N., García J., and Janssen M
"Special Issue on Innovation through Open Data – A Review of the State-of-the-Art and an Emerging Research Agenda" Journal of Theoretical and Applied Electronic Commerce Research ISSN 0718–1876 Electronic Version VOL 9 / ISSUE 2 / MAY 2014
- [20] Electronic Government Agency (Public Organization). "Thailand's three year Digital Government Plan (2016-2018), 2016 Accessed: https://www.ega.or.th/upload/download/file_430e6925f329591155fb3801cdd08d60.pdf [May 1, 2016]

Perception of CSR Information through Distorted Graph and Investors' Intention

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Abstract

Nowadays, investors look into CSR report so as to get a feel of how corporations convey their long-term strategy and sustainable performance information to outsiders. However, consuming information from a report is risky because there is no mandatory auditing process nor regulatory procedures to guarantee its validity. Some firms may disclose the information in order to propagate their corporate image by presenting data with distorted graphs.

In this manuscript, we aim to investigate the effect of distorted graph on investors' intention. An online survey with non-distorted and distorted graphs of CSR data was used to assess the ability to detect distortion. In case of distorted graphs, we manipulated them using a graph distortion measurement named RGD. The data will be collected from postgraduate students of a business school in a large public university. In the survey, the subjects will be separated into two groups depending on the types of graph, bar graph versus pictograph. Conceptual framework and detailed research methodology will be provided in this paper.

Keywords:

CSR, Graph Distortion, Bar graph, Pictograph, Investors' intention

Introduction

With the recurrence of recent financial crises, a number of investors have become more interested in sustainability investment which focuses on gaining constant return on investment rather than a high benefit [13]. Hence, corporate transparency and Corporate Social Responsibility (CSR) information are influential factors for making investment

decisions especially when their financial performances are not significantly different. The information can reflect the level of concern a business has about sustainability development. In addition, CSR information relates to expected future cash flow of a firm which indicates future return on investment [4][11].

Since CSR information is important, many companies disclose such information in their annual reports and CSR reports. Even though CSR information disclosure is just an option, the number of companies disclosing CSR information has increased over the past decade [14][19][38][39]. The popular method used for CSR information disclosure especially in CSR reports is data visualization. The method can attract readers' attention better than any other representation and it can highlight information that is favorable to the company's image [42]. Presenting information by graph is the most popular type of this method. Though investors typically place more trust in the firm which discloses CSR information rather than others, a number of graphs in CSR report is distorted and most of them are favorable distortion [4][11][14][15].

Consequently, using information in a CSR report to make an investment decision is risky [2][18][44]. The lack of regulations to control data quality in the report makes ways for companies to use reports in managing their image and undermining the actual social and environmental impacts of their operations [15][36][44][45].

This manuscript outlines a proposed study to investigate the relationship between individuals' perception of distorted graphs and their intentions toward the company having CSR distorted graphs. Three areas of intention include purchasing of the company's product or service, being the company's

employee and investing in the company. Also, the study inquires whether data trends and graph types will affect ability to detect distortion. Graph literacy and attitude toward corporate social responsibility are included as control variables since they relate to information perception processing of CSR graphs.

Literature Review

CSR report

CSR report is an effective corporate instrument which is used for investor relation management [45]. The report is aimed at declaring the impact of corporate operation with regard to economy, society and environment. These three issues are the components for sustainable development following “Triple Bottom Line” accounting framework [20][27][33]. CSR report is not mandated in most countries [4], however, the report disclosure can increase market capitalization of a firm [11]. In addition, the quality of CSR reports associated with corporate stock liquidity and firm value [4] and the percentage of firms releasing the reports is different by country and industry [25][38][39]. Furthermore, the regulation on CSR report is not necessary in most countries. This loophole results in CSR report being used as an advertising tool. Some reports disclose only favorable information while some unfavorable important information is concealed. Thus, some companies decide to adopt an international sustainability reporting framework in order to convince readers to trust their CSR reports. Global Reporting Initiative (GRI) is the most popular framework which focuses on the CSR report preparation process. The report which is based on GRI can clearly show the firm’s vision [28].

The effect of CSR information

CSR information is a persuasive instrument to create advantage for corporations and will be more important in case of presenting with monetary data, focusing on product development and relating business transparency [1][53]. Investors typically invest in a company in which declares CSR information because the information mirrors the sustainability development plan of a firm. To develop sustainably means the firm has the potential to reduce operating cost, increase income and have a competitive advantage [11]. Presenting a business plan which is concerned about social and environmental issues can increase a firm’s reputation

and profitability [48]. Moreover, stock prices of a company which have engaged in sustainability development tend to have a positive relationship with company’s performance though there are many factors affecting investment decision makings. Running business with social and environmental considerations might make a firm look good from the view of not only investors but also stakeholders [48].

Data visualization

A popular type of data visualization is graphs. Graphs are always used to present corporate information reports and some investors consume information only from this source to make investment decisions [57]. In addition, they are influenced by exciting graph designs [47].

Even though investors (or readers) consume information from the same graph, they may perceive and/or understand the information differently. The main reasons are their differences in background knowledge as well as experiences [50]. These are factors of graph perception and comprehension processes used for interpreting physical description of a graph into quantitative data [16][17][22]. Graph comprehension relies on readers’ graph literacy consisting of the ability to read the data from a graph specified, ability to find differences from graph specifies and ability to forecast the data from a graph when there is enough information [23].

Nevertheless, different graph types have different methods of data interpretation. For example, readers use the height of specifiers to translate visual into quantitative data in the case of bar graph whereas area graph is used instead if the graph is a kind of pictograph [16].

Graphs in corporate reports

The role of corporate reports will increase if the report contains graph(s). It is an advertising instrument more than a formal tool for declaring information legally to investors [9]. However, a number of graphs in corporate reports is based on the firm’s annual financial performance. Companies with a decrease in performance tend to depict information by graphs less than the others[31][56].

Graphs with 10-year, 5-year and 3-year data are the most popular in corporate reports regardless of countries [5][6][7][8][10] and the most frequently used type of graph is bar graph [5][6][10][12][21][30][31][34][40][41][46][52].

Nevertheless, pictographs have become more popular nowadays since it is more effective at conveying meaning. This is the effect from using a symbol to represent data [55].

In the case of CSR graphs, most corporations present the graphs of social safety and health, gas emissions from operations and employee related data [14][15][30]. The companies in which their operations affect society and the environment at high levels tend to present CSR graphs more than the others [34] and they usually present the graphs in both annual reports and CSR reports. Although there are a few studies which aim to investigate graphs in CSR reports, most results indicate that there is a number of distorted graphs which are typically favorable distortion [14][15]. However, companies tend to decrease the number of distorted graphs in their reports when they face a financial crisis. This may be because investors are more cautious in the firm's financial performance [2].

Graph distortion measurement

Distorted graphs are one kind of inappropriately designed graphs [3], however, detection of distortion is relatively subjective. Hence, a number of researchers decided to develop a graph distortion measurement so as to standardize graph distortion detection.

The first graph distortion measurement is Lie factor [54]. Graph discrepancy index (GDI) was developed later due to a difficulty in interpreting distortion [51]. However, GDI has an accuracy problem so Relative Graph Discrepancy Index (RGD) is the third graph distortion measurement. It is the most accurate measurement at present [43]. Also, previous studies found graph distortion threshold to be at the absolute 5 percent of RGD. This threshold is the distortion level which affects readers' perception significantly [32]. However, the threshold reported might be questionable because there is a conflict between the results from 2 parts of Huang and his working group's study.

Study framework

Figure 1 shows the conceptual framework developed based on the review of literature to examine the relationship from distortion perception and CSR attitude to investors' intention. Graph literacy and data trends are also included in this model as it may affect distortion perception. Besides, graph type is a moderator of a relationship between graph literacy and distortion. Graph literacy is evaluated from 3 levels of interpreting data whereas distortion detection asks for graph literacy in a different way. Readers have to use a physical description of graph specifiers for distortion evaluation instead of additional information provided on graph axes. Therefore, a reader's ability to detect distortion may differ by graph type because of a difference in the physical description.

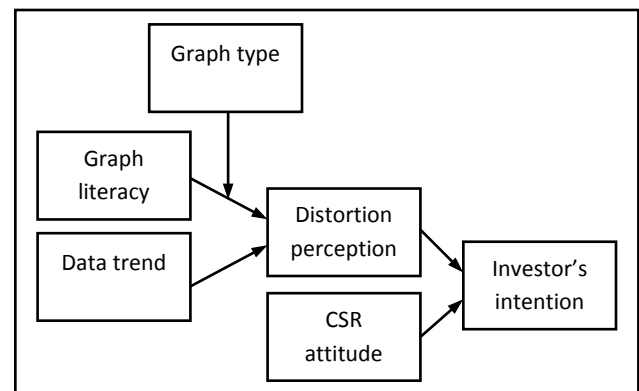


Figure 3: Conceptual framework of the study

Methodology

Sampling frame and samples

The sampling frame of this research is students from a large public university in Thailand as they likely to be business graphs users with general perception [9]. Purposive sampling is used for this research. Only Graduate students from an MBA program are included as samples. Since MBA students come from different educational backgrounds, they reflect typical investors in the real world. To align with the study framework, the samples will be separated into 2 groups with respect to two different graph types. The minimum sample size in this research is 30 subjects in each group as suggested in the rules of thumb by Roscoe [49].

Instrument development

An online survey will be used for data collection. There are 2 graph types used for information presentation, bar graph and pictograph. Therefore, two surveys with each for only one graph type will be provided. There are a total 5 sections in the survey consisting of demographic, CSR attitude, graph literacy, distortion perception and investors' intention. To develop the survey, 2 pilot studies were carried out.

Pilot studies

Study #1: Testing of graph literacy and distortion perception.

This pilot study collected data from 77 undergraduate students and 86 postgraduate students in a large public university in Thailand (Kurusakdapong and Tanlamai, 2016). Using an online questionnaire, both graph literacy and distortion perception questions have been developed as follows:

- Graph literacy questions are adapted from Galesic and Garcia-Retamero's survey instrument which was originally in medical context [24]. Unlike the original instrument, the pilot study uses only bar and column graphs with both time-series and cross-functional data. Questions in the study assess graph literacy with 3 levels of graph reading ability [23].

The result reveals that undergraduate students have a slightly higher graph literacy level. This is the same result as past study which found the correlation between education and graph literacy [24]. The samples from undergraduate student are in accounting major whereas others are in MIS and MBA majors. Accounting students may be familiar with business information.

- Distortion perception questions were based on Beattie and Jones' study where pairs of non-distorted and distorted graphs are presented and each participant was asked to select the graph with the best performance [9]. Distorted graphs from both column and bar graph types were manipulated at -15%, -10%, -5%, -2.5%, 2.5%, 5%, 10% and 15% of RGD with upward and downward data trends. As shown in Figure 2, three choices of selection are provided. The left graph has no distortion and the right graph is 15 percent distortion by RGD. Time used for doing the survey is also recorded.

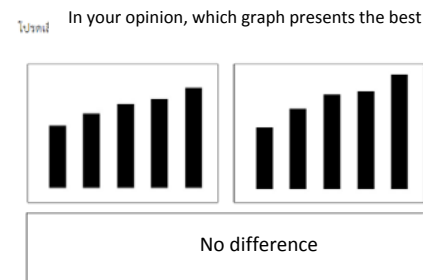


Figure 4: An example question from the distortion perception questionnaire from pilot study.

The result shows a positive association between time used for doing the test and ability to detect distortion. However, feedback from the samples in this pilot study showed that there are factors affecting the analysis of results as follows:

- 1) The respondents are confused with chronological order in the graphs since time labels are not provided.
- 2) There are too many questions in the online questionnaire, thus, the respondents may not pay attention to every question.
- 3) Some questions are improper. All questions ask for the graph which presents the best performance of the firm. Some participants may engage in complex cognitive processes to answer all questions, especially in the case of downward data trends.

Study #2: Selecting a pictograph for the proposed study.

There are variety of pictographs, however, only one pictograph will be used in this research. Thus, in order to ensure that the selected pictograph is appropriate, all graphs from the CSR reports of companies in the Stock Exchange of Thailand (SET) were collected. Nevertheless, only companies from paper and chemical manufacturer sector as well as natural resource sector are included since they are associated with and have the most environmental impacts [26][29]. Each graph was classified by graph type, length of time, and content classification based on the Triple Bottom Line Theory.

The results of Study #2 show that 3-year data and gas emission are the most popular data being shown. Only pictographs which present this popular information were selected. System Usability Scale (SUS) questionnaire will be used for investigating which pictograph is the most suitable for presenting data. Nevertheless, SUS is modified to fit with the research before used. A few specialists in graph

content will be asked to answer the SUS test and the pictograph with the highest score will be selected for the present research.

Measurements

1. CSR attitude

CSR attitude will be evaluated by questions regarding CSR belief and cynicism. CSR belief questions will be drawn from the questionnaire used by Kolodinsky and his group [37]. CSR cynicism questions developed by Kanter and Marvis [35]. These questions will use a 5 point Likert-scale, ranging from strongly disagree to strongly agree.

2. Graph literacy

The graph literacy measure has been developed and tested in pilot study #1. The graph types shown in this test are either bar graphs or pictographs. Two graphs with upward and downward data trends of time-series data will be presented. Each graph will be measured with 3 questions regarding 3 levels of graph reading ability. Score of graph literacy level will be calculated. Also, as found in the pilot study, the time used for doing distortion perception questionnaire relate to graph literacy, thus, will be include as another measure of graph literacy level.

3. Distortion perception

The distortion perception test was improved from the feedback of pilot study #1. All graphs in this study present CSR information with time order. Either bar graphs or pictographs will be shown so that minimum questions per subject can be achieved. Distortion levels will be the same as pilot study #1, except that the 15% and -15% will be excluded since all samples in the pilot study can detect this level of distortion.

Ability to detect distortion is assessed by the total score of the test with 2 scoring schemes as follows:

- 1) Unweighted scoring:
1 and -1 point will be given if the answer is correct and incorrect respectively. If the participant cannot see any difference between comparing graphs, no point will be given.
- 2) Weighted scoring:
No point will be given when the participant answers incorrectly. If “no difference” is chosen, 0.5 point will be given. However, the correct answer will receive different

scores depending on distortion levels. 1, 3 and 5 scores will be given when the subject can answer correctly at the absolute 10%, 5%, and 2.5% of RGD respectively.

4. Investors' Intention

Investors' intention will be evaluated using Aliacik and Genc's questionnaire [1]. The questionnaire comprises 3 dimensions of investors' intention which are intention to purchase a product or service from the company, intention to be an employee of the company and intention to invest in the company. Three pairs of graphs will be presented to answer each question. Each pair of graphs includes non-distorted and distorted graphs. These two graphs are assumed to present CSR performance from 2 companies. Furthermore, the companies' financial performances are assumed to be equal. In case of distorted graphs, they are 2.5, 5 and 10 percent of distortion by RGD.

Participants will choose one of the same three options as in the distortion detection test. However, “no difference” in this survey means there is no difference in doing transactions with these 2 companies. The scoring assignment is also different. When a distorted graph is selected, 1 point will be given, any other choices will be 0 points.

Data collection method

Data will be collected in a computer lab. Before doing an online survey, researchers will explain the details of this research and then a URL link will be provided. Two separate links of the survey, one for each graph type will be given. In the beginning of the online survey, each participant will be given an information sheet and consent form according to the principle of research ethics. The information sheet will describe the research overview such as approximate time used for doing survey. The consent form is employed to ensure the voluntary participation.

Conclusion

This manuscript details a proposal to study the relationships between perceived distortion detection, CSR attitudes and investors' intentions. Graph types are included in this research as a moderator since it may affect graph perception process. Bar graphs and pictographs are selected because of their popularity. Graph literacy and data trends are also included in the

research framework. Graph literacy is a component of graph comprehension and data trend may change readers' data consumption behavior. Detailed research method is provided in this paper.

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Reference

- [1] Alniacik, U., Alniacik, E., and N. Genc, "How Corporate Social Responsibility Information Influences Stakeholders' Intentions". *Corporate Social Responsibility and Environmental Management*, 18(4), 2011 pp 234-245.
- [2] Aresu, S., "Graphical Reporting in Italian Annual Reports during the Financial Crisis: Impression Management or Incremental Information?", *Financial reporting*. (2015)
- [3] Arunachalam, V., Pei, B. K. W., and P. J. Steinbart, "Impression Management with Graphs: Effects on Choices. *Journal of Information Systems*, 16(2), 2002, p20.
- [4] Barth, M. E., Cahan, S. F., Chen, L., and E. R. Venter, "The Economic Consequences Associated with Integrated Report Quality: Early Evidence from a Mandatory Setting", 2015, Available at SSRN 2699409.
- [5] Beattie, V., and J. M. Jones, "Australian Financial Graphs: An Empirical Study". *Abacus*, 35(1), 1999, pp. 46-76.
- [6] Beattie, V., and M. J. Jones, "A comparative Study of the Use of Financial Graphs in the Corporate Annual Reports of Major U.S. and U.K. Companies". *Journal of International Financial Management and Accounting*, 8(1), 1997, p. 36.
- [7] Beattie, V., and M. J. Jones, "Impression Management: The Case of Inter-country Financial Graphs". *Journal of International Accounting, Auditing and Taxation*, 9(2), 2000, p. 25.
- [8] Beattie, V., and M. J. Jones, "A Six-country Comparison of the Use of Graphs in Annual Reports". *The International Journal of Accounting*, 36, 2001. p. 28.
- [9] Beattie, V., and M. J. Jones, "Measurement Distortion of Graphs in Corporate Reports: An Experimental Study". *Accounting, Auditing and Accountability Journal*, 15(4), 2002, p.19.
- [10] Beattie, V., Jones, M. J., and A. Dhanani, "Investigating Presentational Change in UK Annual Reports: A longitudinal Perspective". *Journal of Business Communication*, 45(2), 2008, p.42.
- [11] Berthelot, S., Coulmont, M., and V. Serret, "Do investors value sustainability reports?" A Canadian study". *Corporate Social Responsibility and Environmental Management*, 19(6), 2012, pp. 355-363.
- [12] Bonga, J. and M. Jegers, "Graphical Disclosures by Charities: Clarification or Distortion? The Case of the Netherlands". *International Journal of Nonprofit and Voluntary Sector Marketing*, 14(3), 2009, pp. 181-191.
- [13] Chakornpipat, R. "Sustainability Investment". from http://www.prachachat.net/news_detail.php?newsid=1437553119, 2015
- [14] Cho, C. H., Michelon, G., and D. M. Patten, "Enhancement and Obfuscation through the Use of Graphs in Sustainability Reports: An International Comparison". *Sustainability Accounting, Management and Policy Journal*, 3(1), 2012, pp.74-88.
- [15] Cho, C. H., Michelon, G., and D. M. Patten, "Impression Management in Sustainability Reports: An Empirical Investigation of the Use of Graphs". *Accounting and the Public Interest*, 12(1), 2012, pp. 16-37.
- [16] Cleveland, W. S., and R. McGill, "Graphical Perception: Theory, Experimentation, and Application to the Development of Graphical Methods". *Journal of the American statistical association*, 79(387), 1984, pp.531-554.
- [17] Cleveland, W. S., and R. McGill, "Graphical Perception and Graphical Methods for Analyzing Scientific Data. *Science*, 229(4716), 1985, 6.
- [18] Courtis, J. K. "Corporate Annual Report Graphical Communication in Hong Kong: Effective or Misleading? *The Journal of Business Communication*, 34(3), 1997, p.16.
- [19] Deegan, C. "Introduction: the legitimising Effect of Social and Environmental Disclosures-a Theoretical Foundation". *Accounting, Auditing and Accountability Journal*, 15(3), 2002, pp. 282-311.
- [20] Elkington, J. "Enter the Triple Bottom Line", *The triple bottom line: Does it all add up*, 11(12), 2004, pp. 1-16.
- [21] Ferreira, L. *Graph Usage in Financial Reports: Evidence from Portuguese Listed Companies*. NOVA-School of Business and Economics, 2015.

- [22] Few, S. "Tapping the Power of Visual Perception". *Visual Business Intelligence Newsletter*. 2004
- [23] Friel, S. N., Curcio, F. R., and G. W. Bright, (2001). Making Sense of Graphs: Critical Factors Influencing Comprehension and Instructional Implications. *Journal for Research in mathematics Education*, 2001, pp.124-158.
- [24] Galesic, M., and R. "Garcia-Retamero, Graph literacy: A Cross-cultural Comparison". *Medical Decision Making*, 31(3), 2011, 14.
- [25] García-Sánchez, I.-M., Rodríguez-Ariza, L., and J.-V. Frías-Aceituno, "The Cultural System and Integrated reporting". *International Business Review*, 22(5), 2013, pp. 828-838.
- [26] González-Benito, J., and Ó. González-Benito, "A Study of Determinant Factors of Stakeholder Environmental Pressure Perceived by Industrial Companies". *Business Strategy and the Environment*, 19(3), 2010, pp. 164-181.
- [27] Hall, T. J., "The Triple Bottom line: What Is It and How Does It Work?", *Indiana Business Review*, 86(1), 2011, p. 4.
- [28] Hedberg, C. J., and F. Von Malmberg, "The Global Reporting Initiative and Corporate Sustainability Reporting in Swedish Companies". *Corporate Social Responsibility and Environmental Management*, 10(3), 2003, pp.153-164.
- [29] Hertwich, E., *Assessing the Environmental Impacts of Consumption and Production: Priority products and Materials*: UNEP/Earthprint. 2010
- [30] Hrasky, S., *Visual Disclosure Strategies Adopted by More and Less Sustainability-driven Companies*. Paper presented at the Accounting Forum. 2012
- [31] Huang, S.-Y., Huang, S.-M., Wu, T.-H., and T.-Y. Hsieh, "The Data Quality Evaluation of Graph Information". *Journal of Computer Information Systems*, 51(4), 2011, p. 11.
- [32] Huang, S. Y., Wu, T.-H., Chiu, A.-A., and D. C. Yen, "Measurements of Mislead Threshold of Company Graph Distortion". *Information Systems Frontiers*, 17(5), 2015, pp. 1111-1132.
- [33] Hubbard, G. "The Quality of the Sustainability Reports of Large International Companies: An Analysis". *International Journal of Management*, 28(3), 2011, pp. 824.
- [34] Jones, M. J., *The Nature, Use and Impression Management of Graphs in Social and Environmental Accounting*. Paper presented at the Accounting Forum. 2011
- [35] Kanter, D. L., and P. H. Mirvis, *The Cynical Americans: Living and Working in an Age of Discontent and Disillusion*: Jossey-Bass. 1989
- [36] Kolk, A. (). "Sustainability Reporting". *VBA journal*, 21(3), 2005, pp. 34-42.
- [37] Kolodinsky, R. W., Madden, T. M., Zisk, D. S., and Henkel, E. T. (2010). Attitudes about corporate social responsibility: Business student predictors. *Journal of Business Ethics*, 91(2), 167-181.
- [38] KPMG. *International Survey of Corporate Responsibility Reporting*. [38] 2011
- [39] KPMG. *Currents of Change: The KPMG Survey of Corporate Responsibility Reporting 2015*. www.kpmg.com/crreporting
- [40] Kurusakdapong, J., and U. Tanlamai, "Graphs Used in ASEAN Trading Link's Annual Reports: Evidence from Thailand, Malaysia, and Singapore. *JITAM*, 22(3), 2015, pp. 65-81.
- [41] Laidroo, L., and N. Tamme, Graphs in Annual Reports of Banks: Trustworthy or Not? *Business Challenges in the Changing Economic Landscape-Vol. 1* 2016, pp. 147-166: Springer.
- [42] Leivian, G. M. "How to Communicate Financial Data More Efficiently". *Management Accounting (USA)*, 61(1), 1980, pp. 31-34.
- [43] Mather, D. R., Mather, P. R., and A. L. Ramsay, "An Investigation into the Measurement of Graph Distortion in Financial Reports". *Accounting and Business Research*, 35(2), 2005, p. 13.
- [44] Merkl-Davies, D. M., and N. M. Brennan, "Discretionary Disclosure Strategies in Corporate Narratives: Incremental Information or Impression Management?". *Journal of Accounting Literature*, 27, 2007, pp. 116-196.
- [45] Milne, M., and Gray, R.. "Future Prospects for Corporate Sustainability Reporting. *Sustainability Accounting and Accountability*, 1, 2007, 184-207.
- [46] Othmar M. Lehner, P., Falschlunger, L. M., Eisl, C., Losbichler, H., and A. M. Greil, "Impression Management in Annual Reports of the Largest European Companies: A Longitudinal Study on Graphical Representations". *Journal of Applied Accounting Research*, 16(3), 2015, pp. 383-399.
- [47] Penrose, J. M., "Annual Report Graphic Use: A Review of the literature". *Journal of Business Communication*, 45, 2008, p. 23.
- [48] Ratemp, R. M. *The Relationship Between Stock Prices and Company Performance of Firms Listed at Nairobi Securities Exchange that Engage in Sustainability Reporting*. (Master degree), University of Nairobi. 2015
- [49] Roscoe, J. T., *Fundamental Research Statistics for the Behavioral Sciences [by] John T. Roscoe*: New York, NY: Holt, Rinehart and Winston.

1975

- [50] Shah, P., and J. Hoeffner, "Review of Graph Comprehension Research: Implications for instruction. *Educational Psychology Review*, 14(1), 2002, pp.47-69.
- [51] Steinbart, P. J. "The Auditor's Responsibility for the Accuracy of Graphs in Annual Reports: Some Evidence of the Need for Additional Guidance". *Accounting Horizons*, 3(3), 1989, pp. 60-70.
- [52] Tanlamai, U., and K. Tangsiri, "Business Information Visuals and User Learning". *Journal of Information Technology Applications and Management*, 17(1), 2010, pp. 11-33.
- [53] Teoh, H. Y., and G. Y. Shiu, "Attitudes Towards Corporate Social Responsibility and Perceived Importance of Social Responsibility Information Characteristics in a Decision Context". *Journal of Business Ethics*, 9(1), 1990, pp. 71-77.
- [54] Tufte, E. R., *The Visual Display of Quantitative Information* (2 ed.). United states of America: Graphics press LLC. 1983
- [55] Using Graphs to Display Data. Retrieved 3 March, 2016, from <http://www.whaqualitycenter.org/portals/0/tools%20to%20use/making%20sense%20of%20data/using%20graphs%20to%20display%20data%20r%202-12.pdf>
- [56] William, D. N., and J. J. Diane, "Voluntary Disclosure in Annual Reports: The Association between Magnitude and Direction of Change in Corporate Financial Performance and Graph Use". *Accounting Horizons*, 24(2), 2010, p. 22.
- [57] Zweig, J., "Chart Burn. Money". *Journal of Business Communication*, 2000, pp. 67-69.

Using Region Growing and Block Sampled Matching Strategies to Detect Copy-Move Forgery Duplicated Regions

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Abstract

This paper solves the passive copy-move detection efficiently. A copy-move attack is defined as a region of an image being replaced by a copy of other region in the same image. The proposed scheme improves the performance on the assumption of the copy-move area being larger than a predefined block size. Test image is partitioned to non-overlapping segmented block according to previous predefined block size. Each comparison block, which is overlapped extracted from a segmented block, is compared with upper-left comparison block of all segmented block. Experimental results show that the computation time can be greatly reduced with the similar performance to other conventional schemes.

Keywords: copy-move forgery detection, sampled block matching, region growing

1. Introduction

Digital media file has become easier than ever to modify, synthesis, and create with the rapid growth of digital devices and image/video editing software. The purpose of digital image forensics is to verify the trustworthiness of digital image/video, and it has become important in recent research topics.

Digital image forensics can be categorized to two kinds of techniques, active and passive approaches [1, 2]. Active approaches, like digital watermark techniques, proposed in the past as a way to verify the authenticity of digital images by embedding watermarks into host media [3, 4]. The embedded watermark can also detect any malicious tampering of the image. However, the active approaches have a major drawback that the digital capture devices do not contain the module to insert watermarks. This problem can be overcome by passive approaches

which do not need any image information to detect the malicious tampering.

The copy-move forgery detection is a passive approach to detect copy-move forgery attack, in which a region of an image is replaced by a copy of other region in the same image. Over the past years, a large number of passive approaches for detecting image copy-move forgery modification have been proposed. These methods can be classified into categories based on DCT-based [5-7], Log-polar transform-based [8], texture and intensity-based [9], invariant key-points based [10], invariant image moments based [11], PCA-based, SVD-based, and other algorithms [12-17]. In DCT-based approach, Fridrich et al. [5] used DCT coefficients to detect copy-move regions in digital image. The DCT coefficients were extracted and sorted first, then, the tampered regions were detected based on approximate block matching. Cao et al. [6] reduced DCT feature vector for acquiring robust features on blurring and noise-adding. For texture and intensity-based approach, Davarzani et al. [9] used multi-resolution local binary patterns operators (MLBP) on overlapping image blocks to acquire feature vectors with sorting by lexicographical order. The k-d tree and random sample consensus (RANSAC) algorithms are then adopted to reduce the block matching time and eliminate false detections, respectively. Amerini et al. [10] used scale invariant features transform (SIFT), which can detect size of angle geometric alteration, to detect the duplicated region. Ryu et al. [11] used Zernike moments to detect and localize the copy-rotate-move duplicated regions. Their experimental results show that the Zernike moments based algorithm has higher detection accuracy rates under different rotation degrees than the polar-based approach [8] or the SIFT-based approach [10] obtains.

For other detection algorithms, Muhammad et al. [12] adopted undecimated dyadic wavelet coefficients

extracted from each block as feature vector. A pair of duplicated block can be acquired from similar Euclidean distance values. Lynch et al. [13] used preliminary cluster to reduce the comparison load for acquiring an efficient expanding block algorithm. Zhao et al. [14] integrated DCT and SVD techniques to extract image feature for localizing tampered regions. Chihaoui et. al [15] detected the copy-move forgery duplication by acquiring feature by the Scale Invariant Feature Transform (SIFT) method and matching by the Singular Value Decomposition (SVD) method. The proposed hybrid method is robust to geometrical transformations. Li et al. [16] segments the image into semantically independent patches prior to keypoint extraction. The copy-move duplicated regions can be detected by matching these patches. Popescu and Farid [17] used principle component analysis on exhausted blocks comparison to detect duplicated blocks and a matching algorithm is presented to acquire the duplicated regions.

Among above works, a full block matching algorithm is always required for acquiring a complete comparison among blocks. However, the full block matching algorithm is a time consuming calculation. Therefore, this paper presents a block sampled matching method to reduce the required computation. The proposed scheme is based on an assumption of the copy-move region is larger than a pre-defined size. Therefore, the full block matching algorithm can be then reduced to comparisons between compared blocks and sampled blocks. Since a test image is partitioned to non-overlapped segmented blocks, and each segmented block is partitioned to one upper-left sampled block and several compared blocks. The comparison required in the proposed scheme is between compared blocks in one segmented block and the only one sampled block in other segmented blocks. Thus, the computation load can be greatly reduced.

The paper is organized as follows. Section II gives a brief review of full block matching algorithm. Section III presents the proposed block sampling matching with region growing algorithm (BSMRG). Section IV presents the experimental results. Section V followed by concluding remarks.

2. Review of Full Block Matching Algorithm

In this section, we briefly review the conventional full block matching algorithm for detecting region duplication forgery areas. The full block matching algorithm is the most basic copy-move detection scheme and is defined as comparing each pair of blocks in an image to detect duplicated regions of an

image. Assume that the image has size of $M \times N$ and block size is defined by $k \times k$, there are $(M-k+1) \times (N-k+1)$ overlapped blocks in the image. For ignoring the neighboring blocks with partial overlapped region, each block is needed to be compared with areas outside the area of $(3k-2) \times (3k-2)$. Therefore, the search area can be defined as $(M-3k+2) \times (N-3k+2)$ and the overlapped blocks is $(M-4k+3) \times (N-4k+3)$. Thus, number of total block matching is acquired as $(M-k+1) \times (N-k+1) \times (M-4k+3) \times (N-4k+3)$. This number is a very large load and is worth our study to improve the computation load. Consequently, the proposed scheme uses block sampling perspective to reduce the computation load.

3. Proposed Block Sampled Matching with Region Growing algorithm (BSMRG)

This section introduces algorithm and property discussion of the proposed scheme. Section 3.1 introduces algorithm of the proposed block sampling matching with region growing algorithm (BSMRG). Section 3.2 presents the performance improvement of the proposed scheme with other literatures.

3.1 Algorithm of the proposed scheme

This section introduces our proposed BSMRG algorithm for detecting duplicated regions in an image. Assume that size of the test image is $N \times N$, size of compared block is $k \times k$, and size of the segmented block is $s \times s$ with $k \leq s \leq N$. The proposed BSMRG algorithm is based on the assumption that size of duplicated area is at least larger than $(s+k-1) \times (s+k-1)$. Since the duplicated area is assumed to be larger than $(s+k-1) \times (s+k-1)$, the upper-left $k \times k$ block in all $s \times s$ segmented blocks at least included in the duplicated region. Fig. 1 shows two examples between the $s \times s$ segmented block, $k \times k$ sampled block, and $(s+k-1) \times (s+k-1)$ duplicated region. The assumption shows that at least one $k \times k$ sampled block locates at the upper-left corner of $s \times s$ segmented block. Therefore, only comparing the upper-left $k \times k$ sampled block in each $s \times s$ segmented block to other remaining possible $k \times k$ compared blocks can detect the duplicated region.

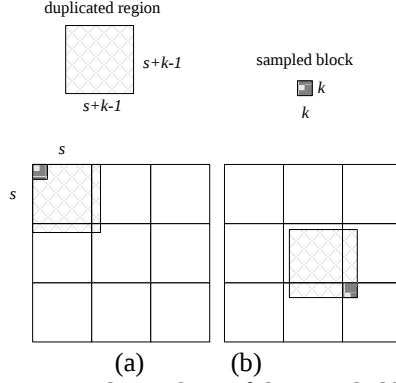


Fig. 1 Two relationships of the sampled block and duplicated region.

The proposed BSMRG algorithm is introduced as follows.

1. Partition the $N \times N$ image to non-overlapped $s \times s$ segmented blocks to acquire $\frac{N \times N}{s \times s}$ segmented blocks.
2. The following steps are performed sequentially for each horizontal scanned $s \times s$ segmented block.
 - 2.1 For any $k \times k$ block with its upper-left pixel included in this $s \times s$ segmented block, calculate the Euclidean distance between the $k \times k$ block b_e and upper-left $k \times k$ block of all $s \times s$ segmented blocks b_o .

$$dis = \sqrt{\sum_{i=0}^{k-1} \sum_{j=0}^{k-1} (b_e(i, j) - b_o(i, j))^2}$$

- 2.2 If the Euclidean distance dis acquired from step 2.1 is smaller than pre-defined threshold ETH , apply the block pair (b_e, b_o) to Step 3 region growing.
3. Set blocks b_e and b_o to regions r_e and r_o , respectively. For regions r_e and r_o , the following steps are applied to grow the duplicated region.
 - 3.1 Calculate the Euclidean distance of each one pixel shifted neighbouring $k \times k$ block of r_e and the corresponding block of r_o . If the Euclidean distance is smaller than the threshold ETH , add the neighbouring blocks to regions r_e and r_o .
 - 3.2 Repeat Step 3.1 until no neighbouring block can be added.
 - 3.3 If the number of block growing is larger than duplication threshold DTH , then the growing blocks forms the detected copy-move area.

Fig. 2 shows the relationship between a test image, non-overlapped $s \times s$ segmented blocks, and upper-left $k \times k$ compared block in each $s \times s$ segmented block. Only upper-left $k \times k$ block in each $s \times s$ segmented block, denoted by dark block, is compared with all

$k \times k$ blocks extracted from each segmented blocks. In Step 2.1, all $k \times k$ blocks starting from pixels in the $s \times s$ segmented block are extracted for further Euclidean distance calculation. Fig. 3 shows all extracted $k \times k$ blocks in an $s \times s$ segmented block when $k = 8$ and $s = 16$. Fig. 4 shows the region growing strategy for an 8×8 block used in Step 3.1. Fig. 4 shows eight neighboring 8×8 blocks found in first-layer growing step with extending one pixel around the central matched 8×8 block.

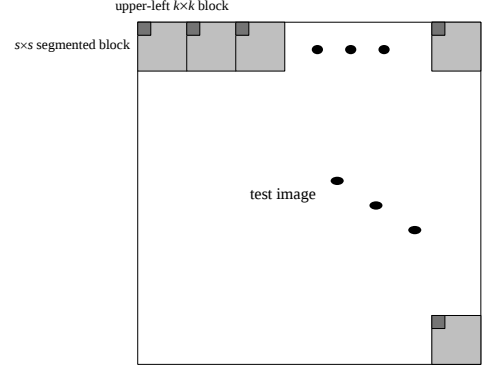


Fig. 2. Example of the relationship between segmented blocks and their upper-left block b_o .

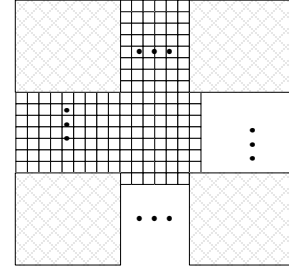


Fig. 3. Example of all 8×8 compared blocks with their upper-left pixels included in the 16×16 segmented block.

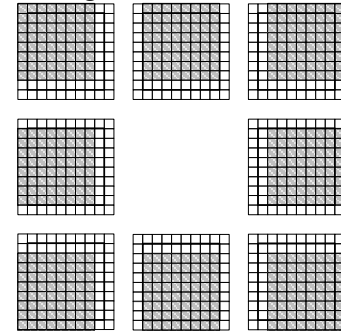


Fig. 4. Example of region growing around the central matched 8×8 block.

3.2 Performance Comparisons

This section theoretically compares the proposed BSMRG algorithm with conventional full blocks

matching algorithm on number of block comparison on Euclidean distance calculation. Assume that size of the image is $N \times N$ and the image is partitioned to $k \times k$ compared block with size. Size of the segmented block is assigned to be $s \times s$.

In previous conventional full blocks matching algorithm, number of the compared blocks are $(N-k+1) \times (N-k+1)$. Ignoring blocks with overlapped pixels, one block should be compared with at least $(N-3k+2) \times (N-3k+2)$ blocks. Therefore, there are
$$\frac{(N-k+1) \times (N-k+1) \times (N-3k+2) \times (N-3k+2)}{2}$$

Euclidean distance calculations in an image.

In the proposed BSMRG algorithm, there are $s \times s$ compared blocks that are defined by upper-left pixel in the segmented block, can be found in an $s \times s$ segmented block. $AN \times N$ can be partitioned to $\frac{N \times N}{s \times s}$

non-overlapped segmented blocks with size $s \times s$. Since the upper-left $k \times k$ block in each segmented block is compared to all $k \times k$ blocks in remaining segmented blocks. Therefore, for compared blocks in all $s \times s$ segmented block, comparing with all other $\frac{N \times N}{s \times s} - 1$ segmented block are needed. Thus, the total

Euclidean distance comparison is
$$\sum_{i=1}^{\frac{N \times N}{s \times s}} \left(\frac{N \times N}{s \times s} - 1 \right) \times s \times s = N^2 \left(\frac{N^2 - s^2}{s^2} \right).$$

4. Experimental Results

This section demonstrates some experimental results of our proposed scheme. All experiments were performed by MATLAB 2015a on a PC with an Intel i5-3230 CPU and 8GB RAM. Experimental results given in this section include detection results of copy-move forgery images, applying JPEG QF attacks or Gaussian smooth attack on forgery images, and computation time.

Fig. 5 shows three different test image with size 256×256 and their detected results. The Euclidean threshold ETH and duplication threshold DTH are empirically determined by 110 and 100, respectively. Figs. 5(a)-5(c) show three original images: Valley, Village, and Scenes. Figs. 5(d)-5(f) depict three copy-move forgery images corresponding to Figs. 5(a)-5(c), respectively. Two kinds of detected results under different assignments are also provided in Fig. 5. Figs. 5(g)-5(i) depict detected results under the assignments of 32×32 segmented block and 16×16 compared block. Figs. 5(j)-5(l) depict detected results under the assignments of 64×64 segmented block and 16×16 compared block. Figs. 5(g)-5(l) uses three different colors to represent detected areas. Each pair of red and blue squares depicts a matching of

compared blocks. The green areas are generated by the proposed region growing step as Step 3 in the proposed algorithm. Comparing the detected results between Figs. 5(g)-5(i) and Figs. 5(j)-5(l), we find that small segmented block size acquires better detected copy-move area. Because we can acquire more 32×32 segmented blocks than 64×64 segmented blocks, the matching pairs in 32×32 segmented blocks are always more than the matching pairs in 64×64 segmented blocks. Therefore, the detected results in Fig. 5(g)-5(i) are always better than detected results in Fig. 5(j)-5(l).

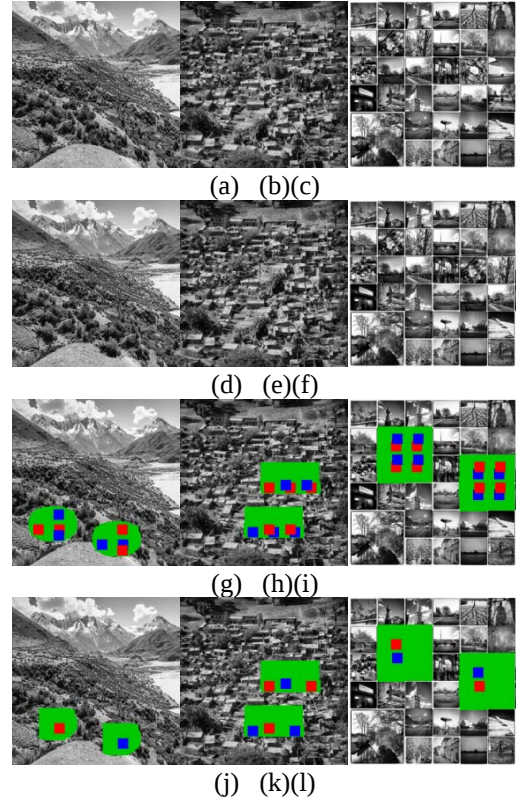


Fig. 5. Three test images, (a)-(c) three original images, (d)-(f) three corresponding copy-move forgery images, (g)-(i) detected results of (d)-(f) using 32×32 segmented block and 16×16 compared block, (j)-(l) detected results of (d)-(f) using 64×64 segmented block and 16×16 compared block.

Moreover, true positive rate and false positive rate are adopted to measure the proposed detected results. The true positive rate is defined by $\frac{|D \cap M|}{|M|}$, where D defines the set of pixels in detected region and M denotes the set of pixels in copy-move forgery area. The false positive rate is defined by $\frac{|D \cap (I - M - B)|}{|I|}$

$\frac{|D \cap (I - M - B)|}{|I - M - B|}$, where I denotes the set of pixels in test image and B denotes the set of pixels in copy-move selected area.

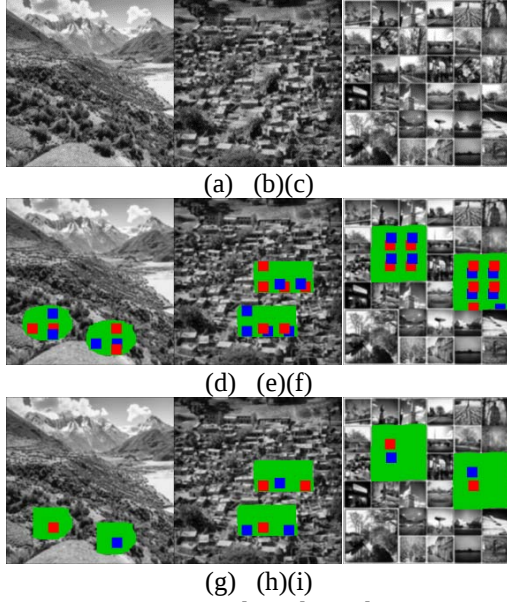


Fig. 6 Detected results under Gaussian smoothing attacks, (a)-(c) three copy-move forgery images suffering Gaussian smoothing attack under kernel size 3×3 and $\sigma=1$, (d)-(f) corresponding detected results using 32×32 segmented block and 16×16 compared block, (g)-(i) corresponding detected results using 64×64 segmented block and 16×16 compared block.

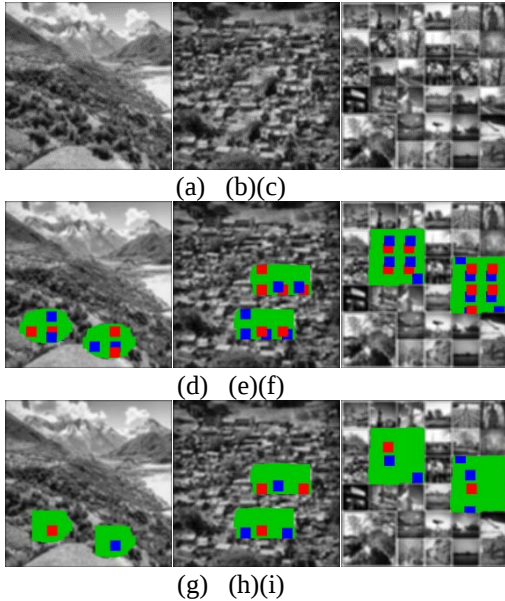


Fig. 7 Detected results under another Gaussian smoothing attacks, (a)-(c) three copy-move forgery

images suffering Gaussian smoothing attack under kernel size 5×5 and $\sigma=5$, (d)-(f) corresponding detected results using 32×32 segmented block and 16×16 compared block, (g)-(i) corresponding detected results using 64×64 segmented block and 16×16 compared block.

Figs. 6 and 7 show the detected results of applying Gaussian smoothing attacks to copy-move forgery images as shown in Figs. 5(d)-5(f). Figs. 6(a)-6(c) and Figs. 7(a)-7(c) show that applying Gaussian smoothing attacks acquires blurred copy-move forgery images. Therefore, the detect results are a little worse than no attacks. Especially in experimental results of test image Valley, we can only acquire one matched pairs in 64×64 segmented blocks as shown in Fig. 6(g) and Fig. 7(g). Therefore, the region growing steps lead to a non-ideal detected region. Comparing with Fig. 6(d) and Fig. 7(d) as the detected results of 32×32 segmented blocks, the number of matched pairs of blocks is 3 and the region growing steps obtain better detected results. Figs. 8 and 9 show the detected results of applying JPEG QF attacks to copy-move forgery images as shown in Figs. 5(d)-5(f). Figs. 8 and 9 acquire similar detected results of Figs. 6 and 7. Fig. 9 shows that the JPEG QF=75 attack modifies image content seriously for copy-move detection in our limited experiments. Figs. 9(e), 9(h), and 9(i) demonstrate this character apparently.

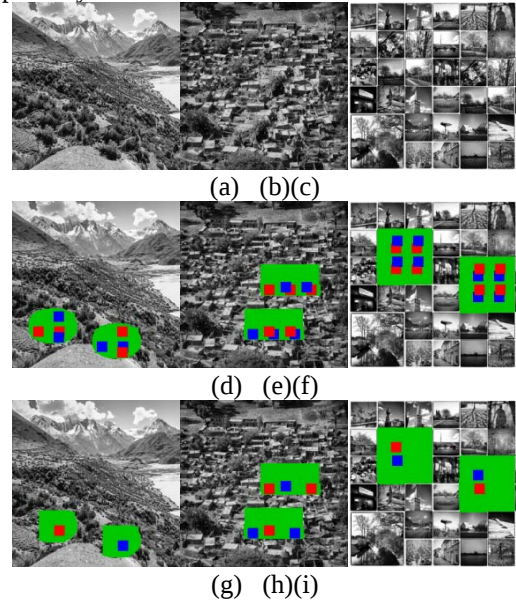


Fig. 8 Detected results under JPEG QF attacks, (a)-(c) three copy-move forgery images suffering JPEG QF=95 attacks, (d)-(f) corresponding detected results using 32×32 segmented block and 16×16 compared block, (g)-(i) corresponding detected results using

64×64 segmented block and 16×16 compared block.

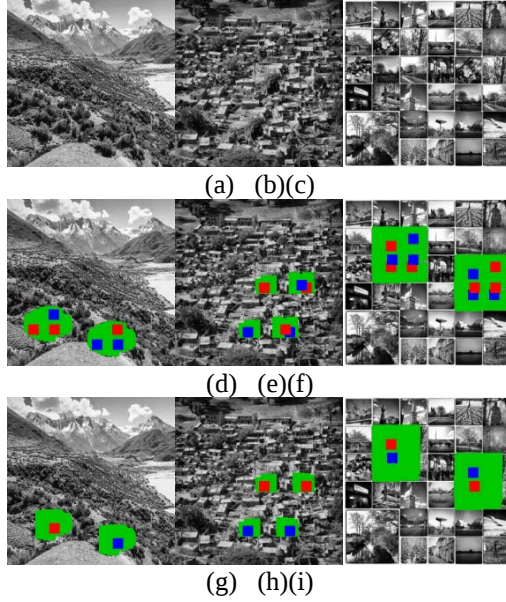


Fig. 9 Detected results under JPEG QF attacks, (a)-(c) three copy-move forgery images suffering JPEG QF=75 attacks, (d)-(f) corresponding detected results using 32×32 segmented block and 16×16 compared block, (g)-(i) corresponding detected results using 64×64 segmented block and 16×16 compared block.

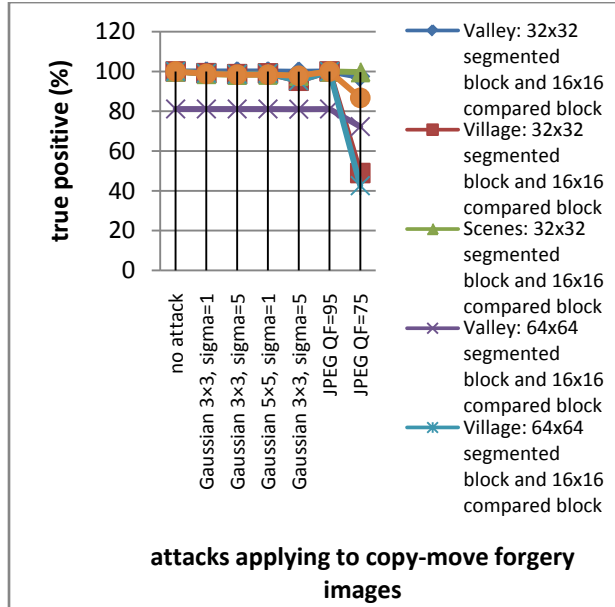


Fig. 10 True positive ratio of the detected results by applying attacks to copy-move forgery images.

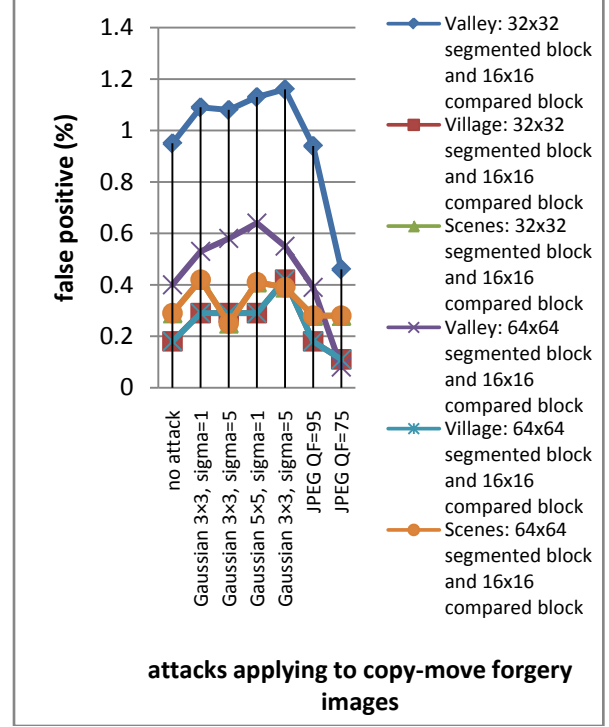


Fig. 11 False positive ratio of the detected results by applying attacks to copy-move forgery images.

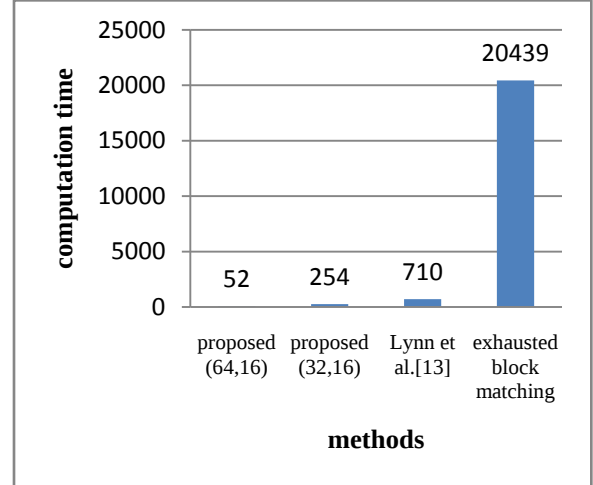


Fig. 12. Computation time comparison between the proposed ECEB and the conventional exhausted block matching algorithm.

Two measurements, named true positive rate and false positive rate, are adopted to demonstrate the proposed detected results. The true positive rate is defined by $\frac{|D \cap M|}{|M|}$, where D defines the set of pixels

in detected region and M denotes the set of pixels in copy-move forgery area. The false positive rate is

defined by $\frac{|D \cap (I - M - B)|}{|I|} \frac{|D \cap (I - M - B)|}{|I - M - B|}$, where

I denotes the set of pixels in test image and B denotes the set of pixels in copy-move selected area. Figs. 10 and 11 depict that true positive ratios and false positive ratios of the experimental results, respectively. Fig. 12 shows computation time comparisons between the proposed ECEB scheme and conventional full block matching algorithm under applying different attacks to copy-move forgery images.

These experimental results show that the proposed scheme can detect the copy-move duplicated regions efficiently. Comparing with conventional full blocks matching algorithm, the proposed scheme improves efficiently with good detected results.

5. Conclusions

This paper presents an efficient way to detect the copy-move forgery areas in an image. In the present work, we assume that the copy-move forgery area is larger than a pre-defined size. Using proposed block sampled matching algorithm can efficiently detect at least a pair of matched blocks within the copy-move forgery area. The proposed region growing steps are then applied to generate the copy-move forgery area. Experimental results show that the proposed ECEB algorithm is efficiently to detect duplicated areas with only using nearly 0.01 computation time in conventional full block matching algorithm used. The detected region can be more completely acquired by better region growing method.

6. References

- [1] H. Farid, "A Survey of Image Forgery Detection," *IEEE Signal Processing Magazine*, vol. 2, no. 6, 2009, pp. 16-25,.
- [2] O.M. Al-Qershi and B.E. Khoo, "Passive Detection of Copy-move Forgery in Digital images: State-of-the-art," *Forensic Science International*, vol. 231, 2013, pp. 284-295,.
- [3] I. Cox, M. Miller, J. Bloom, J. Fridrich, T. Kalker, "Digital Watermarking and Steganography," Morgan Kaufmann, 2nd edition, November 27, 2007.
- [4] F. Y. Shih, "Multimedia Security: Watermarking, Steganography, and Forensics," CRC Press, 1st edition, August 25, 2012.
- [5] J. Fridrich, D. Soukal, and J. Lukás, "Detection of Copy Move Forgery in Digital Images," in *Processings of Digital Forensic Research Workshop*, 2003, pp. 55-61.
- [6] Y. Cao, T. Gao, L. Fan, and Q. Yang, "A Robust Detection Algorithm for Copy-move Forgery in Digital Images," *Forensic Science International*, vol. 214, 2012, pp. 33-43,.
- [7] Y. Huang, W. Lu, W. Sun, D. Long, "Improved DCT-based Detection of Copy-move Forgery in Images," *Journal of Forensic Science International*, vol. 206, 2011, pp. 178-184,.
- [8] S. Bravo-Solorio and A. K. Nandi, "Automated Detection and Localisation of Duplicated Regions Affected by Reflection, Rotation and Scaling in Image Forensics," *Signal Process.*, vol. 91, no. 8, 2011, pp. 1759- 1770,.
- [9] R. Davarzani, K. Yaghmaie, S. Mozaffari, and M. Tapak, "Copy-move Forgery Detection Using Multiresolution Local Binary Patterns," *Forensic Science International*, vol. 231, 2013, pp. 61-72,.
- [10] I. Amerini, L. Ballan, R. Caldelli, A. Del Bimbo, and G. Serra, "A SIFT-based Forensic Method for Copy-move Attack Detection and Transformation Recovery," *IEEE Trans. on Information Forensics and Security*, vol. 6, no. 3, 2011, pp. 1099- 1110,.
- [11] S.J. Ryu, M. Kirchner, M.J. Lee, and H.K. Lee, "Rotation Invariant Localization of Duplicated Image Regions Based on Zernike Moments," *IEEE Trans. on Information Forensics and Security*, vol. 8, no. 8, 2013, pp. 1355-1370,.
- [12] G. Muhammad, M. Hussain, and G. Bebis, "Passive Copy Move Image Forgery Detection Using Undecimated Dyadic Wavelet Transform," *Digital Investigation*, vol. 9, no. 1, 2012, pp. 49-57.
- [13] G. Lynch, F.Y. Shih, and H.M. Liao, "An Efficient Expanding Block Algorithm for Image Copy-move Forgery Detection," *Information Sciences*, vol. 239, 2013, pp. 2539-265,.
- [14] J. Zhao and J. Guo, "Passive Forensics for Copy-move Image Forgery Using a Method Based on DCT and SVD," *Forensic Science International*, vol. 233, 2013, pp. 158-166,.
- [15] T. Chihaoui, S. Bourouis, K. Hamrouni, "Copy-Move Image forgery Detection Based on SIFT Descriptors and SVD-matching," *IEEE International Conference on Advanced Technologies for Signal and Image Processing*, pp. 125-129, 2014.
- [16] J. Li, X.L. Li, B. Yang, and X.M. Sun, "Segmentation-Based Image Copy-Move Forgery Detection Scheme," *IEEE Trans. on Information Forensics and Security*, vol. 10, no. 3, pp. 507-518, 2015.
- [17] A. C. Popescu and H. Farid. Huang, "Exposing Digital Forgeries by Detecting Duplicated Image Regions," *Department of Computer Science*, TR2004-515, 2004.

The Conceptualization of Marketing Practices: A Multiple Perspectives

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Abstract

Consumers are always the centroid of marketing practices. Interestingly, most studies, if not all, are only from a marketer's or firm's standpoint, though they are investigated from different views: theoretical, functional and activity. Through a comprehensive literature review, the authors managed to identify some studies from a consumer's standpoint. However, almost all of them focused on specific marketing activities rather than investigating from a generic and holistic spectrum. This possibly explains why there is yet a scale to measure general marketing practices from a consumer's standpoint. This study has identified consumers' key considerations towards marketing practices by a thorough and systematic literature review. Subsequently, marketing practices has been conceptualised to a multi-dimensional concept represented by VALER (Value, Authenticity, Legitimation, Experiences and Relationship).

Keywords:

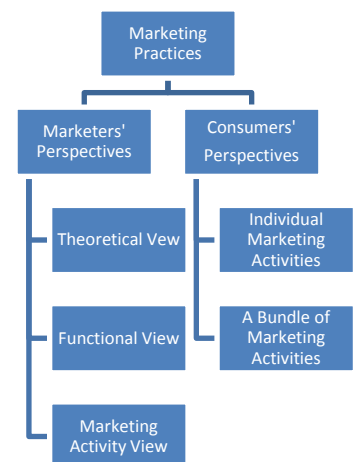
Marketing practices, consumer behaviors, marketing activities, marketing theory

Introduction

The concept of marketing practices has raised the interest of researchers in recent years [2, 4, 5, 13, 16, 24, 25, 26, 23, 28, 29, 34, 36, 27, 54, 53, 59, 58 and 52]. The discussions, however, were mainly concentrated on two perspectives: 1) The theoretical differences between marketing and marketing activities from the marketers' point of view; and 2) The detrimental role of marketing malpractices in the marketplace. In the extant literature, the term "marketing practices" has been used casually without strictly and conceptually defined. Without capturing the full diversity of marketing practices, this leads to a situation that marketing practices, when treated as a construct, was difficult to measure. Hence, the objectives of this paper are to specify the domain of marketing practices as a construct and then conceptualize it from existing literature on marketing into dimensions so that it can be developed

into a measurement scale in the future. This paper is organized in the following sequence. The first part provides an overview of research in marketing practices from both the marketers' perspective and consumers' perspective. Next, we develop a measurement model of marketing practices, which consists of five dimensions (VALER), as a result of literature review on marketing practices. Finally, directions of future research are suggested at the end of this paper.

Two Perspectives of Marketing Practices



Figures1 Perspectives of Marketing Practices

Marketing Practices from Marketers' Perspectives

Scholars who pursue an understanding of marketing practices from marketers' perspective seem to have delineated the concept by looking into three different views of marketing: 1) Theoretical; 2) Functional; and 3) Marketing Activity.

1. Theoretical View of Marketing: on and Spacing

Marketing is regarded as a philosophical approach to doing business [36], (Hooley, Lynch and Shepherd 1990, p.7). Empirical findings from academic studies also support the idea that marketing is a "guiding philosophy" [36] which implies that the central ideas of marketing can guide and direct the development of marketing practices. Many scholars [24, 25, 26, 52, 58] have

investigated marketing practices by using different marketing theories, and these studies have led to the development of different concepts or characteristics. Marketing practices are contextual-based and contingent upon markets and situations [58]. The scholar proposes that when entering an emerging market, marketers are advised to rethink the applicability of marketing theories that have been applied in traditional and highly developed markets. He calls for a rethink in marketing practices, such as a change of marketing practices from globalisation to fusion, from diffusion of innovation to democratisation of innovation, or from country-of-origin advantage to nation brand advantage [58].

Similarly, based on marketing theories, other academics propose that marketing practices can be classified into four archetypes: 1) transactional marketing; 2) database marketing; 3) interaction marketing; and 4) networking marketing, by taking both the exchange theory and relationship marketing theory into consideration at the same time [23, 24, 25]. Even though their studies empirically suggested that the concept of marketing practices could be represented by the above four archetypes of practices as sub-dimensions of marketing practices, the study did have some weaknesses such as an internal reliability issue as indicated by the low Cronbach's alpha of some sub-dimensions (0.62 for transaction marketing and database marketing respectively). Qualitative study was conducted later to further enhance on the concept proposed by Coveilo et al by Palmer and Wilson (2009).

2 Functional View of Marketing

Literature suggests that marketing is also considered by marketers as a function responsible for identifying and meeting customer needs for an organisation [36]. Other academic studies also echoed the idea that "marketing is best viewed as the function that manages connection between the organization and the customers" [48]. Therefore, marketing seen as a function seems to be pervasive in marketing academia.

Furthermore, various aspects of marketing function such as sales support, promotion and customer needs identification and matching are identified in the studies of marketing as functions [29]. These aspects can also be put into different groups depending on the organisation of marketing function. For example, for a function connecting customer and product, aspects such as price, promotion and product design and redesign could be put together; for a function connecting customer and service delivery, aspects such as customer satisfaction, service delivery, loyalty and retention programmes could be assembled [48]. Therefore,

marketing practices are understood as a combination of these different aspects under the idea of marketing function.

In addition, marketing is also viewed as a functional department within an organisation. As the marketing department takes up the function of strategic marketing, the idea of strategic marketing practices is provoked. Functional components of strategic marketing practices such as strategic situation analysis, objective setting, strategy development, marketing control practices are suggested [12].

2. Marketing Activity View

The practices of marketing have been studied from actual marketing activities, and such an approach is known as the marketing activity view approach. The definition of marketing approved by the American Marketing Association (AMA) in July 2013 begins, "Marketing is the activity, set of institution...", and that implies marketing practices refer to a set of specific marketing activities.

Broadly speaking, two concepts of marketing practices have been suggested based on the activity view of marketing. The first refers marketing practices as specific marketing activities, while the second concept refers to marketing practices as generalised categories of marketing activities derived from specific marketing activities.

In the first concept, specific marketing activities are considered as marketing practices by scholars, and the unit of analysis is those specific activities at a micro-level. These studies include both a bundle of specific marketing activities [4, 47] and individual activities of specific areas such as pricing [15], product value [22], promotion methods [45], channels of distribution [27], etc. In addition, studies of marketing practices based on these specific marketing activities aim to understand the effectiveness of the activities in question. Marketing practices of US contractors were investigated and 65 contractors' (marketers) responses towards their marketing activities successfully collected [4]. Specific marketing activities were studied and a bundle adopted by two generations of entrepreneurs in the UK was compared with the help of in-depth interviews with 46 entrepreneurs [46]. Twenty-five channels were identified and evaluated in order to know which specific channel activities were most effective for bed and beverage hotels in the USA [27]. To identify marketing activities that could improve branding position 335 marketers were interviewed [33].

In the second concept, specific marketing activities

are studied and grouped together to form generalised categories of marketing activities such as branding, customer management, etc. to represent marketing practices. Most existing research did not look into the concept of marketing practices from micro-level marketing activities performed by practitioners [29]. Therefore, following an exploratory and qualitative search of marketing activities, they conducted a quantitative study by interviewing company executives at different levels, ranging from CEOs to marketing executives, to identify what marketers do every day. They examined micro-level marketing activities and conceptualised marketing practices as a construct consisting of three dimensions: segmentation and branding, business/marketing planning, and customer management.

Deficiencies in Studies from Marketers' Perspective

As discussed above, studies of marketing practices from marketers' perspective have three approaches. They are from the 1) theoretical view of marketing; 2) functional view of marketing; and 3) marketing activity view. However, all of them seem to suffer from some deficiencies as discussed below.

Even though these studies could contribute to a better understanding of the nature of marketing practices, and enable marketers to look out for a direction to choose or design marketing practices, it seems that an important piece of information is missing. That is whether those marketing practices are welcome or approved by consumers.

Marketing has been understood as a concept that promotes the creation of values to customers, whereas customers are the centre for the design of marketing practices. Kotler advocated that:

“The core concern of marketing is that of producing desired responses in free individuals by the judicious creation and offering of values. The marketer is attempting to get value from the market through offering value to it. The marketer's problem is to create attractive values. Value is completely subjective and exists in the eye of the beholding market. Marketers must understand the market in order to be effective in creative value. This is the essential meaning of the marketing concept” [40].

The marketing concept proposed by Kotler emphasises that the value is “completely subjective” and it exists “in the eye of the

beholding market”. It advocates that marketers need to look into market practices from the eyes of customers. The following subsection will look into those studies of marketing practices from the consumers' perspective, and deficiencies in these studies will be identified.

Marketing Practices from Consumers' Perspectives

Many scholars have looked into the concept of marketing practices from consumers' perspectives [16, 34, 28, 52]. Their studies could be broadly divided into two groups: 1) individual marketing activity; and 2) a bundle of marketing activities.

1. Individual Marketing Activity

Individual marketing activity refers to a single marketing activity in different aspects such as pricing [2, 14, 15, 16], product [52], promotion [18, 43, 45] and channel [50]. Six pricing tactics were studied and found that some were better received by consumers than others [2]. Transparent pricing effect on consumers' perceived value also was studied [16]. They suggest that “consumers gain value from incremental information communicated via transparent pricing to an extent that they express a willingness to buy the more expensive of two identical items”. A study of consumers' risk perception of new products using the case of genetically modified food was conducted in 2013 [52] and contended that consumers would “perceive a series of risks and benefits of consumption and use those perceptions to form product judgment”. As such, firms are suggested to pay attention to consumers' risk perceptions associated with a firm's marketing practices to “create more effective marketing strategies that better resonate with consumers” [52]. How consumers perceive the value of promotion coupons was experimented [18]. Similarly, an exploratory study to understand consumers' perceptions of unfair retail practices was studied [50].

2. A Bundle of Marketing Activities

Academics also study marketing practices by looking into consumers' general perception about marketing, or a bundle of marketing activities respectively. A qualitative study by conducting in-depth interviews with 29 respondents to understand the attitude of consumers towards marketing and their campaigns [34] indicated that a negative attitude towards marketing is prevalent, “especially on the distrust of advertising and promotion”. Most negative impressions seem to stem from marketing campaigns or consumption experiences where the participants felt deceived because of hidden or incomplete information [34].

Another study from a consumer's perspective was

done [5] which focused on consumer resistance towards a bundle of questionable marketing activities in general. These questionable marketing practices are subsequently conceptualised as “anti-commercial consumer rebellion” (ACR). Four sub-dimensions (artifice, avoidance, cynicism and manipulation) were developed to measure these questionable practices [5].

Deficiencies in Studies from Consumers’ Perspectives Even though the above studies evaluated marketing practices from the consumers’ perspective, the following three deficiencies in these studies were spotted:

- Specific in a single area; or
- Exploratory in nature; or
- Focusing on malpractices.

1. *Specific in Single Areas*

Many scholars[16, 28, 34, 52]looking into the concept of marketing practices from customers’ perspectives tended to focus on specific marketing activities, industries or products to evaluate consumers’ responses. These types of studies could enable scholars or marketers to understand specific marketing concerns. As an example, one such study depicts how consumers perceive specifically the six pricing tactics (dripped pricing, reference pricing, free offer, bait pricing, bundle pricing and time limit offer), and therefore provides insights into each specific types of pricing practice [2]. However, it does not provide any ideas about how consumers would perceive a firm’s marketing practices as a whole. The lack of totality in perception of marketing practices as a whole makes the use of those concepts derived from these studies very limited.

2. *Exploratory in Nature*

In marketing literature, there is only a single study that investigates marketing practices as a whole. Unfortunately, it is exploratory in nature.It is a qualitative study on the attitude of consumers towards marketing and its campaigns as a whole [34]. Their findings indicate a prevalent negative attitude towards marketing “especially on the distrust of advertising and promotion” [34]. They highlighted that “most negative impressions seem to stem from marketing campaigns or consumption experiences where participants felt deceived because of hidden or incomplete information” [34]. However, the study is only based on interviews with twenty-nine respondents (seventeen women and twelve men), and its findings cannot be generalised.

3. *Focusing on Malpractices*

Similarly, only one study was found in marketing literature that evaluated marketing malpractices as a

whole. The study was conducted by Austin, Poufs and Peters in 2005. Their investigation focused on consumer resistance towards questionable marketing practices. They defined and conceptualised “anti-commercial consumer rebellion” (ACR) as consumers’ open and avowed resistance to institutionalised marketing practices, and they finally developed a scale to measure these questionable practices [5]. That is to say, the ACR concept describes possible resistant responses from consumers. Four dimensions for the concept of ACR were identified:

- Artifice – a belief that marketing practices are questionable, misleading or deceptive;
- Avoidance – ways that consumers react to problematic marketing practices such as avoid to buy, do not buy or even boycott the product;
- Cynicism – feel cynical, sceptical and suspicious about marketing; and
- Manipulation – perceive that marketers manipulate and take advantage of consumers in different ways.

Even though the study evaluated marketing practices as a whole from consumers’ perspectives, the scholars based their study only on problematic marketing practices. That means the neutral and positive sides of marketing practices were not included.

In summary, most studies of marketing practices from consumers’ perspectives involve an evaluation of consumer response towards marketing activities. These studies usually put all marketing activities under a generic name called marketing practices [1, 4, 6, 12, 21, 27, 28]. The evaluation can be based on individual specific activity or a bundle of activities. However, either way is found to have deficiencies; they are either too narrow for a specific activity, just an exploratory study, or focusing on a specific scope of marketing practice (e.g. malpractices). Therefore, a new construct of marketing practice needs to be developed. Literature suggests that the construct of marketing practice as perceived by consumers consists of five dimensions, which are discussed in the next section.

A Model of Marketing Practices (VALER)

From the above section, marketing practices are considered a generic name for marketing activities [1, 4, 9, 12, 21, 27, 28]. As such, the construct of marketing practices can be conceptualised as consumer perceptions towards marketing activities as a whole. Following an extensive review of how consumers perceive different marketing activities, the construct of marketing practices is delineated into five dimensions:

1) Value; 2) Authenticity; 3) Legitimizing; 4) Experience; and 5) Relationship. Table 1, dimensions of marketing practices as perceived by consumers, summarises the meaning of each dimension.

1. Value

The first dimension of marketing practices is value as perceived by consumers. This concept of perceived value can be delineated into four sub-concepts:

- Overall Utility;
- Affordability;
- Fairness; and
- Dynamic Pricing.

Overall Utility Overall utility refers to an assessment of the utility of a product based on perception of what is received and what is given during an exchange, and this overall utility is consumers' perceived value [66]. As proposed by the scholar, what is received by consumers in a broad sense seems to include "the many different things consumers 'value' (place importance on) in a purchase transaction". Hence, it could include other factors such as "...shopping experience, interpersonal contact..." on top of the product or service in question [43]. By the same token, what is given by consumers would include other factors such as "time, energy and effort" on top of money paid for the purchase [66].

Affordability Affordability refers to the total "give" that consumers are able or willing to afford in return for the total "receive" during an exchange [66]. A product might be seen as having greater overall utility by comparing the "give" and "receive". However, the consumer might finally choose another product having smaller overall utility simply because consumers cannot afford the total "give". Along this thought extended the notion of customer-perceived value and propose that "customer-perceived value is the customer's overall assessment of what is received and what is given (sacrifice)...Customers make this judgement by considering the combination of product quality, service quality, price affordability and shopping experience..." [17]. Therefore, affordability seems to play a role in the customer's perceived value.

Fairness refers to consumers' perceptions of being treated fairly in marketing practices. Marketers have been practicing target marketing that leads to more favourable offers to target groups. As a result, non-target groups end up either paying more to receive the same quality, or they receive less utility even if they pay the same price [44]. Today, consumers are well aware of various types of differential treatments, and they show growing

concern if they are treated unfairly.

Consumer fairness perception is based on a comparison process with three components: comparison focus, comparison referent and guiding principle [42]. Comparison focus refers to objects being compared, and it means different marketing practices in this paper. Comparison referent is someone with whom a focal consumer compares his/her own comparison focus [42] and it means other consumers who receive the same marketing practices. Guiding principle refers to rules or general principles such as equality or equity used in the comparison process [42].

The idea of consumer fairness perception can be illustrated by the following example. A consumer eating in a restaurant finds that the food quality is high, the restaurant's ambience is perfect, and the waiters' service is excellent. Even though the price is a bit high and he needs to make an effort to reserve a table in advance plus it takes an hour to travel to the restaurant, the consumer still believes it is worthwhile. In that case, it seems the consumer's "receive" is considered to be much greater than the "give", and he has a high positive overall utility based on the previous discussion. However, when he accidentally discovers that other walk-in consumers enjoy exactly the same food and experience but seem to pay less, the consumer starts asking himself why others can pay less while he has to pay more. Though the difference in real money terms is not significant and the consumer can afford it, the consumer might start to think it is unfair to him. A perception of unfair pricing has formed and this triggers a view that maybe the meal does not deserve the price he will be paying, because someone else can pay less. The value perception is adversely affected by an unfair perception of pricing.

Literature reveals that studies of consumer fairness perception are found in different marketing practices: pricing [14, 15, 37], promotion [18, 44], retailing [50], service [46], (McColl-Kennedy and Sparks 2003); CRM [65]. However, it seems most studies focus on pricing practices [50] and this is probably because pricing is still the most important factor in determining customer's perceived values.

Literature also indicates that consumers' value perceptions are adversely affected by the consumers' fairness perceptions [44] in particular their perception of unfair pricing practices [41, 56] and unfair promotion practices [18]. Dynamic pricing is seen as an unfair pricing practice [63]. When the price is judged unfair (e.g. overpricing),

the price plays a more important role than the perceived quality that leads to the unfair pricing perception. On the contrary, when the price is judged fair (e.g. under-pricing), the perceived quality plays a more important role than the price, which leads to a fair pricing perception [56].

2. *Authenticity*

The second dimension of marketing practice is authenticity. Literature suggests two meanings as perceived by consumers: Unadulterated truth; and Sincerity.

Unadulterated Truth: Unadulterated truth refers to sufficient and complete information that marketers would pass on to consumers in marketing practices [2, 34]. Literature indicates that consumers show growing concern for various types of misleading and deceptive marketing practices [34]. The use of pricing tactics has been condemned as a common misleading marketing practice, and thus regulators are now having a much closer look at what is being practised [2]. In addition, advertising tactics using trickery to trap individuals into a consumption-oriented lifestyle are considered another candidate for deceptive marketing practices [5]. Given these consumer concerns, consumers seem eager to look for unadulterated truth from marketers when practising marketing tactics.

Sincerity refers to being true to one's inner self and exposing that inner self to others (Melzer, 1995). It also has a connotation that the true self is expected to be honest and does not deceive others. Furthermore, the concept of sincerity is closely related to authenticity [19, 32] but they are not exactly the same. However, in a marketing context they bear a similar meaning, and both sincerity [38, 55] and authenticity [40, 10, 31] are often applied to understand a consumer's perception of branding. Therefore, brand sincerity and brand authenticity are considered the same concept in this thesis, and they are both used to describe brand personality as perceived by consumers.

Literature reveals that "many consumers are cynical with respect to businesses' real intentions and underlying motivations regarding broader societal wellbeing" [5], and this suggests that in consumers' eyes the brand in question is not sincere or trustworthy. For a brand considered sincere or authentic, consumers demand the brand be "honest, fair, consistent, responsible, humane treatment for its workers, does what it says it will do and true to its core value", etc. [8]

3. *Legitimation*

The third dimension of marketing practice is legitimation. The concept of legitimation are different between Western and Chinese perspective.

In the West, it can be understood as congruence while in Chinese it is delineated into Empathy (情), Reasonableness (理) and Legality (法).

Congruence: The concept of legitimation connotes "congruence between social values associated with or implied by (organisational) activities and the norms of acceptable behaviour in the larger social system" [61]. In other words, when an organisation is said to be legitimate, its activities are consistent with expectations derived from social norms and are thus accepted by society at large. Further, the consistency would be judged on whether the activities are desirable, proper or appropriate through the lens of shared beliefs of the social system [61]. Put another way, it means whether most society members would desire those activities and think they are proper and appropriate to society in general for society at large considers the activities as legitimate.

In addition, Suchman [61] states that organisation legitimation consists of three broad types:

- Pragmatic legitimacy is mainly concerned with self-interest of organisations and thus focuses on the calculation of benefits from activities taken by organisations versus the associated costs of those activities [61].
- Moral legitimacy, however, focuses on public interests by observing normative moral propriety [61].
- Cognitive legitimacy focuses on pre-constructed beliefs and understandings about ways of organising work and generating social value [61].

In a marketing context, the judgment of legitimacy is judgment of the public rather than individual. In other words, legitimacy is a social judgment of acceptance, appropriateness and desirability [51]. The congruency can be viewed from two perspectives. The first is from the marketing firm's eyes and it is termed strategic legitimation, while the second is from viewpoints of society members, and it is termed institutionalised legitimation [61]. That implies what marketers think is in congruence with society might not be the case in the eyes of consumers. Even though Suchman proposed that an organisation should work on both perspectives, this paper will focus on institutionalised legitimation for the purpose of study to understand how consumers evaluate marketing practices.

Empathy (情), Reasonableness (理) and Legality (法) when marketing activities are considered appropriate, proper and desirable by society at

large, they are said to be legitimate. In Chinese society, legitimacy refers to empathy (情), reasonableness (理) and legality (法) [65]. It can be considered that when a marketing activity is backed up with a proper reason, it could be said to be appropriate. Therefore, the concept of reasonableness is very similar to appropriateness and properness. In Chinese culture, reasonableness is considered the most important component of legitimization, whereas legality follows and the last component is empathy. That means if a marketing activity is not reasonable, even though it is legal or showing empathy to consumers, it is not legitimate at all. If the marketing activity is reasonable, it has to be legal and then show empathy to consumers.

4. *Experiences*

The fourth dimension of marketing practices is experiences. Marketing practices has been putting more emphasis on consumer experiences on top of the products or services themselves as consumers want to buy products that can deliver good experiences [7]. For example, Hong Kong Disneyland's (Disney) claims that their catering and meeting professionals are "masters at creating unique, well-balanced culinary experiences" for customers. BMW (BMW) says "joy should always surprise you and we make it possible for you to rediscover driving pleasure every day". These experiences often described as unique, joyful and pleasant by marketers can come from consumption of services or products. In addition, consumer experiences coined as value in use is considered as a new type of value apart from the value traditionally anchored in products and services [57]. This also suggests consumers treasure and value the experiences that can be obtained from marketing practices.

Consumers evaluate marketing practices by comparing the expected performance and actual experiences [53]. They would store each experiences in their memory that would serve as a reference point for future evaluation of marketing practices [20]. Furthermore, a study reveals that consumer experiences of hotel guests is affected by two factors: interaction with physical environment and interaction with service personnel [62] Another consumer experiences study relating to smartphone users identified three factors, namely usability, product-fit, and look and feel, that determine how well consumers can interact with a smartphone [64]. These studies suggest that consumer experiences is all about interaction with the products or services in question. Basing on an understanding of the above factors, marketers could work further to "meet or exceed people's emotional needs and expectations" for creating superior

consumer experiences [9].

As suggested in literature, emotional aspect of marketing practices can be enhanced when it carries some feel-good factors. The practices would be more desirable compared to others that do not have any feel-good factor [11]. The emotional aspect can also be reflected by how much consumers like the practices in general [39, 60] and how much pleasure consumers can enjoy from the practices [3]. Therefore, when marketing practices can produce emotional connections such as joy, pleasure, feeling good etc., it also create favourable experiences to consumers.

5. *Relationship*

The fifth dimension of marketing practices is relationship. The concept of intimacy refers to the perceived close relationship between marketers and consumers that marketing activities could bring to consumers. The latter would be perceived as having a stronger bond and better communication due to marketing practices. Looking into marketing relationship orientation, cultivation of four factors, bonding, empathy, reciprocity and trust, would enhance the propensity of building up a close relationship with others [59]. As such, intimacy can be eventually achieved.

Conclusion and Implications

In summary, literature suggests consumers could look at marketing practices from the above five dimensions: value, authenticity, legitimization, experiences and relationship. If a marketing activity bears a high perceived value; is seen to be authentic and truly for the benefit of consumers rather than being felt as misleading, deceptive and manipulative; is legitimate in terms of being reasonable, legal and showing empathy to consumers; is perceived to have a closer relationship; and is thought to bring enjoyable experiences to consumers, the marketing practices would be well received and welcomed by consumers. Most importantly, this evaluation is from a consumer's perspective rather than a marketer's standpoint. That also suggests perceptions of marketing practices are more favourable when all or most dimensions are seen as favourable by consumers. On the contrary, marketing practices are less favourable or unfavourable when most or all dimensions are seen as unfavourable by consumers.

This study has contributed to the conceptualisation of a general view of marketing practices from consumers' perspective. Since a scale to objectively measure the performance of marketing practices from consumer stand point is still missing in the sphere of marketing world, the concept can be operationalised into a construct for developing a new scale of marketing

practices. Following the development of a marketing practices scale, further studies or models that advance knowledge in marketing and related disciplines such as consumer behaviours, business ethics, marketing management and organisational behaviour etc. can be facilitated.

Reference

- [1]Abou-Youssef, M., Kortam, W, Aish, E.A. and N. El-Bassiouny, "An Exploratory Investigation of the Marketing Practices Conducted by Islamic Banks in Egypt", *African Journal of Business and Economic Research*,. 7(1), 2012, pp. 47-63.
- [2]Ahmetoglu, G., Furnham, A. and P. Fagan, "Pricing Practices: A Critical Review of Their Effects on Consumer Perceptions and Behaviour", *Journal of Retailing and Consumer Services*, 21(5), 2014, pp. 696-707.
- [3]Alba, J.W. and E. F. Williams, "Pleasure Principles: A Review of Research on Hedonic Consumption", *Journal of Consumer Psychology* , 2(1), 2013, pp. 2-18.
- [4]Arditi, D., Polat, G. and S.A. Makinde, 'Marketing Practices of U.S. Contractors', *Journal of Management in Engineering*, 24(4), 2008, pp. 255-264.
- [5]Austin, C.G., Plouffe, C.R. and C. Peters, "Anti-Commercial Consumer Rebellion: Conceptualisation and Measurement", *Journal of Targeting, Measurement and Analysis for Marketing*, 14(1), 2005, pp. 62-78.
- [6]Barry, J. and A. Weinstein, "Business Psychographics Revisited From Segmentation Theory to Successful Marketing Practice", *Journal of Marketing Management*, 25(3/4), 2009, pp. 315-340.
- [7]Baser, I.U., Cintamur, I.G. and F.M, Arslan, "Examining The Effect Of Brand Experience On Consumer Satisfaction, Brand Trust And Brand Loyalty", *Marka Ddeneyiminin Müşteri Tatmini, Marka Güveni ve Marka Sadakati Uzerindeki Etkilerinin Incelenmesi.*, 37(2), 2015, pp. 101-128.
- [8]Beattie, G., "The Search for Authenticity", *Public Relations Strategist*,20(4), 2014, pp. 18-19.
- [9]Berry, L.L., Carbone, L.P. and S.H. Haeckel, "Managing the Total Customer Experience", *MIT Sloan Management Review*, 43(3), 2002, pp. 85-89.
- [10]BMW BMW Insights, viewed 2 April, 2016, <<http://www.bmw.com/com/en/insights/brandcampai>
[gn_pleasure/experience.html?cm=Facebook](http://www.bmw.com/com/en/insights/brandcampai_gn_pleasure/experience.html?cm=Facebook)>.
- [11]Brainjuicer-Labs, Connect: The feel-good factors, 32-32, Haymarket Media Group Ltd. , 2014
<<http://search.ebscohost.com/login.aspx?direct=trueanddb=bthandAN=99784783and site=ehost-live>>.
- [12]Brooksbank, R., Garland, R. and D. Taylor, 'Strategic Marketing Practices: Their Contribution to the Competitive Success of Medium-sized Manufacturing Firms in New Zealand", *Small Enterprise Research*, 16(2), 2008, pp. 8-20.
- [13]Brown, S.W., Webster Jr., F.E., Steenkamp, J. BEM, Wilkie, W.L., Sheth, J.N., Sisodia, R.S., Kerin, R.A., MacInnis, D.J., McAlister, L., Raju, J.S., Bauerly, R.J., Johnson, D.T., Singh, M. and R. Staelin, "Marketing Renaissance: Opportunities and Imperatives for Improving Marketing Thought, Practice, and Infrastructure", *Journal of Marketing*, 69(4), 2005, pp. 1-25.
- [14]Campbell, M.C., "Perceptions of Price Unfairness: Antecedents and Consequences", *Journal of Marketing Research (JMR)*, 36(2), 1999, pp. 187-199.
- [15]Campbell, M.C. and E. Carter, "Consumer Perceptions of Unfairness and Greed", *Advances in Consumer Research*, 42, 2014, pp. 118-122.
- [16]Carter, R. and D. Curry, "Transparent Pricing: Theory, Tests, and Implications for Marketing Practice", *Journal of the Academy of Marketing Science*, 38(6), 2010, pp. 759-774.
- [17]Chang, C. and S. Dibb, "Reviewing and Conceptualising Customer-perceived Value", *The Marketing Review*, 12(3), 2012, pp. 253-274.
- [18]Chatterjee, P., "Advertised Versus Unexpected Next Purchase Coupons: Consumer Satisfaction, Perceptions of Value, and Fairness", *Journal of Product and Brand Management*, 16(1), 2007, pp. 59-69.
- [19]Choi, H, Ko, E, Kim, EY and P. Mattila, "The Role of Fashion Brand Authenticity in Product Management: A Holistic Marketing Approach", *Journal of Product Innovation Management*, 32, 2, 2015, pp. 233-242.
- [20]Chou, T.J., Chang, E.C., Zheng, Y. and X. Tang, "What Makes Consumers Believe: The Impacts of Priming and Sequential Service Experiences on Consumer Emotions and Willingness to Pay", *Journal of Services Marketing*, 30(1), 2016, pp. 115-127.

- [21]Christensen, C.M., Cook, S. and T. Hall, "Marketing Malpractice: The Cause and the Cure". *Harvard Business Review*, 83(12), 2005, pp. 74-83.
- [22]Chu, C.W and H.P Lu, "Factors Influencing Online Music Purchase Intention in Taiwan: An Empirical Study Based on the Value- intention Framework", *Internet Research*, 17, (2, pp. 2007, pp. 139-155.
- [23]Coviello, N.E., Brodie, R.J. and H.J. Munro, "Understanding Contemporary Marketing: Development of a Classification Scheme", *Journal of Marketing Management*, 13(6), 1997, pp. 501-522.
- [24]Coviello, N.E. and R.J. Brodie, "An Investigation of Marketing Practice by Firm Size", *Journal of Business Venturing*, 15(5/6), 2000, p. 523.
- [25]Coviello, N.E., Brodie, R.J., Danaher, P.J. and W.J. Johnston, "How Firms Relate to Their Markets: An Empirical Examination of Contemporary Marketing Practices", *Journal of Marketing*, 66(3), 2002, pp. 33-46.
- [26]Coviello, N.E., Brodie, R.J., Brookes, R.W. and R.A. Palmer, "Assessing the Role of e-Marketing in Contemporary Marketing Practice", *Journal of Marketing Management*, 19(7/8), 2003, pp. 857-881.
- [27]Crawford, A., Deale, C.S. and R. Merritt, "Taking the pulse of the B and B industry: An Assessment of Current Marketing Practices", *Tourism and Hospitality Research*, 13(3), 2013, pp. 125-139.
- [28]Crutsinger, C., Knight, D. and H. Kim, "Teens' Consumer Interaction Styles: The Impact of Assertive and Aggressive Behaviour on Attitudes Towards Marketing Practices", *International Journal of Consumer Studies*, 34 (2), 2010, pp. 196-203.
- [29]Dibb, S., Simões, C. and R. Wensley, "Establishing the Scope of Marketing Practice: Insights from Practitioners", *European Journal of Marketing*, 48(1/2), 2014, pp. 380-404.
- [30]Disney Catering and Dining, viewed 2 May, 2016, <<https://www.disneymeetings.com/disneyland/disneyland-hotel/catering-and-dining/>>.
- [31]Girardin, F., Guèvremont, A., Morhart, F., Grohmann, B. and L. Malär, "Brand Authenticity: An Integrative Framework", *AMA Winter Educators' Conference Proceedings*, 24, 2013, pp. 92-93.
- [32]Goffee, R. and G. Jones, "Managing Authenticity: The Paradox Of Great Leadership", *Harvard Business Review*, 83(12), 2005, pp. 86-94.
- [33]Gray, B.J., "Benchmarking Services Branding Practices", *Journal of Marketing Management*, 22, (7/8), 2006, pp. 717-758.
- [34]Heath, M.T.P. and M. Heath, "Mistrust in Marketing: A Reflection on Consumers' Attitudes and Perceptions", *Journal of Marketing Management*, 24(9/10), 2008, pp. 1025-1039.
- [35]Hersh, A. and K. Aladwan, "Tourists Perceive Marketing Deception Through the Promotional Mix", *Business Management Dynamics*, 3(12), 2014, pp. 21-35.
- [36]Hooley, G.J., Lynch, J.E. and J. Shepherd, "The Marketing Concept: Putting the Theory into Practice", *European Journal of Marketing*, 24(9), 1990, pp. 7-24.
- [37]Jin, L., He, Y. and Y. Zhang, "How Power States Influence Consumers' Perceptions of Price Unfairness", *Journal of Consumer Research*, 40(5), 2014, pp. 818-833.
- [38]Joseph, S., "6 Months before Brands Lose Their Sincerity on Vine", *Marketing Week* (Online Edition), 2013, pp. 5-5.
- [39]Kim, J., Jeon-Su, L. and M. Bhargava, "The Role of Affect in Attitude Formation: A Classical Conditioning Approach", *Journal of the Academy of Marketing Science*, 26(2), 1998, pp. 143-152.
- [40]Kotler, P., 'A Generic Concept of Marketing', *Journal of Marketing*, 36(2), 1972, pp. 46-54.
- [41]Lan, X. and Monroe, K.B., "Perceived Price Fairness and Perceived Transaction Value", *Advances in Consumer Research - European Conference Proceedings*, 8, 2008, pp. 394-394.
- [42]Lee-Wingate, S.N., "Managing Consumer Fairness Perceptions To Increase Lifetime Customer Value", *AMA Winter Educators' Conference Proceedings*, 22, 2011, pp. 183-192.
- [43]Lichtenstein, D.R., Netemeyer, R.G. and S. Burton, "Distinguishing coupon proneness from value consciousness: An acquisition-transaction utility", *Journal of Marketing*, 54(3), 1990, p. 54.
- [44]Lo, A.K.C., Lynch, J.G. and R. Staelin, "How to Attract Customers by Giving Them the Short End of the Stick", *Journal of Marketing Research (JMR)*, 44(1), 2007, pp. 128-141.
- [45]Lyberger, M.R. and L. McCarthy, "An Assessment of Consumer Knowledge of Interest in, and

- Perceptions of Ambush Marketing Strategies', *Sport Marketing Quarterly*, 10(3), 2001, p. 130.
- [46] McColl-Kennedy, J.R. and B.A. Sparks, "Application of Fairness Theory to Service Failures and Service Recovery", *Journal of Service Research*, 5(3), 2003, p. 251.
- [47] McPherson, M., "A Comparison of Marketing Practices: Perspectives from First and Second Generation UK South Asians", *International Journal of Consumer Studies*, 31(2), 2007, pp. 174-186.
- [48] Moorman, C. and R.T. Rust, "The Role of Marketing", *Journal of Marketing*, 63(4), 1999, pp. 180-197.
- [49] Morhart, F., Malär, L., Guèvremont, A., Girardin, F. and B. Grohmann, "Brand Authenticity: An Integrative Framework and Measurement Scale", *Journal of Consumer Psychology* (Elsevier Science), 25(2), 2015, pp. 200-218.
- [50] Nguyen, B. and P.P. Klaus, "Retail Fairness: Exploring Consumer Perceptions of Fairness towards Retailers' Marketing Tactics", *Journal of Retailing and Consumer Services*, 20(3), 2013, pp. 311-324.
- [51] Nicholas, C.W. and S. David, "Laments and Serenades: Relationship Marketing and Legitimation Strategies for the Cultural Entrepreneur", *Qualitative Market Research: An International Journal*, 7(3), 2004, pp. 218-227.
- [52] Nilsson, V.T., "You're Not from Around Here, Are You? Fighting Deceptive Marketing in the Twenty-First Century", *Arizona Law Review*, 54(3), 2012, pp. 801-828.
- [53] Oliver, R.L., "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions", *Journal of Marketing Research*, 17(4), 1980, pp. 460-469.
- [54] Palmer, R. and H. Wilson, "An Exploratory Case Study Analysis of Contemporary Marketing practices", *Journal of Strategic Marketing*, 17(2), 2009, pp. 169-187.
- [52] Phillips, D.M. and W.K. Hallman, "Consumer Risk Perceptions and Marketing Strategy: The Case of Genetically Modified Food", *Psychology and Marketing*, 30, 2013, pp. 739-748.
- [55] Puzakova, M., Kwak, H. and M. Bell, "Beyond Seeing McDonald's Fiesta Menu: The Role of Accent in Brand Sincerity of Ethnic Products and Brands", *Advances in Consumer Research*, 40, 2012, pp. 985-986.
- [56] Rondan-Cataluña, F.J. and D. Martin-Ruiz, "Moderating Effects in Consumers' Perceptions of Price Unfairness", *Journal of Consumer Behaviour*, 10(5), 2011, pp. 245-254.
- [57] Sara, S., Bo, E., Per, K. and M., Peter, "Value in Use through Service Experience", *Managing Service Quality*, 18(2), 2008, pp. 112-126.
- [58] Sheth, J.N., "Impact of Emerging Markets on Marketing: Rethinking Existing Perspectives and Practices", *Journal of Marketing*, 75(4), 2011, pp. 166-182.
- [59] Sin, L.Y.M., Tse, A.C.B., Yau, O.H.M., Chow, R.P.M. and Lee, J.S.Y., "Market Orientation, Relationship Marketing Orientation, and Business Performance: The Moderating Effects of Economic Ideology and Industry Type", *Journal of International Marketing*, 13(1), 2005, pp. 36-57.
- [60] Stuart, E.W., Shimp, T.A. and Engle, R.W., "Classical Conditioning of Consumer Attitudes: Four Experiments in an Advertising Context*", *Journal of Consumer Research*, 14(3), 1987, pp. 334-349.
- [61] Suchman, M.C., "Managing Legitimacy: Strategic and Institutional Approaches", *Academy of Management Review*, 20(3), 1995, pp. 571-610.
- [62] Walls, A., Okumus, F., Wang, Y. and Kwun, D.J.W., "Understanding the Consumer Experience: An Exploratory Study of Luxury Hotels", *Journal of Hospitality Marketing and Management*, 20(2), 2011, pp. 166-197.
- [63] Weisstein, F., Monroe, K. and M. Kukar-Kinney, "Effects of Price Framing on Consumers' Perceptions of Online Dynamic Pricing Practices", *Journal of the Academy of Marketing Science*, 41(5), 2013, pp. 501-514.
- [64] Wildner, R., Kittinger-Rosanelli, C. and T. Bosenik, "How Good is Your User Experience? Measuring and Designing Interactions", *Marketing Intelligence Review*, 7(2), 2015, pp. 52-57.
- [65] Yu, X., Nguyen, B., Han, S. Chen, C.H. and F. Li, "Electronic CRM and Perceptions of Unfairness", *Information Technology and Management*, 16(4), 2015, pp. 351-362.
- [66] Zeithaml, V.A., "Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence", *Journal of Marketing*, 52(3), 1988, pp. 2-22.

Developing a Scale for Ren Orientation

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Abstract

This paper aims to construct a scale for Ren Orientation in the business-to-customer context. A two-stage research design was adopted to gather relevant data using qualitative research and quantitative research. In the first stage, qualitative research included focus group discussions and expert opinions. In the second stage, quantitative research included the following activities: quasi-experimental design, sampling, questionnaire design, data collection and scale development. A total of 384 respondents successfully completed the interview. The reliability and the validity of the measurement scales used in this research are considered reasonably good quality as indicated by measures such as GFI, CFI, SRMR, RMSEA and normed chi-square. The paper presents the setting of the study and explains the procedures for the scale development of Ren Orientation, followed by implications, limitations and suggestions for future research

Keywords:

Scale development, Ren Orientation, Value of Ren, Value Ren, Instrumental Ren

Introduction

In this paper, an empirical study is conducted to construct a scale development for Ren Orientation. The literature on Chinese cultural values has indicated that there are genuine needs for studying Ren. Firstly, Ren is a typical Chinese value of man-to-himself orientation according to the value orientation model [17]. It is a deeply embedded Chinese value in Chinese society, but unfortunately has never been systematically and empirically investigated, not to mention in the marketing and management context. Secondly, Ren is a value that is highly internalised and practised daily in Chinese communities [44, 41, 40]. The daily practice of Ren in the Chinese culture enhances one's determination, energy, happiness and self-respect [44]. The study of Chinese cultural values as a stream of academic endeavour seems incomplete without deeper understanding of Ren. Thirdly, Ren, as an important value at the individual level, is highly but implicitly related to other underlying values such as The Doctrine of the Mean which literally means 'without leaning against one side' [33, 19]. Fourthly, the extant literature reviewed that Ren has some similarities with the meaning of forbearance, but in the Chinese context, the meaning of Ren

is more complicated and multidimensional [16] including dimensions such as acceptance of dissimilarity in personality [45], observation of role order [27] and practice of Chung Yung [41].

However, the conceptualization of Ren is not easy as it has encountered many problems. Firstly, as a construct, Ren has always been misunderstood [38, 39, 47, 37]. On one hand, it is regarded as something highly negative while on the other hand, it is considered the same as the Western word 'forbearance'. Secondly but more importantly, Ren has never been empirically explored. It is high time that two important tasks be carried out. The first task is to conceptualize it from varied perspectives. The second is to develop a measurement scale for Ren Orientation so that its relationships with other cultural values can be studied and tested empirically.

This paper consists of four sections. Firstly, conceptualization of Ren Orientation will be explored. Secondly, the steps in developing a new scale of Ren Orientation will be specified. Thirdly, methodology adopted in the study will be discussed. At last, results of the findings will be provided, followed by implications, limitations and suggestions for future research.

Key Components of Ren Orientation in the Chinese Context

Ren orientation refers to the propensity to both act or not to act. Ren, which is a type of sacrifice usually found in interpersonal relationship at both business level and individual levels. The character of sacrificing oneself in the Chinese community is one way to resolve many problems in daily life. Whenever any serious conflict occurs between individuals, Chinese people may use Ren to overcome such conflict. This practice is also instrumental for people when dealing with others in business or in interpersonal relationships.

According to Rokeach Value Survey (1973), the value system is divided into two categories: Terminal Values and Instrumental Values [28]. Terminal Values can be defined as the ideal end-states of presence, which are the goals that people could attain throughout their lifespan. These goals include Mature Love, True Friendship, Happiness, and Self-Respect. Importantly, these Terminal Values are culture-specific. Instrumental Values mean desirable actions of

attaining the Terminal Values, examples of which include Ambition, Cheerfulness, Cleanliness, Self-Control, and Love. As such, RVS consists of a total of 18 terminal values and 18 instrumental values. However, it has at least two deficiencies that lead us not to treat it as a measure for Ren Orientation. Firstly, it does not represent Ren. Among the 18 instrumental values, only self-control is found to share some meaning in common with Ren or Ren Orientation. Secondly, it is a scale of values which measures shared beliefs in a particular society and not one for orientation, which attempts to measure the propensity to act. However, that the scale classifies values into 'terminal' and 'instrumental' can be capitalized when we try to develop a scale for Ren Orientation. A scale is developed based on Harmony Orientation which measures the propensity of Chinese business executives to harmonize with joint venture partners. Value is classified from Harmony Orientation into value harmony and instrumental harmony [28]. In this study, we adopt the same approach and classify Ren into two dimensions: Value Ren and Instrumental Ren.

However, in this study, when we develop a scale for Ren Orientation, we do not treat value Ren as a shared belief system as Rokeach previously defined. Rather, we defined in the orientation context as the degree of propensity to act accordingly to the shared beliefs owned by a consumer. It includes four elements: acceptance of dissimilarity in personality, accommodating with varied opinion, observation of role order, and practice of Chung Yung. In the same vein, instrumental Ren, which is the propensity to activate Ren so that the final objective is accomplished, embraces the elements of Status Quo, Moving Forward, and Moving Backward. The key components of Ren in terms of its sub-dimensions, Value Ren and Instrumental Ren are shown in Figure 1 and will be discussed in detail as follows.

Refer Figure 1

Value Ren As indicated in Figure 1, Value Ren has four dimensions, which together with their marketing implications will be discussed as follows.

1. **Acceptance of Dissimilarity in Personality** Acceptance of Dissimilarity in Personality of Value Ren refers to the shared belief of tolerating other people with different personalities [44]. According to the Bible of Ren, people always need to bear the differences of personalities between people. For example, someone may be more parochial than are one's friends. Someone may be more stubborn and less intelligent than are one's friends. Someone may feel more dissatisfaction than do one's friends [43]. Ren can help deal with the different interactions between individuals. Whether good or bad, we have to tolerate such interactions. For instance, negative comments, which include insults, hatred, jealousy, betrayal, defamation, complaints, opposite views, and so on (One Hundred Stories of Ren) (Xi, 2009), may need to be tolerated. Although praise and crafty facial

expressions may not hurt anyone, it is necessary to tolerate them as well. All the above mentioned situations demand us to use Ren to accept the differences of personalities between people.

2. **Accommodating with Varied Opinion:** Accommodating with Varied Opinion of Value Ren refers to the shared belief of tolerating people's different perceptions toward the importance of things. If people perceive things as insignificant in their lives, they may let them go without complaint. By contrast, if people perceive things that may cause high risk to their lives, they may stop tolerating the situation and begin to fight for their own rights. A small leak will sink a great ship. Gentlemen can cooperate well with other people although they do not easily agree with others without serious considerations. However, the inferior persons agree with others verbally, but not internally. [24].

Based on the Bible of Ren, people who are not greedy with or chasing after fame, authority, materials, money and fortune and opportunities and threats demonstrate Ren. If people can tolerate this instance, they can tolerate other instances.

3. **Observation of Role Order:** Observation of role order of Value Ren can be defined as the shared belief to bear faithfulness to deeds that display respect to other people and admit the responsibilities that arise from the person's position in a ranked relationship [27].

Benevolence can be expressed within the framework of personal relationships and by the wider context of social interactions, such as in the family or in the work environment. Very often, five important Cardinal Relationships are emphasized in Confucianism. Five important relationships, particularly in Chinese society are ruler-and-subordinate, father-and-son, brother-and-brother, husband-and-wife, and friend-to-friend [19].

Knowing the fundamental discipline required in the establishment of personal relationships is a major principle of Confucianism. This discipline is used as a guideline for people to act appropriately. Every entity has a role to play. Conscientiously performing one's individual role enables the wider social body to live together in relative peace and harmony [23].

Zhu Xi believes that all things have their own nature and unique feature, such as in the cases of the monarch, the minister, the father, and the son [47]. In Confucianism, people need to practise Ren in different role orders in different situations, such as the roles of father and son and the roles of elder brother and younger brother in the family context, and the roles of the monarch and the minister in the palace context.

Based on the Bible of Ren [43], the roles of the honour and the inferior the roles of the guest and the host, and so on should be respected. Teachers should be treated as our senior relatives and colleagues as brothers [47].

In sum, Observation of Role Order explains that an individual needs to practise benevolence to observe the role order in different contexts, i.e. family, workplace, and so on. In addition, an individual needs to bear the responsibility given by the role of the position.

4. **Practice of Chung Yung** The Practice of Chung Yung of Value Ren refers to maintaining the equilibrium state while differences are observed. Maintaining Chung means to not lean against either one side or another; Yung signifies the unchanged [42]. Chung Yung, also called The Doctrine of the Mean, is one of the doctrines of Confucianism.

The Doctrine of the Mean [19] is one of the names of the Four Books of Confucian Philosophy. According to the Doctrine of the Mean, if confusion of pleasure, anger, sorrow, or joy is absent, the mind remains in a state of equilibrium and balance. Such equilibrium is essential for all human beings and the progressive existence of nature.

The Doctrine of the Mean [19] signifies moderation, correctness, impartiality, honesty, authenticity, and politeness. Its principle is not to act in excess. Therefore, we should control our temper and desire. For example, emotions, especially anger, happiness, and sadness, should be controlled, in addition to desire. For instance, wine and sex, which refers to unnecessary intercourse, need to be controlled or they will cause disasters.

In sum, Chung Yung of Value Ren teaches people how to maintain equilibrium and not to go to the extreme.

Instrumental Ren: Instrumental Ren, which is the second key component of Ren Orientation, consists of three dimensions as depicted in Figure 1.

In the context of Ren, three mindsets exist, namely, moving forward, moving backward, or no change, wherein three choices are present and only one action can be taken. These three represent different situations. Generally, three actions, which are not correlated, cannot be taken at the same time. Through self-control, self-discipline, and self-reflection, the inner values of Benevolence are revealed [23]. In turn, self-control, self-discipline, and self-reflection help us make the right decisions to act: Status Quo, Moving Forward, and Moving Backward., which together with their marketing implications are explained as follows:

1. **Preference for the Status Quo:** Preference for the Status Quo of Instrumental Ren refers to the mindset of

people that tend to bear the things the way they currently are and to wait for the right moment. Muller [23] suggests staying still with a peaceful attitude when handling all challenges. Confucius teaches us to be patient with the present situation, especially when the time is not right yet. If one cannot tolerate the small things, the big picture will be seriously affected [23]. Waiting for the right opportunity can be very boring and tedious. However, the reward of waiting for the right moment or window of opportunity can be tremendous.

A classic example of waiting for the window of opportunity can be illustrated by Sima Yi, the King of China in the Three Kingdoms Period. Sima Yi was a strategist, politician, and general of the state of Cao Wei in the Three Kingdoms Period. Considering that Sima Yi knew how to use Ren to cultivate his health, he was one of the few leaders in the Three Kingdoms period who could live up to the age of seventy-three and protect the Sima family to the last moment [7]. Sima Yi had the wisdom to foresee golden opportunities, and therefore chose the right action and likelihood in the Ren decision.

In sum, Ren is extremely important to allow people to understand situations more clearly and to outperform their competitors. It tells people to wait, sometimes without movement, for the golden opportunity to come.

Moving Forward: Moving Forward, derived from Instrumental Ren, refers to the mindset of people that tend to not endure the current situation or people and to move ahead to attain one's goal with sacrifice without delay.

Considering the adverse external environment, people often must move forward without delay. Otherwise, the consequence will be absolutely undesirable. One typical example of moving forward without delay, which is mentioned by Sun Tzu, is "When in a difficult country, do not encamp." [13], [Sun Tzu, Ch. 8, Sec. 2].

A person must dare to move forward without delay to attain their goal although numerous people may object to one's decision Mencius [19]. This type of action can actually strengthen one's character. Given the pursuit of the righteous goal of society, one must even sacrifice the relationship with one's father. For example, when a person finds out that their father has bribed the official of the government, they must report it to the police.

Sometimes, the tendency for someone to sacrifice so as to move forward is important to accomplish his task effectively. According to Qianfulun, Ren refers to the willingness to surrender something to others to move forward faster without delay. Accordingly, Ren Orientation is the propensity to be willing to surrender something to others so as to move forward faster

without delay.

2. **Moving Backward:** Moving Backward of Instrumental Ren, which is the opposite action of moving forward, refers to the mindset of people that have the tendency of retreating for a short period to achieve one's desirable goal, i.e., moving forward in the future. Moving backward itself would be a sacrifice. In contrast to moving forward, Ren can be explained by moving backward or retreating for the sake of moving forward or advancing in the near future.

The meaning of retreating can be interpreted as a mindset for people to advance, i.e., moving forward in the future. During the Han Dynasty, Yang Hung comments that Confucius's disciple, Yan Yuan gave away his position to another person are a retreating behaviour. This is an unusual virtue [3].

Moving backward may be interpreted as taking a longer period to attain one's goals. For example, in the past few decades, figures such as the opposition leader in Burma, Nobel Peace Prize laureate Aung San Suu Kyi, and the former President of South Africa Nelson Mandela have been kept in prison for a long period while fighting for liberty, democracy, or higher goals in their own countries.

Similarly, Sun Tzu suggests that one sometimes may take an indirect route, which does not necessarily mean taking a long time, to resolve foreseeable difficulties rather than the obvious or direct route. The final goal will still be obtained [13].

One of the major teachings of Daoism is self-development. Retreat may provide a tranquil place for developing one's inner self [26, 18]. The way of the sage is to refrain from striving and unnecessary endeavour [23]. In sum, the mind-set of moving backward seems to be pessimistic. However, it may also be an optimistic move in terms of goal achievement in the long run. The analogy is similar to pulling the trigger of a pistol before shooting the target.

Methodology

Research design is the plan or structure of a research study that is adopted as a roadmap in gathering and analysing data [8]. In addition, the research needs to ensure that the collected data and information should be related to the objective of the study and be based on cost-effective, scientific and objective methods [30, 9, 7]. According to Churchill and Iacobucci (2010), and Zikmund (1997), the data gathering techniques must be objective and scientifically rigorous. One of the goals of this academic research is to construct a scale of the concepts of Ren [8, 35]. Thus, operationalizing the concepts of Ren, which are not yet known to the contemporary literature, is necessary.

Operationalising refers to the development of an inventory of items that are either reflective or formative in nature to represent a construct or concept. In this study, reflective items were mainly generated from two sources: one from the literature review and the other from the focus group discussions.

A two-stage research design was adopted to gather relevant data: the qualitative research and the quantitative research. In the first stage, qualitative research basically includes focus group discussions and expert opinions. Focus groups can be used for various purposes. Some authors use them to develop grounded theories [14]. The model of this study was developed by using literature review and the results of the focus group. The purpose of expert opinions was to assess the scale items that were developed in the literature review and focus group discussions.

In the second stage, quantitative research included the following activities: quasi-experimental design, sampling, questionnaire design, data collection and scale development. In addition, under quantitative research, a model for developing measures of Ren Orientation was adopted [8, 33]. Firstly, in the literature review, seven dimensions of Ren Orientation were identified. Secondly, an inventory of items of Ren Orientation was developed through literature review, which would be merged with focus group results and expert opinions. As such, the face validity of the scale would be assessed. Thirdly, data were collected using a cluster sampling method. Fourthly, measures of Ren Orientation were purified through exploratory factor analysis and Cronbach's alpha. Fifthly, reliability would be assessed through split-half reliability and item-to-total coefficients. Lastly, various forms of validity for the scale of Ren orientation such as construct validity (EFA and CFA), criterion validity, discriminant validity and convergent validity were assessed.

Sampling and the Sample: In this study, the sampling frame is the customers who dined at Cha Chann Teng (CCT) and were at least 18 years old before the survey. Thus, the sample of this study was drawn from the neighbourhood of the districts where CCT branches are located. According to the Hong Kong District Board in 2014, there are 18 districts with different sizes of population (Census and Statistics Department, 2015). During the two-week period from 23 June 2015 to 5 July 2015, about 652 pedestrians were selected by systematic sampling and were requested to participate in the survey. A total of 384 respondents successfully completed the interview. The response rate was 60.4%, which is more or less the same of that of Cheng (2008) who adopted a shopping mall intercept approach.

Refer Table 1

Characteristics of the Sample: Table 1 show the profile of the survey respondents. The distribution of the respondents' characteristics can be considered generally representative. By means of chi-square statistic, we also compared the

characteristics of this study's sample with those of the Hong Kong population and found that there were no significant difference in terms of gender and family income. However, the sample of this study tends to be younger in age and higher in education level. We need to take these differences into consideration when interpreting the findings.

Development of the Scale for Ren Orientation

The following stages for developing scales in general were adopted:

- Item Analysis and Reliability Assessment
- Checking Dimensions: Exploratory Factor Analysis
- Scale Validity
- Cross-sample Stability

Findings relating to each of the above stages are discussed as follows.

Item Analysis and Reliability Assessment These analyses form the second stage of the scale development procedures that were performed after data collection. To perform item analysis, the sample was divided equally into four parts. With respect to each item, the means of the first and the fourth quartiles were compared using a two-sample t-test. As a result, two items were deleted. The elimination of these two items did not create any adverse effect on the content validity of the scale, as deletions were spread over various subscales.

To purify the measurement scale for Ren Orientation after data collection, the sample was split into two sub-samples. We first randomly split the sample into two halves. Reliabilities

of these two samples were 0.85 and 0.86 respectively. No items with relatively low communalities were deleted, resulting in 22 items for further purification. During the reliability analysis, no item with item-to-total correlation above .4 was deleted. The alpha coefficients of Ren Orientation is 0.92 and for the seven components ranging from 0.75 to 0.88, which are all higher than the threshold of 0.7 and thus considered to be good (Nunnally, 1978). Internal consistency within each subscale was checked using item-to-total correlations which range from 0.45 to 0.82, all of which are higher than 0.4, indicating that all components have consistent reliability.

Exploratory Factor Analysis To assess the dimensionality of Ren Orientation, the items comprising the seven components were subject to exploratory factor analysis. This was undertaken after the components had been purified, in order to avoid spurious results [8]. We subjected the items measuring the seven key components to a principle component analysis with varimax rotation [15]. No item with low communality below 0.55 was deleted, resulting in a battery of 22 items; three for each component, except for the component, acceptance of dissimilarity in personality, which has four items. The final seven factors together accounted for 69.66% of the total variance and the first factor accounted for less than 30.0% of the total variance in the

unrotated solution. The items were loaded significantly on each of the corresponding factor, indicating multi-dimensionality for the sample. These factors were labelled as previous determined.

We examined the threat of common method variance by means of the Harman one-factor test [25]. Because the majority of the total variance could not be explained by one general factor, the threat of common method variance was not serious. Furthermore, the way in which the items were grouped was in line with our expectations.

Refer Table 2

Scale Validity This is the third stage of the scale development for Ren Orientation, which includes a series of tasks to assess construct validity, convergent validity, discriminant validity and predictive validity [8]. Figure 2 about here>

1. **Construct validity** – To examine the construct validity of the scale for Ren Orientation, the result of the exploratory factor analysis was subject to a confirmatory factor analysis using Amos 18.01. Figure 2 shows the confirmatory model for examining Ren Orientation. Latent variables are represented by ellipses, while observed variables are represented by rectangles [2, 29]. The observed variables are connected to the latent variables by an arrow, signifying that these measurement items are theoretically attributed to the latent variable. The values next to the arrows connecting the latent variables to the observed variables are factor loadings and serve as a regression coefficient [29].

The response error (indicated by the numbers pointing to the observed variables) of the measurement items indicates the portion of the observed variable that measures factors other than the hypothesised one [20]. The curved lines in Figure 2 connecting pairs of factors indicate inter-correlations between the factors of Ren Orientation.

Figure 2 shows the GFI indices of the first-order CFA measurement model of Ren Orientation. Table 5.11 presents the values GFI and CFI of 0.93 and 0.97, respectively, the error indices of RMSEA and SRMR of 0.04 and 0.05, respectively, and the value of X^2/df of 1.67 at a significance level of 0.01. All the GFIs were above the recommended level of 0.9, the error indices were low, and the normed chi-square was within the threshold of 1 and 3. Therefore, the first-order CFA measurement model is considered satisfactory.

2. **Convergent Validity** - Convergent validity refers to the degree of agreement in two or more measures or items of the same construct. Evidence of convergent validity in the Ren Orientation scale was examined in two ways. First, we looked into the relationship between the scale and its five components and, second, we scrutinised the

simple correlations among the five components of the scale.

Similar to Figure 2, we constructed a second-order factor model with Ren Orientation as the second-order factor. That is, Ren Orientation is a construct, which consists of the seven components, as shown in Figure 3. Results, as shown in Figure 3, are encouraging. The goodness-of-fit appears to be acceptable, as CMIN/df (2.38) is much less than 3, and GFI, and CFI were found to be 0.90 and 0.93 respectively, all higher than the threshold of 0.90. In addition to this, the RMSEA and SRMR were found to be .06 and 0.7 respectively, indicating that the errors terms are acceptable.

Refer figure 3

With respect to the relationship of the seven components to the Ren Orientation Scale, Figure 3 shows that the standardised regression weights for the components of Ren Orientation scale ranged from .52 to .84, all significant at $p < .01$. This is a good indication that all the components contribute highly to the scale.

Not being shown, correlations among the five components were also significant, ranging from .380 to .791. The pattern of correlations indicates that the seven components are convergent on a common construct. Results of the above two approaches indicates that the scale has convergent validity.

3. Discriminant Validity - Discriminant validity indicates that the dimensions of a construct in theory should not have any relationship with each other. Also, the dimensions of a construct should also have no relationship at all by observation. In this study, three methods were used to test the discriminant validity:

- Fornell and Larcker Criterion
- Comparing Constraint and Unconstrained Measurement Models

Fornell and Larcker Criterion: The Fornell and Larcker criterion is a technique that evaluates the discriminant validity of the dimensions of a construct [12]. Fornell and Larcker criterion is the best method to assess discriminant validity [11]. When adopting the Fornell and Larcker criterion, the average variance extracted (AVE) of each dimension is compared with the shared variance among dimensions. If the AVE for each dimension is larger than its shared variance with any other dimension, the discriminant validity is supported. As shown in Table 3, the AVE of each dimension is located on the diagonal of the matrix, and the off-diagonal cells are shared variances with other dimensions. Practice of Chung Yung is the first dimension in the table. It has an AVE of 0.74, which is greater than the shared variances across other dimensions except 0.75, a shared variance with the dimension of Status Quo. However, as 0.74 is close to 0.75, the difference is insignificant.

Refer Table 2

The dimension of Acceptance of Dissimilarity in Personality has an AVE of 0.77, which is greater than all shared variances across other dimensions. This result is consistent with the Fornell and Larcker criterion. The same applies to all the other dimensions. Therefore, based on Fornell and Larcker criterion, all dimensions have discriminant validity among themselves, as all the shared variances within the same dimensions were significant at the 0.01 level. Therefore, the discriminant validity of the Ren Orientation scale is supported in this study because the AVE for each dimension is greater than its shared variance with any other dimension.

Comparing Constraint and Unconstrained Measurement Models: Comparing Constraint and Unconstrained Measurement Models, also called the Paired Constructs Test, compares the parameter estimate of two measurement models, the constrained model and the unconstrained model [1]. This test also compares all possible pairings of the dimensions in the same study.

With the reduction of one degree of freedom from the unconstrained model to the constrained model, the parameter estimate yields a chi-square value that is greater than or equal to 3.84 [1]. A two-dimension result proves a better fit to the data. Therefore, the discriminant validity between the two dimensions is supported. In other words, when comparing a constrained model with an unconstrained model. If the chi-square value of the unconstrained model is lower than the constrained model by 3.84 or more, the unconstrained model fits to the data better and discriminant validity between two constructs is supported [11].

Table 4 shows the results of comparing the parameter estimates of two measurement models. An unconstrained Model B with two dimensions is compared with a constrained Model A with a single dimension model. If the constrained model fitness deteriorates when the items from the two dimensions collapse, discriminant validity exists between these two dimensions. As the scale has 7 dimensions, 21 pairs of dimensions can be formed. As such, 21 comparisons are made.

For example, an unconstrained model with the dimensions of acceptance of dissimilarity in personality and accommodating with varied opinions, CFA was performed. The overall model fitness was found acceptable, with chi-square = 43.39, df = 8, chi-square/df = 5.42, GFI = 0.96, CFI = 0.97, and SRMR = 0.06 as GFI and CFI are larger than the threshold of 0.9 and SRMR is smaller than 0.08 though the chi-square/df is larger than 3. In contrast, the results of the constrained model was considered unsatisfactory as chi-square (df = 9) = 173.9, chi-square/df = 19.32, which is much higher than 3. Moreover, that the chi-square difference between the two models is 130.5 with degree of freedom is 1 indicates a

significant difference between the two models. Therefore, discriminant validity exists between the dimension of Acceptance of Dissimilarity in Personality and the dimension of Accommodating with Varied Opinion.

The same procedure was repeated for the other 20 pairs of dimensions. Results show that discriminant validity exists among all pairs of dimensions.

3. **Criterion Validity** - Criterion validity refers to the assessment of how effective the scale or variable predicts a future outcome. Criterion comprises predictive validity and concurrent validity [8]. In this study, the predictive validity of Ren Orientation was assessed, and Harmony was adopted as the criterion. A SEM analysis using AMOS 18 was performed, and the overall model fitness was found acceptable, with chi-square = 677.79, df = 312, chi-square/df = 2.17, GFI = 0.89, CFI = 0.93, RMSEA = 0.06 and SRMR = 0.07.

Refer figure 4

As shown in Figure 4, the path coefficient from Ren Orientation to Harmony is 0.41, which is significant at $p = 0.001$. Therefore, Ren Orientation can be regarded as a good predictor of Harmony with good predictive validity because the coefficient is considerably high.

Cross-sample Validation Cross-sample validation is the process of checking if some robustness of the measurement scale exists by dividing the sample into two subsamples [31]. It is important to conduct cross sample validation for the development of new measurement scale in consumer behaviour [31]. Precisely, cross-sample validation was examined adopting the following process.

Firstly, a confirmatory factor analysis model with Ren Orientation was identified. Then, we assessed to what extent that the specification remains across the two sub-samples. In the analysis, we used a series of testing processes to assess the gradually limiting forms of variance [22]. In this study, cross-sample validation was adopted to gauge Ren Orientation, and the sample was randomly divided into two halves using SPSS (Version 19). Table 3 describes the results of the cross-sample comparisons between two randomly split subsamples. Initially, the factor loadings of the Ren Orientation model were found invariant across the two subsamples. The covariance matrices of the two subsamples show a satisfactory fit ($X^2/df=1.923$, GFI=.852, CFI=.916, RMSEA=.049). In addition, the Hoelter index was 234, higher than 200 at $p=0.00$, showing that the model fits the data and the sample size is acceptable. Therefore, the same factor loadings of the scale for Ren Orientation are mapped into the two subsamples.

Furthermore, we examine if the measurement weights, structural weights, structure covariance, structural residuals and measurement residuals are invariant across the two subsamples. Table 3 describes the results attained from

Amos 18. Firstly, Model 1 (M1) indicates that the factor pattern was found to be invariant across the two subsamples as there are no difference between measurement weights across the subsamples ($\chi^2 (415) = 792.416$, $p=0.082$), showing that the measurement weights are invariant. Therefore, we can confirm that the same factor loadings of the scale for Ren Orientation are mapped into the two subsamples.

Secondly, we tested whether the structural weights were the same across the two subsamples. In model 2 (M2), we can calculate the chi-square difference to examine the structure weights, as indicated by the difference in chi-square (M2-M1: $\chi^2 (6) = 6.930$, $p=0.327$). Hence, the structural weights are the same across the two subsamples.

Thirdly, we also examine if the structure covariance were invariant across the sub-samples. Model 3 (M3) describes that there is no significant difference in structural covariance across the two subsamples ($\chi^2 (1)=3.478$, $p = 0.062$). Lastly, despite the differences found in the structural residuals and measurement residuals for the two subsamples as shown in the last two columns of Table 5.18 ($\chi^2 (7) = 20.567$, $p= 0.004$; $\chi^2 (24) = 66.232$, $p= 0.000$) respectively, they cannot affect the factor loadings of the scale for Ren Orientation. Overall, we found that the measurement weights, structural weights and structure covariance are invariant across the two subsamples. As such, the factor loadings of the scale for Ren Orientation are invariant across two subsamples. Based on the results of the cross-sample validation, the robustness of the Ren Orientation scale is ensured.

All stages of the scale development indicated that the Scale for Ren Orientation, which consists of 22 items in 7 dimensions was generated and successfully found reliable and valid.

Conclusion and Implications

The model of Ren Orientation has two parts: value Ren and instrumental Ren. Value Ren in the Scale for Ren Orientation consists of four dimensions: acceptance of dissimilarity in personality, accommodating with varied opinion, observation of role order and practice of Chung Yung. Instrumental Ren is the propensity to activate Ren and embraces three dimensions in the Scale for Ren Orientation: preference for the status quo, moving forward and moving backward.

For reliability, Cronbach's α and split-half reliability were adopted. For scale validity, construct validity, discriminant validity, convergent validity and criterion validity were examined using AMOS version 18 [2]. Results of these analyses indicate that the Scale for Ren Orientation was considered reliable and valid.

The study has some important implications.

Firstly, this study presents a valid and reliable scale for measuring Ren Orientation scale.

Secondly, Ren Orientation is an important construct closely related to other constructs such as harmony and relationship. Developing it into a scale can help researchers in Chinese marketing studies to study Ren in the future.

Thirdly, the concept of Ren is not exactly the same as the concept of forbearance in the Western culture. The development of the scale for Ren Orientation is a further step to help distinguishing between the two constructs conceptually and empirically.

Limitations of the Study As this study is the first of its kind in examining Ren in the service context, the result of this study can be treated as an indicative direction for future research rather than an irrefutable conclusion. Although various necessary measures have been adopted to prevent the downside of the survey, the following limitations are still embedded in this study.

Firstly, the empirical data were collected on the streets. The results could be more authentic if the survey had been conducted in a real-life setting, such as a restaurant or a service organisation.

Secondly, the constricted sample adopted in this study is another limitation. The research was conducted in selected spots in the street during non-lunchtime or non-dinnertime to minimise the interference and to easily implement the manipulation of service behaviour. As a result, the respondents did not hurry in answering the survey. Nevertheless, the ideal situation would be if the sample were more diverse, such as respondents chosen at any time.

Lastly but not the least, bias arising from social desirability may occur, either consciously or unconsciously. Our physical presence may cause the respondent to convey modified or untrue answers to reduce embarrassment or to suggest a favourable or optimistic impression in the public place. Social desirability questions, whether in long or short form, were not included in the questionnaire, which was already long with 100 questions included. However, as focus groups and a pilot survey had been conducted before the implementation of the main survey, social desirability was not found to be serious in this study.

Suggestions for Future Research: We suggest the following in conducting academic research on the Chinese value of Ren:

Firstly, the respondents were selected from Hong Kong only. In future research, the value of Ren can also be explored in other Chinese communities, such as Taipei, Beijing and Singapore. Particularly, through the cooperation of different academic scholars from different Chinese societies, the business model of Ren and Ren scale can be generalised in the above Chinese societies.

Secondly, this study was intended for gauging the conceptual model of Ren Orientation in a Chinese community. Research on the cross-cultural differences between Chinese and non-Chinese people in practicing Ren in CCT would be interesting as Chinese people practise Ren on a daily basis.

Thirdly, as mentioned in the section on limitations, questions on social desirability may be incorporated in the questionnaire so that its influence can be qualified.

Lastly, as mentioned earlier, the Scale for Ren Orientation can serve to help making a difference conceptually between Ren and forbearance. Empirical studies are encouraged to conduct either in Chinese and non-Chinese communities to compare these two constructs.

References

- [1] Anderson, J.C. and D.W. Gerbing, "Structural Equation Modelling in Practice: A Review and Recommended Two-step approach," *Psychological Bulletin*, Vol. 103, 1988, pp. 411-413.
- [2] Arbuckle, J. Amos 19 user's guide, Chicago, IL: SPSS, 2010.
- [3] Baike, Available from: <http://www.baike.com>, Accessed on 21 Mar 2013.
- [4] Beerman, J. "Cha Chaan Reng Cheat Sheet: What to order at the Most Popular eateries in Hong Kong," CNN Go. 20 February 2012.
- [5] Chen, S. C., Raab, C., and Tanford, S., "Antecedents of Mandatory Customer Participation in Service Encounters: An Empirical Study," *International Journal of Hospitality Management*, 46, 2015, pp.65-75.
- [6] Cheng, C.L.S., "A Study of Intention of Elderly Institutionalization: The Impact of Chinese Values – Hsiao and Bao" Unpublished PhD Thesis, Department of Marketing, City University of Hong Kong, 2008.
- [7] Chisnall, P. M., *Marketing Research*, 6th edition, Berkshire: McGraw-Hill, 2001.
- [8] Churchill, G. A. Jr, "A Paradigm for Developing Better Measures of Marketing Constructs," *Journal of Marketing Research*, 1979, pp. 64-73,
- [8] Churchill, G. A. Jr. and D. Iacobucci, *Marketing Research: Methodological Foundations*, 10th edition, Ohio: South-Western, 2010.
- [9] Cooper, D. R. and P. S. Schindler, *Business Research Methods*, 11th ed., Boston: McGraw-Hill, 2011.
- [10] Dunning, J. H., "International Production and the Multinational Enterprise", *RLE International Business*, (Vol. 12), 2012.
- [11] Farrell, A. M., "Insufficient discriminant validity: A Comment on Bove, Pervan, Beatty, and Shiu," *Journal of Business Research*, 63(3), 2010, pp.324-327.
- [12] Fornell, C. and D.F. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18 (1), 1981, pp.39-50.
- [13] Giles, L., *Sun Tzu on the Art of War: The Old Military Treatise in the World*, London: Kegan Paul, 2002.

- [14] Glaser, B.G. and A.R., Strass, *The Discovery of Grounded Theory*, New Brunswick: Aldline Transaction, 2006.
- [15] Hair, J.F., Anderson, R.E., Tatham, R.L. and William, C., *Black, Multivariate Data Analysis*, 1998.
- [16] Hartz, P., *Daoism*, New York: Infobase Publishing, 2009.
- [17] Kluckhohn, F.R. and F.L., Strodtbeck, *Variations in Value Orientations*, New York: Row, Peterson and Company, 1961.
- [18] Kohn, L. *Monastic Life in Medieval Daoism: A Cross-Cultural Perspective*, USA: University of Hawaii Press, 2003.
- [19] Legge, J., *The Confucian Classics*, 5 volumes. Hong Kong: Hong Kong University Press, 1960.
- [20] Mlhotra, N.K., Agarwal, J. and Peterson, M., "Methodological Issues in Cross-cultural Marketing Research: A state-of-the-art review," *International Marketing Review*, 13(5), 1996, pp.7-43.
- [21] McLane, D., "Eating in Hong Kong: the Cha Chaan Teng," *International New York Times*, 30 January 2008.
- [22] Mullen, E. M., *Mullen Scales of Early Learning* (), Circle Pines, MN: AGS, 1995, pp. 58-64.
- [23] Muller, C., *Five Chinese Classics - Translated by Charles Muller*, 2015. Available from: <http://www.acmuller.net/con-dao/analects.html>, Accessed on 6 January 2016
- [24] Nunnally, J., *Psychometric Theory*, 2nd edition, New York: McGraw-Hill, 1978.
- [25] Podsakoff, P.M. and Organ, D.W., "Self-reports in organizational research: Problems and prospects," *Journal of management*, 12(4), 1986, pp.531-544.
- [26] Raz, G., *The Emergence of Daoism: Creation of Tradition*, Hoboken: Taylor and Francis, 2011.
- [27] Riel, B., "Profiles in Culture - Getting to Know the People of Shanghai," *Journal and Real Estate News*, 10 (12), Dec., 1996.
- [28] Rokeach, M., "The Nature of Human Values", New York: Free press, 1973.
- [29] Schumacher, R.E. and R.G., Lomax, *A Beginner's Guide to SEM.*, New Jersey,: Lawrence, 1996.
- [30] Sekaran, U. "Research Methods for Business: A Skill-Building Approach, (3rd Ed)", New York: Wiley, 2002.
- [31] Sin, L. Y., Alan, C. B., Yau, O. H., Chow, R. P., Lee, J.S., and L. B., Lau, "Relationship Marketing Orientation: Scale Development and Cross-cultural Validation," *Journal of Business Research*, 58(2), 2005, pp.185-194.
- [33] Yau, O. H. M., *Consumer Behaviour in China: Customer Satisfaction and Cultural Values*, London and New York: Routledge, 1994.
- [34] Yau, O. H. M. & R. P. M. Chow, "In Search of Complementarity," *Asia Pacific Management Review*, 7(1), 2002, pp.61-84
- [35] Zikmund, W.R., *Business Research Methods*, 5th ed., Texas: Dryden Press, 1997.
- [36] Zhang G. "Mathematics and Aesthetics", *Chengde Teachers College for Nationalities*, 02, 2000, pp. 17-18.
- Chinese [On-official translation]
- [37] Law Luo Guoying, "Interpersonal Harmony and Tolerance values: from interpersonal conflicts that arise should Look at Intergenerational Differences", "thematic research program into the National Science Council Fruit Report ", 2002, NSC-90-2413-H-031-006-SSS.
- [38] Trishanne, L. L. "The Formation and Change of the Chinese Marriage Toughness: Clarify the Concept and Theory Construction", "indigenous Psychology Research", 25, 2006, 101-137.
- [39] Trishanne, L. L. "Tolerance and Support between Husband and wife: the dual Effect Relationship, the Chinese Family Relations", " Seminar", in June, the South: Academia Sinica, 2010.
- [40] Shuming, L. L. "Chinese Culture", Taipei: Patou Bookstore, 1982.
- [41] Chong, M. W. "On the Chinese national character from the value orientation", see Li Yi Park, and D. Y. Kuo-shu, (editor): "Chinese Character", Taipei: Laurel Books, 1988.
- [42] Mao Wei Moa wide, "meaning comment moderation set release," China: history and philosophy Press, 2002.
- [43] Wu Wu C. "Tolerance by the" China: history and philosophy Press, 2009.
- [44] Xi Shi Bodhi, *Advised Endure one Hundred Pro for Everyday Living*. Taiwan: Gold House Culture, 2009.
- [45] Yang Yang Kuo-shu, "Chinese people's social orientation: social interaction perspective", see Yang Kuo-shu, Yuan Bang (editor): "Chinese people's psychological and behavioral concepts and methods .-articles", Taipei: Laurel Book Company, 1992, pages 87-142 .
- [46] Zhao Weihua compilation, "tolerance by • decent • Anti-Jing" (yuan) Wu Liang, (clear) Song Zongyuan, (Don) with Zhao Rui, Xi'an: Shaanxi Press, 2013.
- [47] Zhu Jie people, Zuo Yan, Liu Yongxiang compilation, "Zhu Xi (Zhu Xi): childish notes, the book of Zhu Xi, Shanghai: Shanghai Ancient Books Publishing House, 2002.
- [48] Lee and Sui Lee Trishanne, Xiaoying Ling, "the Chinese to maintain the quality of marriage: the effect of conflict with the patient," "indigenous psychology research", 29, 2008, pages 77-116.

Table 1: Profile of the Respondents (N=384)

Gender	N	%	Months of Patronage in the past	N	%
Male	156	40.6	1-24	166	43.2
Female	228	59.4	25 or above	218	56.8
Age	N	%	Times of Patronage during last week		
18-29	165	43	0-1	130	33.9
30-39	45	11.7	2 or above	254	66.1
40-49	62	16.1			
50-59	75	19.5			
60 or above	37	9.6			
Education	N	%	Friends with you in the last Patronage		
Primary School or below	54	14.1	No	173	45.1
Secondary School	179	46.6	Yes	211	54.9
Undergraduate or Higher Education	146	38.0			
Postgraduate or above	5	1.3			
Family Income	N	%			
HK\$9,999 or below	42	10.9			
HK\$10,000-HK\$29,999	135	35.2			
HK\$30,000-HK\$49,999	95	24.7			
HK\$50,000 or above	28	7.3			
No idea	84	21.0			

Table 2.
Items Generated for the Scale for Ren Orientation

Dimension and its Items
Acceptance of Dissimilarity in Personality (Explained r1. I can work with other people that have different characters. r2. I can bear other people who have extreme characters. r3. I can stand stubborn people.

Accommodating with Varied Opinion r8. I can accept other people's different opinions. r9. I can accept other people's complaints. r11. I can accept other people's opposite opinions.
Observation of Role Order r12. I can accept that brothers working together cooperatively can succeed easily. r13. I can accept the hierarchy between father and son. r15. I can accept that friends need to be loyal to one another.
Practice of Chung Yung r16. At work, I expect myself to be impartial. r17. At work, I can maintain peaceful emotions. r18. At work, I try not to be too subjective.
Preference for the Status Quo r20. I will not take reckless action without trying hard to understand myself and others fully. r21. At work, I will not take reckless action without sufficient practice. r22. I will think deeply and plan thoroughly when faced with difficulties. r23. I will not take reckless action to maintain my core competence when faced with difficulties.
Moving Forward r27. At work, I act boldly to move forward as I believe everything will be alright in the end. r28. At work, I act boldly to move forward as I believe every cloud has a silver lining. r29. Sometimes, I allow myself to move forward without hesitation.
Moving Backward r30. If I allow myself to take a step backward now, I will achieve the state of a brighter future later. r31. I believe that small things must be endured; otherwise, they will cause chaos in big things. r32. At work, I sometimes allow myself to fall back to attain peace.

Table3. Correlation Matrix of Different Values

	Practice of Chung Yung	Acceptance of Dissimilarity in Personality	Accommodating with Varied Opinion	Preference for the Status Quo	Moving Backward	Observation of Role Order	Moving Forward
Practice of Chung Yung	0.742						
Acceptance of Dissimilarity in Personality	0.383	0.772					
Accommodating with Varied Opinion	0.497	0.727	0.779				
Preference for the Status Quo	0.750	0.464	0.543	0.766			
Moving Backward	0.530	0.358	0.501	0.593	0.843		
Observation of Role Order	0.588	0.372	0.458	0.522	0.459	0.706	
Moving forward	0.452	0.351	0.401	0.412	0.573	0.598	0.716

*All correlations are significant at the 0.01 level.

Table 4. Results of the Cross-sample Comparisons between Two Randomly Split Subsamples

Goodness-Of-fit index	Acceptable Value (range)	Model				
		M1: Equal Measurement Weights	M2: With Structure Weights	M3: With Structure Covariance	M4: With Structural Residuals	M5: With Measurement Residuals
χ^2 (df)	Small relative to df	792.416 (415)	799.346 (421)	802.824 (422)	823.391 (429)	889.624 (453)
P	$P < .05$	0.00	0.00	0.00	0.00	0.00
χ^2/df	<3.0	1.909	1.899	1.902	1.919	1.964
GFI	>.80	.849	.848	.847	.843	.830
CFI	>.90	.914	.914	.913	.910	.941
PGFI	>.60	.696	.705	.707	.715	.743
RMSEA	<.08	0.049	0.049	0.049	0.049	.050
Hoelter	>200 at $p = 0.01$	235	236	236	233	227
Model Comparison		M1: Equal Weights $P = 0.082$	M2 - M1: Equal Structure $\Delta \chi^2 (6) = 6.930$, $p = 0.327$	M3 - M2: Equal Covariance $\Delta \chi^2 (1) = 3.478$ $p = 0.062$	M4 - M3: Equal Structural Residuals $\Delta \chi^2 (7) = 20.567$ $p = 0.004$	M5 - M4: Equal Measurement Residuals $\Delta \chi^2 (24) = 66.232$ $p = 0.000$

Legend: GFI: Goodness-of-fit index

CFI: Comparative fit index

RMSEA: Root mean square error of approximation

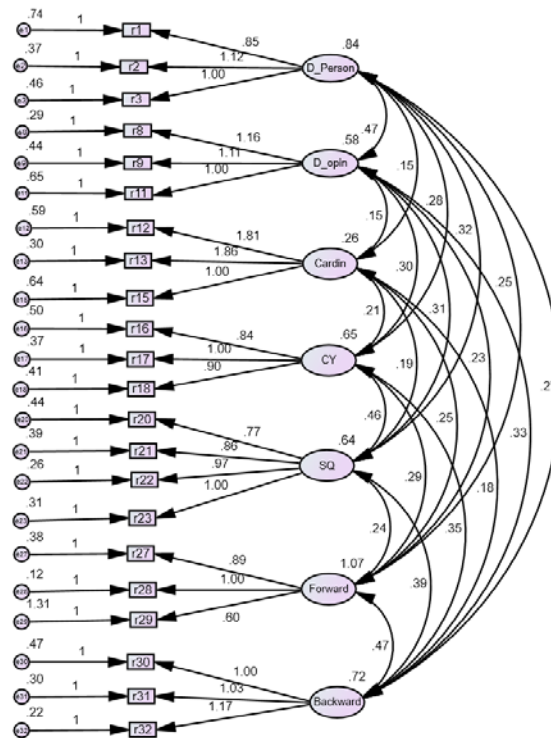
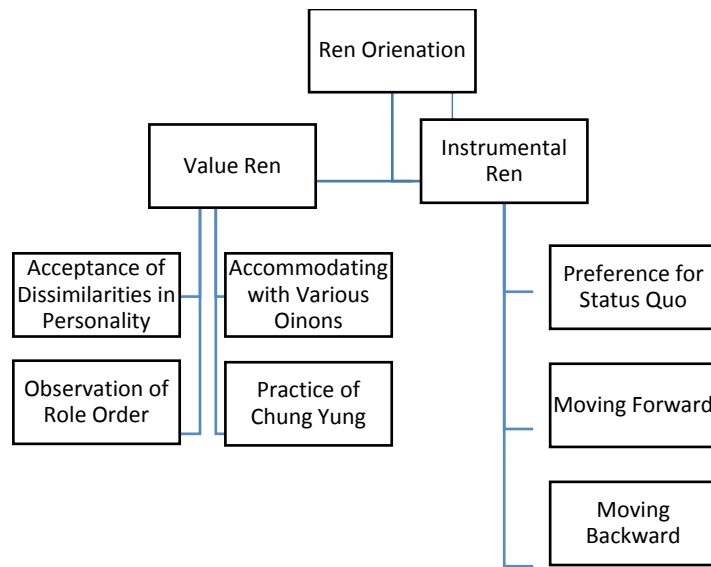
Hoelter:

χ^2 : Likelihood-ratio chi-square

df: Degree of freedom

χ^2/df : Normed chi-square

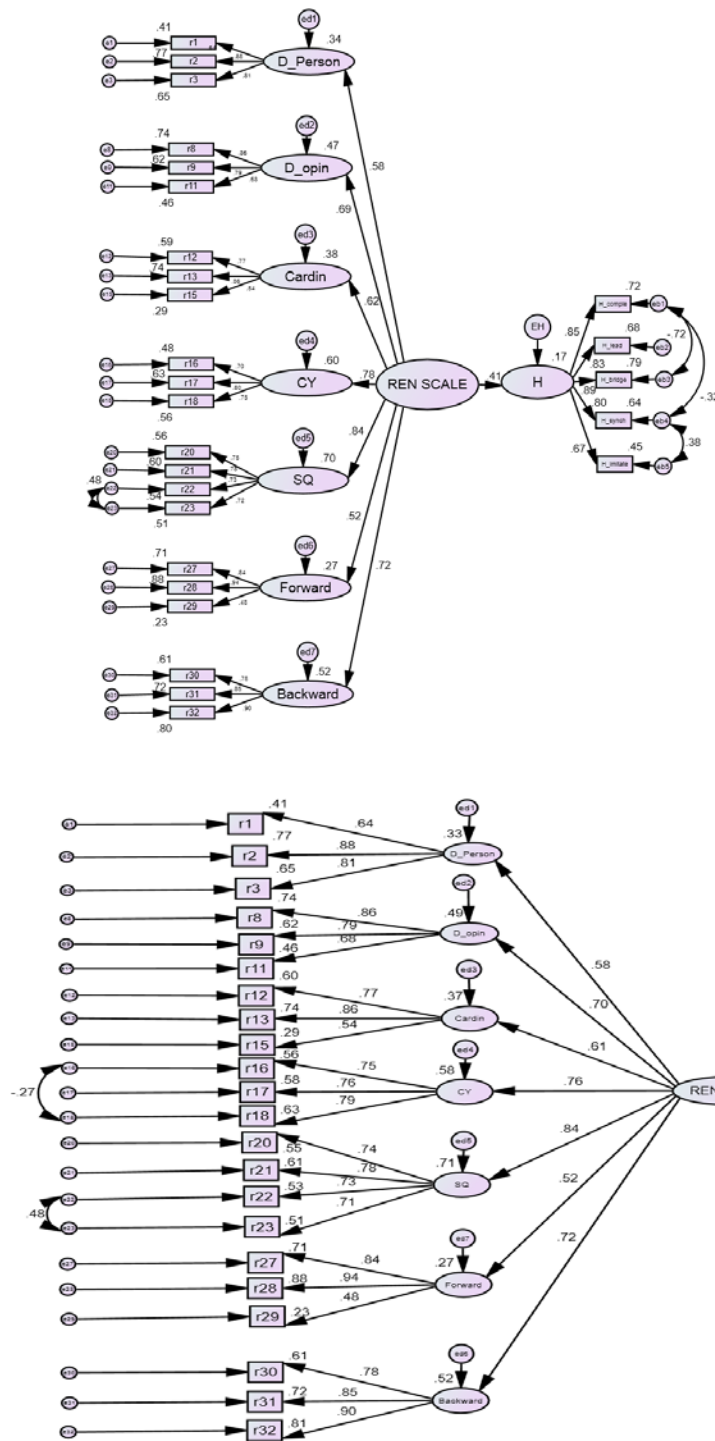
Figure 1. Key Components of Ren Orientation



Chi Square = 412.201 Df = 188 p = .000
 Normed Chi Square = 2.193
 GFI = .910 CFI = .947 NFI = .908
 RMSEA = .056 SRMR = 0.05

Figure 2. First-order Measurement Model of Ren Orientation

Figure 3. Second-order Measurement Model of Ren Orientation



Chi Square = 479.079 Df = 200 p = .000
 Normed Chi Square = 2.395
 GFI = .901 CFI = .934 NFI = .893
 RMSEA = .060 SRMR = 0.0697

Figure 4. Criterion Validity of Ren Orientation Using Harmony as a Criterion

Optimizing Employment and Learning System Using Big Data and Knowledge Management Based on Deduction Graph

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Abstract

In recent years, big data has usefully been deployed by organizations with the aim of getting a better prediction for the future. Moreover, knowledge management systems are being used by organizations to identify and create knowledge. Here, the output from analysis of big data and a knowledge management system are used to develop a new model with the goal of minimizing the cost of implementing new recognized processes including staff training, transferring and employment costs. Strategies are proposed from big data analysis and new processes are defined accordingly. The company requires various skills to execute the proposed processes. Organization's current experts and their skills are known through a pre-established knowledge management system. After a gap analysis, managers can make decisions about the expert arrangement, training programs and employment to bridge the gap and accomplish their goals. Finally, deduction graph is used to analyze the model.

Keywords

Employment, Learning, Big data, Knowledge management, Deduction graph.

1. Introduction

From the earliest developments to the modern data-warehouse era, the human race has always gathered information. However, recent technological advances in

the past decades, such as the rise of social media [1], internet expansion and sensor development [2], have led to the production of an overwhelming flow of structured, semi-structured and unstructured data. The massive amount of produced data is usually referred to as "Big Data", generating datasets with sizes and rapid data generation rates being beyond the ability of typical database software tools to handle, store, manage, and analyze [3]. Big data is an offspring of the computer revolution, first appeared in scientific literature in an IEEE paper, "Visually exploring gigabyte data sets in real time", by a group of NASA researchers in 1999 [4], attracting the interests of academia, industry, government and other organizations alike.

There are extensive potentials associated with mining big data, which have shown to be quite useful [5]. Traditional analytical methods collect and analyze small data sets from specified sources during specific times and have shown limited performance capabilities. On the other hand, big data sets are constantly growing with online user-generated data and are being necessary for moving towards real-time analysis of the data of large magnitudes. This has facilitated big data analysis, establishing extraordinary results about consumer behaviors and trends; perhaps, the most interesting use of big data analysis was to create new products and services for customers. A company readily arriving at useful insights is expected to gain a competitive advantage and achieve an outstanding leverage against other competitors [6].

Here, we propose a model using big data and knowledge management information with the purpose of modifying the competence sets in order to meet the future requirements. We also address a case study in which a financial firm is willing to evaluate and expand its service capabilities through big data and knowledge management outputs. Information derived from big data is to help the top management in establishing new strategies and defining or modifying firm's processes. A certain competence set (experts with special skills) is necessary in order to carry out the processes; the information about firm's current competence set can be obtained via a knowledge management system.

Several analytical techniques such as Burbidge's connectance concept, influence diagram, cognitive mapping or induction graph can be used for generating a visual representation of the problem. Burbidge's connectance concept [7] uses the cause and effect relationship to create a network of variables. It can connect different variables, tools or objectives and show clear relationships among them; by knowing the different sequences for achieving the target, it can create a whole view of action plans. Burbidge's connectance concept can also make it easy to understand problems and provide additional options for decision making; but, it is a qualitative technique and cannot generally identify the optimal choice.

Influence diagram [8] is one of the most recognized and used cause-effect diagrams in operations management. It systematically identifies the real causes of the problem and the directions of the effects by breaking down the problem into smaller components. It can make the problem easier to understand. Although quantitative analysis could be applied to the developed model, but efficiency can be lost as the problem gets complicated.

Cognitive mapping [9] uses statements to build complicated networks for a problem. It allows an individual to acquire, store, recall and decode information about the relative locations and attributes of phenomena in their everyday environments. It is simple to apply for construction of a network from different perspectives, but it may result in very complicated networks, not having a systematic approach for network construction.

Induction graphs [10] are generalizations of decision trees. In induction graphs, unlike decision trees which do not allow backward links from the leaves to the root, moving from a node to a lower or a higher level node is

allowed and the user can introduce links between different level nodes and thus create a graph structure.

The above mentioned analytic infrastructures are designed for general purpose decision makings and thus do not necessarily arrive at optimal solutions. Here, deduction graph is used as proposed by Li [11]. Tan [12] developed an analytic infrastructure based on deduction graphs for supply chain innovations harvesting big data.

The rest of our work is organized as follows. In Section 2, the problem is defined in detail and a mathematical formulation of the problem is provided. The performance of the proposed approach is examined through a numerical example in Section 3. Finally, we conclude in Section 4.

2. Model Description

Consider a company revising its strategies according to the output of big data analysis. After defining the new strategies, the action plan is redefined according to the strategies, which in turn results in new processes. The company uses a knowledge management system for knowledge sharing and identification of the experts and skill sets in different fields. Obviously, implementation of new processes will make some changes in the needs of experts and skills in different departments. Some skills can be acquired through association among experts, some new experts with special skill sets should be hired in order to fulfill the needs and some experts with unneeded skills should leave the company. In other words, the company tries to elevate some of its employees using current experts and rotate some experts' workplaces according to the new needs of different departments. Also, as another option, the company can employ new experts instead of teaching or transporting the available ones. Each of these policies has its own benefits and drawbacks for the company. Therefore, the company has to decide which of these three policies or a combination of them should be used for different departments with the goal of minimizing the total cost. Figure 1 shows the analytic infrastructure framework. According to this figure, the company finds its current experts through a knowledge management system. Moreover, new strategies are needed to develop the processes discovered via big data analysis. Also, company's new needs for experts and skill sets can be deducted from the newly modified processes. Finally, a deduction graph can be drawn using the gap of the available skill sets

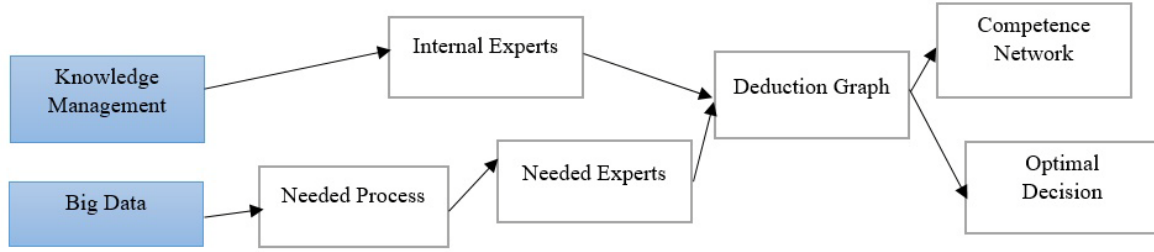


Figure 1. An analytic infrastructure framework

and the needed ones which will be used for defining and optimizing the decision making model.

The following notations and decision variables are used to describe the model:

N : number of the departments ($i, i' = 1, 2, \dots, n$)

M : number of skills ($j, j' = 1, 2, \dots, m$)

$x_{j,j'}^i$: number of experts with skill j who learn skill j' from experts with skill j' in department i

$L_{j,j'}^i$: cost per $x_{j,j'}^i$

$y_{i,j}^i$: number of experts with skill j who are transferred from department i to department i'

$T_{i,j}^i$: cost per $y_{i,j}^i$

A_j^i : number of internal experts with skill j in department i before change

$A_j^{i'}$: final needed number of experts with skill j after change

z_j^i : number of experts with skill j who will leave the company.

According to the above discussion, the costs associated with each department includes elevation, transferring and employment of new experts. Therefore, the total cost for department i is:

To implement the process, the least number of needed experts for each skill of the processes should be located in each department which offers the following constraint for department i

$$A_j^i + \sum_{j'} x_{j,j'}^i + \sum_j y_{i,j}^i$$

Staff elevation through association happens after the relocation of experts. In other words, experts associate or expand their skills in their new departments as shown by:

$$\sum_{i' \neq i} y_{i',j}^i \leq A_j^{i'} - A_j^i, \quad \forall j. \quad (3)$$

The company does not employ new staff unless the required skills cannot be attained through the available staff training. This can be shown as follows:

$$\sum_j x_{j,j'}^i \leq \sum_{i' \neq i} y_{i',j}^i + A_j^i - \sum_{i' \neq i} y_{i,j}^{i'}, \quad \forall j. \quad (4)$$

Therefore, the final model for the company can be formulated as:

$$Cost = \sum_i Cost_i \quad (5)$$

s.t.

$$A_j^i + \sum_{j'} x_{jj'}^i + \sum_{j'} z_j^i + \sum_{i' \neq i} y_{ij'}^{i'} - \sum_{j'} x_{jj'}^{i'} - \sum_{i' \neq i} y_{ij}^{i'} \geq A_j^i, \quad \forall i, j \quad (6)$$

$$\sum_{i' \neq i} y_{ij}^{i'} \leq A_j^i - A_j^i, \quad \forall i, j \quad (7)$$

$$\sum_{j'} x_{jj'}^i \leq \sum_{i' \neq i} y_{ij'}^{i'} + A_j^i - \sum_{i' \neq i} y_{ij}^{i'}, \quad \forall i, j. \quad (8)$$

3. A Numerical Example

Consider a company consisting of three different departments namely, A, B and C. Using a knowledge management system, the company already has knowledge about its available skills and the number of

experts who can handle them. Table 1 shows the skills and the number of the experts in each department. For example, there are 3 experts with skill “a” in department A.

Department	Skills									
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>m</i>	<i>n</i>
Department A	3	0	1	4	0	2	1	4	2	1
Department B	0	3	1	1	3	2	0	2	2	1
Department C	1	4	1	0	2	0	0	3	1	1

Table 1. Available experts in various departments.

least needed experts for implementing them are shown in Table 2. As an example, the process develops product needs with at least 2 experts with skill *a*, 2 experts with skill *c*, 1 expert with skill *d* and 2 experts with skill *g* for implementation.

After generating new strategies by analyzing the data warehouse, the company decides to implement 4 new processes in the departments. These processes and the

Process	Skills									
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>m</i>	<i>n</i>
I: Development of product/service design	2	0	2	1	0	0	2	0	0	0
II: Management of customer service	1	2	0	1	2	1	0	2	0	0
III: Management changes	0	1	1	1	0	1	1	0	0	0
IV: Performance planning and management accounting	1	0	2	1	1	0	0	1	0	0

Table 2. Processes and their expert needs.

Table 3 notes the processes to be implemented in each department. For example, all the processes except “manage changes” are going to be implemented in department A.

Department	Process			
	I	II	III	IV
Department A	☑	☑		☑
Department B		☑	☑	
Department C	☑		☑	☑

Table 3. Processes of

departments.

Skills a, n, m can be learned from each other because the experts who use these skills have the same field of study. Skills c, b, h and skills d, e, g, h are two other

skill sets which can be learned from each other. The company estimated a cost of approximately \$10 for each skill training.

The number of experts with specific skills may be more than the department needs, and therefore, some experts can be transferred to other departments. The cost of transferring experts with skill set $\{a, m, n\}$ is estimated to be \$7 and the costs for sets $\{c, b, h\}$ and $\{d, e, g, f\}$ is expected to be \$8 and \$5, respectively.

Although training and transferring experts are made prior to employment, in some cases the company needs to employ new experts due to lack of experts in some departments. On the other hand, some experts may leave the company because there is no further need for their skills. Table 4 indicates the cost of employment of each skill in each department.

Process	Skills										
	a	b	c	d	e	f	g	h	m	n	
Department A	20	15	20	10	15	22	22	22	22	22	22
Department B	10	20	20	10	20	10	20	20	20	20	20
Department C	15	20	20	18	18	20	18	18	20	20	18

Table 4. Cost of employment for each skill.

Figures 2, 3 and 4 show the expanding process of departments A, B and C, respectively. Each node represents one skill, and arcs indicate the possibility of learning skills based on the current skill set; for example, the arc $m \rightarrow a$ means that skill a is attainable for an expert with skill m . Based on the developed

networks and according to the model described in the previous section, the linear programming problem can be formulated as follows. At first, the cost function is written according to (1) considering the cost of different departments. Then, constraints 6 to 8 will be developed for each department separately.

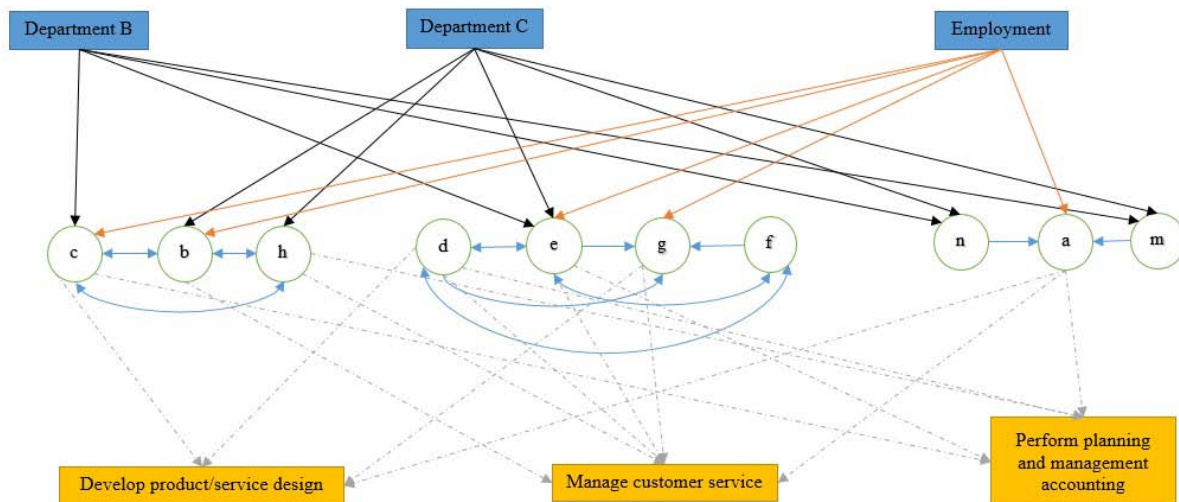


Figure 2. Expanding process for department A

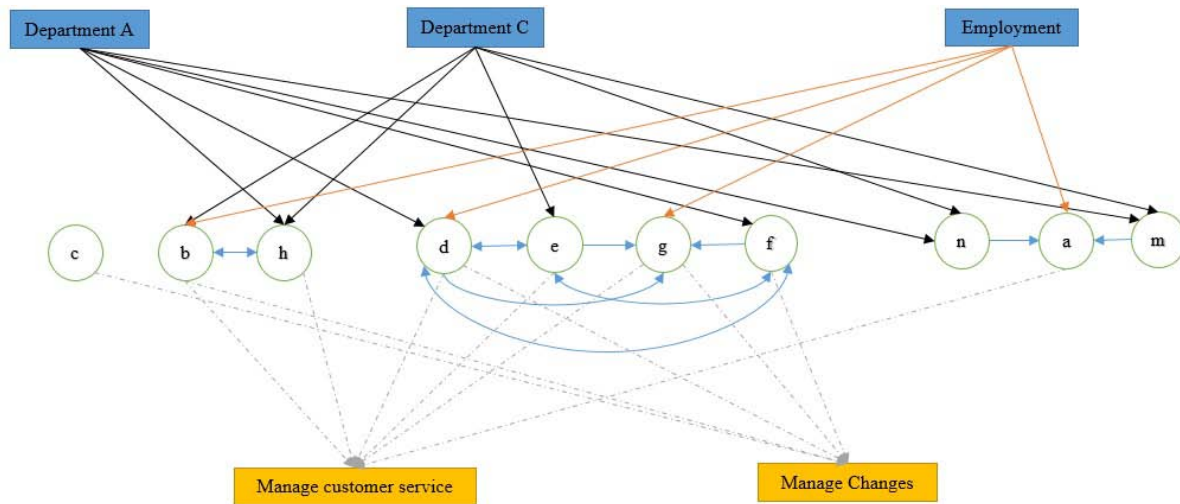


Figure 3. Expanding process for department B

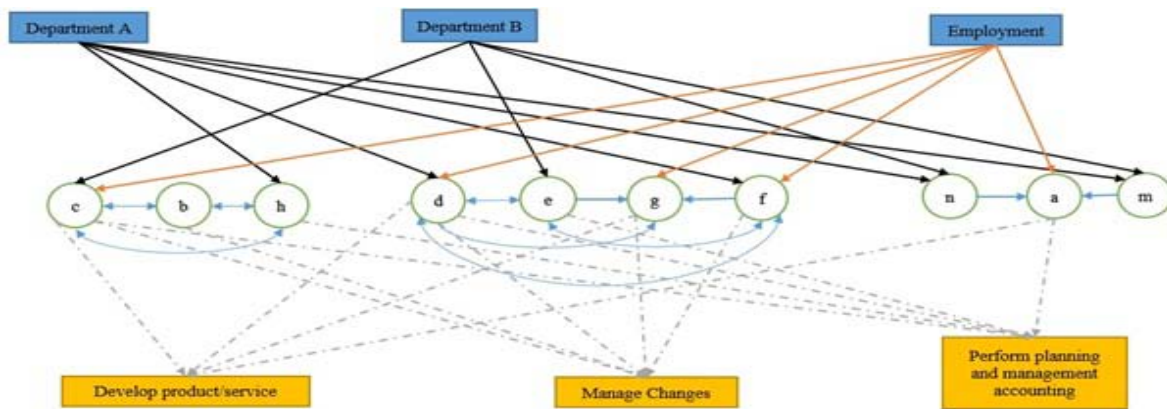


Figure 4. Expanding process for department C

$$\begin{aligned}
Cost = & \left((10x_{na}^A + 10x_{ma}^A + 20z_a^A) + (7y_{Bn}^A + 7y_{Cn}^A + 7y_{Bm}^A + 7y_{Cm}^A) \right. \\
& + (10x_{cb}^A + 10x_{hb}^A + 15z_b^A + 8y_{Cb}^A) + (10x_{bc}^A + 10x_{hc}^A + 20z_c^A + 8y_{Bc}^A) \\
& + (10x_{bh}^A + 10x_{ch}^A + 8y_{Ch}^A) + (10x_{ed}^A + 10x_{fd}^A) \\
& + (10x_{de}^A + 10x_{fe}^A + 15z_e^A + 5y_{Be}^A + 5y_{Ce}^A) \\
& + (10x_{eg}^A + 10x_{eg}^A + 10x_{fg}^A + 2z_g^A + z_g^A) + (10x_{ef}^A + 10x_{df}^A) \Big) \\
& + \left((10x_{na}^B + 10x_{ma}^B) + (7y_{Cn}^B + 7y_{An}^B + 7y_{Cm}^B + 7y_{Am}^B) \right. \\
& + (10x_{hb}^B + 20z_b^B + 8y_{Cb}^B) + (10x_{bh}^B + 5y_{Bh}^B + 5y_{Ch}^B) \\
& + (10x_{ed}^B + 10x_{fd}^B + 10z_d^B) + (10x_{de}^B + 10x_{fe}^B + 5y_{Ce}^B) \\
& + (10x_{eg}^B + 10x_{eg}^B + 10x_{fg}^B + 20z_g^B) + (10x_{ef}^B + 10x_{gf}^B + 10x_{df}^B + 5y_{Bf}^B) \Big) \\
& + \left((10x_{na}^C + 10x_{ma}^C + 15z_a^C) + (7y_{Bn}^C + 7y_{An}^C + 7y_{Bm}^C + 7y_{Am}^C) \right. \\
& + (10x_{cb}^C + 10x_{hb}^C + 20z_b^C) + (10x_{bc}^C + 10x_{hc}^C + 20z_c^C + 8y_{Bc}^C) \\
& + (10x_{bh}^C + 10x_{ch}^C + 18z_h^C + 8y_{Ch}^C) + (10x_{ed}^C + 10x_{fd}^C + 18z_d^C + 5y_{Bd}^C + 5y_{Cd}^C) \\
& + (10x_{de}^C + 10x_{fe}^C + 18z_e^C + 5y_{Be}^C) + (10x_{eg}^C + 10x_{eg}^C + 10x_{fg}^C + 18z_g^C) \\
& \left. + (10x_{ef}^C + 10x_{df}^C + 20z_f^C + 5y_{Cf}^C) \right)
\end{aligned}$$

s.t.

Constraints for department A:

$$\begin{aligned}
3 + z_a^A + x_{na}^A + x_{ma}^A & \geq 4 \\
z_b^A + x_{cb}^A + x_{hb}^A + y_{Cb}^A & \geq 2 \\
1 + x_{bc}^A + x_{hc}^A + y_{Bc}^A & \geq 4 \\
4 + x_{bh}^A + x_{ch}^A + y_{Ch}^A & \geq 3 \\
4 + x_{ed}^A + x_{fd}^A - y_{Ad}^C - y_{Ad}^B & \geq 3 \\
z_e^A + x_{de}^A + x_{fe}^A + y_{Be}^A + y_{Ce}^A & \geq 3 \\
1 + z_g^A + x_{eg}^A + x_{eg}^A + x_{fg}^A & \geq 2 \\
2 + x_{ef}^A + x_{df}^A - y_{Af}^C - y_{Af}^B & \geq 1 \\
y_{Ah}^C + y_{Ah}^B & \leq 1 \\
y_{Ad}^C + y_{Ad}^B & \leq 1 \\
y_{Am}^C + y_{Am}^B & \leq 2 \\
y_{An}^C + y_{An}^B & \leq 1 \\
y_{Af}^C + y_{Af}^B & \leq 1
\end{aligned}$$

$$\begin{aligned}
x_{na}^A + x_{ma}^A &\leq 3 \\
x_{cb}^A + x_{hb}^A &\leq y_{Cb}^A \\
x_{bc}^A + x_{hc}^A &\leq y_{Bc}^A + 1 \\
x_{bh}^A + x_{ch}^A &\leq y_{Ch}^A + 4 \\
x_{ed}^A + x_{fd}^A &\leq -y_{Ad}^C - y_{Ad}^B + 4 \\
x_{de}^A + x_{fe}^A &\leq y_{Be}^A + y_{Ce}^A \\
x_{eg}^A + x_{fg}^A &\leq 1 \\
x_{ef}^A + x_{df}^A &\leq -y_{Af}^C - y_{Af}^B + 2
\end{aligned}$$

Constraints for department B:

$$\begin{aligned}
z_a^B + x_{na}^B + x_{ma}^B &\geq 2 \\
3 + z_b^B + x_{hb}^B + y_{Cb}^B &\geq 3 \\
1 - y_{Ac}^C - y_{Ac}^A &\geq 1 \\
2 + x_{bh}^B + y_{Ah}^B + y_{Ch}^B &\geq 2 \\
1 + z_d^B + x_{ed}^B + x_{fd}^B + y_{Bd}^B &\geq 2 \\
3 + x_{de}^B + x_{fe}^B + y_{Ce}^B - y_{Ae}^C - y_{Ae}^A &\geq 2 \\
z_g^B + x_{eg}^B + x_{fg}^B &\geq 1 \\
2 + x_{ef}^B + x_{df}^B + y_{Bf}^B &\geq 2 \\
y_{Bn}^C + y_{Bn}^A &\leq 1 \\
y_{Bm}^C + y_{Bm}^A &\leq 2 \\
y_{Be}^C + y_{Be}^A &\leq 1 \\
x_{na}^B + x_{ma}^B &\leq 0 \\
x_{hb}^B &\leq y_{Cb}^B + 3 \\
0 &\leq -y_{Bc}^C - y_{Bc}^A + 1 \\
x_{bh}^B &\leq y_{Ah}^B + y_{Ch}^B + 2 \\
x_{ed}^B + x_{fd}^B &\leq y_{Ad}^B + 1 \\
x_{de}^B + x_{fe}^B &\leq y_{Ce}^B - y_{Be}^C - y_{Be}^A + 3
\end{aligned}$$

$$x_{eg}^B + x_{eg}^B + x_{fg}^B \leq 0$$

$$x_{ef}^B + x_{df}^B \leq y_{Af}^B + 2$$

Constraints for department C:

$$1 + z_a^C + x_{na}^C + x_{ma}^C \geq 3$$

$$4 + x_{cb}^C + x_{hb}^C - y_{Cb}^A - y_{Cb}^B \geq 1$$

$$1 + z_c^C + x_{bc}^C + x_{hc}^C + y_{Bc}^C \geq 5$$

$$3 + x_{bh}^C + x_{ch}^C + y_{Ch}^C - y_{Ch}^A - y_{Ch}^B \geq 1$$

$$z_d^C + x_{ed}^C + x_{fd}^C + y_{Cd}^C \geq 3$$

$$2 + x_{de}^C + x_{fe}^C + y_{Be}^C + y_{Ae}^C - y_{Ce}^B \geq 1$$

$$z_g^C + x_{eg}^C + x_{eg}^C + x_{fg}^C \geq 3$$

$$z_f^C + x_{ef}^C + x_{df}^C + y_{Af}^C \geq 1$$

$$y_{Cb}^A + y_{Cb}^B \leq 3$$

$$y_{Cm}^A + y_{Cm}^B \leq 1$$

$$y_{Cn}^A + y_{Cn}^B \leq 1$$

$$y_{Ch}^A + y_{Ch}^B \leq 2$$

$$y_{Ce}^A + y_{Ce}^B \leq 1$$

$$x_{na}^C + x_{ma}^C \leq 1$$

$$x_{cb}^C + x_{hb}^C \leq -y_{Cb}^A - y_{Cb}^B + 4$$

$$x_{bc}^C + x_{hc}^C \leq y_{Bc}^A + 1$$

$$x_{bh}^C + x_{ch}^C \leq y_{Ah}^C - y_{Ch}^A - y_{Ch}^B + 3$$

$$x_{ed}^C + x_{fd}^C \leq y_{Ad}^C$$

$$x_{de}^C + x_{fe}^C \leq y_{Be}^C - y_{Ce}^A - y_{Ce}^B + 2$$

$$x_{eg}^C + x_{eg}^C + x_{fg}^C \leq 0$$

$$x_{ef}^C + x_{df}^C \leq y_{Af}^C.$$

The model discussed above is linear and could be solved efficiently using linear solvers. The LINGO software is employed here to obtain the optimal solution yielding the following solution: $x_{hc}^A = 2, x_{dg}^A = 1, x_{na}^A = 1, z_b^A = 2, z_c^A = 1, z_e^A = 1, y_{Be}^A = 1, y_{Ce}^A = 1, x_{na}^B = 1, z_d^B = 1, z_g^B = 1, x_{bc}^C = 3, x_{hc}^C = 1, x_{na}^C = 1, x_{ma}^C = 1, y_{Af}^C = 1, z_g^C = 3, z_d^C = 3$ and other decision

variables which are not listed here are equal to zero. Using the optimal variables, the final optimal cost gained is equal to \$314. Moreover, there are 2 experts with skill m in department A and 2 experts in department B who should leave the company. The results are shown graphically as follows:

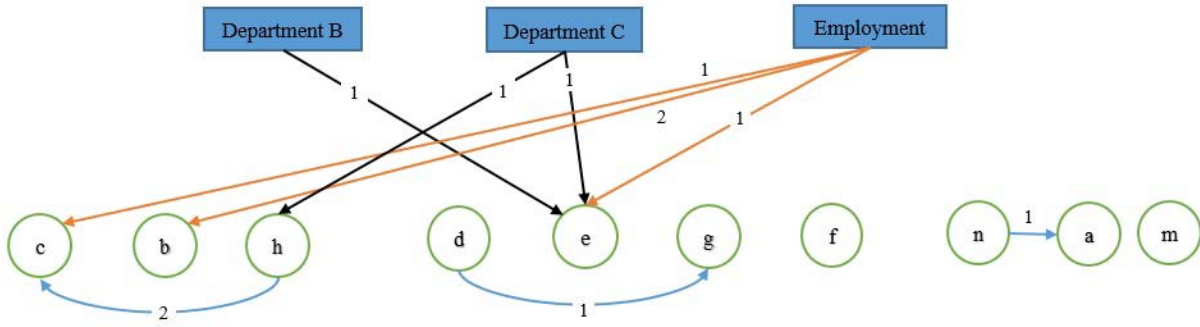


Figure 5. Deduction graph for department A

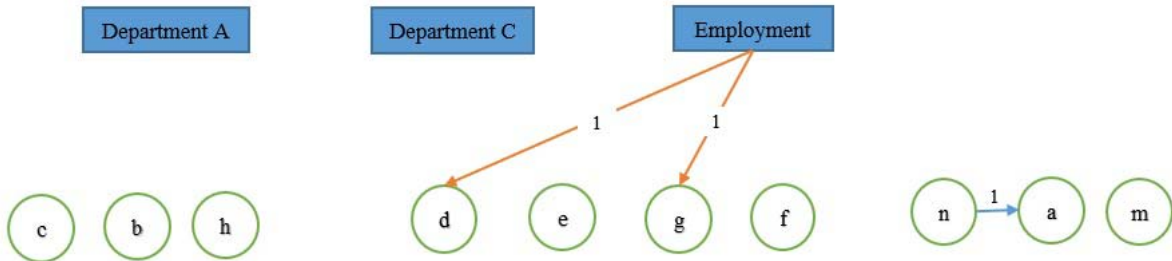


Figure 6. Deduction graph for department B

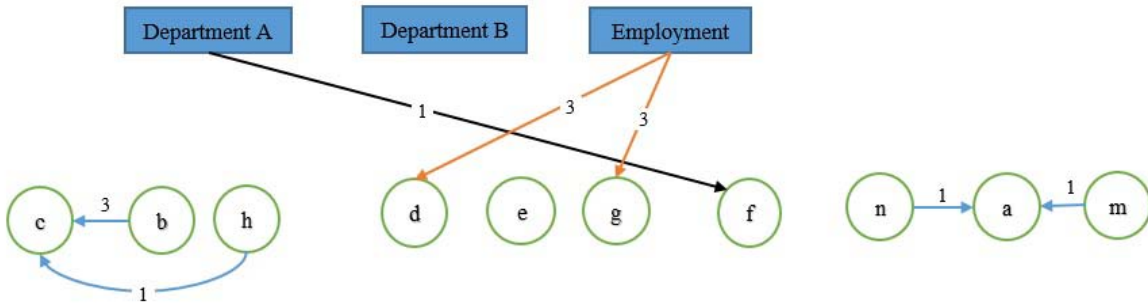


Figure 7. Deduction graph for department C

Conclusion

A new model was developed for the implementation of new processes using the output of big data analysis and knowledge management system. The aim was to help managers to decide about the company's experts and skill requirements in a cost effective way in accordance with the new processes identified through the big data analysis. Training and transferring experts to other

departments or employing new experts were the policies considered in the proposed model to satisfy the company's future expert requirements. The performance of the model was examined through a numerical example and an optimal solution was gained using LINGO. The optimal solution can help the management to decide upon employee training, transferring or hiring.

References

- [1] Ackerman, E., and E. Guizzo, "5 technologies that will shape the web". *Spectrum, IEEE*, 48(6), 2011, pp. 40-45.
- [2] Grolinger, K., L'Heureux, A., Capretz, M. A., and L. Seewald, "Energy Forecasting for Event Venues: Big Data and Prediction Accuracy. *Energy and Buildings*, 112, 2016, pp. 222-233.
- [3] Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., and A. H. Byers, *Big data: The Next Frontier for Innovation, Competition, and Productivity*. 2011
- [4] Bryson, S., Kenwright, D., Cox, M., Ellsworth, D., and, R. Haimes, "Visually Exploring Gigabyte Data Sets in Real Time". *Communications of the ACM*, 42(8), 1999, 82-90.
- [5] Wang, Y., Kung, L., and T. A. Byrd, "Big Data Analytics: Understanding its Capabilities and Potential Benefits for Healthcare Organizations, *Technological Forecasting and Social Change*. 2016.
- [6] Erevelles, S., Fukawa, N., and L. Swayne, "Big Data Consumer Analytics and the Transformation of Marketing. *Journal of Business Research*, 69(2), 2016, pp. 897-904.
- [7] Burbidge, J. L. (1984). "A production System Variable Connectance Model": Technical Report, Department for the Design of the Machine Systems, Cranfield Institute of technology
- [8] Guezguez, W., Amor, N. B., and K Mellouli, "Qualitative Possibility Influence Diagrams based on Qualitative Possibilistic Utilities. *European Journal of Operational Research*, 195(1), 2009, pp. 223-238.
- [9] Buzan, T., *Use Your Head*. BBC/Ariel Books, 1982
- [10] Zighed, D. A., Rakotomalala, R., and A. Graphes, *d'induction, Data Mining Hermes Sciences Publications*. 2000
- [11] Li, H. L. "Incorporating Competence Sets of Decision Makers by Deduction Graphs". *Operations Research*, 47(2), 1999, pp. 209-220.
- [12] Tan, K. H., Zhan, Y., Ji, G., Ye, F., and C. Chang,. "Harvesting Big Data to Enhance Supply Chain Innovation Capabilities: An Analytic Infrastructure Based on Deduction Graph", *International Journal of Production Economics*, 165, 2015, pp 223-233.

Relevance of Multivariate Analysis in Management Research

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Abstract

Often we receive misled conclusion in the research if properly variables are not analyzed. In different functional issues of management it is very essential that all the latent and observed variable are properly understood so management decisions will be relevant and effective. The objective of this paper is to investigate the use of different multivariate tools for analyzing in the management research: applied or basic. The sources of data is primary as well as secondary. The primary includes the observation of different research articles of the proceedings of different conferences. And the secondary includes different publications related to multivariate analysis. The study has revealed the reasons of not using such tools of research. The preliminary finding reveals that most of the researches do not use such analytical tools in a comprehensive manner. Carelessness in design while fixing the design aspect is the main reasons of not using appropriate design.

Keywords: *multivariate tools, factors, variables*

Introduction

The information age has resulted in masses of data in every field. Despite the quantum of data available, the ability to obtain a clear picture of what is going on and make intelligent decisions is a challenge. When available information is stored in database tables containing rows and columns, Multivariate Analysis can be used to process the information in a meaningful fashion. To a competent analyst multivariate analysis is an essential tool to simplify the mass of chaotic data, and provide them in a suitable graphical presentation which can be impossible from one to one tabulation. Research has indicated multivariate analysis as a useful tool for examining critical aspects of the competitiveness of industrial sectors [1]. Multivariate thinking is a body of thought processes that illuminate

the interrelatedness between and within sets of variables. Corporate competitiveness is the synergy effect of many factors so calls for multivariate analysis in place of bivariate and univariate analysis [13]. The essence of multivariate thinking rises to expose the inherent structure and meaning revealed from the variation of the sets of variables through application and interpretation of various statistical methods. A large numbers of variables need to be analyzed at a time of making business decisions, more the information are understood greater the business has opportunity to make appropriate decisions. For example marketing is the key function of any business that devote on knowing customers. Understanding consumers is most complicated job because what consumers like, how consumers are affected, how they make decisions etc are determined by many factors, like age, sex, qualification, experience, maturity level, family background, peer group, location, etc. to set the business to address these consumers also very tough. Similarly HR function has to manage a large number of attributes of large number of individuals, knowing their strength and weaknesses. It has to minimize the effect of weakness and optimize the strength of individuals to treat them as an important and most valuable assets of business. Satisfaction of external customers are possible if the business understands internal customers. An individual in the organization is guided by various direct and indirect measures. Operation in the other hands must produce and deliver the goods and services considering quality, costs and speed. A large number of the activities must be selected out of the many variables and arrange them in a value chain that business become successful to attain the competitive position by reducing costs, increasing speed and meeting the quality defined by customers. Finance functions on the other hands have to serve all the business activities by reducing costs and increasing returns of the investments. It has to manage cost centers and revenue

centers which are composed of many variables and cost drivers.

The role of research in the business is very high. Research describes the current activities as why it is being done, and projects for the best future considering all elements and their values. It decides where and what are to be controlled. It describes about variables which are seen and injected in the system to bring possible changes and there occur different unseen variables that affect the result which are called factors or constructs. Multivariate analysis assumes that anything that come out in the society or the system it is because of many variables and factors injected purposely or unintentionally, they are to be known, and induced or controlled while making administrative decisions so that desired objectives can be achieved.

Objective

Objective of this paper is to assess the use of multivariate analysis in business research and decision making and reveal the status of the use of multivariate analysis in such proceedings.

Method

The method adopted is review of literature and reviews of research design of 338 research articles presented in different proceedings of managements. Such proceedings and journals were randomly selected from some international conferences. They are:

Table 1: Research design reviewed

Indian institute of Technology (IIT International Conference proceedings) Roorki, India	138
Institute of management studies, IMS (books from selected article of International Conference Ghaziabad)	28
ITAM proceedings [korean Data Based Society]	23
Nepalese Academy of Management (Proceeding of international conference)	35
Birala Institute of Technology BIT proceedings	114
Total articles	338

Review of literature

Many researchers in their research have indicated the use of multivariate analysis will be dominant analytical method in the future research [2 & 3]. In quantitative analysis three types analysis are used: univariate analysis, bivariate analysis and multivariate analysis.

There are two different groups of techniques in multivariate data analysis known as- dependency techniques and interdependency techniques. The former consist of techniques in which a variable or a set of variables is identified as the dependent variable that is being predicted or explained by other variables, identified as the independent variables. Multiple regressions are an example of a dependency multivariate technique. In contrast, in the case of interdependency techniques there is no single variable or set of variables identified as being independent or dependent. Interdependency techniques involve the simultaneous analysis of all the variables in the set. Factor analysis is one example of an interdependent technique.

Table 2: Major multivariate tools and their uses

Major multivariate tools	uses
correlation	Is used when the intent is simply to assess the possible linear relationship between the DV and the IVs[4].
Regression analyses	Regression analyses are sets of statistical techniques that allow one to assess the relationship between one dependent variable (DV) and several independent variables (IVs)[4]. The beta coefficients (weights) are the marginal impacts of each variable, and the size of the weight can be interpreted directly multiple regressions is often used as a forecasting tool.
Conjoint Analysis	Predicting choice behavior when product or service involves a relatively high resource commitment and tends to be “analyzable” by the purchaser (e.g., banking or insurance services, industrial products)[5]
Factor analysis	A set of techniques for finding the underlying relationships between many variables and condensing the variables into a smaller number of dimensions called factor [5].
Correspondence Analysis	Correspondence analysis is often used in positioning and image studies where the researcher wants to explore the relationships between brands, between attributes, and between brands and attributes [5]. the marketing researcher may want to identify (a) closely competitive brands, (b) important attributes, (c) how attributes cluster together, (d) a brand’s competitive strengths, and most importantly (e) ideas for improving a brand’s competitive position [6](Whitlark & Smith, 2001)

Cluster analysis	The usual objective of cluster analysis is to separate objects (or people) into groups such that we maximize the similarity of objects within each group, while maximizing the differences between groups. Cluster analysis is thus concerned ultimately with classification, and its techniques are part of a field of study called numerical taxonomy [7, & 8]. Cluster analysis can also be used to (a) investigate useful conceptual schemes derived from grouping entities; (b) generate a hypothesis through data exploration; and (c) attempt to determine if types defined through other procedures are present in a data set [8]
Multivariate Analysis of Variance	Mean differences between groups on the separate scales provide information and clues as to how the groups can be described separately. The multivariate analysis of variance answers the important question of whether patterns of differences involving both groups and scales are present and what the levels of significance are in terms of chance expectations[9]
Canonical variate analysis	(CVA) is a widely used method for analyzing group structure in multivariate data.CVA can be interpreted as a special case of canonical correlation analysis where one set of variables consists of group indicators [10]
Multivariate meta-analysis	Multivariate meta-analysis model that jointly synthesizes the multiple endpoints and obtains all the pooled results collectively[11&12].
Multidimensional Scaling (MDS)	Exploratory technique, it is useful in examining unrecognized dimensions about products and in uncovering comparative evaluations of products when the basis for comparison is unknown.
Structural Equation Modeling	Structural equation modeling (SEM) examines multiple relationships between sets of variables simultaneously.This represents a family of techniques, including LISREL, latent variable analysis, and confirmatory factor analysis. SEM can incorporate latent variables, which either are not or cannot be measured directly into the analysis. For example, intelligence levels can only be inferred, with direct measurement of variables like test

	scores, level of education, grade point average, and other related measures. These tools are often used to evaluate many scaled attributes or to build summated scales.
Discriminant Analysis	Discriminant analysis is used to create classifications of people based on a variety of characteristics, such as whether the person is an “outdoors” person or do-it-yourselfer, and then determine which classification the person being surveyed fits into based on how his responses match up.
Logistic Regression Analysis	Sometimes referred to as “choice models,” this technique is a variation of multiple regression that allows for the prediction of an event. It is allowable to utilize nonmetric (typically binary) dependent variables, as the objective is to arrive at a probabilistic assessment of a binary choice. The independent variables can be either discrete or continuous.
Probit analysis	Probit Analysis is a type of regression used with binomial response variables. It is very similar to logit, but is preferred when data are normally distributed. It differs from logit because it is used when data are normally distributed [14].

Some common software for handling MVA

Analytica: Analytica is a powerful, stand-alone application for visual quantitative modeling. Analytica offers a comprehensive array of statistical functions for analyzing sample data including standard mean, variance, skewness, percentiles, correlations, with built in graphics to visualize uncertainties using density functions, cumulative functions, probability bands, and viewing the underlying sample. Analytica Optimizer adds powerful solvers for linear, quadratic, and nonlinear optimization.

SPSS: Statistical Package for the Social Sciences (SPSS) can help find new relationships in the data and predict what will likely happen next. Watch IBM's free statistics video demo to learn how to easily access, manage and analyze data sets-without previous statistics experience; virtually eliminate time-consuming data prep; and quickly create, manipulate and distribute insights for decision making.user friendly software and perfect for any statistical analysis

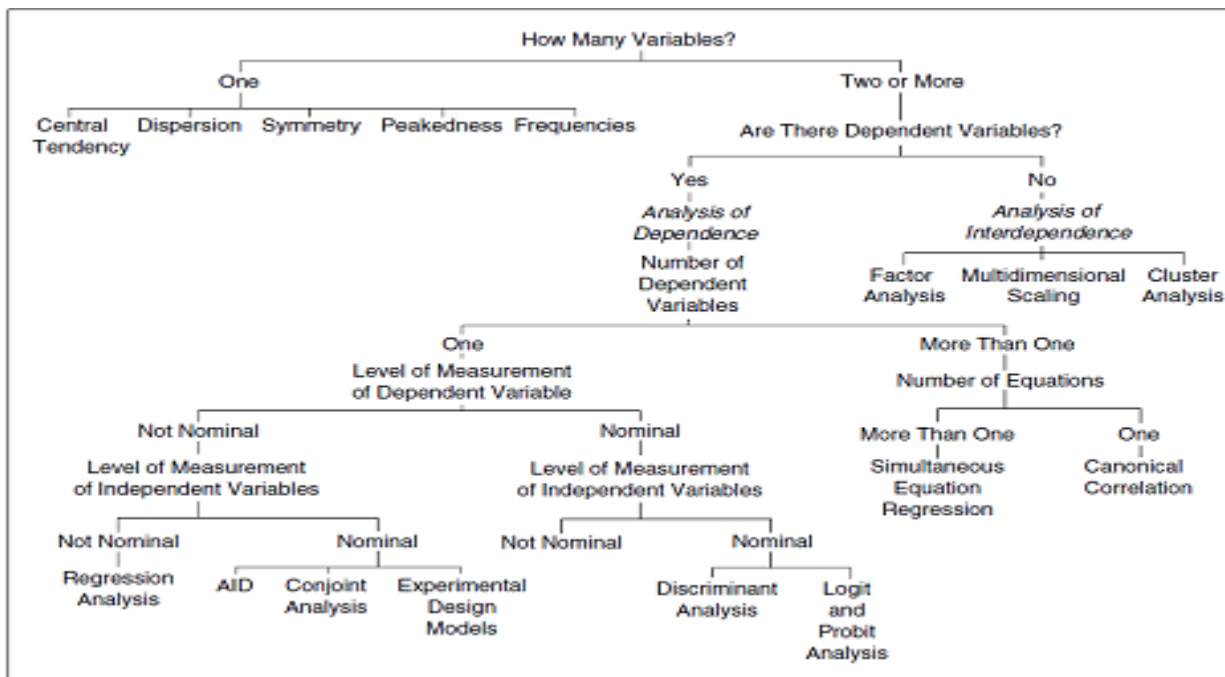


Figure 1: A glimpse on multivariate Analysis

Plug &Score Modeler: Plug & Score Modeler is easy-to-use credit scorecard development software. Key features: data preparation and analysis, automatic scorecard creation, monitoring and validation of scorecards using a set of pre-defined reports. Reject Inference with automated and manual inference methods. Automated binning based on chi-square and manual binning based on WOE, estimating a correlation coefficient for each pair of dataset variables. Work with several validation datasets. Credit risk professionals and consultants who need a convenient tool for developing credit scoring models.

MaxStat: MaxStat is easy-to-use and affordable software for scientific data analysis. Statistical analysis is done in three simple steps within a single dialog window. MaxStat guides user with little experience in their statistical analysis. Other features are the easily understandable way to interpret the results and making high-quality graphs. MaxStat includes a complete word processor, and it's the place to store notes and reports with your data analysis and graphs.

Statwing: Statwing is an easy-to-use statistical tool. Expert users work 5x faster in Statwing than they would in Excel or statistical tools like R or SPSS, and novice users can get as much insight out of their data as an expert data analyst. Statwing's modern, intuitive interface chooses statistical tests automatically, then reports results in plain English. You have to try it to see how much better statistical analysis can really be.

Minitab 17: The car you drive. The medicine you take. The bank you use. The device or computer you're looking at right now. Chances are that all of them have been developed or improved using Minitab. Minitab is the leading statistical software used for quality improvement and statistics education worldwide. More than 90% of Fortune 100 companies, and more than 4000 colleges and universities, use Minitab to graph and analyze their data.

SAS Statistics: SAS statistics provides a wide range of statistical software, ranging from traditional analysis of variance to exact methods and dynamic data visualization techniques.

Statistica: Data mining, statistical analysis, enterprise quality control, and web-based analytics software.

Stata: This statistical software is a complete, integrated statistical software package that provides everything you need for data analysis, data management, and graphics. Stata is not sold in modules, which means you get everything you need in one package. And, you can choose a perpetual license, with nothing more to buy ever. Annual licenses are also available.

Statistix: Statistix is an intuitive, easy statistical program designed by researchers for researchers. Comprehensive but not intimidating, Statistix offers basic and advanced statistics in one inexpensive package.

Our ideal customer is quantitatively savvy, but not

Unistat: A statistical software package featuring a statistics add-in for Excel data analysis, charting and presentation-quality reporting.

Meghastat: A statistical software package featuring a statistics add-in for Excel data analysis, charting and presentation-quality reporting.

xlstat: Variety of tools to enhance the analytical capabilities of Excel, making it the ideal for data analysis and statistics requirements.

Coheris SPAD: It is a data mining and predictive analytics software, uses company data to anticipate risks, identify opportunities and optimize the different business operations.

R and S-plus: The last two applications, R and S-Plus, have nearly identical command-line syntax, but the latter is more GUI-oriented. The two programs started out the same. S-Plus was developed into a commercial product that can handle large amounts of data, while R focuses more on small data samples and is more appropriate for university researchers, particularly those interested in computational statistics.

Results

In this part a review of some proceedings so some universities were done to find what design they use. The result is presented in table 3.

Table 3: Proceedings and used design

IMS proceeding [2015]		
Research design		
Qualitative	17	61%
Quantitative	11	39%
A. Univariate/bivariate	7	25%
B. Multivariate	4	14%
	28	100%
IIT proceedings [2015]		
Research design		
Qualitative	54	39%
Quantitative	84	61%
A. Univariate /bivariate	56	41%
B. Multivariate	28	20%
	138	100%
ITAM proceeding [15 th of 2015]		
Research design		
Qualitative	7	30%

Quantitative	16	70%
A. Univariate/bivariate	13	57%
B. Multivariate	3	13%
	23	100%
Nepalese Academy of Management [2015]		
Research design		
Qualitative	21	60%
Quantitative	14	40%
A. Univariate/bivariate	9	26%
B. Multivariate	5	14%
	35	100%
BIT proceedings [2015]		
Research design		
qualitative	36	32%
quantitative		68%
A. Univariate/bivariate	56	49%
B. Multivariate	22	19%
	114	100%

On the review of the design of 338 articles, it is found that 135 (40%) were found to use qualitative design, and 203 (60%) used quantitative designs. Even in 203 quantitative designs, 155 (46% of the total) were found to use univariate analysis and 48(14% of the total) used multivariate analysis. This means the numbers of researches using multivariate analysis is low.

Discussion

Comparatively researches conducted in the country have methodologically not quantitative. The analysis of proceedings of ITAM proceedings shows it is comparatively more quantitative than others of the sampled. Birala Institute of Technology's proceedings are also mostly quantitative. It is followed by IIT; IMS and NAMs proceedings are 61%, 39% and 40%. The argument is put here that for the best researches of all designs should be balanced. The ITAM proceedings seem to be 70 % quantitative and 30% qualitative in design. The ratio of design of researches of IMS on qualitative and quantitative is 61% and 39%. IIT proceedings have the ratio of quantitative and qualitative 61% and 39%. It is 60 % qualitative and quantitative in the case of Nepalese Academy of Management. The fields that call for deeper analysis are consumer and market research, quality control and quality assurance across a range of industries such as food and beverage, paint, pharmaceuticals, chemicals, energy, telecommunications, etc., process optimization and process control and research and development. When researchers in the field of social sciences like to go into deeper analysis of variables, then they are found to use multivariate analysis. The main reason for growing interest on multivariate analysis is

development of dozens of statistical software. This software has capability of analyzing a large number of variables. So interpreting becomes easy too. Traditionally research believes in two types of variables-independent and dependent and researchers use one way interaction whereas multivariate analysis permits two way analyses assuming that they are interdependent, for instance education and social economic status are interdependent because one helps others. For instance quality education leads to rise in social economic status and social economic status offers better education.

There are varieties of methods developed in multivariate analysis to understand the variables and their nature. Both extensive and intensive analysis is possible at a time. It has shifted on the focus to individual factors taken singly to relationship among variables.

As has already been discussed the reasons of being multivariate analysis popular is the invention of computer software and fast processing capability of computer CPU along with the structure of human knowledge and emphasis of differences sciences including to use multivariate analysis. Equally responsible factor for this is the cooperation between computer scientists and statisticians.

Large number of organizations are established each year, large number of decisions are to be made by these organizations. Out of these, limited numbers that is below 30% sustain and grow, and out of the large number of decisions, few give effective impacts. The reasons behind these are the bases of decisions not realizing fully the need of analysis of the factors and variables concerning them. Highly skilled people and highly advanced statistical software, and fast processing computers are essential for these. Organization of developing countries cannot afford these.

Mostly organizations do not allocate research budget to undertake research activities.

Conclusion

Business requires decision with correctly analysed and synthesized information about customer, supplier, manufacturing plants and ingredients, market conditions, internal and external resources available. Greater supports for the business is possible only when information supplied are valid, Valid information come from the research done with proper designing and appropriate analysis of data through multivariate analysis.

References

[1] Lipovatz, D., Mandaraka, M. and A. Mourelatos, "Multivariate Analysis for the Assessment of Factors Affecting Industrial Competitiveness: The case of Greek food and Beverage Industries". *Applied*

Stochastic Models in Business and Industry, vol. 16, No. 2, 2000, pp 85-98;

[2] Chandra, S., and D. Menezes, "Applications of Multivariate Analysis in International Tourism Research: The Marketing Strategy Perspective of NTOs". *Journal of Economic and Social Research* Vol. 3, No. 1 2001, pp. 77-98

[3] Hair, J. F. Jr., Anderson, R., Tatham, R., and W. C. Black *Multivariate Data Analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall. 1998

[4] Villamorán, E. P. "Multivariate Data Analyses: Multiple Regressions Applied in Educational Research". 10th National Convention on Statistics (NCS), EDSA Shangri-La Hotel, October 1-2, 2007

[5] Smith, S. M., and G. S. Albaum, *An Introduction to Marketing Research*. Scott M. Smith and Gerald S. Albaum, 2010

[6] Whitlark, D., and S. Smith, "Using Correspondence Analysis to Map Relationships: It's Time to Think Strategically about Positioning and Image Data. *Marketing Research*, 2, 2001, summer, pp 23-27.

[7] Sokal, R. R., and P. H. A. Sneath, *Principles of Numerical Taxonomy*. San Francisco: W.H. Freeman. 1963

[8] Aldenderfer, M. S., and R. K. Blashfield, *Cluster analysis*. Beverly Hills, CA: Sage. 1984

[9] Thomas D. Haupt and M. A. Robert. (1965). "A Multivariate Analysis of Variance of Scale Scores on the Sex Inventory, Male Form" . The University of Miami. National Science Foundation Grants GU 728 and GU 1218, (1964-65, 1965-66)

[10]. Gittins, R.: *Canonical analysis: A Review with Applications in Ecology*. Berlin: Springer Verla, 1985

[11] Gleser L, and I. Olkin: *Stochastically Dependent Effect Sizes*. In: *The Handbook of Research Synthesis*. Cooper H, Hedges L, eds. Russell Sage Foundation: 1994, New York; 339-355.

[12] Houwelingen, H. C. V., Lidia R. A. and T. Stijnen: (2002). "Advanced Methods in Meta-analysis: Multivariate Approach and Meta-regression". *Statistics in Med*: Vol. 21, pp. 589-624.

[13] Častek, O., Blazek, L., Pudil, P., and P. Somol, . "Comparison of the Multivariate and Bivariate Analysis of Corporate Competitiveness Factors Synergy". *VŠB-TU Ostrava*, Vol 16, 2013. pp. 67-77

[14]. Finney, D. J., Ed. *Probit Analysis*, Cambridge, England, Cambridge University Press. 1952

A User Perspective on Smartphone by Using Conjoint

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Abstract

Rapid technological advancements and widespread adoption of smart phones in recent years provide students with new opportunities for getting knowledge and making researches in innovation century. As the penetration of smart phone devices in education increases, there is a large growth in the use of these devices especially among the youth. In spite of increasing importance of smart devices in education, the significant features of these technology devices for general learning have not been experientially addressed. In this study we are going to investigate the comparison of smart phone devices and find the necessary conditions for using mobile devices as an educational tool by a conjoint method. There will be five attributes: screen size, batter type, mobile OS, memory capacity and price. By surveying we got the results which showed us the respondents' desire of using specific smart phone; thus, we defined that screen size attribute is the most important device characteristic.

Keywords:

Conjoint Analysis, Technology, Smart Phone, Education

Introduction

Information and communication technologies have greatly changed the way we live and have become an inseparable part and moreover have played a big role in our lives. Many people, especially the youth, use these technologies on a daily basis and for various purposes. People use computers to make researches, to get some important information on the internet [1], to watch videos, to play games with their friends and to communicate with others. On the other hand most people have smart phones and use them on-the-go. If in the past people used their mobile devices only for making calls or sending messages, nowadays smart phones [2] have many functions as the personal computer have. Therefore, people can watch movies, listen to music online, play different games, connect to

internet and check their email, manage social networking sites, pay some bills, order food, read the latest news and etc. The rapid development of technology has had an influence on the way we teach and learn and various types of advanced technologies and equipment, including smart boards, mobile devices has been introduced in education. In particular comparing to PCs, mobile devices have a huge potential for use in education because they have directly changed from electronic learning to general learning environments, where both students and professors can use digital textbooks and other educational content anywhere and anytime [3]. Therefore, mobile devices can effectively contribute to the early growth of education, although several obstacles to their use, such as small screens and limited computational power, have been mentioned. Nowadays the students with their head buried in a smart phone screen are found everywhere. But the question like what is being done or read or otherwise achieved on these devices has not been sufficiently addressed yet. The difference in the use of technology for this generation from those that came before it has been well-documented. Having grown up with the modern technology, internet, smart phones, instant messaging, video games and cell phones, the "millennial" generation, as it has become known, has a very different view of information access than their parents and grandparents. Various studies have investigated the potential of computer and mobile devices for education by designing education systems and confirming their effectiveness or examining users' learning process or adoption process using the technology acceptance model. However, empirical research on comparing essential features of smart devices as educational tools for learning has not yet been conducted. And yet, there is a lack of empirical research on comparison of mobile technology in education nowadays.

The possession of internet devices has seen a significant increase by undergraduate students in recent years. But unfortunately, popular literature shows that most of these devices are generally used for playing games, entertainment and communication. Therefore, this study

attempted to investigate empirically optimal characteristics of mobile devices in education by using a conjoint analysis of consumer preferences [4]. Consumer preference might be useful in determining the essential features that mobile devices and computers should have because a large part of the development of technology products has been driven by the pull of demand rather than the push of technology. Thus, this study can provide to a better understanding of the essential characteristics of mobile devices for helping in education by consumer preferences on mobile devices or computers for helping in education using a conjoint approach [5]. The method is generally used to understand the importance of different product components or features. In addition to the characteristics technology devices and based on the conjoint analysis requirements, some concepts which essentially influence consumers' objectives to choose and use a specific technology device have been identified for the purpose of this study to be used in the questionnaire.

This study attends to survey and determine what kind of smart phone device is more used and obtain the best smart phone according to screen size, price, battery type, memory and platform that would be used by consumers after making conjoint analysis.

Literature Review

This study aims to fill a gap in the current research on comparison the mobile technology usage in education. There are many researches about technology usage, statistics, applications usability and provided analysis of findings, but no systematic research has been conducted on mobile devices' comparison in learning education. This will be the first study to initiate an empirical-based discussion on the comparison of nowadays' smart phone devices in educational field. While the majority of research on mobile technology has focused primarily on students, recently researchers have started exploring the potentials of mobile learning and devices [6] within teacher education. Most researchers do not have a clear sense of how to evaluate effective use of technology and professors do not know much about their universities' vision for the use of technology in their lectures. Due to the lack of sound understanding of the specific goals of technology integration, the use of technology per se may have become the goal in many cases. Universities, as well as educational technology research, often turn to how much time students spend using technology and what technology is available as indicators of successful technology integration, but do not measure whether or not, or how, technology is being used in meaningful ways in teaching and learning. Nowadays we know that technology sphere is very important for both children

and young people. There are some types of technology devices which are preferred by a person himself to choose which is more desirable for him or her. If children get their training from these technology devices, young people get their ubiquitous knowledge [7]. Existing literature suggests the platforms have various strategies related to openness and flexibility to attract users. However, how people generally make decisions on using a specific device or adopting platforms has not been studied yet. Nikou, Bouwman & Reuver [4] studied which characteristics of digital platforms consumers most preferable. They focused on mobile platforms where application stores, operator portals, and service provider platforms compete for the consumer's attention. Moreover they conducted a conjoint analysis among 166 consumers to determine the most important characteristics of the mobile platforms. And after making their analysis they found that application related characteristics were most important, especially the number of available applications. Governance-related and technical characteristics were hardly important. Platform characteristics were considerably less important than the brand of the operating system linked to the platform. Nikou, Bouwman & Reuver's study showed us some results according to their study on the usage of nowadays' technology by using conjoint analysis. Nevertheless we have to say that some of their attributes which they made in their work were not specific. In the operating systems levels they had Symbian from Nokia and Blackberry OS which are already almost not used nowadays. We all know that today's two giant mobile OS's are iOS and Android. And when they made a fractional factorial design and an orthogonal plan they excluded some important interaction of attributes. The number of application wasn't done in the most appropriate way.. In Lopez, Fortiz, Almendros & Segura [2] study we see how authors showed the importance of development of customizable and adaptable applications which provide many benefits as it helps mold the learning process to different cognitive, sensorial or mobility impairments. They have devised a mobile platform called Picaa and designed to cover the main phases of the learning process: preparation, use and evaluation. Additionally they have formed a pre-experimental study about the use of this application by 39 students with special education needs and saw the positive effects in the development of learning skills like language, math, and awareness have been improved and finally got the result that the use of electronic devices increases their interest in learning and attention. But nevertheless we should say that there are many limitations in this study. Firstly, they have done an application only on the iOS mobile operating system. We have to mention that only ten percent of all smart phones are used in iOS, while for

more than eighty percent all over the world people use Android. Secondly, there were very few amounts of students who participated in that experiment, and only from one country (Spain). In my point of view future researches should replicate these findings in more natural settings with different populations.

Research Methodology

As conjoint analysis [5] has become an increasingly popular approach to estimate the benefits received from the attributes of a product, it has been widely used as a quantitative tool, not only in marketing research but also in ICTs and ICT services. Before performing a conjoint analysis, reasonable attributes and the level of each attribute should be set [8]. As we can see in table 1, five attributes were selected to examine consumer preference for mobile devices and computers. The first attribute was the screen size of devices. Screen size is the most critical factor in determining the form of the mobile device and a small screen display is usually recognized as a clear limitation of a mobile device for mobile learning in education. Considering several screen sizes of devices that are currently existing, I took in a consideration the following three sizes: small, regular and large. Device is the most important factor in determining the form of the technology we are going to use. The small screen sizes are those ones which have a diagonal less than 4 inches, the regular ones have a diagonal more than 4 inches and less than 5 inches and the third ones are those ones which have the diagonal more than 5 inches. The second attribute is the battery type. Here we have two levels: removable and unremovable. Removable batteries are those ones that we can change on our smart phones (e.g. Samsung Galaxy S4, S5 and etc). The smart phones like iPhones or last models of Samsung Galaxy, they have unremovable batteries. The third attribute is the type of platform, which usually refers to the hardware configuration, operating system (OS), software framework, or any other common entity on which a number of associated components or services run. In contrast to laptops whose platform is based on Windows or MacOS, globally, mobile OS market is currently dominated by two giant companies: Google with Android and Apple with its competing product iOS [9]. In other words, compared with the traditional PC-based platforms including Windows and MacOS, mobile platforms provide different user interfaces and user experiences for end users. Therefore, the following four levels were then considered: a PC-based platform Windows, MacOS, and a mobile-based platform Apple's iOS and Google's Android. The forth attribute is a memory capacity. One of the most important features of the smart phones is their memory size,

because everything that we store in our devices is kept there. Therefore here we have three levels: 16GB, 64GB and 256GB. The last attribute is the price of the device. Some people use only the last models of the mobile phones or laptops. They don't concern about the cost of the product because they only want the latest version and the fastest one. And other people prefer general type rather than the most expensive ones. Here we have three levels: 200\$, 500\$ and 800\$.

Table 1 - Attributes and their levels are described

Attributes	Levels		
	Small	Regular	Large
Screen Size			
Battery Type	Removable		Irremovable
Mobile OS	iOS		Android
Memory Capacity	16GB	64GB	256GB
Price	200\$	500\$	800\$

Full profile conjoint approach consists of all the possible combinations of the attributes and levels. In this study if we count the combination of all the attributes and levels creates 108 ($3 \times 2 \times 2 \times 3 \times 3$) possible profiles. It would be a difficult task for respondents to answer all the questions when there are too many profiles. Therefore, to make the task easier for respondents, full profile conjoint analysis uses what is termed as fractional factorial design to present a suitable fraction of all possible combinations of profiles as we can see below in table 2. The resulting set is called orthogonal array. Orthogonal array considers only the main effect of each attribute level, and not the interaction effects between attributes. In this study in order calculate data SPSS software was used. The issue that needs to be addressed is the utility and part-worth in conjoint analysis. Analysis of the data was done with the conjoint procedure and results were in a utility score. These utility scores are called a part-worth, for each attribute level. The obtained utility scores give a quantitative measure of the preference for separate parts of the product. The larger values indicate greater preference.

Table 2 - Conjoint alternatives

Card ID	Screen Size	Battery Type	Mobile OS	Memory Capacity	Price
1	large	removable	android	256GB	500\$
2	large	unremovable	iOS	64GB	200\$
3	regular	unremovable	android	16GB	200\$
4	small	unremovable	android	16GB	200\$

					0\$
5	small	unremovable	android	64GB	50 0\$
6	small	unremovable	iOS	16GB	50 0\$
7	small	removable	iOS	256GB	20 0\$
8	small	removable	android	64GB	80 0\$
9	large	unremovable	iOS	16GB	80 0\$
10	large	removable	android	16GB	20 0\$
11	small	unremovable	iOS	256GB	20 0\$
12	regular	removable	iOS	64GB	20 0\$
13	regular	unremovable	android	256GB	80 0\$
14	small	removable	android	16GB	20 0\$
15	small	removable	iOS	16GB	80 0\$
16	regular	removable	iOS	16GB	50 0\$

Sampling

A questionnaire was developed, which estimated demographics (age, education, gender) as it is showed in table 3, features of the smart devices. Respondents were asked “Imagine you would like to buy a new smart phone. How important are the following features for you in using it as an educational tool?” [10] For preference ratings a seven-leveled Likert-Scale was used. Participants were asked to evaluate their level of agreement of disagreement on a symmetric agree-disagree scale. (1 = “is extremely unimportant” to 7 = “is extremely important”).

Data collection took about one week period. Unfortunately we couldn’t get data from many students; therefore not more than thirty respondents participated in this survey. The students who participated in this survey were daily smart phone users, we can’t say that they are experts but still all of them are familiar because most of them study in top universities of all over the world. We formally invited respondents to participate in the research project and to fill out an online survey questionnaire by the help of Google Docs. We used the English questionnaire for all students even if they are not native speakers. One condition for recruiting respondents to participate in this survey was that they should own a smart phone or be able to use it in a daily life. Respondents took an average of 10 minutes to complete the questionnaire. Table 3 provides

respondents’ demographics. Because our sampling strategy focused on students taking undergraduate and graduate courses in the best universities, we expected respondents’ relatively high level of education and their relatively young age.

Table 3 – Sample Characteristics

Current Operating System	iOS 54%	Android 46%
Education	Bachelor:62%	Master & PhD:38%
Gender	Male:77%	Female:23%
Age:	From 21 to 28(Average 22.3)	

Results and Discussion

Table 4 shows the results of the conjoint analysis. Importantly, the results show that respondents considered all the attributes since the relative importance of each attribute was higher than 13%.

Table 4 – Conjoint Results

Attributes	Levels	Utility Estimate	Standard Error	Relative Importance
Screen Size	Small	-.974	.267	24.563
	Regular	-.138	.313	
	Large	1.112	.313	
Battery Type	Removable	.279	.200	13.975
	Unremovable	-.279	.200	
Mobile OS	Android	-.740	.200	15.526
	iOS	.740	.200	
Memory Capacity	16GB	1.507	.242	23.735
	64GB	3.014	.483	
	256GB	4.521	.725	
Price	\$200	-.850	.242	22.201
	\$500	-1.699	.483	
	\$800	-2.549	.725	
Constant		8.391	.634	

Pearson’s R = 0.951 (0.000), Kendall’s tau = 0.762 (0.000).

The most important attribute was screen size, with a relative importance level of 24.563%. An interesting finding was that respondents preferred smart phones with a screen with more than 5 inches, which is more convenient to make some work. It means that respondents want to receive digital educational content, including digital textbooks and lecture materials, on a large screen display.

The next important attribute was a memory capacity

with 23.735%. We see that people worry about keeping data in their devices and we can see that the price of smart phones with a relative importance of 22.201% is almost the same as the memory which indicates that respondents do care about the price almost at the same level as the memory capacity. The result showed that respondents preferred the Apple's mobile platform. This means that most respondents are accustomed to iOS mobile operating systems and for their educational purposes, maybe they want mobile devices with a platform that is compatible with their MacBook at home or at the university, even though they enjoyed using iPhones and iPads with iOS mobile-based platforms. The results also showed that respondents prefer removable batteries of their devices. This means that they would rather have several batteries and in the case of battery off they would change them instead of using power banks or always carrying a battery charge with themselves. The experimental results actually have significant implications for smart phone manufacturers to understand the important characteristics of mobile devices for the successful usage in education. First, in terms of screen size, the results show that current smart phones may not be optimal mobile devices for studying or working because users may not be satisfied with 3.5 - or 4-inch screens on the smart phone devices. After all manufacturers have introduced some kinds of smart phones, the optimal screen size for educational mobile devices needs to be larger than those ones which are commonly used nowadays. Thus, manufacturers need to consider developing and introducing educational mobile devices for convenient use. Second, in terms of memory capacity and price, the results indicate that people want to have a large amount of gigabytes in their smart devices and get it as cheap as possible. On the other hand having many manufacturers is advantage for consumers, because nowadays there are many smart phone companies that decrease the prices of their products and make them competitive in the market. In terms of the type of platform, the results implicate that potential users prefer Apple mobile operating systems rather than Google's android. This may claim a consistent platform regardless of the device they use. It means that digital educational content should be delivered equally through devices with a single platform-based with large screen devices. Therefore, smart phone makers need to develop educational mobile devices in the short term and other platform providers should make efforts to overcome the current limitations. Finally, the result also shows that, smart phones with a removable battery are more preferable than the other one. Although potential users usually want a larger screen size which has more powerful battery it is not enough for consumers to use it regularly. Therefore they have to whether use power banks or carry battery charge with themselves which is

not very convenient. Thus, manufacturers need to keep considering several alternatives for their battery and find the optimal one rather than just wait for the best smart phone device in education.

Conclusion

Smart phones are the devices that are able to be used to deliver digital textbooks, video materials, useful software applications [11] which can be downloaded from the Apple store or Google play [12] and other educational content to students anywhere and anytime [3], and therefore they can effectively facilitate studying or working despite their limitations, such as their small screen and limited computational power compared to computers, laptops and tablets. This study investigated the significant features of smart phones as an educational tool by using a consumer preference approach. The results implied that, the most important features of all smart phones is its screen size. Therefore, the results suggest that manufacturers should develop educational mobile devices for convenient usage and policy makers consider promoting the development of educational smart phones as a mobile device. However, for the available usage of these devices, manufacturers also need to increase the memory capacity of their products and decrease the price in order to be used ubiquitously by consumers. Moreover they have to consider about a single platform-based products with large screen devices. Although this work has showed several significant findings, there is no doubt that it has some limitations too. First of all, the amount of respondents wasn't that enough to be objectively appropriate so that having a larger number of participants may provide more fruitful results. Secondly, this study examined user preferences for mobile devices in education by considering only five features. To fully understand the requirements of mobile devices, further research should review other characteristics and have some dependent variables to identify specific characteristics which mobile devices should have. We should take these things in a consideration in our future research.

References

- [1] Davis, F. D. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology". *MIS Quarterly*, 13(3), 1989, pp. 319-340.
- [2] Lopez, A. F., Fortiz, M.J. R., Almendros, M. L. R., and M. J.M. Segura. "Mobile Learning Technology Based on iOS Devices to Support Students with

- Special Educational Needs” ,Computers & Education, 2013 pp. 77-90
- [3] Jun, Y., and H. Zhi-yi, “Learning anywhere anytime with mobile devices”. Proceedings of the 3rd International Conference on Artificial Intelligence and Education, 2010, pp. 768-771
- [4] Nikou, S., Bouwman, H., and De Reuver, M. “ A Consumer Perspective on Mobile Service Platforms: A Conjoint Analysis Approach” ,Communications of the Association for Information Systems 34(83), 2014, pp. 1409-1424
- [5] Gustafsson, J., Hermann, A., and F. Huber, “Conjoint analysis as an instrument of market research practice”. In J. Gustafsson, A. Hermann, and F. Huber (Eds.), Conjoint measurement, methods and applications (pp. 5-46). Berlin: Springer, 2003
- [6] Economides, A., & Grousopoulou, A. (2009). Students’ Thoughts About the Importance and Costs of their mobile devices’ features and services. *Telematics and Informatics*, 26(1), 57-84.
- [7] Zahrani, M. S. “The Benefits and Potential of Innovative Ubiquitous Learning Environments to Enhance Higher Education Infrastructure and Student Experiences in Saudi Arabia”, *Journal of Applied Sciences*, 10(20), 2010 pp. 2358-2368.
- [8] Hagerty, M. (1985). Improving the predictive power of conjoint analysis: The use of factor analysis and cluster analysis. *Journal of Marketing Research*, 22(2), 168-184.
- [9] Gafni, R., and Geri, N. “Do Operating Systems Affect Perceptions of Smartphone Advantages and Drawbacks?” *Issues in Informing Science and Information Technology*, 10(36), 2013, pp. 175-184
- [10] Johnson, R. M., and B. K. Orme, “How many questions should you ask in choice-based conjoint studies?” (Technical paper). Sequim, Wash: Sawtooth Software, 1996.
- [11] Bergvall-Kåreborn, B., and D. Howcroft, “Mobile Applications Development on Apple and Google platforms”, *Communications of the Association for Information Systems*, 29(1), 2011, pp. 565-580.
- [12] Holzer, A., and J. Ondrus, “Mobile Application Market: A Developer’s Perspective”. *Telematics and Informatics*, 28(1), 2011, pp. 22-31.

Selection Test and Predictability of Job Performance of the Employees

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Abstract

Employees employed through proper selection are great assets in the organization. Likely, improper selection practices create liabilities not employees. Tests can measure abilities in the individual and help selection decision. Varieties of tests are required to measure varieties of abilities. The objective of the study is to investigate how Nepalese organizations determine the relevancy of the test they use while selecting employees? How the practices found in Nepal differ with the practices adopted in other developed country? The source of data is primary as well as secondary. Content analysis of the tests has been being done to develop insight to relate them with the factors required to do jobs efficiently in some service organizations like banks, and schools. Interviews with the selecting bodies were conducted.

Keywords: *reliability, validity, test construction, and test standardization.*

Introduction

Employees are important agents in every organization. Employees should be viewed as long-term assets, not short-term costs [24] if chosen properly. Organizations often make mistakes by not choosing the right staffs and resulting effect is the question of its survival. The result of it can be unnoticed effect of loss in employee morale to a heavy loss of organizational profit and bringing the organization to the big question like sustainability due to the cost, quality and speed in the product and its delivery system. Most powerful people in the organization's task environment is external customers who puts their strong demands of cost, quality, and speed of product and services and the second powerful people are employees including managers, CEO/MD, who must understand what external customers want. The managerial people of the organization should handle internal staffs to make them capable of fulfilling demands of customers.

Means of right matching of external customers and internal customers are expressed in the process of collecting job information which is called job analysis. The primary job of managers and CEO in business organization is to prepare the internal staffs (internal customers) in such a manner that they

in turn can address every want of external customers and ensure the growth of the organization.

(1). External demand	(2). Means of achieving (1)	(3). Means of achieving (2)	(4).Means of achieving (3)
Cost, quality and speed of product or service	Competent staffs with (KASH)	Right assessment of employees	Right recruitment and selection

External demand: External demand gives birth of business. This process is done through supplying the product or services in competitive environment. Customers judge the organizational product or service based on these. Reasonable price, reasonable quality (durability, comfort, portability, image and prestige attributes, etc.) are defined by customers.

Competent staffs: It is the competent staffs, who make the organization able to address every types of challenges that external environment throws on it and turns them into opportunity of its being exist in the societies.

Right assessment of employees: There must be people of diversified nature and capabilities who can address the problems of challenges of diversified nature. The people filled in the organizations from two sources, externally and internally termed as recruitment. Both the sources have their respective advantages and disadvantages. Before recruiting and selecting, it is the job of organization managers to design and implement proper assessment of the people who are being recruited and selected.

Right recruitment and selection: Only the right assessment of existing employees, sometimes retiring employees and incoming fresh employees can ensure the organizations that they will have competent people to address the every situation that have probability to come. All tests are not able to measure the ability of individual if they do not possess the qualities like *Reliability:* reliability is the consistency in the result it gives in the measurement of person's ability if repeatedly used, like a measuring gauge gives accurately the length and size of an object. Only standardized tests can provide this.

Validity: validity is the predictability that a test provides that what does the test pass means; for passing in high grade means probability that the person can be a better performer. If it says about current performance standard then it is called concurrent validity and if it says about the future performance of the individual then it is called predictive validity. For example

many entrance tests, admission tests and selection tests have these qualities regarding what the candidate's ability is and what would be in the future.

Test construction: It is a process of selecting items that can measure different constructs of the individuals, like knowledge, skills, attitudes interest, manner, personality, etc.

Test standardization: it is a process of increasing the value of test by increasing reliability and validity, with the help of research and evaluation of test items in different testing situations and performances of the individuals that have undergone through the tests. Under this process some items of test are removed and some are added and continuously developed until it does not give targeted standard result in terms of performance.

This article focuses on the proper employee assessment system for the selection of employees of the organizations.

Objective

The main objective of this study is to analyze the existing employee's assessment system of the organizations of Nepal. Other objectives are to analyze the issues that are currently supporting and hindering for the right assessment system.

Method

The method adopted in the research is review of literature and enquiries with some organizations of country. For the purpose of enquiries organizations selected are presented in Table 1.

Table 1: The sample of organizations selected for analyzing selection test.

	Number of organizations in round	Proportional Sample size	Corrected samples
Small and cottage industry	10000	90	44
Medium scale industry	1000	9	5
Large scale industry	100	1	1
Approximate total	11100	100	100

For the purpose of doing analysis and coming to the conclusion key personnel of 100 organizations were contacted and short interview were conducted about their recruitment and selection practices and the testing devices they used. The selection of the number and nature of organizations were based on total number of organizations of the countries as supplied by Department of Industries.

Literaturereview

Selection of employee for the organization is not new. The first documented employee selection test was begun in AD 605 in China for its civil servants and it is claimed that its effect remain in all the subsequent tests run thereafter [1]. Now in different parts of the world tests are administered to

select employees. There have been some researchers conducted on different issues of selection tests for their usefulness. Mostly issues relate on the practicality, reliability, validity, and utility of various forms of selection measures [2]. The main reason for conducting selection tests are to see whether the person being tests is fit for the jobs or not? The test must measure applicant's personality style, values, motivations, and attitudes along with knowledge and skill requirements of the job. So the tests administered should have ability to measure personality is engrained in individuals. Technical competency which includes knowledge and skills can be taught to the individual when employed. However, better will be if these also are assessed when hiring.

The tests conducted were in the form of oral, written and practical. The oral form of test is known as interview. Through the varieties of interview techniques, candidate's abilities are assessed. Interview ranges from simple structured interview to receive common interview to in-depth interview to assess the candidates deeply rooted individual's idea, interest and abilities that really can differentiate one individual from others. Such interview techniques are termed as comprehensive structured interview and structured behavior interview. For selecting large number of people interview has been remarked as uncomfortable, time consuming, and biased technique [3]. The meta analysis of interview revealed that in comparison to unstructured interview, structured interview have high validity score (0.63 vs 0.20) and if interview board use consensus then its validity was found(0.64)[29]. Research on three types of interviews situational, job-related, and psychological, the mean validity score were 0.5, 0.39, and 0.29 respectively [7].

The personality factors that are assessed most frequently in work situations include conscientiousness, extraversion, agreeableness, openness to experience and emotional stability [20, & 21]. The most widely used personality test is the California Psychological Inventory Multipurpose questionnaire, which is designed for use in a variety of settings, including business and industry, schools and colleges, clinics and counseling agencies, and for cross cultural and other research. This also has been suggested for employees/applicants about their vocational plans [4]. Personality tests have low predictive validity and its nature to try to seek some privacy has raised questions (Hogan, Hogan, & Roberts, 1996).

Biographical methods are used to assess the employee's potential performance looking at past several years' achievement and interest. Mixed information have been received about its predictions some said it has high predictability [11 &12] some raised question due to presence of sufficient validity [5].

Employee aptitude survey consists of Verbal Comprehension, Numerical Ability, Visual Pursuit, Visual Speed and Accuracy, Space Visualization, Numerical Reasoning, Verbal Reasoning, Word Fluency, Manual Speed and Accuracy, and Symbolic Reasoning. These are cognitive ability types of tests. Cognitive ability tests have higher validity score so are generalizable [30, 31]. Cognitive ability tests are more valid in most of the occupations. The main limitation of cognitive ability test in selection is its adverse effects on some group (impact against protected group member) by scoring lower score. Unless business arises such test are accepted by the courts because a group of people will be deprived from the job [30, 31]. This test is abandoned by most of the companies [30].

Pairing personality and cognitive tests are becoming useful; it has drawn interest with revival [31]. Some items of personality, which are questionable to privacy are removed and some inherent items related to cognitive but not having adverse impact [32] are left in the personality test. It also can be expressed that some items from the personality and some from the cognitive ability tests are removed. Recent studies have challenged this method too [33]. Combination of predictors resulted in the highest predictive validity; the inclusion of cognitive ability with these alternative predictors increased the potential for adverse impact [30].

Physical ability tests are used for determining the individual's fitness in the job. For determining the fitness work sample tests also are used [6]. Work sample tests mirror the tasks that employees are required to perform on the job. Some such tests are: Work-Sample Tests of Trainability, Simulation of an Event, Low Fidelity Simulations. These tests help the selection committee to know whether candidates possess work experiences and predict their potentiality of the job. However such tests have not been attributed with high validity from the perspective of content and criteria.

Intelligence test has its history from Alfred Binet's general intelligence theory to Howard Gardner's multiple intelligence theory for employee performance prediction. With the question in mind, during 1900s, that what will make school students success which is not taught in the school but make different in learning ability, and these took a form of intelligent test [27]. In the Stanford University a test came out, and this was called Stanford-Binet Intelligence Scale. This test defined IQ by mental age divided by chronological age. For instance, a child with a mental age of 12 and a chronological age of 10 would have an IQ of 120 ($12/10 \times 100$). With the improvement it was used in Army recruits in 1917 in US during World War I. Written test Alpha and oral test Beta were used to decide the leadership ability in army and to decide other suitable position [25].

The next development in the history of intelligence testing was the creation of a new measurement instrument by American psychologist David Wechsler. Much like Binet, Wechsler believed that intelligence involved a number of different mental abilities, describing intelligence as, "the global capacity of a person to act purposefully, to think rationally, and to deal effectively with his environment" (1939). Dissatisfied with the limitations of the Stanford-Binet, he published his new intelligence test known as the Wechsler Adult Intelligence Scale (WAIS) in 1955. Intelligence test in different forms of that time was: Wechsler Intelligence Scale for Children (WISC), Wechsler Preschool and Primary Scale of Intelligence (WPPSI), and the adult version of the test has been revised since its original publication and is now known as the WAIS-IV. Different versions of intelligence test appeared were WAIS (1955), WAIS-R (1981), WAIS-III (1997) and WAIS-IV (2008). Current version is WAIS-IV (2008). The scoring is based on the scores obtained in (1) verbal Comprehension Index, (2) Perceptual Reasoning Index (3) Working Memory Index, (4) a Processing Speed Index (5) a Full Scale IQ score that combines performance on all four index scores (6) and a General Ability Index based on six subtest scores.

Gardner's Theory of Multiple Intelligences (1983) came out with eight intelligences, and has suggested the possible addition of a ninth known as "existentialist intelligence" [26].

Critics argue that Gardner's definition of intelligence is too broad, and that his eight different "intelligences" simply represent talents, personality traits and abilities.

1. Visual-Spatial Intelligence
2. Linguistic-Verbal Intelligence
3. Logical - Mathematical Intelligence
4. Bodily-Kinesthetic Intelligence
5. Musical Intelligence
6. Interpersonal Intelligence
7. Intrapersonal Intelligence
8. Naturalistic Intelligence
9. Existentialist intelligence

Studies [28] indicated that these have association with job performance in the organization.

Relation between employee performance and multiple intelligence

Table 2. Ability and intelligence matching

Ability	intelligence
1. Ability: employees range in ability of doing work	Bodily-kinesthetic
2. Clarity: employees range in	Logical -

understanding work.	Mathematical
3. Help: employees range in helping others/colleagues	Interpersonal
4. Interest: employees range in taking interest	Intrapersonal
5. Evaluation: employees range in evaluation his/her work and taking feedback to improve work	Interpersonal
6. Validity: employees range in understanding the legal rules and making works valid	Visual - spatial
7. Environment: employees range in making them fit for external environment	Verbal intelligence

For higher level supervisory position assessment centers are designed for work sample tests [17, 18, &19]. Candidates are asked a series of questions in simulated situation and they are to answer how they will solve in real situation. Group discussion, role play, case analysis, in basket exercise is some of the techniques used this.

There are practices to assess individual's honesty, trustworthiness and dependability in the job through a test called Integrity tests [13, 14, 15, and 16]. However, it is difficult to predict if this test is used in selection because people speak one does another.

Selection decisions are largely affected by validity of predictors. Predictors for selection always have less than perfect validity and scatter plots can help us to find these mistakes. [8]

Test biases

Test biases as invalidity or systematic error in how a test measures members of a particular group [22]. Different types of biases are revealed in Tab1 2.

Table 2: different types of test biases

<i>Test biases</i>	<i>symptoms</i>
Bias in measurement	Bias in measurement occurs when the test makes systematic errors in measuring a particular characteristic or attribute. For example intelligence test deigned for middle class people, interview board rating to good looking people.
Bias in prediction	It takes place when a test can

	predict to a group of people but not to all. For example the test can predict children's behavior but not adult, and males but. Female.
Cultural bias	It takes place when it test items are selected looking at the majority. For example different religious groups have different god names. Polygamy can be sin one culture but not to all.
Criterion bias	Same criteria does not mean same thing everywhere. Passed with lower marks from remote areas might be harder worker than the person passed with higher marks of municipality area.
Bias in individual items	There can be biased in individual items so group items should not differ by more than 15.
Method Bias	Method bias refers to factors surrounding the administration of the test that may impact the results. The testing environment, length of test and assistance provided by the teacher administrating the test are all factors that may lead to method bias.
Construct Bias	Construct bias occurs when the construct measured yields significantly different results for test-takers from the original culture for which the test was developed and test-takers from a new culture.
Language Differences and Test Bias	Non-native English test-takers may struggle with reading comprehension, which hinders their ability to understand questions and answers. They may also struggle with writing samples, which are intended to assess writing ability and levels.

Theories and techniques of reducing bias in psychometric tests

Table 3: Techniques of reducing bias

Differential item functioning	According to Zumbo (1999) DIF statistical techniques are based on the principle that if different groups of test takers (males and females) have roughly the same level of something (knowledge), and then they should perform similarly on individual test items regardless of group membership.
Expanding criterion and predictors	Sackett and Divoice (2001)[23] report some support for expanding the criterion as a means of reducing subgroup differences thereby getting rid of bias.[adding more test to increase validity]
Banding	Banding is based on a thread of psychometric theory that holds that small differences in test scores are quite possibly due to measurement error and, therefore, these differences within an acceptable band are considered irrelevant for interpretation and decision-making purposes.
Differential prediction	Slopes and intercepts differences two sub groups are reduced. These are treated as bias. Different groups have different slopes and intercepts.
Use of highly standardized tests	They are also designed to measure relative performance. tests are interpreted with reference to a comparable group of people
Implementing models of fairness	Sackett et al. (2003) identified five models of fairness, including pure

	quota and culture-free models in which fairness in both is defined based on how well selection ratios represent protected group proportions in a relevant labor market.
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Guidelines and suggestions for avoiding cultural bias in test questions

- Readability of questions
- Reading Lists
- Unnecessarily academic content
- Every day practical reference material
- Content which unnecessarily evokes emotional responses
- Balanced or neutral representation as to age, gender, culture, and ethnic group
- Contamination with irrelevant test content
- Test Content which is equally familiar to all groups
- Context
- Tricky questions
- Time limits
- Equal practice in test taking

Result and discussion

Out of a number of issues there was a pertinent issue on what should constitute in a selection tests. Generally such tests take the form of written types, oral types, and practical types. Selection decision comprises three types of decisions: false negatives, false positives, and accurate. Candidates can be rejected though he/she should not be rejected. And sometimes is selected though should not be selected. The third decision is selected who should be selected, this is possible if selection committee is able to increase the validity of test. One hundred percent right prediction is very difficult to achieve.

A meta-analysis of selection methods in personnel psychology found that general mental ability was the best overall predictor of job performance and training performance [9]. Meta-analysis has shown that job candidate is selected paid higher, and recognized on the basis of their behaviors of loyalty, helping and voices [10, 8].

Only the predictability of a test can be threatened by the courts these days on the ground of adverse effect to minorities because the test might give high score to people of higher social class, and highly educated. But the positions and duties may not require that qualification to be effective then such situation can be termed as biased situation. If the people can

be developed after their selection but the test does not give opportunity to such from being selected also treated as bias.

A large number of researches are needed to estimate the predictability of selection tests as it has been discussed and revealed in the review of literature. On the enquiry with the selection committees of some organizations of Nepal it is revealed that there is no single research that has been done by applying longitudinal methods to reveal the validity of selection tests in Nepalese context. For the selection of government employees an independent agency called Public Service Commission has been established. Their research interest in this direction is very low and not yet done any research to establish predictability of its tests. They maintain secrecy and procedures of testing to show external validity but what is the status of internal validity of their test in relation to predicting the candidates for the future is not done. Even the experts and members are not from the background of test and measurement specializations except one week to few months abroad training in regard to selection tests and selecting candidates. Some IQ tests they copy from the published manuals but what is their cultural effect or bias has not been studied.

Banking and different private companies use out-sourcing for the selection of employees. In a sample of study of banking sectors the curriculum designed for selections test found were general knowledge, IT, banking laws and practices. The items designed were both were subjective and objective type's questions along with short case studies.

In case of selection of government officers and employees typical subjects designed are general knowledge, administrative laws, administration and management as paper and pencil tests, group discussion as work sample test. For this purpose a separate independent body is formed named 'Public Service Commission'. It collects vacancies from different government organizations and calls applications from qualified candidates for different posts and conducts selections tests and recommends candidates. Its selection practices include both internal and external. However, the key positions, like secretary in the government office always has been criticized due to the its selection from government cabinet based on political influence and quota.

In the case of selection practices of university, University Service Commission does selection functions for teaching faculties of different levels assistant professors to professors and employees from to junior to senior level. However, university service commission has been criticized for its unfair treatment to candidates based on political influence and political party's quota. The chief authority and members of the service commission also has been criticized for their

appointments from the political quota. In the case of government owned business organizations, i.e. public enterprises the main CEO/GM is appointed from political influence so the selection based on professional competence is always has been questioned.

Selection of private organizations of small and medium scale is based advertising the candidates, and calling them for tests. Organizations chief himself have found involved in the selection. No standard tests and procedures have been declared in writing regarding the selection tests.

Selection steps begins with sorting initial applications received within due dates, it follows written test, interview, medical examination and reference check.

An observation was made on CEO selection of some companies. It is true that if CEO is correctly selected then its effect on sleeting other staffs can be effective, because CEO leads overall organization. He/she can keep all sections and departments intact. It has three step procedures. (1) Calling application from the candidates, (2) short listing the applicants and (3) conducting few rounds unstructured interviews. The interviews were not pre designed and the interactions with the interviewee were not analyzed for the purpose of predating job performances. Higher qualification and past several years of experiences were mentioned at the time of inviting candidates for application. The in-depth analysis were never done in connection with matching of CEO's role in the organization with the capability of CEOs.

In this process of selecting CEOs there were some flaws. They are (1) advertising used to be stereotyped, (2) the selection committee and its interviews were not professional as it should be and (3) CEO 's recruitments and selections are also seem to be the recruitment and selection of other common staffs. No special privilege, no special right and no special and remarkable consideration are provisioned, in the public organizations CEOs are treated as cadre of political parties because their appointments are under the quota of major political parties enjoying power. Their job descriptions also reflect that they are put there for meeting compliance rather than taking leadership in the organization.

Conclusion

Suggested interview is situational because it has high mean validity in comparison to others. Cognitive ability tests have high validity but cognitive ability favors to some groups and leave some group back who are protected so organizations hesitate to use because they have to prove business necessity. Growing number of research studies show that the best way for organizations to achieve close to optimal validity and job performance prediction, is to create a predictor composite that

includes a measure of cognitive ability and an additional measure such as a personality test. At last the analysis of selection practices reveal that in most of the key positions of major public organizations political influence is the dominating factor. This affect to junior level also as Peter Drucker once said organizations ruins from the top. The chance of accepting candidates who should not be selected is very high.

References

- [1]. Ssu-yü, Têng, "Chinese Influence on The Western Examination System". *Harvard Journal of Asiatic Studies*, Vol 7, No. 4, 1943pp 267–312. ISSN 0073-0548. Retrieved 2013-12-29.
- [2]. Steel, P. "From the Work one Knows the Worker: A Systematic Review of the C hallenges, Solutions, and Steps to Creating Synthetic Validity", http://papers.ssrn.com/sol3/papers.cfm?abstract_id=889965 *International Journal of Selection and Assessment*, Vol. 14, No 1, 2006, pp. 16-36.
- [3]. "Personnel Selection: Methods: Interviews". *www.hr-guide.com*. Retrieved 2015-12-01.
- [4]. "Personnel Selection: Methods: Personality Tests". *www.hr-guide.com*. Retrieved 2015-12-01.
- [5]. "Personnel Selection: Methods: Biographical Inventories". *www.hr-guide.com*. Retrieved 2015-12-01.
- [6]. "Work sample". *Changingminds.org*. Retrieved 2015-12-01.
- [7]. McDaniel, M. A., Whetzel, D. L., Schmidt, F. L., and S. D Maurer, "The Validity of Employment Interview: A Comprehensive Review and Meta-analysis, *Journal of Applied Psychology*, Vol. 79, No. 4, 1994, pp. 599-616.
- [8] Muchinsky, P. *Psychology Applied to Work*, (10th ed.). Summerfield, N klu C: Hypergraphic Press, 2012.
- [9] Schmidt, F. L. and J. E Hunter,. "The Validity and Utility of Selection Methods in Personnel Psychology: Practical and Theoretical Implications of 85 years of Research Fndings" (<http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=1998-10661-006&CFID=5257837&CFTOKEN=93267042>). *Psychological Bulletin*, Vol. 124, No 2, 1998, pp. 262-274.
- [10] Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., and & P. Mishra, Effects of Organizational Citizenship Behaviors on Selection Decisions in Employment Interviews (<http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=apl-96-2-310&site=ehost-live>). *Journal of Applied Psychology*, Vol 96, No 2, 2011, pp. 310-326.
- [11] Stokes, G. S., Mumford, M. D., and W. A. Owens, (Eds.). *Biodata handbook*. Palo Alto, CA: CPP Books. 1994
- [12] Shoenfeldt, L. F. (1999). "From Dustbowl Empiricism to Rational Constructs in Biodata", *Human Resource Management Review*, Vol 9, pp. 147-16
- [13] Ones, D. S., Viswesvaran, C., and F. L. Schmidt, "Comprehensive Meta-analysis of Integrity Test Validities: Findings and Implications for Personnel Selection and Theories of Job Performance". *Journal of Applied Psychology* (monograph), Vol, 178, 1993, pp. 531-537.
- [14] Sackett, P. R., and J. E. Wanek. "New Developments in the Use of Measures of Honesty, Integrity, Conscientiousness, Dependability, Trustworthiness, and Reliability for Personnel SelectionM". *Personnel Psychology*, 49, 1996, pp.787-829.
- [15] Camara, W. J., and D. L. Schneider, "Integrity tests: Facts and unresolved issues". *American Psychologist*, Vol. 49, 1994, pp. 112-119.
- [16] Goldberg, L. R., Grenier, R. M., Guion, L. B., Sechrest, L. B., and H. Wing, *QuestionsUsed in the Prediction of Trustworthiness in Pre-employment Selection Decisions: An APA Task Force Report*. Washington, D.C.: American Psychological Association, 1991
- [17] Gaugler, B. B., Rosenthal, D. B., Thornton, G. C., III, and C. Bentson, Meta-analyses of Assessment Center Validity. *Journal of Applied Psychology*, Vol, 72, 1987, pp. 493-511.
- [18]Thornton, G. C., III, and W. C. Byham, *Assessment Centers and Managerial Performance*. New York: Academic Press. 1982
- [19] Thornton, G. C., III, *Assessment centers in human resources management*. Addison-Wesley, 1992
- [20] Raymark, M. J., Schmit, M. J., and R. M. Guion, "Identifying Potentially Useful Personality Constructs for Employee Selection". *Personnel Psychology*, Vol, 50, 1997, pp. 723-736.
- [21] Tett, R. P., Jackson, D. N., and M. Rothstein, "Personality Measures as Predictors of job Performance: A Meta-analytic Review. *Personnel Psychology*, Vol, 44, 1991, pp. 703-742

- [22] Wicherts, J. M. "Group Differences in Intelligence Test Performance". *European Journal of Personality*, Vol. 21, 2007, pp. 763-765.
- [23] Sackett P, Laczo R, and Z, Lippe.. "Differential Prediction and the Use of Multiple Predictors: Omitted Variables Problem". *Journal of Applied Psychology*. Vol. 8: 2003, pp. 158-166.
- [24] Gowing, M. K., Kraft, John D. and Quick, J. C.(eds). *The new organizational reality: Downsizing, restructuring, and revitalization*, Washington, DC: American Psychological Association. 1998
- [25] McGuire, F. "Army Alpha and Beta Tests of Intelligence". In R. J. Sternberg (Ed.), *Encyclopedia of Intelligence*. New York: Macmillan, 1994
- [26] Gardner, H., *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books, 1983
- [27] Kamin, L. J. (1995). "The Pioneers of IQ Testing". In Jacoby, R. and N. Glauberman (Eds.), *The Bell Curve Debate: History, Documents, Opinions*. New York: Times Books.
- [28] Abadi, Z. D. and M. M. Peidaie, "The relationship between the components of employees' multiple intelligence and their performance". *GMP Review*, Vol. 16, No. 3, 2015
- [29] Wiesnerf, W. H. and S. F. Cronshaw, "A Meta-analytic Investigation of the Impact of Interview Format and Degree of Structure on the Validity of the employment Interview" *Journal of Occupational Psychology*., 61, 1988, pp. 275-290.
- [30] Thomas, S. L. and A. S. Wesley, Psychological Testing in Personnel Selection: Contemporary Issues in Cognitive Ability and Personality Testing, *Journal of Business Inquiry* , *Journal of Business Inquiry: Research, Education & Application* ., 5(1), 2006, p28-38.
- [31] Schmidt, F. L., Ones, D. S., and J. E. Hunter," Personnel selection", *Annual Review of Psychology*, 43, 1992, pp. 627-670.
- [32] Ryan, A.M., Ployhart, R.E. and L.A. Friedel, "Using Personality Testing to Reduce Adverse Impact: A Cautionary Note". *Journal of Applied Psychology*, 83, 1998, pp. 298-307.
- [33] Bobko P, Roth PL, and D. Potosky, "Derivation and Implications of a Meta-analytic Matrix Incorporating Cognitive Ability, Alternative Predictors and Job Performance". *Personnel Psychology*, 52, 1999, pp. 561-589
- [34] Schmitt, N., Rogers, W., Chan, D., Sheppard, L., and D. Jennings, Adverse impact and predictive efficiency of various predictor combinations. *Journal of Applied Psychology*, 82, 1997, pp. 719-730.

Annex

Evaluation of Assessment Methods on Four Key Criteria				
Assessment Method	Validity	Adverse Impact	Costs (develop/administer)	Applicant Reactions
Cognitive ability tests	High	High (against minorities)	Low/low	Somewhat favorable
Job knowledge tests	High	High (against minorities)	Low/low	More favorable
Personality tests	Low to moderate	Low	Low/low	Less favorable
Biographical data inventories	Moderate	Low to high for different types	High/low	favorable Less
Integrity tests	Moderate to high	Low	Low/low	Less favorable
Structured interviews	High	Low	High/high	More favorable
Physical fitness tests	Moderate to high	High (against females and older workers)	High/high	More favorable
Situational judgment tests	Moderate	Moderate (against minorities)	High/low	More favorable
Work samples	High	Low	High/high	More favorable
Assessment centers	Moderate to high	Low to moderate, depending on exercise	High/high	More favorable
Physical ability tests	Moderate to high	High (against females and older workers)	High/high	More favorable

Interview schedule

1. What is the nature of your organization?
2. What product you deal?
3. How have you been employing people for last five years?
4. Which method of employment is better in your view/
5. Which selections tests are better for different positions and nature of jobs?

Devastating Earthquake in Nepal: Victims Relief Cash Transfer Through Branchless Banking

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Abstract

Earthquake is an unpredictable natural process. Because of high magnitude earthquake in Nepal, thousands of people died, the worth of thousands millions of homes, heritage, and schools, turned useless. Millions of people turned into homeless and compelled to shelter as temporary arrangement. The victims are provided victim identification card from government level through manual process. Government of Nepal has announced providing home grant to each victim household. At present, the process of digitization of victim data is very much important and relief cash transfer is crucial so that victim could get sheltered soon. This research paper designs a framework for proper digitization of data, quick and efficient way of relief cash transfer through branchless banking.

Keywords:

Earthquake, digitization, cash transfer, branchless banking

Introduction

Earthquake is an unpredictable natural process which shakes the earth and lasts for less than a minute. The major earthquake of 25 April 2015 and 12 May 2015 of 7.6 and 7.3 magnitudes respectively devastated central parts of Nepal. 31 out of 75 districts of Nepal have been affected, out of which 14 were declared 'crisis hit' for the purpose of prioritizing rescue and relief operations; remaining 17 adjoining districts are partially affected [1]. It has been declared that 8,856 numbers of people have been death and 22,309 numbers of people have been injured. Likewise, more than 2,673 and 3,757 government buildings have been fully and partially damaged. More than 602,257 and 285,099 private houses have been fully and partial damaged. People are homeless and are forced for temporary shelter arrangement [2]. The earthquake is followed by 458 numbers of aftershocks with local magnitude of 4.0 and more as of 24 May 2016 [5]. The destruction was widespread covering residential and government buildings, heritage sites, schools and health posts, rural roads, bridges, water supply systems, agricultural land, trekking routes,

hydropower plants and sports facilities. It is estimated that the total value of disaster effects (damages and losses) caused by the earthquakes is NPR 706 billion or its equivalent of US\$ 7 billion [1]. The government of Nepal (GoN) has provided paper based earthquake victim identification card to those people who are homeless and are under temporary arrangement.

The homeless and earthquake affected people are in need of social assistance programme. Through the programme, life style of poor people can be changed [3]. The government of Nepal (GoN) has declared providing reconstruction assistance (financial, technical and social) to these needy people. So, they empower them to lead their own recovery [1]. Through the assistance programme they could build earthquake resistance home. The government has announced providing financial assistance of NRs 200,000 to earthquake victims through banking channel into personal bank account [4].

The presence of financial institutes is very much low or absence at Village Development Committee (VDC) level rather these institutes are highly concentrated at headquarter of districts in Nepalese context. The financial inclusion rate of Nepalese is low; it is only 35% [6]. The primary motive of these institutes is to maximize the profit so they provide services at urban areas where there is a huge monetary transaction daily. Therefore, a huge number of people of remote areas are out of banking services. So, as to increase financial inclusion rate, new innovative technology called "branchless banking" needs to be used at VDC and settlement level in remote areas of Nepal.

The concept of branchless banking has been booming in developing countries. It has a huge potential to provide financial services to low-income households of remote and rural areas that are not reached by traditional banks [7]. It is the use of technology, such as mobile phones and bank cards to conduct financial transactions electronically and remotely using third party outlets known as agents, financial services provider that allows customers to use financial services without going to bank branches [8]. In addition to transactional services, it also provides basic cash deposit and withdrawal and also government remittances for the poor [9]. It has great potential to extend the

distribution of financial services with lower cost both to banks for building and maintaining a delivery channel and to customers for accessing services [10].

Statement of the Problem

The GoN has provided paper based earthquake victim identification card to all affected people who are homeless and are under temporary arrangement through manual process. Moreover, the GoN has declared to provide financial, technical and social assistance to them so that they could build earthquake resistance home as soon as possible. The distribution of financial assistance is through personal bank account. The presence of banks and financial services is very much low or absence at VDC and settlement level rather concentrate at headquarter of district. And carrying huge amount of money from district headquarters and keeping it at settlement level by earthquake victims is always of high risk.

Objectives

The main objective of this research work is to design a framework to distribute earthquake relief cash transfer through branchless banking. In order to achieve the main objective, the secondary objective is to explore proper mechanism of digitization of victims' data.

Literature Review

Nepal is the 11th most earthquake-prone country in the world. The first recorded earthquake of 1255 AD in Nepal, that killed one-third of the population of the Kathmandu Valley including the King named Abhaya Malla. The last great earthquake of magnitude 8.4 in 1934 AD resulted in more than 10,000 deaths in the Kathmandu Valley. Most of the infrastructure and major heritage sites had to be rebuilt [1].

The high magnitude of 7.6 and 7.3 earthquakes struck in a central part of Nepal on 25 May 2015 and 12 April 2015 respectively which affected 31 districts of Nepal. Out of these 31 districts 14 were highly affected. The earthquake affected districts and categories of earthquake affected districts are shown in the figure 1.

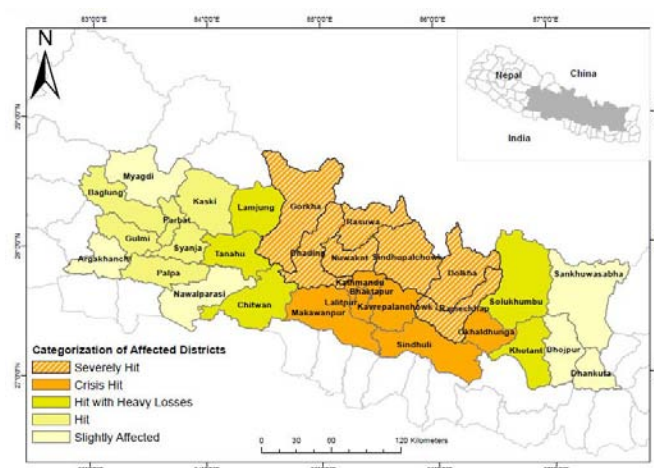


Figure 1: Categories of Earthquake-affected districts

The major earthquake and regular aftershocks killed humans and damaged private houses, schools, government buildings, heritage and many other sectors. The share of disaster effects across sectors is shown in figure 2. More than 58% of share is of social sector and 86% of social sector is housing sector.

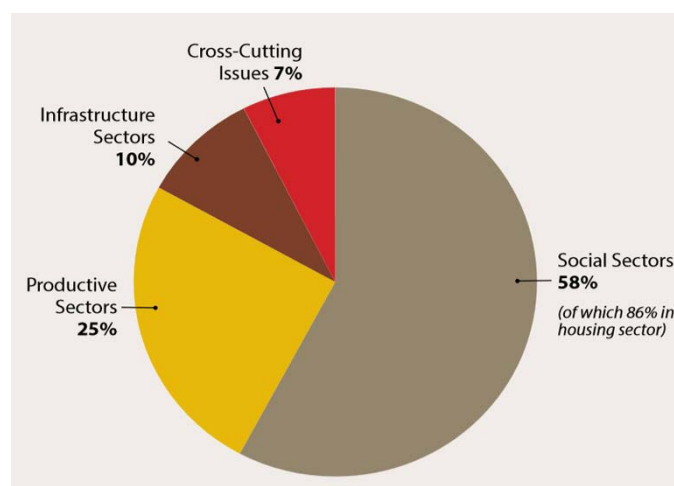


Figure 2: Share of Disaster Effects across Sectors

Figure 3 shows the number of death and injured people of 14 most affected districts namely Bhaktapur, Dhading, Dolakha, Gorkha, Kabhre, Kathmandu, Lalitpur, Makwanpur, Nuwakot, Okhaldhunga, Ramechhap, Rasuwa, Sindhuli and Sindhupalchowk. Out of these 14 districts, 3,532 people died in Sindhupalchowk district and 7,952 people injured in Kathmandu district.

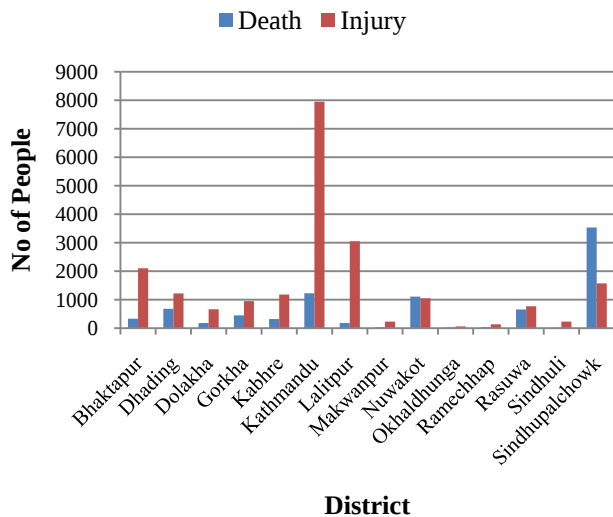


Figure 3: Number of death and injured people of 14 most affected districts
(Adapted from [2])

Figure 4 shows number of fully and partially damaged private houses in 14 most affected districts. In Dhading district, more than 81,313 numbers of private houses were fully damaged and 56,054 numbers of private houses were partially damaged in Kathmandu district.

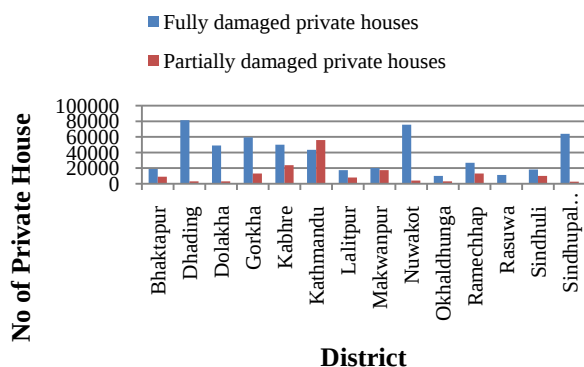


Figure 4: Number of fully and partially damaged private houses in 14 most affected districts
(Adopted from [2])

The GoN with support of different NGOs, INGOs and development partners has provided different kind of support to these earthquake affected victims. The government has provided paper based earthquake victim identification card to all affected people. These victims were provided of NRs 15,000 as quick grant for temporary settlement and NRs 10,000 for warm clothes. At present, the government has declared of providing grant of NRs 200,000 in three installments to each household through banking channel into bank accounts from local government level. In fact, victims are in need of local government for their quick response.

Service delivery is an essential function in relation between government bodies and citizens. It is a part of complex relation between government, society and citizens. The government as a key public service provider, citizens has a right to demand quality services fast, easy at moderate cost. The image of government depends on service delivery with quality services at affordable price to its citizens [11]. Through the proper utilization and implementation of technology and digital tools, the service delivery of local government could be more effective and challenges could be minimized [12]. Effective public service delivery is one of the key parameters to measure the goodness of governance. Therefore, government should be willing to formulate new strategies for effective public service delivery [13].

The rapid development of ICT has helped in exploring new opportunities for service delivery and income generation [14]. ICT is a potential tool of efficient public service delivery. It offers new possibilities for communication between people and organization and increases the quality and quantity of interaction with people. It enhances the transparency and access to organization[13]. With the implementation of ICT-enabled public service delivery, it improves access to public services, increases efficiency, transparency and accountability of government [11].

With the innovation in technologies, globalization and regulatory disruption, there has been huge changes in global payments history. The global payment networks have transformed the lives of millions and billions people and many industries that were deprived of banking facilities [16]. Technology helped banks to reach the doorsteps of the customer by overcoming the limitations on geographical/physical reach in branch banking and easing the resource and volume constraints [17]. Non-availability or limited availability of banking services in the rural areas has been the most common reason cited for considering payment “not feasible” through banks [18].

The branchless banking is a new innovative idea to reach to poor and unbanked people of rural areas. It is a strategy of distribution channels which are used to provide financial services through the growth and development of technology and helps to expand the concept of the traditional bank branch [19]. This technology has become a common mechanism to extend financial services to the economically deprived populations in the developing regions of the world [20]. The usage of branchless banking services has the potential of improving service delivery, reducing overall fiduciary risks and leakage in the system. The payments are made directly into beneficiaries’ accounts. It facilitates beneficiaries with access to the modern financial system and prospect for future financial inclusion [21]. The POS (Point of Sale) machine is very much popular for branchless banking because of its special characteristics such as light weight, resistant, equipped with printer and fingerprint sensor, online and offline mode of transaction and easy card

reader [15]. The biometrics is a feature measured from the human body that is distinguishing enough to be used for user authentication [22].

Methodology

The research paper is based on field visit experiences of the researchers and adopted qualitative techniques. The researchers have visited Dolakha, Mankwanpur, Okhaldhunga and Sindhuli districts of Nepal and interacted with district and VDC level staff. Besides, they have also interacted with banks and financial services providers, political parties, earthquake victims, etc regarding earthquake relief cash transfer through branchless banking. The researchers working experience are also used.

Proposed Framework

Based on the field visit and interaction with district, VDC and earthquake victims, it is concluded that the process of relief cash to be started as early as possible so that victims who are under temporary arrangement could settle at earthquake resistance house soon. The GoN has provided paper based victim identification card and recorded in register through manual process.

Since, the GoN decision is relief cash transfer through banking channel into personal bank account. So, the list of victim maintained in register has to be digitized soon. The central database is proposed at Government Integrated Data Center (GIDC) in Singhadurbar premise. Since, internet access from all VDCs is not possible so offline database is necessary. After data digitization from VDC level, it can be easily uploaded into central database through internet from district level.

The number of earthquake victims is high and availability of banking channel is not sufficient. Therefore, clustering of banks, their branches and branchless points has to be completed in such a way that one bank provides banking services to at least one VDC.

Once the process of data digitization is completed, the list can be sent to banks based on banking cluster. Based on the list provided by the government, bank can easily open bank account of victims and pre-filled Know Your Customer (KYC) form can be printed. The GoN can transfer required amount of money to concern bank(s) based on number of victims. And bank(s) can transfer to victim's personal bank account.

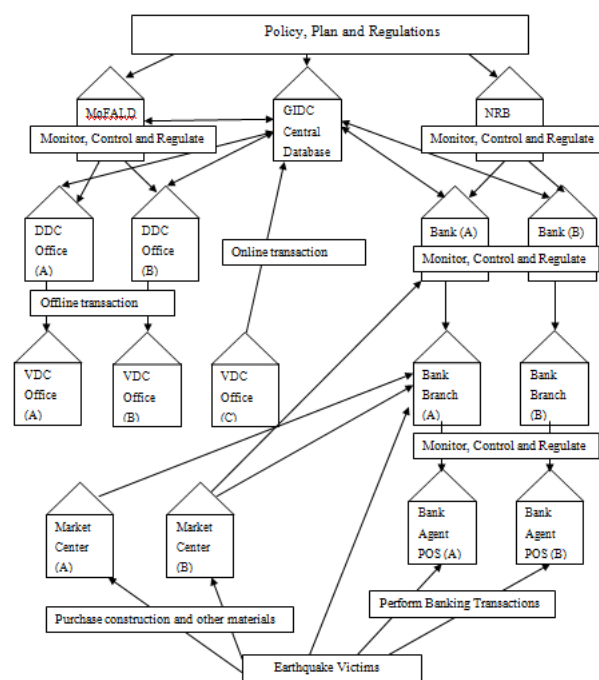


Figure 5: Proposed framework for earthquake relief cash transfer through branchless banking

The earthquake victims with their paper based card can go to bank agent and withdraw necessary amount of money easily. The bank agent uses PIN code and victim's biometrics (fingerprint) to identify the correct victim. After final verification, the agent gives physical required cash to the victims. Now, victims can easily order necessary material for construction of house from near market center.

Conclusion

The high magnitude of 7.6, earthquake struck in central part of Nepal and damaged private houses, government buildings, school buildings, heritage, etc. More than 8,856 people died and 22,309 people injured. Many people are homeless and are under temporary arrangement. The GoN has provided paper based earthquake victim card to each household. The GoN has announced of providing financial, technical and social assistance to earthquake victims so that they can build earthquake resistance shelter soon. The GoN has announced of providing financial assistance of NRs 200,000 to each household victims in three installments of NRs 50,000, NRs 80,000 and NRs 70,000 through banking channel into victim's personal bank account. It is natural that carrying a huge amount of money from district headquarter to settlement level is always of high risk. Moreover, placing a huge amount by victims who are under temporary arrangement is more risky. This research proposes a framework for earthquake relief cash transfer through branchless banking. The presence of banks and banking channels are highly concentrated at headquarter of district only. These banks are not sufficient to provide banking facilities to all VDCs of earthquake affected

districts. Because of different constraints like infrastructure, policies, human resource management, high cost, monetary transaction, etc. banks are not able to establish their branch offices at each VDC of these districts. Therefore, in order to cater relief cash transfer, branchless banking is one of the solutions which are very much easy, quick, reliable and efficient. The proposed framework definitely helps to digitize the list of victim and operate bank account with victim's personal biometrics easily. The branchless banking can easily provide banking channel to all victims at VDC level so that the relief cash transfer is easy, safe and reliable.

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References

- [1] Government of Nepal, National Planning Commission, *Nepal Earthquake 2015: Post Disaster Needs Assessment*. Vol. A, Kathmandu, 2015
- [2] <http://www.drrportal.gov.np>
- [3] World Bank, "Safety Net Programs and Poverty Reduction: Lessons from Cross Country Experiences," Washington, D.C., 1997
- [4] National Reconstruction Authority (2016), "Personal Home Reconstruction Grant Distribution Guideline 2016", Kathmandu, Nepal
- [5] <http://www.seismonepal.gov.np>
- [6] Singh, J.(2015), "Scaling Up Digital Financial Services in Rural Areas", UNCDF Mobile Money for the poor, Developing a Digital Financial Services Strategy in Nepal
- [7] Mauricio, D. and Mandrile, M.(n.d), "A New Agent for Branchless Banking in Colombia", International Development Law Organization
- [8] Cohen, M., Hopkins, D. and J. Lee, "Financial Education: A Bridge between Branchless Banking and Low-Income Clients", Microfinance Opportunities, Working Paper No. 4, 2008.
- [9] Subramanian, L. (n.d), "A Study of Branchless Banking in Achieving Financial Inclusion in India"
- [10] Ivatury, G. and I. Mas, "The Early Experience with Branchless Banking", CGAP Focus Notes, No 14, 2008.
- [11] Eigeman, J. "Service Delivery, A Challenge for Local Governments," VNG International, TheNetherlands, 2007
- [12] Fleming, P. "Transforming Local Public Services Using Technology and Digital Approaches," Local Government Association, London, 2014
- [13] Prasanna, B.R.(n.d),"e-Governance and Service Delivery-Scope and Implementation Issues", Institute of Management in Government, Kerala, India
- [14] J. McArthur, and D. Snower, "Everybody's Business: Strengthening International Cooperation in a More Interdependent World, Creating Employment, Eradicating Poverty and Improving Social Welfare," World Economic Forum, 2010.
- [15] Leger, M. "Bringing Financial Services to Emerging Countries," 2012.
- [16] Michael, F. and N. Paul, "Ending Poverty with Electronic Payments," Give Directly and Segovia Technology, 2015.
- [17] Kumar, V. A. and J. S. Chitra, "M-Banking in India: A strategic analysis of issues and challenges," International Journal of Development Research, Vol. 3, Issue, 11, pp.150-158, ISSN: 2230-9926, November, 2013.
- [18] National Planning Commission, Assessment of Social Security Allowance Program in Nepal, Kathmandu, Nepal, 2012.
- [19] Deloitte, "eTransform Africa: Modernising Government through ICTs," 2012.
- [20] Anand, M. B. and D. L. Sreenivas, "A study on branchless banking in India," International Journal of Development Research, Vol. 3, Issue, 8, pp.001-006, August, 2013.
- [21] Pandey, J. and P. Joshi, "Testing Branchless Banking to Deliver Cash Transfers," UNDP Nepal Development Advocate Nepal, Year 2, Issue I, ISSN: 2362-1435, pp 36-38, April-September 2014.
- [22] Gorman, L. O. "Comparing Passwords, Tokens, and Biometrics for User Authentication", Proceedings of the IEEE, Vol. 91, No. 12, Dec 2003.

Generalized Ecosystem of Ethnic Cultural Industry and Evolution Towards a Cyberspace

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Abstract

Ethnic cultural industry is the important engine of promoting regional economic development. Due to limited consumption ability in the local market, the most potential consumers of ethnic cultural products and services are mainly from economic developed areas. Therefore, how to improve its industrial influence forces and market scale through Internet has been the key development strategy. However, a series of issues such as cross-cultural cognition, refactoring of industrial chain, and evolutionary pattern should be studied systematically in the transformation process. Based on a comprehensive summary of the existing researches, this paper analyzed the structure, ecological chain, and sustainable mechanism of ethnic cultural industry from the perspective of generalized ecosystem, and discussed the above issues in its evolution towards a cyberspace. For the reference, a case study of Naxi ethnic culture industry in western China was offered.

Keywords:

Ethnic Cultural Industry, Industrial Evolution, Generalized Ecosystem, Cross-cultural Cognition, Cyberspace

Introduction

Ethnic cultural industry refers to this industry form which utilizes the ethnic cultural resources to provide products and services with distinctive regional and national features [1]. From the development history of world culture industry, ethnic cultural industry played as the important engine of promoting regional economy [2]. However, due to limited consumption ability in the local market, the most potential consumers of ethnic cultural products and services are mainly from economic developed areas [1]. The widespread application of Internet, e-business, and social media such as WeChat, QQ, etc., as well as various online service platforms, have provided new opportunities for the development of ethnic cultural industry towards a cyberspace. In that process of industrial transformation, a series of issues such as cross-cultural cognition, refactoring of industrial chain, and evolutionary pattern should be

thought systematically.

In recent years, how to improve the influence forces and market scale of ethnic cultural industry with the help of Internet's superiorities has been an important national strategy for the development of cultural industries in the world. This also attracted the attention of many scholars. Through a comprehensive analysis, we hereby summarized the research findings into the following three aspects [1][3][4].

Firstly, the existing researches have revealed that ethnic cultural industry is usually a resource-based industry at its beginning with the characteristics of "path dependence" in development, and therefore needs to conduct the capital, technology, and talents from economic developed areas. In the transformation from local market into an external development pattern, it will deal with the following issues: (1) innovation according to new demands of the oriented external market and protection of the inherent cultural spirits; (2) cross-cultural cognition and conflicts caused by cultural communication obstacles; (3) cultural brand shaping and integration with the related industries to improve added value. Secondly, the influence of Internet on the development of ethnic cultural industry has been highly concerned. Many empirical studies have exhibited that Internet is an "enabler" which can help to realize the rapid development of ethnic cultural industry, and provides the new model of networking industrial cluster with optimized integration of elements at low cost. Besides, when benefiting from the new market and economic income, the local regions also obtain new concepts, knowledge, and innovative skills. Thirdly, the evolution of ethnic cultural industry towards a cyberspace is systemic innovation affected by many factors such as concepts, infrastructure, laws and regulations, cross-cultural cognition, and the cultivation of professional talents, etc. Therefore, the pattern, pathway, and policy support need to be researched deeply.

In the natural world, the sustainable development mechanism of an ecosystem gives us a lot of inspiration in exploring the complex interactions and dynamical evolution of industrial system. In the early of 1960s, researchers already found the similar behaviors and characteristics

between creatures and socioeconomic organizations. In 1980s, Nelson and Winter, Freeman and Hannan, etc. established the theory of organization ecology [5][6]. It has been successfully applied to analyze the complex adaptive system in technological innovation, industrial evolution, and social development [1]. However, later studies found that there are still many differences between a socioeconomic system and the natural ecosystem [7]. Therefore, Dai presented the concept of Generalized Ecosystem (GE) in 2006, and defined it as the abstract model which has the common structure, rules and characteristics existing both in natural ecosystem and socioeconomic system [8]. According to the viewpoint of generalized ecosystem, the evolutionary process of ethnic cultural industry towards a cyberspace is essentially a process for that industry to reconstruct its ecological chain and community in the Internet habitat, and realize a new succession across regions [1]. This paper aims to provide a new perspective of generalized ecosystem for the analysis of that transformation process, and explores the appropriate evolutionary pattern.

Generalized Ecosystem of Ethnic Cultural Industry

The Structure of Generalized Ecosystem

In a generalized ecosystem, the organisms gathering in a certain space and specific period form a “food” chain. The collection of same species in that “food” chain is termed “population”, and all the different “population” in a whole

“food” chain compose a “community”. Therefore, the community in a generalized ecosystem can be modeled by a group of intelligent agents.

If G represents a community containing n organisms, and is divided into m ($m \geq 2$) population according to their different functions, then G can be expressed as:

$$G = \{Agent_1, Agent_2, Agent_3, \dots, Agent_n\}, \text{ and}$$

①

$$\forall Agent_i (i = 1, 2, 3, \dots, n), Agent_i \in C_j (j = 2, 3, 4, \dots, m);$$

C_j are the different population subsets of G , and compose a whole “food” chain.

From the theory of generalized ecosystem, ethnic cultural industry is composed of different functional units by Industrial Investors (INR), Cultural Resource Supplier (CRS), Cultural Product and Service Producers (PSP), Sale and Marketing Intermediary (SMI), Cultural Product and Service Customers (PSC), Infrastructure and Environment Providers (IEP), and the Governmental Administrative Department (GAD) as shown in Figure 1. In this system, the related units play as functional roles of producers, consumers, and decomposers in a natural ecological system, which maintain the balance in process of dynamic development? Through the agent-based simulation analysis, we found that the optimized structure of generalized ecosystem existed under a certain environmental conditions, which can maximize the benefits of each participants and ensure the sustainable development of [1][7].

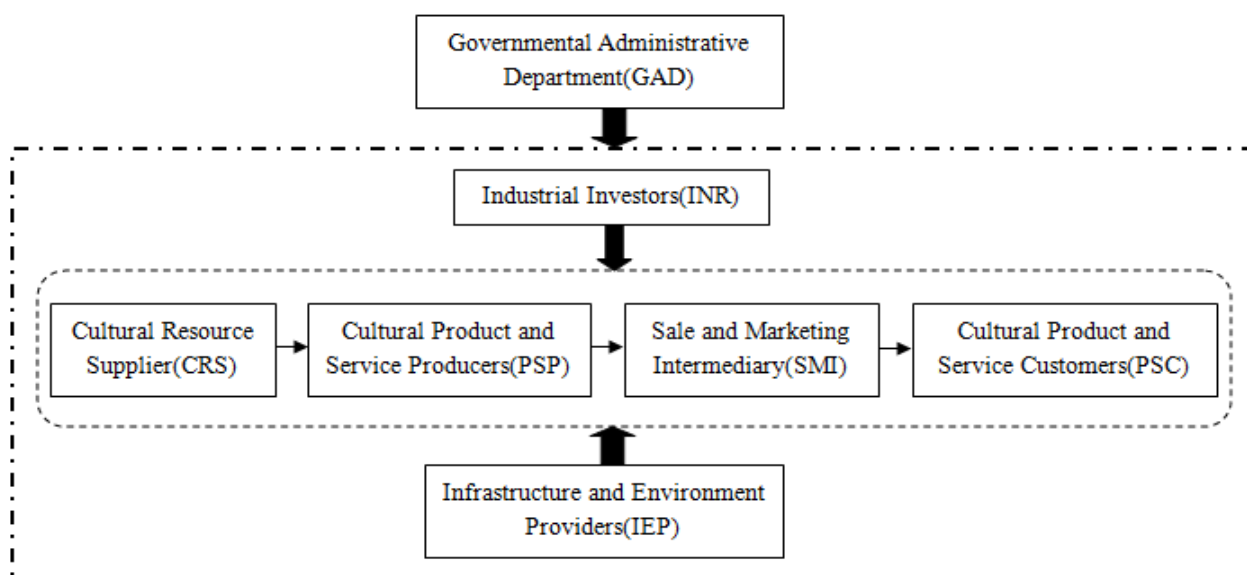


Figure 1- Generalized Ecosystem Structure of Ethnic Cultural Industry

Ecological Chain and Sustainable Mechanism

The ecological chain in a generalized ecosystem refers to the “energy flow” relationships in metabolism of a population, which is the measures of effectiveness in a “food” chain, and can be understood as the value flow

relationships in a socioeconomic system. Figure 2 shows the ecological chains between the related functional units. The sustainable mechanism of a generalized ecosystem should satisfy the following conditions [1][9]-[11]: (1) A complete series of functional units to realize each circles in the ecosystem; (2) Positive net income or return for each

functional unit to ensure its development in metabolism;
and (3)Effective adjustment mechanism to maintain the

dynamicbalance of the above circulation system.

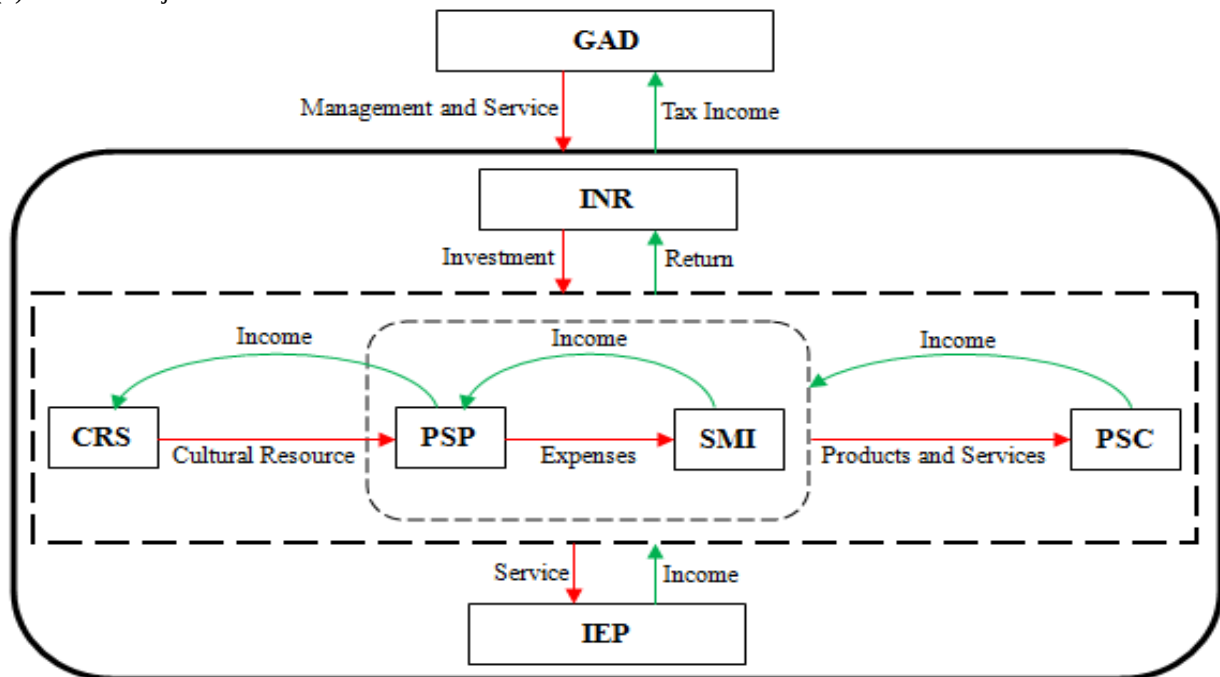


Figure 2- Ecological Chain of Generalized Ecosystem

Evolution Towards a Cyberspace

Cross-culturalCognition

The most important issue to be considered in the evolutionary process of ethnic cultural industrytowards a cyberspace is the changes of Product and Service Customers(PSC). Different from other competitive products, the products and service of ethnic cultural industry usually have unique features and lack of competitors in a new market. Nevertheless, how to enablethe consumers to experience the charm and value of those products and service, and therefore inspires their strong motivation of consumption, is the foundation of a successful evolution in the generalized ecosystem. This issue involves a deep study of cross-cultural cognition. For example, Figure 3 shows the different favorite styles of people in Shanghai and Beijing, China.

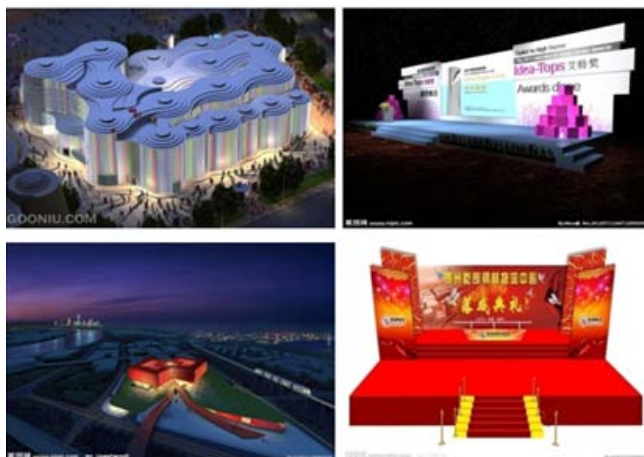


Figure 3- Different Favorite Styles of People in Shanghai(upper) and Beijing(lower), China
People in Shanghai enjoy the fashionable shape and elegant appearance as in the upper designs, however, People in Beijing adoredistant view, red color, and water as in the under pictures. Although we can analyze the cognitive characteristics of the consumers through the traditional questionnaire or survey methods, but it is still difficult in providing a product design or marketing solution which has thepredictable and perfect effects in a real market.

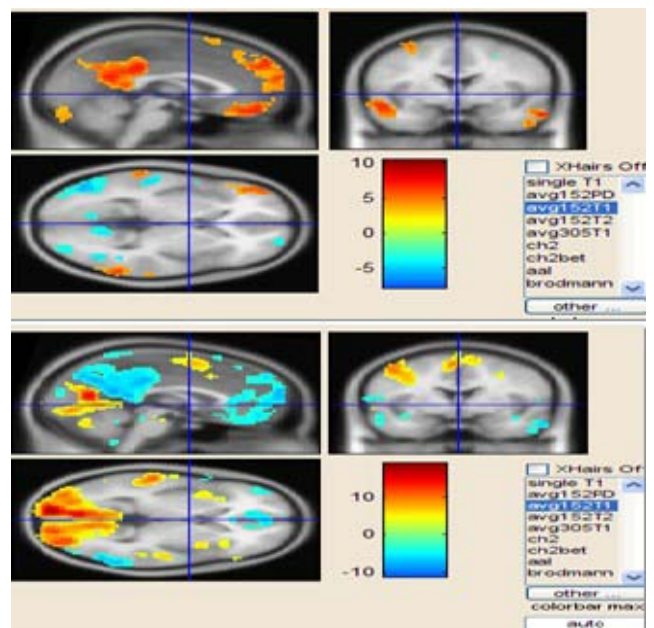


Figure 4-Brain Reactions to Different Designed Styles of Ethnic CulturalProducts

Owing to the development of modern neural experimental equipment such as fMRI (functional Magnetic Resonance Imaging), we can observe the neural reactions in the brain, and understand the precise experience of consumers in their cross-cultural cognitions. For example, Figure 4 is the brain reactions of a foreign consumer to the different designed styles of ethnic cultural products in our fMRI experiment. Obviously, the style corresponding to the picture below can arouse more attentions and experience of the consumer. The design of cultural products and service according to the target consumers' neural cognitive characteristics has been an important field in Neuro-culture research.

Refactoring of Industrial Chain

The evolution of ethnic cultural industry towards a cyberspace is a systematic innovation which requires establishes a new ecological community as well as the ecological chain in the cyberspace. This will lead to the refactoring of its industrial chain in the following aspects: (1) the participation of cross-regional industrial partners. Especially, the participants from economic developed areas play an very important role in the new industrial chain. Compared with the relatively weak industrial base and innovative ability in the local area, economic developed area not only has the advantages of talents, funds and the advanced experience of Internet application, but is also

itself the target market of ethnic cultural products and service. (2) the reconstruction of marketing channels and distribution system. A variety of social media, online service providers, and e-commerce platforms will become the main body of the industrial chain in marketing and sales. (3) the great changes in specialization of industry chain and operation mode. Development and design tasks of products and service will be separated from the producers, and assigned to professional cooperation organizations to satisfy the different requirements in the target markets. As well, multiple cross-regional production bases may be required due to the limited production capacity and infrastructure supporting ability in the local area. Therefore, a networked collaborative innovation and industrial operation in the cyberspace will become the main mode.

Evolutionary Pattern towards Cyberspace

The evolution of ethnic cultural industry towards a cyberspace is a systematic and dynamic process. In order to illustrate the evolutionary pattern, we conduct a case study of Naxi ethnic culture industry. Lijiang is a small town located in Yunnan Province, western China. It is very famous for natural landscapes and Naxi ethnic culture, and has developed an abundance of ethnic products such as clothing, painting, opera and dance performances as shown in Figure 5.



Figure 5-Naxi ethnic cultural products in Lijiang, western China

In the view of generalized ecosystem, the evolutionary process of ethnic cultural industry towards a cyberspace may be divided into three stages: import of the Internet, reconstruction of ecological chain, and virtual clustering in the cyberspace. By our investigation, an evaluation of the industrial development degree shows that the Naxi ethnic cultural industry in Lijiang has just entered the initial stage of import of the Internet[1], which is characterized by the utilization of WeChat marketing and mobile order

processing.

In the evolution towards a cyberspace, the first step should be taken is a deep analysis of the connotation and characterization of Naxi culture, which can be perceived profoundly by the potential consumers under cross-cultural environment. Afterwards, the design may be more highlighted in characteristics, and causes the strong interest of consumers in the development of products and service. The next step at the stage of import of the Internet will be

appropriately an O2O (on-line and off-line) e-commerce. It aims to bring the new charm of ethnic culture to consumers, enable them to deeply realize the cultural value, and therefore arouse strong consumption motivations, by the integrated marketing communications of store display, tourism and Internet marketing, and large ethnic opera and

dance performances such as “Charming Lijiang”, “Impression Lijiang”, etc. On this basis, the reconstruction of ecological chain and virtual clustering in cyberspace will be following stages in the evolutionary process as shown in Figure 6.

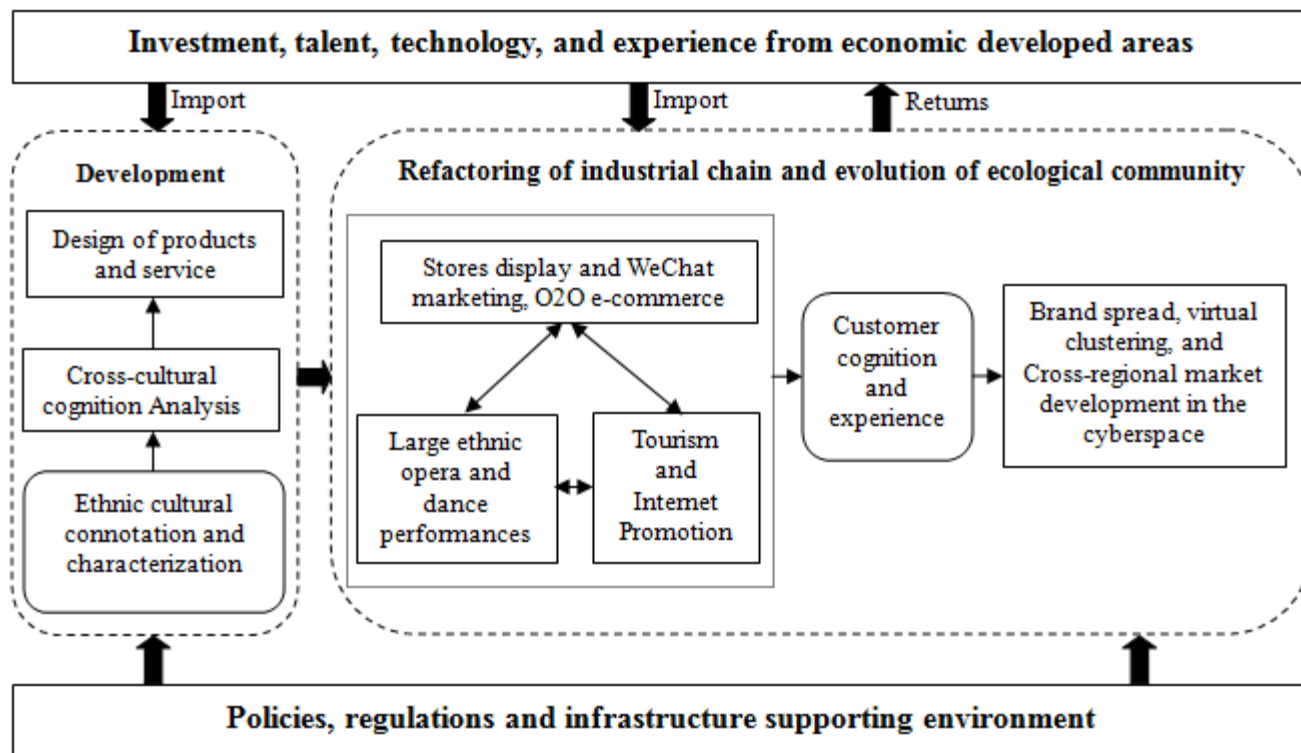


Figure 6- Evolutionary Pattern of Naxi Ethnic Cultural Industry Towards a Cyberspace

Conclusion and Discussion

Due to limited consumption ability in the local market, evolution of ethnic cultural industry towards a cyberspace has been the key strategy for its development. Based on the theory of generalized ecosystem, this paper analyzed the structure, ecological chain, and sustainable mechanism of ethnic cultural industry, and discussed the related issues in that process as well as its evolutionary pattern. Research work of this paper provided an ecological theory and method for the analysis of ethnic cultural industry's development. A dynamic simulation of evolutionary pattern, process, and its supporting environmental conditions will be the further study on this research.

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References

- [1] Zhou, X., *The Ecological Community Model of Ethnic Cultural Industry in Western China*, Chengdu, China: Sichuan Conservatory of Music, 2016.
- [2] Bhikhu, P., *Rethinking Multiculturalism Cultural Diversity and Practical Theory*, Macmillan Press Ltd, 2000.
- [3] Guo, M. L., "Research on Development Countermeasures of Cultural Industry in China Western National Areas," *Academic Exchange*, Vol.2013, No.8, 2013, pp. 200-203.
- [4] Chen, W. H., "Mediatizing the Network Model of Cultural Capital: Network Diversity, Media Use, and Cultural Knowledge Along and Across Ethnic Boundaries," *Social Networks*, Vol.40, 2015, pp.185-196.

- [5]Nelson, R. R. andWinter, S. G., *An Evolutionary Theory of Economic Change*, Cambridge: Bellknap Press, 1982.
- [6]Hannan, M. T. and Freeman, J. H., *Organizational Ecology*, Cambridge: Harvard University Press, 1989.
- [7]Dai, W. H.,*Ecological Community Pattern and Strategy of Independent Innovation: Some Pillar Industries in Shanghai*,Project Report of Shanghai Municipal Science and Technology Commission, 2003.
- [8]Dai, W. H., “Generalized Ecological Community: Theory and Application in IT-driven Emerging Industry,”*Advances in Systems Science and Applications*, Vol.10, No.4, 2010, pp.666-670.
- [9]Huang, L. C.,“The Subsistent Mechanism of Regional Technological Innovation Ecosystem,”*Scientific Management Research*, Vol.21, No.2, 2003, pp.47-51.
- [10]Jeffries, C., “Qualitative Stability and Digraphs in Model Ecosystems,”*Ecology*, Vol.55, 1974, pp.1415-1419.
- [11]May, R. M.,“Patterns of Species Abundance and Diversity,” In: Caddy M L, Diamond J M. eds. *Ecology and Evolution of Communities*, Cambridge: Harvard University Press, 1975: 81-120.

The Impact of IT Service Provider Switches on XBRL Quality

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Abstract

This study investigates companies' switch decisions on IT service providers of eXtensible Business Reporting Language (XBRL), which is an innovative business and financial reporting technology mandated by the Securities and Exchange Commission (SEC). We explore IT service providers' characteristics that may affect the switch decision and whether the switch would result in better XBRL quality. Our findings show when the service provider has more clients in the same industry or has longer relationship with the client, it is less likely for the client company to switch. In addition, larger companies and companies with better performance are more likely to switch to public service providers. The switch is also related to better XBRL quality measured by the use of standard and extension elements. This study not only contributes to the literature in both switch of IT service provider and XBRL but also has policy implications for SEC in better implementing XBRL.

Keywords:

IT Service Providers, Extensible Business Reporting Language (XBRL)

Introduction

The eXtensible Business Reporting Language (XBRL) is an innovative business and financial reporting technology that has been implemented around the world to enhance internal and external reporting, electronic filing, and sharing of information [34]. The use of XBRL thus is promised to IT revolutionize financial reporting by providing improved consistency, access to and transparency of data contained in financial reports. A growing body of research has investigated the economic consequences of XBRL adoption, including lower cost of capital [21, 28], improved information quality [38], reduced information risk [18], increased analyst coverage, forecast accuracy [21, 24] and stock price synchronicity [9], firm performance [37], foreign investors' interests [36] as well as improved firm disclosure [4, 5].

However, the introduction of a new technology into the financial reporting process can be risky, disruptive and costly and the promised benefits cannot be taken for granted. The SEC's most recent observations note that smaller filers constitute 96% of the situations when a filing is made up of highly customized tags (custom tag rates are more than 50%) where, in many cases, using standard tags should have sufficed. Using a prominent IT service provider is not necessarily a cure; one IT service vendor

was identified as being responsible for one-third of the companies identified as having high and unjustified custom tag rates. Those costs, efforts, and challenges bring questions to the potential of XBRL in reducing costs, reducing risks, greater transparency, and clearer communication from companies directly to stakeholders, and better oversight.

In light of this concern, we use mandatory XBRL filers to examine the efficacy of XBRL-tagged information from the perspective of preparers/filers and address the following two questions: First, we examine how and why filers select and switch their IT service providers. Second, we further investigate whether the switch is related to different quality levels of XBRL-formatted information.

Our results first demonstrate when IT service provider is an expert in a specific industry, the client is less likely to switch to a new provider. When IT service provider has a longer tenure with the client, the client is also less likely to switch to a new service provider. In addition, larger firms and firms with better performance are more likely to switch to public providers. In addition, our findings suggest that the switch results in fewer extension elements and fewer standard elements used in filings. This effect is more pronounced after switching to a public provider compared to a private provider.

This study contributes to the growing number of academic studies on the economic consequences of XBRL adoption [5, 10, 18, 21, 24], and echoes recent calls for further research on XBRL quality [7, 8]. This research also has policy implications for XBRL regulators by helping the public better understand the mechanisms of the market economy as the efficacy and completeness of XBRL taxonomies governed by the SEC continues to be a concern for XBRL adopters and external users.

Research background

According to the Commission's Division of Economic and Risk Analysis in 2014¹, there has been a large increase in the number of third-party IT service providers from 11 in 2009 to approximately 34 in 2013. Why does the choice of service providers matter? Precise implementation of XBRL is essential for firms' communications with the financial markets. As the SEC noted, each piece of business and financial data with a standardized official tag (element) from an agreed on taxonomy (i.e., the official U.S. GAAP elements) improves information asymmetry [e.g., 5, 10,

¹ See <http://www.sec.gov/dera/reportspubs/assessment-custom-tag-rates-xbrl.html>.

18], reduces investors' information acquisition and processing costs [15], and promotes more firm-specific information in evaluating securities [9]. Using the XBRL mandate as an exogenous shock to information processing costs, Blankespoor [4] finds that firms increase their quantitative disclosures following the adoption of XBRL detailed tagging requirements. She interprets the evidence as consistent with the notion that information processing costs to investors can be significant enough to impact a firm's disclosure decisions. In addition, the XBRL-induced information environment facilitates external monitoring and scrutiny by outside users of accounting information, which in turn constrains managerial opportunism in financial reporting, especially for firms that use more standardized official elements than customized extensions [17]. The use of standard versus extension elements may be related to managers' earnings management behavior as the increased transparency through XBRL may help users detect the opportunistic behavior [14, 20].

However, several research has raised questions about the quality of XBRL-tagged data through identification of numerous inconsistencies in XBRL documents [7, 8, 13] and addressed assurance issues related to the use of XBRL [e.g., 6, 29, 35]. In fact, producing high-quality XBRL data is not just a compliance exercise since the safe harbors are gone. Most filers now bear full liability for mistakes in their XBRL disclosures. Thus, for every filer, finding the appropriate service provider to the preparation and implementation of XBRL disclosures is absolutely crucial.

IT Service provider switch

The XBRL preparation and implementation range the selection of vendors along a continuum of differing levels of involvement. The XBRL US / AICPA survey in January 2010 shows that of the first time filers, albeit the very largest filers, 57% required over 120 hours, plus internal resources, to complete their first submissions due to the complexity of the reporting process. In fact, 52% of all large accelerated files use outside XBRL services or tools to prepare their XBRL documents.² However, as with any new and unfamiliar process, some firms decide to switch IT service provider due to the use of their own staffs and resources to map, tag, and review their XBRL disclosures, which allow them to have greater control over all filing processes and to learn more about XBRL and the individual tags. The Financial Executives Research Foundation [11] recently surveyed 416 finance executives from corporations of various sizes and found that many executives favored internal XBRL filings. Those executives not planning on outsourcing their XBRL filings went up 16% among those required to file XBRL in 2009. Another reason behind the frequent switch is a growing dissatisfaction with IT service providers regardless insourcing or outsourcing contracts. It simply amounts to inappropriate processes and inadequate controls because of overreliance on software vendors and IT service providers

that claim their automated tools produce high quality documents without management's understanding about the U.S. GAAP financial reporting taxonomy or the SEC's requirements. In some cases, the corporate filing process must be handled internally due to the complexity of reporting requirements. If there are last-minute changes to filings or other timely issues, client firms do not have enough time to adjust their filings with the SEC or other agencies, which in turn results in late filings.

As XBRL represents both a technological and a financial reporting innovation, firms look for exploiting costs and benefits in terms of IT service provider selection and switch. Switching the practices and decisions of leading organizations often reflect deeper knowledge about the markets and technological trajectory of the industry in general. Such IT service provider switches are frequently driven by a possible spillover, which occurs through two channels.

First, spillover occurs if the firm's industry leader has concerns about the risks of XBRL implementation. Many industry members view the largest firm in the industry to have superior information and better capability due to slack resources devoted to external research and market analysis, making them ideal referents to imitate, especially from small, financially constrained firms [31]. Industry leaders are the most prominent figures in the industry and therefore their XBRL disclosure practices will likely have the most influence. For example, *Nielsen has been outsourcing the technical aspects of XBRL tagging to RRD (the largest XBRL creator/service provider; approximately completed 35% of XBRL filing submissions by summer 2010), an outsourcing/external solution, however, as the firm's strategy is evolvingto bring the process inhouse using ActiveDisclosure by RRD (a cloud vendor tool) and is currently using a hybrid approach that combines both the RRD outsource and cloud tools.*[11]

Second, a firm closely monitors what their rivals do in capital markets before any switch. A firm may either imitate or distinguish itself from its rival. For instance, *In July 2012, Cisco switched from an outside service provider to WebFilings, but still maintains the outside service provider for printing and selected SEC filings. The reason for the switch was because of (1) obtaining more control over the change and filing process, (2) dealing of "pre-work" eight weeks before the actual filing, and (3) having the capabilities to do the tag-selection in-house.*[11]

After observing the rival's risk factor being questioned regarding XBRL quality, a firm may switch service providers by applying a combination of internal and external resources to prepare XBRL filings due to an increase in the self-creating approach over the third party full-creating approach in order to further integrate the XBRL creating and submission into the financial reporting process.

Methods

We first use the monthly Really Simple Syndication (RSS)

² See <http://ww2.cfo.com/regulation/2013/03/the-xbrl-factor/>

feeds archived from EDGAR,³ the program used for all interactive data submitted to the SEC from June 15, 2009 to January 30, 2015.⁴ From this initial sample, we first exclude 32,065 submissions that are not qualified.⁵ The resulting sample pool consists of 10,164, 20,096, 39,607 first-, second-, and third- year interactive submissions from the SEC site. We further remove 3,688, 7,685, 15,988 submissions that have missing values in Compustat. The final sample consists of 6,476, 12,411, 23,609 firm-filing observations from the Phases 1, 2, 3 adopters, respectively. Table 1 demonstrates the number of firm-filing observations based on the XBRL service providers. For each service provider, we categorize it into public service provider or non-public service provider (denoted as *PUBPROVIDER* equal to one if the service provider is a public provider, and zero otherwise). We define a service provider to be a public service provider if it is a publicly-traded firm. If it is not a publicly-traded firm, then it is defined as a private service provider or unidentified. Please notice that 5,053 firm-filing observations in our sample do not have clear information indicating whether the XBRL service provider is a public provider or a non-public provider; thus these observations are excluded from our later analyses. In our sample, 45,041 firm-filing observations are generated by public XBRL service providers while 19,746 observations are based on non-public service providers.

Table 1

	Public	Non-Public		Total
		Private	Unidentified	
2009	670	0	6	676
2010	2,712	4	80	2,796
2011	7,948	14	1,594	9,556
2012	11,365	1,717	4,121	17,203
2013	11,107	1,947	4,465	17,519
2014	11,079	1,713	3,974	16,766
2015	160	19	92	271
Total # of Obs.	45,041	5,414	14,332	64,787

Table 1 Panel B provides the number of observations for each of these switches. Based on the provider information, we document whether a firm switches to a different service provider, which is the main variable of interest in our analyses. There are two categories of the switch: (1) switch to a public service provider (denoted as *SWITCHPUB* equal

to one if a firm switch to a public service provider, and zero otherwise) or (2) switch to a non-public service provider (denoted as *SWITCHNONP* equal to one if a firm switch to a non-public provider, and zero otherwise). For *SWITCHPUB*, a firm may switch either from a non-public provider or a public provider to a different public provider. For *SWITCHNONP*, similarly, a firm may switch from a public provider or a non-public provider to a different non-public provider.

Table 1-Panel B

Filing Year	No Switch	Switch			
		Switch to public		Switch to Non-Public	
		Non-Pub to Pub	Pub to a Diff Pub	Pub to Non-Pub	Non-Pub to a Diff Non-Pub
2009	296	0	25	1	0
2010	1,812	3	256	7	2
2011	5,651	47	1,013	17	27
2012	14,199	124	1,581	743	387
2013	16,135	188	722	157	259
2014	16,215	71	191	71	214
2015	262	2	1	1	5
Total # of Obs.	54,570	435	3,789	997	894
Phase I	8,287	81	839	73	12
Phase II	15,749	139	1,707	200	73
Phase III	30,534	215	1,243	724	809

We use Equation (1) to examine why client firms switch service providers, which is estimated with multinomial logistic regression model with year and industry fixed effects and firm clustered standard errors:

$$SWITCHLEVEL_{t+1} = \alpha_1 + \alpha_j ProviderCharacteristic_{tst} + \alpha_k FirmCharacteristics + \varepsilon_t \quad (1)$$

where *SWITCHLEVEL* equals zero when there is no switch; equals 1 when a firm switches to a different public provider; and equals 2 when a firm switches to a different non-public provider. For provider characteristics, we consider both *EXPERT*, that captures the number of clients a service provider has in the two-digit SIC code industry at the end of the XBRL filing quarters, and the number of years the incumbent service provider has provided services (denoted as *PROVIDERTENURE*). The experience has been identified to be a critical element in affecting XBRL quality [11]. Our control variables for firm characteristics are motivated by prior research. First, we control for the size of the firm (*SIZE*) using the natural logarithm of total assets at the end of each quarter. The market to book ratio (*MB*) captures the growth potential perceived in the market, [19]. The need to control for the past financial performance of a firm (*ROA*) [3, 22, 23, 32].

To further consider financial health and risk level, we control for a firm's financial loss (*LOSS*) [27]. In addition, financial risks increase as a firm's financial leverage increases [19], and highly leveraged firms tend to disclose more financial information to reassure creditors and to signal their confidence to the public markets [25]; thus, we include the leverage ratio (*LEVERAGE*). In addition, leverage and market-to-book ratio capture a firm's financing decisions and the importance of intangibles, which may result in different reporting schemes of

³ See <http://www.sec.gov/Archives/edgar/monthly>.

⁴ Note that the Commission voted on April 4, 2009, to allow a mandatory program of filing versions of registrants' financial statements (SEC 2009). For our sample of mandatory XBRL adopters, only 32 filers chose to adopt the SEC mandate early and begin filing the XBRL exhibit in April 2009. The results remain unchanged if these firms' observations are included.

⁵ We restrict our investigation to 10-Q and 10-K filings, thereby excluding 32,065 unqualified submissions. For example, other filings (i.e., 6K, 8K, 10Q/A, and 10K/A), Voluntary Filing Program (VFP) filings, and unqualified public floats for Phases 1 and 2 (i.e., market floats below \$5 billion and \$700 million for the Phase 1 and 2 samples, respectively) are not qualified for this study.

financial reports and levels of standard or extension elements [2]. Finally, we control for the fixed industry and year effects.

Research question 2 is concerned with whether service providers differ in their propensity to provide the quality of XBRL. We use Equation (2) to examine this research question. Equation (2) is estimated using ordinary least squares (OLS) models with year and industry fixed effects and firm clustered standard errors.

$$ChangeinQuality_{t+1} = \alpha_1 + \alpha_2 SWITCH_t + \alpha_3 \sum Controls_t + \varepsilon_t \quad (2)$$

where *ChangeinQuality* is one of the following variables: (1) *ANEWEXTRATIO*: change in the ratio of new extension elements in the filing from quarter *t* to quarter *t*+1, (2) *ANEWSTNRATIO*: change in the ratio of new standard elements in the filing from quarter *t* to quarter *t*+1, (3) *AUSED EXTRATIO*: change in the ratio of used extension elements in the filing from quarter *t* to quarter *t*+1, and (4) *AUSEDSTNRATIO*: change in the ratio of used standard elements in the filing from quarter *t* to quarter *t*+1. These four variables are used to capture the change of elements in filings. We consider both standard (*STN*) and extension (*EXT*) elements in our analyses and take into account the ratio of new or used elements as a proxy for the quality of XBRL filings. Switch includes four different possible switches as defined in the previous subsection, namely, *SWITCHPUB*, *SWITCHNONP*, *NONPTOPUB*, and *PUBTONONP*. Control is a vector of control variables, as explained in relation to Equation (1).

Results

Descriptive Statistics

Un-tabulated results show that, on average, there are fewer new extension elements (-0.026) or new standard elements (-0.013). In addition, about 64% of the firm-filings in our sample are generated by using the tool provided by public service provider. About 6 % of the firm-filings switch to a different public provider while 2.5% of them switch to a different non-public provider. In our sample, the firms have an average total assets (after logarithm transformation) of 6 billion dollars and are about 21 years old. The firms in our sample, on average, have a negative return on assets. Last, the service providers, on average, have about 48 clients in the two-digit SIC code industry.

Public and non-public providers are very different in all the characteristics in terms of the mean or median differences. Larger firms, older firms, and firms with better performance use the tool provided by public providers. In addition, when we compare the descriptive statistics for switching to public providers and switching to non-public providers, the firm characteristics of these two groups are significantly different. However, the change of the use of new extension or standard elements is insignificant across the two groups. When we compare the groups of switching from non-public to public provider and switching from

public to non-public provider, the non-public to public provider group is smaller in terms of the logarithm of total assets and volatility of return-on-assets.

We also check for the Pearson correlations of the variables. In general, service provider switches are significantly negatively correlated with XBRL quality. None of the correlations are above 0.5, and the highest variance inflation factor (VIF) in our regression is about 10 except for *SIZE* (about 13), which is at an acceptable level of the multicollinearity problem threshold of 10 [26]. Our examination of the standard errors and size of the coefficients also shows that they are not sensitive to the inclusion or exclusion of the highly correlated variables, indicating multicollinearity is unlikely to be problematic [16].

Results for IT service provider switch model (Eq.1)

Our main results are given in Table 2 and Table 3. As mentioned earlier, we use Equation (1) to explore why a firm switches to a different XBRL service provider. Equation (1) is estimated with multinomial logistic regression model and the base case is no switch. That is, the findings are compared to the case when there is no switching. The result is given in Table 2. Table 2 shows that compare to the case when there is no switching, the service provider's number of clients in the industry would reduce the possibility of switching to both public and non-public providers. This finding suggests that when the service provider is an expert in a specific industry, the client is less likely to switch to a new provider. The finding is similar for the tenure of the provider with the client. Specifically, when the service provider has a long tenure with the client, the client is less likely to switch to a new service provider. In addition, larger firms and firms with better performance are more likely to switch to public providers.

Table 2 (Eq.1)

	Switch to A Diff Pub Provider SWITCHLEVEL = 1	Switch to A Diff Non-Pub Provider SWITCHLEVEL = 2
Intercept	-3.639*** (-7.82)	-0.892* (-1.83)
EXPERT	-0.002*** (-5.00)	-0.011*** (-13.58)
PROVIDERTENURE	-0.473*** (-58.27)	-0.519*** (-35.88)
SIZE	0.288*** (34.29)	-0.093*** (-10.80)
LEVERAGE	-0.036 (-1.19)	-0.001** (-2.51)
MB	0.000 (1.32)	0.000 (1.21)
LOSS	-0.077* (-1.85)	-0.036 (-0.68)
ROA	0.008** (2.15)	0.001 (1.11)
N	56,077	
adj. R ²	0.299	

t statistics in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$

Results for XBRL quality model (Eq.2)

We now change our focus to the association between switch and XBRL quality. There are four models in Table 3.

The dependent variables for Model (1) and Model (2) are *ANEWEXTRATIO* and *ANEWSTNRATIO* respectively.

These two models are used to test the association between switch and the change of new extension or standard elements in filings. For Model (1) and Model (2), larger firms and firms with better performance have fewer new extension and standard elements (coefficients of *SIZE* and *ROA* are significant negative) but firms with more segments (*NUMSEG*) have more new extension and standard elements. In addition, we observe a negative association between switch and the change in using new extension or standard elements. Such effect is larger when switching to a public provider compared to a non-public provider. This finding suggests that when switching to a new provider, there are fewer extension elements and fewer standard elements used in filings. This effect is more pronounced after switching to a public provider.

Different from Model (1) and Model (2), the dependent variables for Model (3) and Model (4) are *AUSEDEXTRATIO* and *AUSEDSTNRATIO* respectively. These two models are used to validate our results in Model (1) and Model (2). That is, if we observe a negative association in Model (1) and Model (2) for new extension and standard elements, we would expect to observe a positive association for used extension and standard elements. As expected, we consistently observe a positive association between switch and the change in using used extension or standard elements. Similarly, the positive effect is larger when switching to a public provider than to a non-public provider.

Table 3 (Eq.2)

	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	0.259*** (6.20)	0.156*** (6.95)	-0.156*** (-6.95)	-0.256*** (-6.14)
<i>SWITCHPUB</i>	-0.114*** (-12.58)	-0.078*** (-12.53)	0.078*** (12.53)	0.111*** (12.29)
<i>SWITCHNONP</i>	-0.076*** (-5.61)	-0.052*** (-5.84)	0.052*** (5.84)	0.077*** (5.79)
<i>SIZE</i>	-0.004*** (-8.61)	-0.003*** (-11.30)	0.003*** (11.30)	0.003*** (7.52)
<i>LEVERAGE</i>	-0.000 (-1.23)	-0.000* (-1.92)	0.000* (1.92)	0.000 (1.11)
<i>MB</i>	0.000*** (2.97)	0.000*** (2.84)	-0.000*** (-2.84)	-0.000*** (-3.03)
<i>LOSS</i>	0.000 (0.13)	0.001 (0.67)	-0.001 (-0.67)	-0.002 (-0.52)
<i>ROA</i>	-0.000* (-1.72)	-0.000*** (-2.71)	0.000*** (2.71)	0.000 (1.63)
<i>LNSIDROA</i>	-0.002** (-2.45)	-0.001*** (-2.95)	0.001*** (2.95)	0.001 (1.58)
<i>FIRMAGE</i>	-0.000 (-0.61)	-0.000 (-0.92)	0.000 (0.91)	0.000 (0.22)
<i>NUMSEG</i>	0.001*** (3.23)	0.000** (1.97)	-0.000** (-1.97)	-0.001*** (-3.24)
<i>10K</i>	-0.134*** (-39.75)	-0.182*** (-89.64)	0.182*** (89.64)	0.130*** (38.87)
<i>EXPERT</i>	0.000*** (3.18)	0.000*** (5.64)	-0.000*** (-5.64)	-0.000*** (-3.32)
<i>N</i>	42,496	42,496	42,496	42,496
adj. <i>R</i> ²	0.041	0.118	0.118	0.040

t statistics in parentheses, * $p < .1$, ** $p < .05$, *** $p < .01$

Robustness tests

We perform the following robustness tests to further validate our main results. First, to ensure that our results are not affected by the choice of measures, we use the number of new/used extension or standard elements as an alternate measure and our results remain similar. In addition, we subtract the number of new/used extension or

standard elements and the ratio of new/used extension or standard elements by two-digit industry average ratio and number to form an industry adjusted measure. Second, we estimate the models by using only *SWITCHTOPUB* or only *SWITCHTONONP* or using only *NONPTOPUB* or only *PUBTONONP*. Our un-tabulated findings remain similar.

Third, we re-perform our analyses based on a matched sample. The matched sample is formed by using a one-to-one propensity score matching by using the nearest neighbor algorithm. In particular, we first estimate the tendency to switch by regressing the dummy variable of switch on *SIZE*, *MB*, *LOSS*, *ROA*, and year and industry effects. Then for each switched firm, the “nearest neighbor” of non-switching firm is identified based on propensity scores. We re-perform our analyses based on the matched sample. The results are given in Table 6 Panel A, which are similar to our main results for *SWITCHTOPUB* and *SWITCHTONONP*.

Fourth, a Heckman two stage model is performed to take into account the potential selection bias in our full sample model. That is, when we consider switch or no switch, we can only capture the firms that have adopted and selected a service provider. In order to control for this bias, the first stage of the Heckman model is to regress adoption on *SIZE*, *MB*, *LOSS*, *ROA*, and year and industry effects where the second stage is our main analyses. The results of the two stage Heckman models are largely similar with our main results.

Conclusions

Academic researchers as well as professional managers have attempted to gain deeper insights into why and how the capital market responds to a wide variety of information technological and financial innovation issues, such as XBRL. Investigating XBRL implementation and quality related to service provider is important to business managers since the enhanced XBRL filings deliver management’s messages directly to the stakeholder community as an important part of corporate governance and responsibility. The evidence generated here will be also of special interest to policymakers. By better understanding the nature and impact of service providers for XBRL adoption and implementation in the market, standard setters and regulators will have a basis for developing more effective policies to encourage constructive and definitive disclosure quality.

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References

- [1] S. Asthana, and S. Balsam, "The effect of EDGAR on the market reaction to 10K filings", *Journal of Accounting and Public Policy*, 20(2001), pp. 349-372.
- [2] C.L. Becker, M.L. Defond, J. Jiambalvo, and K.R. Subramanyam, "The effect of audit quality on earnings management", *Contemporary Accounting Research*, 15(1), 1998, pp. 1-24.
- [3] A. Bharadwaj, "A resource-based perspective on information technology capability and firm performance: an empirical investigation", *MIS Quarterly*, 24(1), 2000, pp. 169-196.
- [4] E. Blankespoor, "The impact of investor information processing costs on firm disclosure choice: Evidence from the XBRL Mandate", 2012.
- [5] E. Blankespoor, B. Miller, and H. White, "Initial evidence on the market impact of the XBRL mandate", *Review of Accounting Studies*, 19(2014), pp. 1468-1503.
- [6] J.E. Boritz, and W.G. No, "Assurance on XBRL-related documents: The case of United Technologies Corporation", *Journal of Information Systems*, 23(2), 2009, pp. 49-78.
- [7] R. Dechow, S. Fawcett, M. Piechowski, C. Felden, and A. D'eri, "Flex or break? Extensions in XBRL disclosures to the SEC", *Accounting Horizons*, 25(4), 2011, pp. 631-657.
- [8] R. Dechow, S. Fawcett, M. Piechowski, C. Felden, and A. Gränig, "Does it add up? Early evidence on the data quality of XBRL filings to the SEC", *Journal of Accounting and Public Policy*, 29(3), 2010, pp. 296-306.
- [9] Y. Dong, O. Li, Y. Lin, and C. Ni, "Information processing cost and stock return synchronicity-evidence from XBRL adoption", *Journal of Financial Quantitative and Analysis*, 2015, pp. forthcoming.
- [10] J. Efendi, J. Park, and L. Smith, "Do XBRL filings enhance informational efficiency? Early evidence from post-earnings announcement drift", *Journal of Business Research*, 67(2013), pp. 1099-1105.
- [11] Financial Executive Research Foundation, "Challenges of XBRL", 2013.
- [12] P.A. Griffin, "Got information? Investor response to form 10-K and form 10-Q EDGAR filings", *Review of Accounting Studies*, 8(2003), pp. 433-460.
- [13] T.S. Harris, and S. Morsfield, "An evaluation of the current state and future of XBRL and interactive data for investors and analysts", 2012.
- [14] D.E. Hirst, and P.E. Hopkins, "Comprehensive income reporting and analysts' valuation judgments", *Journal of Accounting Research*, 36(Supplement), 1998, pp. 47-75.
- [15] F. Hodge, J. Kennedy, and L. Maines, "Does search-facilitating technology improve the transparency of financial reporting?", *The Accounting Review*, 79(3), 2004, pp. 687-703.
- [16] D. Hosmer, and S. Lemeshow, *Applied Logistic Regression*, John Wiley & Sons, New York, NY, 1989.
- [17] J.B. Kim, J.W. Kim, and J.H. Lim, "Does XBRL adoption constrain managerial opportunism in financial reporting? Early evidence from mandated U.S. filers", 2013, pp. Working Paper, City University of Hong Kong, Nova Southeastern University, and University of Waterloo.
- [18] J.W. Kim, J.H. Lim, and W. No, "The effect of mandatory XBRL reporting across the financial information environment: Evidence in the first waves of mandated U.S. filers", *Journal of Information Systems*, 26(1), 2012, pp. 1-27.
- [19] S.P. Kothari, L. Xu, and J.E. Short, "The effect of disclosures by management, analysts, and business press on cost of capital, return volatility, and analyst forecasts: A study using content analysis", *The Accounting Review*, 84(5), 2009, pp. 1639-1670.
- [20] Y.J. Lee, K. Petroni, and M. Shen, "Cherry picking, disclosure quality, and comprehensive income reporting choices: the case of property-liability insurers", *Contemporary Accounting Research*, 23(3), 2006, pp. 655-692.
- [21] O.Z. Li, Y. Lin, and C. Ni, "Does XBRL adoption reduce the cost of equity capital?", 2012, pp. Working paper, National University of Singapore.
- [22] J.H. Lim, T. Stratopoulos, and T. Wirjanto, "Role of IT executives on the firm's ability to achieve competitive advantage through IT capability", *International Journal of Accounting Information Systems*, 13(1), 2012, pp. 21-40.
- [23] J.H. Lim, T. Stratopoulos, and T. Wirjanto, "Sustainability of firm's reputation for IT capability: Role of senior IT executives", *Journal of Management Information Systems*, 30(1), 2013, pp. 59-98.
- [24] C. Liu, W. T., and L.J. Yao, "XBRL's impact on analyst forecast behavior: An empirical Study", *Journal of Accounting and Public Policy*, 33(1), 2014, pp. 69-82.
- [25] D. Malone, C. Fries, and T. Jones, "An empirical investigation of the extent of corporate financial disclosure in the oil and gas industry", *Journal of Accounting and Finance*, 8(3), 1993, pp. 249-273.
- [26] D. Marquardt, "You should standardize the predictor variables in your regression models. Discussion of: A critique of some ridge regression methods", *Journal of the American Statistical Association*, 1980, pp. 87-91.
- [27] A. Masli, G.F. Peters, V.J. Richardson, and J.M. Sanchez, "Examining the potential benefits of internal control monitoring technology", *The Accounting Review*, 85(3), 2010, pp. 1001-1034.
- [28] R. Pinsker, and S. Li, "Costs and benefits of XBRL adoption: Early evidence", *Communications of the ACM*, 51(3), 2008, pp. 47-50.
- [29] R.D. Plumlee, and M.A. Plumlee, "Assurance on XBRL for financial reporting", *Accounting Horizons*, 22(3), 2008, pp. 353-368.
- [30] D. Qi, W. Woody, and I. Haw, "The incremental information content of SEC 10-K reports filed under the EDGAR system", *Journal of Accounting Auditing and Finance*, 15(2000), pp. 25-46.
- [31] K. Ruckman, N. Saraf, and V. Sambamurthy, "Market positing by IT service vendors through imitation", *Information Systems Research*, 26(1), 2015, pp. 100-126.
- [32] R. Santhanam, and E. Hartono, "Issues in linking information technology capability to firm performance", *MIS Quarterly*, 27(1), 2003, pp. 125-1536.
- [33] Security and Exchange Commission, "Final report of the advisory committee on improvements to financial reporting to the United States Securities and Exchange Commission", 2008.
- [34] Security and Exchange Commission, "Interactive data to improve financial reporting", 2009.
- [35] R.P. Srivastava, and A. Kogan, "Assurance on XBRL instance document: A conceptual framework of assertions", *International Journal of Accounting Information Systems*, 11(2010), pp. 261-273.

- [36] T. Wang, and J.-L. Seng, "Mandatory adoption of XBRL and foreign investors' holdings—Evidence in China", *Journal of Information Systems*, 28(2), 2014, pp. 127-147.
- [37] T. Wang, C.Y. Wen, and J.-L. Seng, "The association between mandatory adoption of XBRL and performance of listed state-owned enterprises and non-state-owned enterprises in China", *Information and Management*, 51(3), 2014, pp. 336-346.
- [38] H. Yoon, H. Zo, and A.P. Ciganeck, "Does XBRL adoption reduce information asymmetry?", *Journal of Business Research*, 64(2), 2011, pp. 157-163.

Act of Online Review Fixation on Customers' Overall Perception and Purchase Intention

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Abstract

Online reviews have become highly influential decision making tools for customers nowadays, especially in tourism industry. Recent studies indicate that over 50% of travelers would not book a hotel that did not have online reviews. Moreover, good online reviews make hotels revenue increased 56% and bad reviews can seriously affect hotel's reputation. This study has the objective to investigate impacts of customers' fixation in six different parts of hotel online reviews which are (1) summary rating, (2) category rating, (3) individual customer rating, (4) positive comments, (5) negative comments, and (6) service owners' reply or hotel owners' reply, on customers' overall perception and purchase intention. Eye-tracking device, Tobii Pro X2, is used to collect customers' fixation in different parts of online reviews. The questionnaires are used to collect customers' overall perception of a hotel and intention to book a hotel room. Data analyses on the collected data reveals that customers' overall perception has significant positive relationship with the time customers look at "individual customer rating" section in online review page and the time customers look at "category rating" section in online review page. Moreover, it is found that customers' intention to reserve a hotel room has significant positive relationship with the time customers look at "individual customer rating" section in online review page.

Keywords:

Online Reviews, Overall Perception, Purchase Intention, Eye-tracking, Fixation

Introduction

With the Internet's growing popularity, online channels have become popular choices for booking hotel rooms. Before booking a hotel room, most people often use search engines to gather more information about the specific place

of their interests which they may not be familiar with. According to a study by Gretzel and Kyung in 2008, three-quarters of travelers have considered online reviews as information sources when planning their travel trips [3].

Online review is one form of electronic word-of-mouth (eWOM) that is important in purchase decision process and choice behavior [1][15]. It is easy for customers to obtain information from other travelers via online reviews from hotel websites or third-party online travel intermediaries such as TripAdvisor, Expedia.com, Booking.com and Agoda.com. Moreover, online reviews offer quality information to reduce risk in purchasing experience goods (products or services where product or service quality may be difficult to observe in advance) [3][6][14]. Customers can learn about service satisfaction from previous customers without having to experience the good themselves. Due to the richness and strength of message, eWOM affects customer perceptions including trust and purchase intention [10]. Customers are more likely to make a purchase decision based on reviews from which they trust the most. Consequently, the quality and quantity of online reviews are significant factors that affect customers' information processing. The number of reviews can represent the product or service popularity, since it is reasonable to assume that the number of reviews is related to the number of customers who have bought products or services [9]. Therefore, online reviews have become important marketing tools to increase hotel's reputation rating. According to Ye and his colleagues' research in 2011, it was found that 10 percent increase in travel review ratings would increase online bookings by more than 5 percent [16].

Online reviews can be either positive or negative reviews. Positive review is likely to be described as pleasant, compliment or descriptions of good experiences, whereas negative review is likely to include private complaining, unimpressed or even irritating comments [11]. Studies in the past found that negative reviews weigh more heavily

than positive reviews [5][8]. When the proportion of negative reviews increases, customers' attitudes about the product or service would become more undesirable [7]. In addition, negative information spreads faster than positive ones. Unsatisfied customers are more likely to tell family and friends about their bad or unpleasant experiences than satisfied customers [17]. In this sense, a negative eWOM message could have a stronger influence on a customer's purchase intentions than positive message.

Rating is one of the factors that may affect customer purchase intention. Due to the graphic information that is easy to process such as numeric or star ratings, it is reasonable for customers to use categorical thinking processes when understanding the information in order to make overall evaluations [11]. Recent studies found that customer ratings have a strong positive effect on customers' willingness to book a hotel or customers' hotel room reservation intentions [13].

Owner's Responses or management's responses is one form of customer relationship management in hotel industry. It also affects the customers' evaluation and purchase decision when they are reading online reviews [4]. Management responses to a positive review show that hotel managers are listening, and appreciate positive reviews from customers. On the other hand, management responses to a negative review can recover from service failure and increase satisfaction by influencing customers' perceptions of fairness [14]. Recent research found that, management should respond to online complaints as soon as possible to recover from service failure [2].

In prior researches, there were many studies about online reviews in tourism industry. These studies have investigated relevant factors that customers evaluate in hospitality product consumption, including review valence (positive and negative review), ratings, trust in online review and management responses to consumer reviews. The purpose of this study is to determine how consumers read and process online reviews, and to investigate the impact of online hotel review attributes on hotel booking intention and customer's overall perception with an emphasis on eye tracking data rather than only on data collected from a questionnaire.

Based on literature reviews, the research framework is proposed in figure 1. Also, twelve hypotheses are developed as follows.

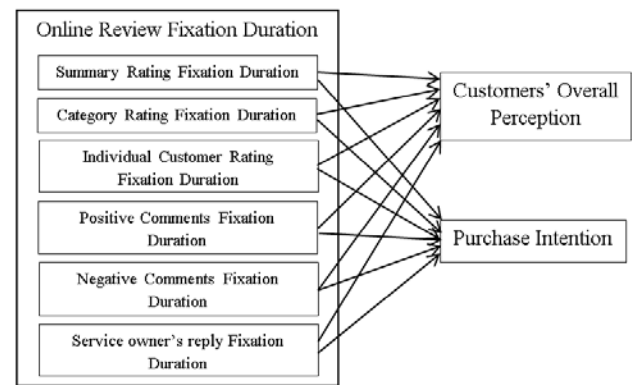


Figure 1 - A Research Model

H1: Summary rating fixation duration relates to customer's overall rating.

H2: Category rating fixation duration relates to customer's overall rating.

H3: Individual customer rating fixation duration relates to customer's overall rating.

H4: Positive comments fixation duration relates to customer's overall rating.

H5: Negative comments fixation duration relates to customer's overall rating.

H6: Service owner's reply fixation duration relates to customer's overall rating.

H7: Summary rating fixation duration relates to purchase intention.

H8: Category rating fixation duration relates to purchase intention.

H9: Individual customer rating fixation duration relates to purchase intention.

H10: Positive comments fixation duration relates to purchase intention.

H11: Negative comments fixation duration relates to purchase intention.

H12: Service owner's reply fixation duration relates to purchase intention.

Methodology

This study used an experimental method, which was designed to examine how consumers process online review. In this pilot study, we used an eye-tracking device called Tobii Pro X2 to collect eye movement data. These data then are automatically calculated by Tobii software and produce fixation duration data of each area of interest or AOI.

Sampling frame and Subject

The samples of this research are those who are studying and/or working in Bangkok, Thailand. Purposive sampling is used in this study. Graduate students from Chulalongkorn University and working people are recruited as the study participants. There are 33 participants in this pilot experiment.

Research Tools

1. Online Review Page

In this pilot study, we developed a hotel review page based on hotel reviews pages from booking.com website. One hotel reviews was selected to developed a sample review page and 10 reviews were selected from the actual hotel reviews from websites with themixed of positive and negative reviews. Figure 2 shows the developed review page with six areas of interest (AOIs) which are (1) summary rating, (2) category rating, (3) individual customer rating, (4) positive comments, (5) negative comments, and (6) service owners' reply.

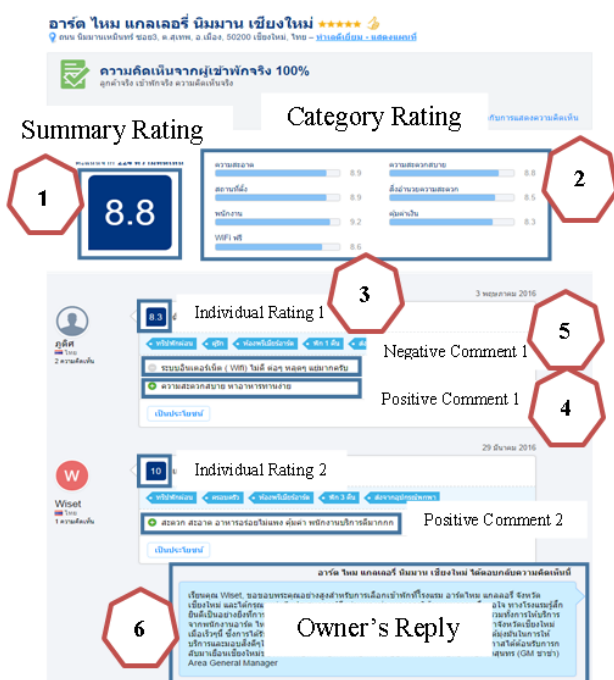


Figure 2: The Area of interests (AOIs) of the review page.

2. Questionnaire

This pilot study uses a questionnaire to collect participant's overall perception about the hotel and purchase intention or intention to reserve a hotel room, as well as each participant's personal data. There are two sections in this questionnaire. First, we asked participants about their personal information including gender, age, and experiences with online booking. Second, participants were asked to evaluate their purchase intentions with 5 Likert-scale from strongly disagree (1) to strongly agree (5). These

questions were adapted from Torcharoen's questionnaire [12]. The last question, participants were asked to determine the score or rating of their overall perception after they read the online reviews.

3. Eye tracking device

Tobii Pro X2 was used to collect and calculate fixation duration of participants or the time that participants looked at each of the six specific areas of interest. The resolution of the notebook screen was set to 1920 x 1080 pixels. The eye-tracking device is located below the screen display as shown in Figure 3. Participants sat approximately 50 cm away from the display, which provided the online review webpage. The collected data were which is called fixation duration data.



Figure 3: A Setup of an eye tracking device.

Procedure

An experiment was carried out with one participant in each session. The participant arrived and was briefed about the purpose of the study, the procedure, and the usage of the eye-tracking station. After being seated at the Tobii Pro X2, the participant was guided through the calibration process using a 5-point grid.

The hotel review page was then shown on the screen after pressing recording-start button. We let our participants freely read reviews on the review page. When they felt that they had read enough reviews or gained enough information about the hotel, they clicked on the exit button of the Internet Explorer to end the eye-tracking session and continue with the questionnaire. Each participant was asked to rate the hotel room booking intention and determine the overall perception of the hotel.

Data from questionnaire was then paired with eye tracking data to match customer's fixation duration data. After that, statistics analyses were performed on these collected data.

Table 1 – Pearson Correlations

		Summary Rating	Category Rating	Individual Rating	Positive Comments	Negative Comments	Service Owner's Reply
Customers' Overall Perception	Pearson Correlation	.110	.381*	.360*	.219	.261	.192
	Sig. (2-tailed)	.543	.029	.039	.221	.143	.284
Purchase Intention	Pearson Correlation	.011	.312	.346*	.108	.143	.103
	Sig. (2-tailed)	.950	.077	.049	.549	.428	.568
N		33	33	33	33	33	33

Results

As shown in Table 1, positive relationships were discovered between online review fixation duration in 6 different parts of online review page and customers' overall perception as well as between online review fixation duration in 6 different parts of online review page and customers' intention to reserve a hotel room. However, only 3 of the 12 hypotheses were accepted at 95% confident interval, which are H2: Category rating fixation duration relates to customer's overall rating, H3: Individual customer rating fixation duration relates to customer's overall rating, and H9: Individual customer rating fixation duration relates to purchase intention.

Conclusion

It can be concluded from the data analyses on the collected data that customers' overall perception has significant positive relationship with the time customers look at "individual customer rating" section in online review page and the time customers look at "category rating" section in online review page. Moreover, it is found that customers' intention to reserve a hotel room has significant positive relationship with the time customers look at "individual customer rating" section in online review page.

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References

- [1] Baek, H., Ahn, J., & Choi, Y. (2012). Helpfulness of online consumer reviews: Readers' objectives and review cues. *International Journal of Electronic Commerce*, 17(2), 99-126.
- [2] Cheng, X., & Zhou, M. (2010). Empirical study on credibility of electronic word of mouth. Paper presented at the Management and Service Science (MASS), 2010 International Conference on.
- [3] Gretzel, U., & Kyung, H. (2008). Use and Impact of Online Travel Reviews, Information and Communication Technologies in Tourism 2008, Innsbruck: Springer Vienna.
- [4] John Bowen, D. S. B., Dr, Lee, H., & Blum, S. C. (2015). How hotel responses to online reviews differ by hotel rating: an exploratory study. *Worldwide Hospitality and Tourism Themes*, 7(3), 242-250.
- [5] Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, 263-291.
- [6] Kim, E. E. K., & Lee, C. H. (2015). How do consumers process online hotel reviews? The effects of eWOM consensus and sequence. *Journal of Hospitality and Tourism Technology*, 6(2), 113-126.
- [7] Lee, J., Park, D.-H., & Han, I. (2008). The effect of negative online consumer reviews on product attitude: An information processing view. *Electronic commerce research and applications*, 7(3), 341-352.
- [8] Maheswaran, D., & Meyers-Levy, J. (1990). The influence of message framing and issue involvement. *Journal of Marketing research*, 361-367.
- [9] Park, D.-H., Lee, J., & Han, I. (2007). The effect of on-line consumer reviews on consumer purchasing intention: The moderating role of involvement. *International Journal of Electronic Commerce*, 11(4), 125-148.
- [10] Rong, J., Vu, H. Q., Law, R., & Li, G. (2012). A behavioral analysis of web sharers and browsers in Hong Kong using targeted association rule mining. *Tourism Management*, 33(4), 731-740.
- [11] Sparks, B. A., & Browning, V. (2011). The impact of online reviews on hotel booking intentions and perception of trust. *Tourism Management*, 32(6), 1310-1323.
- [12] Torcharoen, K. (2012). Impacts of service product information and online reviews on trusting beliefs in web vendor and purchase intention. (Master of Science Program in Business Software Development), Chulalongkorn University.
- [13] Verma, R., Stock, D., & McCarthy, L. (2012). Customer preferences for online, social media, and mobile innovations in the hospitality industry. *Cornell Hospitality Quarterly*, 1938965512445161.
- [14] Xie, K. L., Zhang, Z., & Zhang, Z. (2014). The business value of online consumer reviews and management response to hotel performance.

- International Journal of Hospitality Management, 43, 1-12.
- [15] Ye, Q., Law, R., & Gu, B. (2009). The impact of online user reviews on hotel room sales. *International Journal of Hospitality Management*, 28(1), 180-182.
- [16] Ye, Q., Law, R., Gu, B., & Chen, W. (2011). The influence of user-generated content on traveler behavior: An empirical investigation on the effects of e-word-of-mouth to hotel online bookings. *Computers in Human Behavior*, 27(2), 634-639.
- [17] Zhao, X., Wang, L., Guo, X., & Law, R. (2015). The influence of online reviews to online hotel booking intentions. *International Journal of Contemporary Hospitality Management*, 27(6), 1343-1364.

Impact of Access Types to Internet Vendors through Mobile Phone on Perceived Usefulness, Perceived Ease of Use, Compatibility, and Intention to Use

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Abstract

As the increasing of popularity of mobile commerce recently, many mobile applications and mobile-friendly websites are developed for online business channels. Therefore, it is important to understand users' points of view about their acceptance of using these mobile applications and mobile-friendly websites. The proposed research model is based on Technology Acceptance Model (TAM) which consists of perceived usefulness and perceived ease of use, together with compatibility. There are three main objectives in this research; the first objective is to examine the impact of access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use. Second objective is to examine the impact of access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use when product types are different. In order to compare between two product types, product and service, existing mobile applications and mobile-friendly websites of Lazada and Agoda are chosen as representatives of businesses related to product and service respectively. Third objective is to study relationships between three variables: perceived ease of use, perceived usefulness, and compatibility and intention to use. The data was collected from 120 samples using questionnaires. The study reveals that access types to internet vendors through mobile phone has a direct effect on intention to use, especially, when product type is service. Also, it is found that perceived ease of use, perceived usefulness and compatibility are related to intention to use positively.

Keywords:

Mobile Commerce, Perceived Usefulness, Perceived Ease of Use, Compatibility, Intention to Use

Introduction

As growing of popularity of mobile phone and internet technology in Thailand, it is found that mobile phone and internet technology users increase from 61.8 percent to 77.2 percent and 22.4 percent to 34.9 percent respectively from 2010 to 2014 [1]. Moreover, smart phones become devices that Thai people mostly use to access internet [2]. Development in both devices and internet technology makes people use mobile phones to do more complicated tasks. Mobile phone roles have changed from a sole communication tool to a sophisticated device [3]. Currently, people use mobile phones to perform many tasks such as online purchasing of products and services. This is one of the reasons that make mobile commerce continuously grow. Moreover, nowadays many jobs in electronic commerce can be adjusted to perform in wireless environment [4]. Mobile commerce is equal to electronic commerce in types of product and transaction process [5]. In addition, it is revealed that mobile commerce grew 47 percent in the second quarter of 2014 while the growth of electronic commerce was 10 percent [6].

While websites are used as channels for communication between businesses and customers in electronic commerce, mobile websites and mobile applications are used as channels for communication in mobile commerce. However, it is discovered that they have some different usage. For retailing area, customers in United States of America spend their time on mobile applications longer than mobile websites [7]. On the other hand, it is also found that customers buy products and services through mobile websites more than mobile applications. 58 percent of sales from 500 leading retailers come from mobile websites while another 42 percent come from mobile applications. However, the possible reason might be that there are 262 retailers that use both mobile websites and mobile applications while 238 retailers use only mobile websites [8]. Moreover, mobile applications

and mobile websites have different advantages and disadvantages which each company should consider in order to decide to use a suitable channel. For example, mobile website can be developed once and then use with every mobile device [9]. On the other hand, mobile application development is concerned with operating system [10].

For mobile commerce, it is important to understand the driving forces of consumers' intentions to use mobile services in order to adapt the services to fulfill consumers' motives for using them [11]. Therefore, knowing of customers' intention to use mobile applications or websites which are channels for communication between businesses and customers is very important. In order to study intention to use technology, Technology Acceptance Model (TAM) is applied in many researches. It is found that most of previous researches related to mobile commerce acceptance also apply TAM which consists of two main variables; perceived ease of use and perceived usefulness [12].

Besides perceived ease of use and perceived usefulness, compatibility which is one of innovation characteristics from Diffusion of Innovation Theory is also one of the factors that used for studying intention to use of technology [13], [14].

Like offline shopping channel, there are many different kinds of products sold in online shopping channel. Some products become different as a result of new technology, for example, tangible products turned into digital products such as music, movies. However, customers can perceive only sight and sound in online shopping in contrast they cannot feel, smell and taste. This causes a limitation of product type sold in online channel [15]. Moreover, it also makes product types affect online customers' behavior [16].

Prior experience in using websites, mobile websites, or mobile applications also should be considered since each channel has different characteristics [17]. In addition, in online shopping, experienced customers will have different point of view from inexperienced customers [18].

Thus, this study will examine impact of access types to internet vendors through mobile phone on perceived usefulness, perceived ease of use, compatibility, and intention to use by considering product types as a moderating variable. This research will also study the relation between perceived usefulness, perceived ease of use, compatibility, and intention to use.

Background, Research Model and Hypotheses

Mobile Commerce

Mobile commerce also known as mobile electronic commerce is considered as a new technology that branches from electronic commerce [19]. Several previous studies defined mobile commerce in different meanings. For example, mobile commerce refers to the use of wireless technology to facilitate transaction, information search, and user task performance in Business to Customer (B2C), Business to Business (B2B) and intra-enterprise communication [20]. Mobile Commerce is defined as managing commercial transaction via mobile telecommunication using device such as mobile phone [21].

Mobile commerce is classified since there are many businesses using mobile commerce nowadays. However, there is different taxonomy of mobile commerce in previous studies. For example, mobile commerce is divided into 4 groups according to service: 1) Mobile Financial Service, 2) Mobile Advertisement, 3) Mobile Entertainment, and 4) Mobile Shopping [4]. Mobile commerce is categorized into 12 groups including business to business (B2B) and business to consumer (B2C) such as 1) Mobile Financial Applications, 2) Mobile Advertising, 3) Mobile Entertainment Services [22]. Many previous researches are also related to mobile commerce, for example, mobile payment [23], mobile banking [24], mobile advertisement [25], [26] and mobile shopping [3], [27].

Even though mobile commerce awakes from electronic commerce, there are some differences between them such as 1) ubiquity, 2) convenience, 3) localization, and 4) personalization [28]. These some differences which make mobile commerce play important roles in businesses. Furthermore, mobile commerce is believed to change the way businesses conduct according to the following reasons: 1) the number of mobile phones is larger than amount of personal computer users and it is growing faster, 2) user's intimacy with mobile phone devices is higher, 3) it can be accessed anywhere and anytime, 4) it helps employees access information anywhere and anytime in order to make decision without going back to personal computers, 5) it helps reducing time consuming during task performing [29].

Access Types to Internet Vendors through Mobile Phone

There are two main choices that businesses can use to present their contents to customers via mobile phones and tablets which are mobile websites and mobile applications [30].

Mobile Website

Mobile website is a website that should be ideally fit on the mobile device screen. The functions should be efficient with the internet network speed [30]. Many different techniques can be used in

order to develop mobile websites, for example, responsive web design and JQuery mobile. Responsive web design uses the concept of cascading style sheets (CSS) to design websites for supporting different screen sizes of each device such as personal computers, tablets, and smart phones. Website is designed only once and can be used with all devices. On the other hand, JQuery mobile is a JavaScript library or mobile framework that supports variety of touch events and design elements in tablets and smart phones in order to make appearances and functions of mobile websites similar to native apps. [31]

Mobile Application

Mobile application is an application developed specifically for each operating system and device [31]. It can take advantage of device capabilities such as camera. Mobile application can be downloaded from marketplace provided by each service provider such as app store, play store [30]. Nowadays, there are three main leading mobile operating systems which are Android, iOS, and Windows phone [31].

Mobile websites and mobile applications have different advantages and disadvantages. For mobile website, it can be accessed from any handheld devices. Businesses can decide to launch it any time after development completed [30]. Moreover, development of mobile website does not require special code for different operating systems and devices. However, there are some disadvantages of mobile websites; for instance, it cannot be used offline [10]. On the other hand, for mobile applications, capability is fast and effective for users. In addition, some applications can be accessed without internet. However, mobile applications need to use specific language in development for each operating system, for example, using Objective C and Java to develop mobile applications for iOS and Android operating systems respectively [10], [31].

Technology Acceptance Model

Technology Acceptance Model (TAM) is one of the most widely used models in information system first proposed by Davis in 1986 [32], [33]. TAM was adopted based on Theory of Reason Action (TRA) introduced by Fishbein and Ajzen in 1975. Technology Acceptance Model (TAM) studies factors that influence behavioral intention to use technology. TAM model consists of external variables, perceived ease of use (PEoU), perceived usefulness (PU) and attitude toward using (A). According to TAM, perceived ease of use (PEoU) and perceived usefulness (PU) are main factors that influence behavioral intention which activates user acceptance [16]. Perceived usefulness (PU) was defined as “the degree to which a person believes

that using a particular system would enhance his or her job performance”, while perceived ease of use (PEoU) refers to “the degree to which a person believes that using a particular system would be free of effort” [34]. TAM was adopted in the study of handheld device acceptance and it supported that perceived ease of use effects perceived usefulness [9].

A research in [35] explained that TAM has been applied across wide range of information technologies such as Word Processors, Spreadsheet, E-mail, Voice Mail and Telemedicine Technology. In addition, results in adoption of TAM in numerous researches support that it is valid to use TAM for prediction of an individual’s technology acceptance [36]. In electronic commerce area, TAM was adapted in order to understand attitude and behavior of purchasers in online context. TAM was applied in research and found that perceived ease of use did not affect behavioral intention while compatibility had the most significant influence [13]. Moreover, in mobile commerce, TAM was also used in acceptance of mobile commerce [12]. The study of mobile commerce acceptance applied TAM and discovered that perceived usefulness influenced attitude toward using mobile commerce [37].

Compatibility

Diffusion of Innovation Theory was proposed by Rogers. It is widely used in information technology. Previous research found that this theory has advantage in predicting different technology acceptance, for example, Spreadsheet software, and smartcard etc. [14]. Diffusion of Innovation Theory includes five characteristics: Relative Advantage, Compatibility, Complexity, Trial ability, and Observables [13].

Compatibility means “the degree that innovation is perceived to be consistent with existing values, prior experiences and needs of potential adopters” [38]. There are two types of compatibility defined: behavioral compatibility and needs compatibility [39]. Compatibility is one of important factors for customer acceptance [37].

For mobile commerce, many previous researches studied compatibility. For example, the research of mobile commerce acceptance [13] discovered that compatibility is the factor that affected behavioral intention to use the most, compared to perceived risk, cost, perceived usefulness, and perceived ease of use. Later, the research [14] studied impact of compatibility on intention to use mobile ticketing and found that compatibility has positively direct effect intention to use.

Intention to Use

Theory of Reasoned Action (TRA) explains that the

factor that indicates individual behavior is behavioral intention. Moreover, behavioral intention is influenced by attitudes toward the behavior and subjective norms [40]. Later, Theory of Reasoned Action (TRA) was developed to be Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM).

Intention to use means “the strength of one’s intention to perform a specified behavior” based on Fishbein and Ajzen definition [11]. In a context of website, intention means the willingness to use website and extent to which users would like to use website again in the future [41].

For intention to use new information technology of users, perceived usefulness and perceived ease of use are the most two important factors [42].

There are many advantages of mobile commerce, for example, convenience to access internet, flexibility etc. These can increase values in business transactions, so marketers place important on understanding of factors that can influence people to use and accept mobile commerce [43].

In mobile commerce, Lin and Wang [44] studied 5 factors that might affect intention to use mobile commerce of customers in Taiwan such as perceived usefulness, perceived ease of use, perceived credibility, perceived self-efficacy, and perceived financial resources. They found that those factors affected intention. In addition, there are researches related to mobile commerce area. For example, mobile financial services, research [45] studied 5 factors, i.e. perceived usefulness, perceived ease of use, perceived credibility, perceived self-efficacy, and perceived financial resources that might influence intention to use mobile banking in Taiwan. It is also found that all five factors influence intention to use. Another research studied intention to use mobile payment [42], this study applied TAM and discovered that mobile payment system characteristics such as mobility, reachability, compatibility, convenience affected perceived usefulness and perceived ease of use. Besides, perceived usefulness and perceived ease of use influenced intention to use mobile payment. Apart from that, the research about intention to use mobile ticketing revealed that perceived ease of use and compatibility positively direct affected intention to use, on the other hand, perceived usefulness did not [14].

Prior Experience

Prior experience is considered as one of important factor to determine behavior [46]. Experiences of customers in buying products from internet and from physical shops are different. There are 4 main aspects that make differences in online and offline shopping experiences: personal contact, information provision, time period for interactions, and brand presentation [47]. Therefore, experience

in using website can play an important role in E-Commerce. Web experience consists of searching, selecting, comparing, evaluating information, and interacting and transacting [48].

Impact of prior experience on purchasing behavior is important. Behavior of previous customers and newcomers in E-Commerce are different [49].

Some customers decide not to purchase products via internet due to some following reasons: lack of access, technophobia etc. [50]. Prior experiences help reducing anxiety about unknown things during interaction with website [49]. Some previous researchers found that prior online shopping experiences affected online purchase intention [51].

Product Type

Internet is considered as one of channels for retailing. It is communication media that has benefits of product information searching, product simulation, and assistance with comparison and decision making for shopping. Internet sales of different products and services can reflect the strengths and weakness of the channel [52].

There are some bestselling products on the internet such as books, music, travel, computer hardware, software, and flowers. This success might be because of the suitability between product characteristics and electronic channel [52].

In previous researches, it is found that product type can be classified in many different ways, for example,

1) Product and Service [53]

There are four characteristics used to separate service from product such as intangibility, inseparability, heterogeneity, and perishability.

2) Functional Product and Expressive Product [54],

Functional products also known as think products are subjected to rational purchase motives. The examples are batteries, household cleaner etc. On the other hand, expressive products or sometimes called feel products are subjected to affective purchase motives. The examples of expressive product are fashion apparel, jewelry. [55]

3) Search Product and Experience Product [56].

Search product means product that information of its dominant attributes can be determined prior to purchase without any inspection. In contrast, experience product means product that its information can be known with direct experience. The examples of search attributes are color, size etc. While the examples of experience attributes are taste, fit etc. [57]

Purchasing decision of each person is different depending on product types, the degree of relation between products and customers, and other factors [16]. In addition, online purchase intentions depended on different products [58].

Previous research studied differences of internet shopping intention between products classified by tangibility and cost. It supports that internet shopping intention differs by tangibility of product [52]. It is also found that products with intangible values are more likely to be purchased via internet [15].

Based on literature reviews, this study applies TAM model in order to explore the impact of access types to internet vendors through mobile phone on intention to use. The model consists of 1 independent variable (access types to internet vendors through mobile phone) and 4 dependent variables (perceived usefulness, perceived ease of use, compatibility, and intention to use) and 1 moderating variable (product type) as shown in Figure 1. The followings are hypotheses that have been developed.

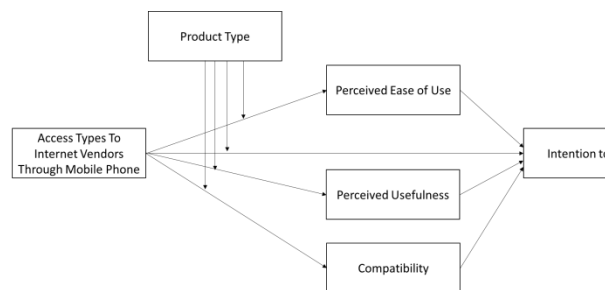


Figure 1- A Research Model

H1. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Ease of Use.

H2. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Usefulness.

H3. Access Types to Internet Vendors through Mobile Phone has a direct effect on Compatibility.

H4. Access Types to Internet Vendors through Mobile Phone has a direct effect on Intention to Use.

H5a. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Ease of Use when Product Type is tangible product.

H5b. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Ease of Use when Product Type is intangible product or service.

H6a. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Usefulness when Product Type is tangible Product.

H6b. Access Types to Internet Vendors through Mobile Phone has a direct effect on Perceived Usefulness when Product Type is intangible product or service.

H7a. Access Types to Internet Vendors

through Mobile Phone has a direct effect on Compatibility when Product Type is tangible Product.

H7b. Access Types to Internet Vendors through Mobile Phone has a direct effect on Compatibility when Product Type is intangible product or service.

H8a. Access Types to Internet Vendors through Mobile Phone has a direct effect on Intention to Use when Product Type is tangible Product.

H8b. Access Types to Internet Vendors through Mobile Phone has a direct effect on Intention to Use when Product Type is intangible product or service.

H9. Perceived Ease of Use is related to Intention to Use positively.

H10. Perceived Usefulness is related to Intention to Use positively.

H11. Compatibility is related to Intention to Use positively.

Methods

Data Collection Procedure

The study is conducted in Thailand. Surveys [1], [59] discovered that Thai internet users age between 15-24 years old access internet the most and internet users age between 25-34 years old purchase products and services online the most. Moreover, online shopping in LINE Flash Sales Thailand 2014, most of purchases come from Apple devices. Therefore, population in this study is Thai internet users' age between 15-34 years old, who have experiences with iPhone and online shopping but do not have experience in using Lazada or Agoda mobile websites and applications.

In this research, purposive sampling and quota sampling which are non-probability sampling techniques are applied. For quota sampling, the followings are characteristics of samples: 1) Age – between 15-34 years old, 2) Education – Bachelor Degree or Master Degree, 3) Experience with vendor – do not have experience with mobile applications and mobile websites of Lazada and Agoda, 4) Experience with iPhone – have experience in using iPhone. Therefore, samples in this study are students in Chulalongkorn University who have specified characteristics mentioned above.

Sample groups are classified into four groups as shown in Table 1.

Table 1 – Sample group for collecting data

Sample	Access Types To Internet Vendors Through	Product Type	Amount
--------	--	--------------	--------

	Mobile Phone		
Group 1	Mobile Website	Product	30 samples
Group 2	Mobile Application	Product	30 samples
Group 3	Mobile Website	Service	30 samples
Group 4	Mobile Application	Service	30 samples

In each group, we applied same proportion of samples as shown in Table 2 using quota sampling.

Table 2 – Sample in each group (quota sampling)

Ages	Gender		Total
	Male	Female	
15 - 24 Years old	6	14	20
25 – 34 Years old	3	7	10
Total	9	21	30

Tools for measuring constructs

Questionnaire

Questionnaire is used as a tool to collect data in this study. In order to measure each construct, the items for each construct are adapted from prior researches as the followings. For construct ‘Perceived Ease of Use’ and ‘Perceived Usefulness’, items are adapted from [34], [60], [35], [61], [62], [63]. For construct ‘Compatibility’, the items are adapted from [14], [13]. For construct ‘Intention to Use’, the items are adapted from [34], [60], [62] and [63].

Furthermore, the items use Likert scale from 1 to 5 with range from ‘strongly disagree’ to ‘strongly agree’ for all questions.

Mobile Application and Website

Nowadays, consumers can purchase both products and services via internet. Not only tangible products like clothes, accessories, food, but also intangible products or services such as online ticketing also become popular [1]. So, this research studies both products and services.

Lazada and Agoda are chosen as representatives of business selling products and services respectively. Samples in this study used mobile applications and websites of Lazada and Agoda before answering questions in the questionnaire. However, those mobile applications and websites were used via iPhone6 only in order to prevent problems that can occur by differences of operating systems and screen sizes Mobile websites and applications of Lazada and Agoda are shown in Figure 2 and 3 respectively.

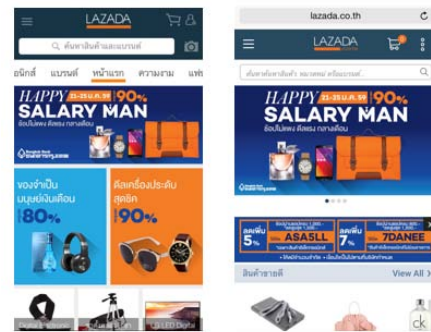


Figure 2– Example of Lazada Mobile Application and Website

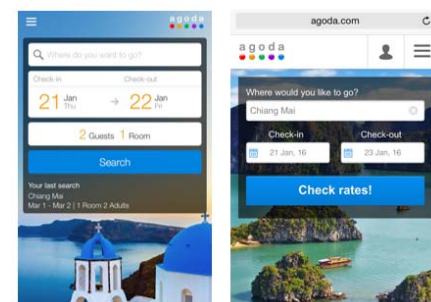


Figure 3- Example of Agoda Mobile Application and Website

Results

This research collected data from 120 samples using questionnaire. Table 3 shows that the proportion of age and gender is consistent with proportion that specified in Table 2 (15-24 years old = 66.7%, 25-34 years old = 33.3%, male = 30% and female = 70%). Most of samples have internet experience more than 10 years and purchase online 2-3 times in a year. Moreover, the proportion of samples with mobile purchase experience is 55.8%.

Table 3 – Descriptive Statistics from 120 samples

Age	Frequency	Proportion
15 - 24 Years old	80	66.7%
25 – 34 Years old	40	33.3%
Gender		
Male	36	30%
Female	84	70%
Internet Experience		
5-10 years	37	30.8%
More than 10 years	83	69.2%
Online Purchase Experience		
Never	7	5.8%
1 Time	13	10.8%
2-3 Times	41	34.2%
4-5 Times	32	26.7%
6-10 Times	10	8.3%
More than 10 times	16	13.3%

Mobile Purchase Experience		
Never purchase via mobile phone	53	44.2%
Purchase via mobile phone	67	55.8%

As shown in Table 4, means of dependent variables, i.e. perceived ease of use, perceived usefulness, compatibility, and intention to use, are 4.1222, 4.1736, 3.8104, and 3.7125 respectively. Table 5 displays means and standard deviations of each variable when product type is moderating variable.

Table 4 - Descriptive Statistics of dependent variables

Variables	Access Types	Statistics
Perceived Ease of Use	Mobile Application	Mean 4.1806 SD 0.6139
	Mobile Website	Mean 4.0639 SD 0.4986
	Total	Mean 4.1222 SD 0.5600
Perceived Usefulness	Mobile Application	Mean 4.2111 SD 0.4889
	Mobile Website	Mean 4.1361 SD 0.5166
	Total	Mean 4.1736 SD 0.5022
Compatibility	Mobile Application	Mean 3.8208 SD 0.6607
	Mobile Website	Mean 3.8000 SD 0.5836
	Total	Mean 3.8104 SD 0.6208
Intention to Use	Mobile Application	Mean 3.8333 SD 0.6355
	Mobile Website	Mean 3.5917 SD 0.6140
	Total	Mean 3.7125 SD 0.6339

Table 5 - Descriptive Statistics of dependent variables (Product type as a moderating variable)

Variables	Access Types	Statistics
Product		
Perceived Ease of Use	Mobile Application	Mean 4.006 SD 0.695
	Mobile Website	Mean 4.006 SD 0.544
Perceived Usefulness	Mobile Application	Mean 4.078 SD 0.541
	Mobile Website	Mean 4.078 SD 0.536
Compatibility	Mobile Application	Mean 3.692 SD 0.709

Variables	Access Types	Statistics
Intention to Use	Mobile Website	Mean 3.925 SD 0.518
	Mobile Application	Mean 3.550 SD 0.674
	Mobile Website	Mean 3.433 SD 0.583
Service		
Perceived Ease of Use	Mobile Application	Mean 4.356 SD 0.469
	Mobile Website	Mean 4.122 SD 0.450
Perceived Usefulness	Mobile Application	Mean 4.344 SD 0.396
	Mobile Website	Mean 4.194 SD 0.499
Compatibility	Mobile Application	Mean 3.950 SD 0.592
	Mobile Website	Mean 3.675 SD 0.627
Intention to Use	Mobile Application	Mean 4.117 SD 0.449
	Mobile Website	Mean 3.750 SD 0.612

Test of Homogeneity

Since there are 4 groups of samples in this study, it is necessary to investigate whether samples in each group are homogeneity or not, by applying Chi-Square (χ^2) test. The three factors used for test of homogeneity are internet experience, online purchase experience, and mobile purchase experience.

The results show that internet experience has Sig. = 0.356, purchase experience has Sig. = 0.314, and Mobile Purchase Experience has Sig. = 0.519. All are greater than significant level 0.05. Thus, distribution of 3 factors, internet experience, online purchase experience, and mobile purchase experience in all 4 groups are the same.

Normality test

It is essential to prior check the normal distribution of the data in order to decide to use statistics technique properly. The sample size in this study is larger than 50, therefore, Kolmogorov Smirnov statistics is applied in normality test.

The results show that the data is not normal distributed because perceived ease of use (Sig. = 0.02), perceived usefulness (Sig. = 0.023), compatibility (Sig. = 0.007), and intention to use (Sig. = 0.000) have p-values less than 0.05. Thereby, Mann-Whitney U test, one of the non-parametric test techniques, is applied in hypotheses testing.

Hypotheses Testing

In order to compare whether dependent variables: perceived ease of use, perceived usefulness, compatibility, and intention to use between 2 access types: mobile application and mobile website are different or not. Mann-Whitney U test is applied for testing developed hypotheses in this research. Mann-Whitney U test is used when dependent variable is not normally distributed in order to compare difference between two groups of independent [64].

The set of hypotheses H1, H2, H3, and H4 studies effect of 2 access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use. Tables 6 shows the statistics Mann-Whitney U test which compares variables; perceived ease of use, perceived usefulness, compatibility, and intention to use two access types to internet vendors through mobile phone.

The results show p-value of perceived ease of use ($p = 0.180$), perceived usefulness ($p = 0.519$), compatibility ($p = 0.807$), and intention to use ($p = 0.019$). Only p-value of intention to use is less than significant level 0.05. Hence, H4 is supported while H1, H2 and H3 are rejected. That is access types to internet vendors through mobile phone have a direct effect on intention to use. On the other hand, access types to internet vendors through mobile phone have not direct effect on perceived ease of use, perceived usefulness, and compatibility.

Table 6 - Mann-Whitney U test

Variables	Mann-Whitney U	Z	Sig.
Perceived Ease of Use	1546.500	-1.341	0.180
Perceived Usefulness	1678.000	-0.645	0.519
Compatibility	1754.000	-0.244	0.807
Intention to Use	1372.500	-2.348	0.019

Furthermore, product types are categorized into product and service in this study. The set of hypotheses H5a, H5b, H6a, H6b, H7a, H7b, H8a, and H8b studies effect of two access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use when product type is moderating variable. Table 7 shows p-value of perceived ease of use ($p = 0.823$), perceived usefulness ($p = 0.994$), compatibility ($p = 0.222$), and intention to use ($p = 0.320$) in case of tangible product. There is no p-value less than significant level 0.05.

While in case of intangible product or service, results show p-value of perceived ease of use ($p = 0.074$), perceived usefulness ($p = 0.349$), compatibility ($p = 0.101$), and intention to use ($p = 0.013$). Only p-value of intention to use is less than

significant level 0.05.

Hence, H8b is supported, while the others are rejected. That means access types to internet vendors through mobile phone have a direct effect on intention to use when product type is intangible product or service.

Table 7 - Mann-Whitney U test (Product Type as moderating Variable)

Product Type	Variables	Mann-Whitney U	Z	Sig.
Tangible Product	Perceived Ease of Use	435.000	-0.224	0.823
	Perceived Usefulness	449.500	0.007	0.994
	Compatibility	368.500	-1.222	0.222
	Intention to Use	385.500	-0.995	0.320
Intangible Product/ Service	Perceived Ease of Use	330.000	-1.790	0.074
	Perceived Usefulness	387.500	-0.937	0.349
	Compatibility	340.500	-1.639	0.101
	Intention to Use	294.500	-2.488	0.013

Moreover, Spearman Correlation is used for the set of hypotheses H9, H10, H11 that studies relationships between perceived ease of use, perceived usefulness, compatibility and intention to use. In Table 8, it shows that Spearman correlation coefficient between 3 variables: perceived ease of use, perceived usefulness, compatibility and intention to use are 0.427, 0.547, 0.361 respectively and their p-value = 0.000. All correlation coefficients are positive and p-values are less than 0.01. Therefore, H9, H10, H11 are supported. Perceived ease of use, perceived usefulness and compatibility are related to intention to use positively.

Table 8 – Spearman Correlation between 3 variables and intention to use

Variables	Correlation Coefficient	Sig.
Perceived Ease of Use	0.427	0.000
Perceived Usefulness	0.547	0.000
Compatibility	0.361	0.000

Usefulness		
Compatibility	0.361	0.000

Discussion and Conclusion

This study proposed the model based on Technology Acceptance Model(TAM). There are 3 objectives in this research; the first objective is to examine the impact of access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use. Second objective is to examine the impact of access types to internet vendors through mobile phone on perceived ease of use, perceived usefulness, compatibility, and intention to use when product type is different. Third objective is to study relationships between 3 variables: perceived ease of use, perceived usefulness, and compatibility and intention to use.

One finding in this research is that means of all dependent variables: perceived ease of use, perceived usefulness and compatibility, and intention to use when access type is mobile application are greater than means of dependent variables when access type is mobile website.

Previous information system researches used to study the influence of external variables such as the system's technical design characteristics on behavioral intention [34]. Apart from that, a research [65] studied external variable such as computer factors, for example, Presence of Clear Menu Items on Each Page, Presence of Shopping Cart and found that they affected perceived usefulness. The study also supported that perceived usefulness influenced online purchase intention. In this research, according to TAM, access type to internet vendors through mobile phone is also considered as external variable. The finding for the first objective is that access types to internet vendors through mobile phone have a direct effect on intention to use only. The other variables are not influenced by access types. Prior experiences might be the reason that perceived usefulness, perceived ease of use, and compatibility are not affected. Although samples in this study do not have any experience with mobile applications and mobile websites of Lazada and Agoda. However, they may have experiences with other businesses. Prior experiences can help them perform better task and reduce worry [49].

As considering product type as a moderating variable for the second objective, as shown in Table 5, it is found that for both product and service, most of means of dependent variables: perceived ease of use, perceived usefulness, and intention to use when access type is mobile application are greater than means of dependent variables when access type is mobile website. However, for product, mean of compatibility when access type is mobile website is greater. In addition, comparing means of

each variable between these two product types, it reveals that most of mean of each variable for service are greater than mean of each variable for product. This is consistent with a research [15] which suggested that intangible products are more likely to be purchased via internet.

However, there is no impact of access types to internet vendors through mobile phone on all of dependent variables for tangible product. While access types to internet vendors through mobile phone has a direct effect on intention to use for intangible product or service. This finding is also consistent with a research [58] which supported that online purchase intention differs by different products. Furthermore, a research[52]also revealed that the difference in tangibility of product leads to the difference in online purchase intention.

For the third objective, all of three variables: perceived ease of use, perceived usefulness and compatibility are positively related to intention to use. This supports previous researches that applied Technology Acceptance model. A research [63] also studied relation between perceived ease of use, perceived usefulness, and intention to transact and discovered that both perceived ease of use and perceived usefulness are positively related to intention to transact. Another research [66] studied online shopping channel and also supported that both perceived ease of use and perceived usefulness are positively related to intention to use online shopping channel. Moreover, among three variables in this study, the positive strongest correlation is relationship between perceived usefulness and intention to use.

This research explores the impact of access types to internet vendors on perceived ease of use, perceived usefulness, compatibility, and intention to use. Since this study focuses on two businesses related to products and services, Lazada and Agoda, future researches can apply the model to mobile websites and applications from different businesses. Moreover, factors such as perceived risk, prior experiences and purchase intention could be applied in order to investigate more users' perception further.

References

- [1] N. S. O. "The 2014 Household Survey on the Use of Information and Communication Technology," 2014.
- [2] E. T. D. Agency, "Thailand Internet User Profile," 2014.
- [3] Dmour, H., Alshurideh A. M. and F. Shishan, "The Influence of Mobile Application Quality and Attributes on the Continuance Intention of Mobile," *Life Science Journal*, vol. 11, no. 10, 2014, pp. 172-181,
- [4] Giri, M. and S. Singh, "Issues in Mobile e-

- commerce: A survey," *International Journal of Computer Science and Information Technologies*, vol. 5, no. 4, 2014, pp. 5068-5070.
- [5] Choi J., Seol, H., Lee, S., Cho, H. and Y. Park, "Customer satisfaction factors of mobile commerce in Korea," *Internet Research*, vol. 18, no. 3, 2008, pp. 313 - 335,
- [6] comScore, "Q2 M-Commerce Explodes to 47% Y/Y Gain: What it Means for the Growth of Mobile[Online]," 2014. [Online]. Available: <http://www.comscore.com/Insights/Blog/Q2-M-Commerce-Explodes-to-47-YY-Gain-What-it-Means-for-the-Growth-of-Mobile>.
- [7] IAB, "Apps and Mobile Web: Understanding the Two Sides of the Mobile Coin[Online]," 2014. [Online]. Available: <http://www.iab.net/mobileappsandweb>.
- [8] Internet Retailer, "How often do shoppers use retail apps?[Online]," 2014. [Online]. Available: <https://www.internetretailer.com/2014/08/21/how-often-do-shoppers-use-retail-apps>.
- [9] G. C. Bruner II and A. Kumar, "Explaining consumer acceptance of handheld Internet devices," *Journal of Business Research*, vol. 58, 2005, pp. 553–558.
- [10] A. Mendoza, *Mobile User Experience* (1st ed.), Elsevier Inc., 2013.
- [11] Nysveen, H., Pedersen, P. E. and H. Thorbjørnsen, "Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons," *Journal of the Academy of Marketing Science*, vol. 33, no. 3, 2005, pp. 330-346.
- [12] Min, Q., Li, S. and Q. Zhong, "An Empirical Study of M-Commerce Adoption from Usability Perspective," *Eighth International Conference on Mobile Business*, 2009, pp. 215 - 220.
- [13] Wu J.-H. and S.-C. Wang, "What drives mobile commerce? An empirical evaluation of the revised technology," *Information & Management*, vol. 42, 2005, pp. 719–729.
- [14] Mallat, N. Rossi, M., Tuunainen, V. K. and A. O'Connell, "The impact of use context on mobile services acceptance: The case of mobile ticketing," *Information & Management*, vol. 46, 2009, pp. 190–195.
- [15] Phau I. and S. Meng Poon, "Factors influencing the types of products and services purchased over the Internet," *Internet Research*, vol. 10, no. 2, 2000, pp. 102 - 113.
- [16] Wannayot, K., "Impact of online product presentation formats, product types and customer's gender on perceptions of website quality, purchase intention and intention to return to electronic commerce website," 2010.
- [17] Chu, J. Arce-Urriza, M., Cebollada-Calvo, J.-J. and P. K. Chintagunta, "An Empirical Analysis of Shopping Behavior Across Online and Offline Channels for Grocery Products: The Moderating Effects of Household and Product Characteristics," *Journal of Interactive Marketing*, vol. 24, 2010, pp. 251–268.
- [18] Frambach, R. T., Roest, H. C. and T. V. Krishnan, "The Impact of Consumer Internet Experience on Channel Preference and Usage Intentions Across the Different Stages of the Buying Process," *Journal of Interactive Marketing*, vol. 21, no. 2, 2007, pp. 26-41.
- [19] Leung, C. H., Chan, Y. Y. and C. S. C. Chan, "Analysis of Mobile Commerce Market in Hong Kong," *Proceedings of the 5th international conference on Electronic commerce*, 2003, pp. 408-412.
- [20] Chan, S. S. and X. Fang, *Interface Design Issues for Mobile Commerce, Electronic Commerce: Concepts, Methodologies, Tools, and Applications*, 2009, pp. 250-257.
- [21] Öztürk Ö. and K. Rızvanoğlu, "M-Commerce Usability: An Explorative Study on Turkish Private Shopping Apps and Mobile Sites," *DUXU/HCI 2013, Part IV, LNCS 8015*, 2013, pp. 623-630.
- [22] Venkatesh, V. and F. D. Davis, "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies," *Management Science*, vol. 46, no. 2, 2000, pp. 186-204.
- [23] Cooharajanone, N., Muadthong, A., Limniramol, R. Tetsuro, K. and O. Hitoshi, "The Evaluation of M-Commerce Interface on Smart Phone in Thailand," in *ICACT2011*, 2011.
- [24] Laukkanen T., "Internet vs Mobile Banking: Comparing Customer Value Perceptions," *Business Process Management Journal*, vol. 13, no. 6, 2007, pp. 788 - 797.
- [25] Leppäniemi, M. and H. Karjalainen, "Factors influencing consumers' willingness to accept mobile advertising: a conceptual model," *Int. J. Mobile Communications*, vol. 3, no. 3, 2005, p. 197–213.
- [26] Merisavo, M., Kajalo, S., Karjalainen, H., V. Virtanen, Salmenkivi, S., Raulas, M. and M. Leppäniemi, "An Empirical Study of the Drivers of Consumer Acceptance of Mobile Advertising," *Journal of Interactive Advertising*, vol. 7, no. 2, 2007, pp. 41-50.
- [27] Lu, H.-P. and P. Yu-Jen Su, "Factors affecting purchase intention on mobile shopping web sites," *Internet Research*, vol. 19, no. 4, 2009,

- pp. 442 - 458.
- [28] Clarke, I, "Emerging value propositions for M-commerce," *Journal of Business Strategies*, vol. 18, no. 2, 2001, pp. 133-148.
 - [29] Hsieh, C.-T, "Mobile Commerce: Assessing New Business Opportunities," *Communications of the IIMA*, vol. 7, no. 1, 2007, pp. 87-100.
 - [30] Buettner, K. and A. M. Simmons, "Mobile Web and Native Apps: How One Team Found a Happy Medium," *Design, User Experience, and Usability, Pt I, HCII 2011*, vol. LNCS 6769, 2011, pp. 49-554,.
 - [31] Jobe, W., "Native Apps vs. Mobile Web Apps," *International Journal of Interactive Mobile Technologies*, vol. 7, no. 4, 2013, pp. 27-32.
 - [32] Cyr, D., Head, M. and A. Ivanov , "Design aesthetics leading to m-loyalty in mobile commerce," *Information & Management*, vol. 43, 2006, pp. 950-963,.
 - [33] Okazaki, S. and F. Mendez, "Exploring convenience in mobile commerce: Moderating effects of gender," *Computers in Human Behavior*, vol. 29, 2013, pp. 1234-1242.
 - [34] Davis, F. D., Bagozzi, R. P. and P. R. Warshaw, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science*, vol. 8, 1989, pp. 982-1003.
 - [35] Koufaris, M. , "Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior," *Information Systems Research*, vol. 13, no. 2, 2002, pp. 205-223.
 - [36] Wang, Y.-S., Lin, H.-H. and P. Luarn, "Predicting consumer intention to use mobile service," *Information Systems Journal*, vol. 16, p. 157-179, 2006.
 - [37] Yang, K. C., "Exploring Factors Affecting the Adoption of Mobile Commerce in Singapore," *Telematics and Informatics*, vol. 22, 2005, pp. 257-277.
 - [38] Roger, E. M., *Diffusion of Innovations*, Fourth Ed, New York: The Free Press, 1995.
 - [39] Dai, H. and P. C. Palvia, "Mobile Commerce Adoption in China and the United States: A Cross-Cultural Study," *The DATA BASE for Advances in Information Systems*, vol. 40, no. 4, 2009, pp. 43-61, November.
 - [40] Fishbein, M. and I. Ajzen, *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Addison-Wesley Publishing Company, 1975.
 - [41] Lin, J. C.-C. and H. Lu, "Towards an understanding of the behavioural intention to use a web site," *International Journal of Information Management*, vol. 20, 2000, pp. 197-208.
 - [42] C. Kim, M. Mirusmonov and I. Lee, "An empirical examination of factors influencing the intention to use mobile payment," *Computers in Human Behavior*, vol. 26, 2010, pp. 310-322,).
 - [43] Ko, E., Kim, E. Y., and E. K. Lee, "Modeling Consumer Adoption of Mobile Shopping for Fashion Products in Korea," *Psychology & Marketing*, vol. 26, no. 7, 2009, pp. 669-687.
 - [44] Lin, H.-H. and Y.-S. Wang, "Predicting Consumer Intention to Use Mobile Commerce in Taiwan," in *Proceedings of the International Conference on Mobile Business*, 2005.
 - [45] Luarn, P. and H.-H. Lin, "Toward an Understanding of the Behavioral Intention to Use Mobile Banking," *Computers in Human Beh*, vol. 21, 2005, pp. 873-891,.
 - [46] Taylor, S. and P. Todd, "Assessing IT Usage: The Role of Prior Experience," *MIS Quarterly*, vol. 19, no. 4, 1995, pp. 561-570.
 - [47] Rose, S., Hair, N. and M. Clark, "Online Customer Experience: A Review of the Business-to-Consumer Online Purchase Context," *International Journal of Management Reviews*, vol. 13, 2011, p. 24-39,.
 - [48] Constantinides, E., "Influencing the online consumer's behavior: the Web experience," *Internet Research*, vol. 14, no. 2, 2004, pp. 111-126.
 - [49] Weisberg, J., Te'eni, D. and L. Arman, "Past purchase and Intention to Purchase in e-commerce: The Mediation of Social Presence and Trust," *Internet Research*, vol. 21, no. 1, 2011, pp. 82 - 96,.
 - [50] Peterson, R. A., Balasubramanian, S. and B. J. Bronnenberg, "Exploring the Implications of the Internet for Consumer Marketing," *Journal of the Academy of Marketing Science*, vol. 25, no. 4, 1997, pp. 329-346.
 - [51] Shim, S., Eastlick, M. A., Lotza, S. L. and P. Warrington, "An Online Prepurchase Intentions Model: The Role of Intention to Search," *Journal of Retailing*, vol. 77, 2001, pp. 397-416,.
 - [52] Vijayasathy, L. R., "Product Characteristics and Internet Shopping Intentions," *Internet Research*, vol. 12, no. 5, 2002, pp. 411- 426,.
 - [53] Liu, X. and K. K. Wei, "An Empirical Study of Product Differences in Consumers' E-commerce Adoption Behavior," *Electronic Commerce Research and Applications*, vol. 2, 2003, pp. 229-239,.
 - [54] Dahln, M. , Rasch, A. and S. Rosengren,

- "Love at First Site? A Study of Website Advertising Effectiveness," *Journal of Advertising Research*, vol. 43, no. 1, 2003, pp. 25-33.
- [55] Jiang, Z., Chan, J., Tan, B. C. and W. S. Chua, "Effects of Interactivity on Website Involvement and Purchase Intention," *Journal of the Association for Information Systems*, vol. 11, no. 1, 2010, pp. 34-59,.
- [56] Nelson, P., "Information and Consumer Behavior," *Journal of Political Economy*, vol. 78, no. 2, 1970, pp. 311-329,.
- [57] Hassanein, K. and M. Head, "The Impact of Infusing Social Presence in the Web Interface: An Investigation Across Different Products," *International Journal of Electronic Commerce (IJEC)*, vol. 10, no. 2, 2005, pp. 31-55,.
- [58] Brown, M., Pope, N. and K. Voges, "Buying or browsing?: An exploration of shopping orientations and online purchase intention," *European Journal of Marketing*, vol. 37, no. 11/12, 2003, pp. 1666 - 1684,.
- [59] N. S. O. "The 2013 Household Survey on the Use of Information and Communication Technology," 2013.
- [60] Moon, J.-W. and Y.-G. Kim, "Extending the TAM for a World-Wide-Web Context," *Information & Management*, vol. 38, 2001, pp. 217±230,.
- [61] Heijden, H. v. d., Verhagen, T. and M. Creemers, "Understanding Online Purchase Intentions: Contributions from Technology and Trust Perspectives," *European Journal of Information Systems*, vol. 12, 2003, pp. 41–48.
- [62] Gefen, D., Karahanna, E. and D. W. Straub, "Inexperience and Experience With Online Stores: The Importance of TAM and Trust," *IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT*, vol. 50, no. 3, 2003, pp. 307-321.
- [63] P. A. Paylou, "Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model," *International Journal of Electronic Commerce*, vol. 7, no. 3, 2003, pp. 69–103, ..
- [64] L. S. "Mann-Whitney U Test using SPSS Statistics," [Online]. Available: <https://statistics.laerd.com/spss-tutorials/mann-whitney-u-test-using-spss-statistics.php>. [Accessed 26 May 2016].
- [65] Hausman, A. V. and J. S. Siekpe, "The Effect of Web Interface Features on Consumer Online Purchase Intentions," *Journal of Business Research*, vol. 62, 2009, pp. 5–13,.
- [66] Li, Y.-H. and J.-W. Huang, "Applying Theory of Perceived Risk and Technology Acceptance Model in the Online Shopping Channel," *World Academy of Science, Engineering and Technology*, vol. 53, 2009, pp. 919-925.

Practice of ICT for Effective Implementation of Internal Control System and Internal Audit in the Context of Nepalese NGOs

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Abstract

Internal control system is an essential component required for an organization. This study examines the Information and communication technologies used for effective implementation of internal control system in the management of NGOs. It explores how ICT as a key component of internal control, has been implementing in operation of NGOs in Nepal. The data used are both primary and secondary data. The primary sources included questionnaire with 116 finance officers/manager of NGOs, and face-to-face in depth interviews with 20 different representative of NGOs and its stakeholders. The secondary sources include the review of the published journals and bulletins.

Keywords: Internal Control System, ICT, Internal Audit, NGO.

Introduction

The technologies used in information and communication systems have changed operational mechanism NGOs. Technology has shown its impact on the internal control system and internal audit in the NGOs. The use of ICT as tool of internal control could be effective to identify fraudulent transactions [2].

Literature review

The limited studies have been done on the study on ICT practices for internal control and internal audit in the country, and not been carried out in the context Nepalese NGOs. A sound ICT system provides a sure and guarantee medium of financial information delivery that covers the entire accounting cycle of the NGOs [1]. The literature shows that the proper management reporting system needs suitable information technology system [17].

Existing context of NGOs working in Nepal

NGOs started operation in Nepal after 1950. Since then they are playing an increasingly important role in public service by helping to execute to the

policies in Nepal. Social Welfare Council (SWC) is government body regulating NGOs in Nepal. The SWC is entrusted for the promotion, facilitation, coordination, monitoring and evaluation of the activities of the NGOs in Nepal [18]. NGO Federation of Nepal, which is composed of the representing members from NGOs, is helping to strengthening their capacity and monitoring NGOs closely in various aspects. SWC has registered 39,759 NGOs [19]. And NGO Federation of Nepal has 5,370 NGOs members under it [13].

Local and National NGOs exists in Nepal. National NGOs engage in development and humanitarian activities, but they are very diverse in both their aims and their activities. National NGOs are usually concerned with global, national and local issues. Local NGOs are usually only interested in specific local issue or a relatively small geographically defined area [4].

Internal control system and COSO model

There are number of control models have influenced the practice of internal control worldwide, the COSO model is widely recognized standard against which organizations measure the effectiveness of their systems of internal control. The COSO Model is composed of five interrelated components [7]. Normally, the base of the pyramid is the Control Environment, which includes integrity, ethical values, and competence, and NGO work environment. The next layer, the Risk Assessment includes mechanisms to identify, analyze, and manage risks to achieve the NGOs' objectives. The next layer is the control activities; it includes the policies and procedures to address the risks identified by management in the Risk Assessment level. The entire internal control process must be monitored and modified when the need arises. Finally, Information and Communication System, showed as the edges of the pyramid, represent the capture and transfer of data needed by the NGOs to control operations. These five components are not linear steps but, will influence another [6].

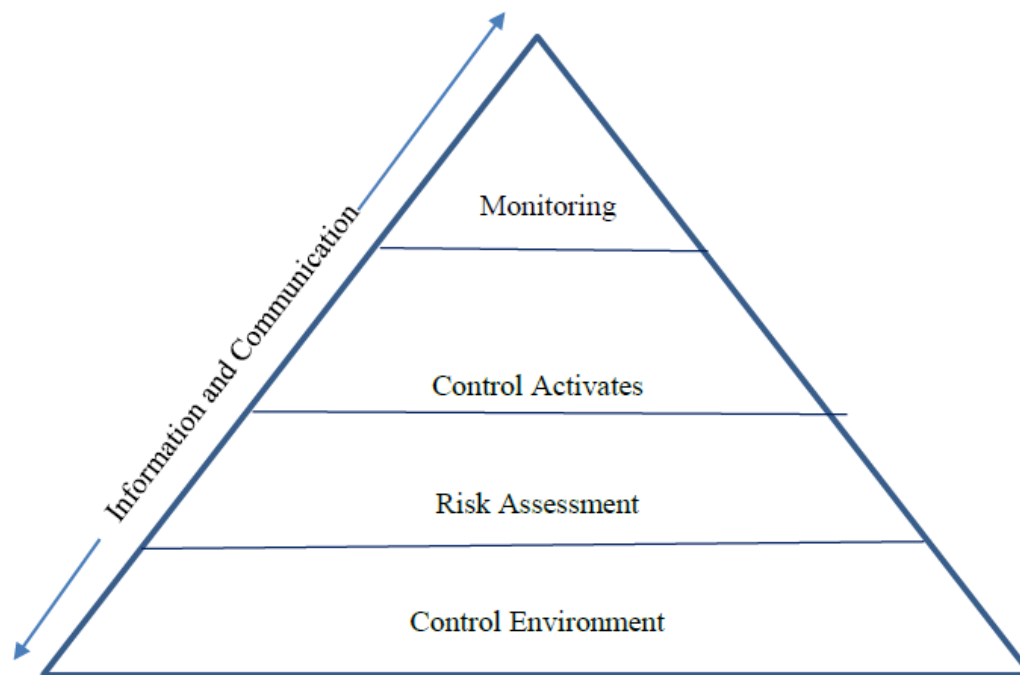


Figure 1: The COSO Model of Internal Control, Adopted from [16]

Information and communication system as a key component of internal control system for control operations

The information and communication systems could range from sophisticated computer technology to simple staff meetings in order to support smooth flow of internal control system of any organizations [3]. The Information and communication systems within organization can be formal or informal. The NGOs has its own Information and communication channels to ensure that staff has access to the information they need to carry out the necessary controls within organization. The information systems has to be placed to ensure that all the relevant information is gathered reliably and at the right time, and distributed to the stakeholder in proper manner. The information and communication is also required for the NGOs staff to make them aware of its roles and responsibilities in terms of internal controls. The quality information and communication system enable organization to make the right decisions regarding organizational strategies and ensure organizational growth and development [1].

Use of ICT Support System for Internal Control and Internal Audit

The ICT tools have been widely used in operation and control of organization activities worldwide. In a survey conducted by Price water house Coopers, it was found that the organizations are increasingly

using ICT tools for internal control and internal audit. The ICT-based tools and techniques are being used by internal auditors to make internal control more effective. The study found that the use of ICT for internal control has a positive impact on the reporting and operational independence of internal auditors [14].

ICT refer to all hardware and software technologies to achieve its organizational objectives. In Nepalese NGOs context, the use of ICT is new change in both local and national NGOs, the NGOs are aware that IT provides a solid platform to process activates and to meet the organization objective. Simply, ICT includes computer hardware, software, data, storage technology, and networks providing a portfolio of shared IT resources for the organization [12].

There are six main functions affected by the usage of ICT tools are shown in Figure 2 below. It is very clear that Internal Audit is most directly involved in internal control activities out of the six functions. Internal audit is part of the internal control system put in place by the management of an organization. It helps to management to ensure that the financial operations are correctly carried out according to the law and also in accordance with organizational policy. The use of ICT tools and techniques by internal auditors for internal control purposes is increasing globally because ICT tools and techniques are useful for internal control's task, efficiency and effectiveness [1].

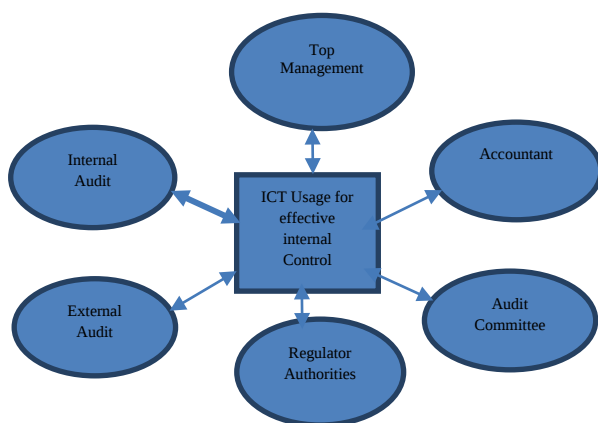


Figure 1: Functions affected by ICT Tools and Techniques Usage for Internal Control. Adopted from [1]

According to the IIA (Institute of Internal Auditors) Performance Standard 2130 states that Internal Auditors have to perform internal audit to promote appropriate ethics and values within the organization, ensuring effective organizational performance management and accountability, effectively communicating risk and control information to management [9] and coordinate the activities and make the appropriate recommendations among the board member of organization for improving governance process [11]. This standard is also applicable for the Nepalese NGOs sector as well, as ICT tools help the organization for effectiveness of internal control system and internal audit.

Internal audit and forming and audit committee is also widely growing internal control practice in Nepal. The practice of forming an audit committee is good practice for recognized and addressed smooth internal control system. The audit committee is important to serve as an independent check on top management and to independently support to ensure quality internal control process. It also determines the areas of control or influence of the internal audit function. The formation of audit committee is a low cost solution for charitable and nonprofit making NGOs. The audit committee has essential functions for effectively monitor the NGO's financial reporting practices and evaluate management's competence. The trend of formulation of the audit committee has been seen as part of wider worldwide practices within the NGOs. The audit committees have precise role in order to have internal control mechanisms and to contribute in internal audit functions [20].

Research method

The primary data were collected using structured questionnaires. The study used a questionnaire containing both closed-ended and open-ended questions. The mixed design method was used in this study. In quantitative method, the data collected were the practices of internal controls by NGOs in their operations and use of ICT to support on the system has been measured. A questionnaire designed in the Likert scale was used to collect the data from the 116 finance representatives as respondents from the 116 NGOs. Likert scale questions were therefore used since they are appropriate; abide by the principles of validity, reliability, and consideration. In qualitative method, face-to-face in depth interviews with 20 different representatives of NGOs including the key informant from SWC, NGOs' CEO and board members were also conducted. The data was analyzed using Statistical Packages for Social Sciences (SPSS) computer package analyzed the degree to which internal controls was applied and level of ICT used by NGOs in Nepal. Secondary data was collected from library research, financial and management books, research reports and the internet.

Sampling size

The researcher has chosen those NGOs affiliated with both local and national within 2014/2015. The researcher has the reason behind shorting and choosing both affiliations is important for the researcher because those NGOs who wish to receive foreign or government funding should affiliate them with SWC and NGO federation is affiliation helping NGO to strengthening their capacity and monitoring NGOs closely. Hence, after analysis over list of SWC and NGO Federation overall NGOs affiliation there are only 1741 has both affiliated with both association. Hence, the researcher has determined 1741 number of NGOs as research study population. Ten percent of this was taken as sample for enquiry and data collection, this way it seemed 171 NGOS. Out of which the researcher have received only 116 response from NGOs finance respondents.

Reliability and validity of data

The Cronbach's Alpha was conducted to analysis the reliability of the questionnaire. The reliability analysis of SPSS has sufficient standard, the consistency is found in measuring the respondent responses as overall Cronbach's alpha of study is 0.929. The result for quantitative analysis has been verified with the research participant during qualitative analysis.

Result and discussion

This section examines descriptive analysis of the data collected of Nepalese NGOs. The data has been collected from the Nepalese National and Local NGOs. The researcher has taken data from 75 districts of Nepal and included all 14 zones of Nepal with 116 respondents of finance representative of NGOs. There were 171 questionnaires have been distributed among Nepalese sample NGOs and 116 respondents of NGOs response.

The response pattern of finance representatives of NGOs shown in table 1 indicates that there are 45.7% local NGOs and 54.3% national NGOs sample for the study.

Table 2 consists, the count of information and communication system which local and national NGOs follow within the organization. It shows that out of 52 (45% of total NGOs) local NGOs, 28 number of NGOs (54%) said they have somewhat large numbers of information and communication system within organization. Similarly, out of 63 (55% of total NGOs) national NGOs, 36 numbers of NGOs (57%) said they have somewhat large numbers of information and communication system within organization. Total 23 numbers of NGOs (20%) have very large information and communication system. While conducting in depth interview with NGOs representative during qualitative analysis, the representative stated that *"The effective organizational information and communication system is highly depended on organizational working period how long NGOs working in Nepal. The organization who are working for many years usually is big and grown up NGOs, who has to involve many staff for various activities. It is very obvious that without effective information and communication system NGOs could not operationalize their work for longer period"*. (Field Note: 13 Feb 2015)

Hence, analysis shows that effective and optimal information and communication system within NGOs has also based on number of NGOs working in Nepal.

Furthermore, Correlation between Number of years NGOs working in Nepal and Information and Communication is carried out, the result of the same is in table 4 and is being followed by required explanations. It shows that there is positive correlation (.068), the value is greater than 0.05, information and communication with the number of year NGOs working in Nepal,

The researcher also verify the result with SWC representative. The representative agreed that *"the most of NGOs who are working continuously and*

communication system. In overall only 2 numbers of NGOs (2%) have not good information and communication system. The data reveals Nepalese NGOs have optimal level of information and communication system with in organization.

The representative of national NGOs stated that *"the most of Nepalese NGOs have basic ICT practices the NGOs, they are using internet connection, e-mail communication and basic networking technologies within organization. But ICT practices need to be improved for more accessibility"*. (Field Note: 15 March 2016)

To know the information and communication system based on the number of years NGOs working in Nepal, the cross tabulation has been done for further analysis.

In table 3, the survey shows that the NGOs greater than 20 years working in has good information and communication system. There are total 40 NGOs who are working for more than 20 years in Nepal. Out of 40 NGOs on same group, 19 number of NGOs has somewhat large information and communication system. Similarly 11 number of NGOs out of 40 NGOs has very large information and communication system and 9 out of 40 NGOs has neither small nor large information nor communication system within organization.

from longer period in Nepal are good in information sharing and transparent. Without effective information and communication system within organization, NGOs can't maintain the level of transparency and information sharing to its stakeholders". (Field Note: 18 March 2015)

Hence, the analysis reveals that information and communication system is linked with the longer the working years of NGOs in Nepal. Internal control framework consists of five integrated component.

Table 5 shows descriptive statistical of internal control framework with five integrated component for the Nepalese NGOs. The Committee of Sponsoring Organizations (COSO) report indicated that components of the internal control structure are control environment, risk assessment, information and communication, control activities, and monitoring. According to COSO, these five internal control components should have within organization in order to conclude that internal control is effective [7]. Nepalese NGOs are following internal control components, study denotes NGOs has optimal level of effectiveness in their organizational internal control system. The mean values of each component have greater than 3.00 which indicate that Nepalese NGOs follows standard components of internal control system.

In table 6, the respondents agreed somewhat largely that their organization follow standard element of internal control, such as they agreed 37.4% respondents believe they follow control environment, 55.7% respondents believe they follow Information and Communications, 46.4% respondents believe they follow Control Activities, 38.3% respondents believe they follow monitoring and 33.9% follow risk assessment with in organization. The study reveals most of Nepalese NGOs are following all elements of internal control in optimal level.

The research participant of the NGO viewed *“Our NGO is following internal control system and covering all internal control components as per donor and audit requirements, which is helping us to detect errors and give chance to verify the process of each organizational activities to achieve goals”*. – (Field Note, March 1, 2015)

The most of research participants are agreed that their NGOs try to follow all internal control components in various level but their key focus is to improve on implementation of all elements. The SWC representatives also agreed that *“some Nepalese NGOs may not have fully implemented internal control system in line with COSO, they are following as per their organizational need”*. (Field Note: 18 March 2015)

The analysis has shown that Nepalese NGOs are following internal control components as per their organizational requirement.

Audit Practices on Nepalese NGOs

In table 7 denotes all Nepalese NGOs is fulfilling statutory requirement of annual fiscal year audit. There are 99 numbers of NGOs who are fulfilling very large the requirement, 11 numbers of NGOs who are somewhat large fulfilling the requirements and 6 numbers of NGOs who are fulfilling neither small nor large fulfilling statutory requirement of the annual fiscal year audit. Table 8 shows clearly that 42 numbers (79%) out of 53 local NGOs fulfil the annual audit requirement in very large and fully satisfactory level. Similarly, 57 (90%) out of 63 numbers of National NGOs fulfil the annual audit requirement in very large level.

It shows, national NGOs are fulfilling very large, the requirement of annual audit requirement in comparatively local NGOs. SWC representative stated that *“Nepalese NGOs should have compulsory submit their annual audit to SWC and District Administration Office for annual renewal. NGOs are accountable to shows their financial*

health on annual basis to continue the operation.” (Field Note, March 15, 2015).

Table 8 shows internal audit practice of local and national NGOs working in Nepal. There are 4 numbers (i.e. 8%) of local NGOs, who is not using internal audit at all in overall 53 number of NGOs. Similarly 8 (i.e. 13%) numbers of national NGOs, who are not using internal audit at all out of 63 national NGOs. In overall 12 NGOs (i.e. 10%) of NGOs don't have internal audit system and remaining NGOs have various level of internal control system. There are 51 numbers (i.e. 44%) of NGOs out of 116 sample NGOs has very large and effective internal audit system.

A national NGO representative stated that *“Our management depends on internal audit to proper, economic and effective use of resources. It also supports us to examine and evaluate the reports on the adequacy of internal control. We use accounting software data, electronic database for our internal audit but we are not able to fully use the ICT tools for our internal audit.”* (Field Note, March 18, 2015)

Furthermore nation NGOs representative has added that *“I believe that internal control and internal audit helps us to prevent corruption within our organization.”* (Field Note, March 18, 2015)

The representative of NGO Federation of Nepal has emphasized that *“the output of NGOs internal audit has to support the management for control, to provide useful recommendation and effective decision making within the organization but the audit recommendations is not useful unless management shows interest in implementing them. Based on my knowledge and experience the Nepalese NGOs are weak in implementation of audit recommendation.”* (Field Note: March 20, 2015)

The study response pattern indicates that, the most of Nepalese NGOs have established internal audit function in various levels, it helps the organization on management control and to review of the internal control system. The analysis reveals that Nepalese NGOs have given optimal priority on internal audit function to evaluate of financial and operating information systems and procedures to provide useful recommendations for improvements. The goal of internal audits is to assist the board and managers to investigate and reexamine any problems in internal controls and to judge operational results [12].

ICT Practices in Nepalese NGOs

Almost all NGOs replied that they have internet connection and using e-mail communication within organization for basic ICT practices but there is limited internet accessibility. There are only 63% of NGOs have networking technologies and have ICT applications/systems. Basically, local NGOs are still underway in ICT and they still need to take a proactive approach to the use of ICTs because ICT directly affect the NGOs to increase the efficiency of internal management and service delivery [11].

Nepalese NGOs use ICT in internal audit

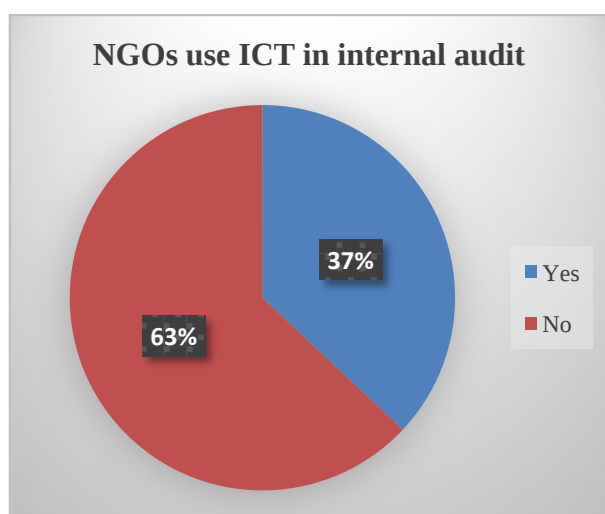


Figure 3. Nepalese NGOs use ICT in internal audit.

The survey shows that there is 37% Nepalese NGOs who are using ICT in their internal audit process and 63% of Nepalese NGOs don't use ICT in internal audit. In Nepalese NGOs, the internal audit process has evolved from the traditional manual audit of an accounting system to the methods of auditing with and through computers. The survey shows that Nepalese NGO sector still has not fully using ICT in internal audit process.

According to one the local NGO representative board member stated *"our internal audit process is due to lack of qualified ICT personnel and other reasons for not using because of high cost for ICT gadgets and maintenance cost, which is not possible for us to cover in long run. But we know ICT-based tools are effective in detecting electronic fraud and support for organizational goal."*

The analysis shows NGOs representative and stakeholder are aware on important of use of ICT tools and know to them it supports on the organizational growth and support to the achievement the organizational goals and objectives but there is challenge to use ICT tools

fully because of cost limitation ICT affordable for the NGOs are still low in context of Nepal. The study identified ICT as a strong factor impacting internal control for effective prevention and detection of electronic fraud [1].

The board members of national NGOs stated that *"we are using internet, emails accounting software and ICT tools for financial management and exploring several auditing application, which may help us to conduct real-time preparation, examination, and extraction of financial information. I think still most of Nepalese NGOs following traditional manual auditing"*. (Field Note: 20 March 2016).

ICTs can reengineer the nonprofit sector as it can be viewed as an important tool to enhance efficiency and effectiveness in managing organizational operations and the service delivery process [5].

Summary and Conclusion

The purpose of the study was to assess the information and communication technologies (ICTs) practices for effective implementation of internal control system and internal audit of NGOs in Nepal.

The analysis shows that Nepalese NGOs have following optimal of internal control system and its all components practice of internal control system to strengthens the risk management and reduces the frauds of an organization. There main focus of internal control systems is maintain accurate and reliable financial reports and reduce corruptions. The NGOs are expected to be more transparent and accountable to their stakeholders on their operations and activities including finance and accounting [5].

The findings of the study revealed that NGOs in Nepal are using information and communication system which is one of the key component of internal controls system to ensure that staff has access to the information they need to carry out the necessary controls in organizational activities. The analysis shows there are good information and communication system within those NGOs who are working continually working for longer period and number of working of NGOs in Nepal has positive correction with information and communication system.

The study also focus on internal audit and ICT use in internal audit. In Nepalese NGOs, the study show the role of internal audit taken into consideration to prevent the misuse of funds and combat the high incidence of corruption. ALL Nepalese NGOs are not using ICT tools for

internal audit, there is still need to The internal auditor are also responsible to perform tests of controls to determine the effectiveness of internal control structure, policies and procedures, which is only possible if NGOs have adequate internal control procedures exist within organization [9].

The financial representative of NGOs and NGOs various research participants have common perception that the sound ICT infrastructure fully support on the organizational growth, it supports to achieve the organizational goals and objectives. But Nepalese NGOs fully not able to implement ICT tools in practice. The finding also indicates that the national NGOs are using applicable ICT tools but most of local NGOs are not able to use the ICT tools because of high cost for ICT gadgets and maintenance cost.

ICTs provide new opportunities and at the same time poses challenges for NGOs, this study has not included misuse of information and communications technology (ICT) in NGOs sector of Nepal. The ICT environment is rapidly changing hence the misuse of ICT provide opportunities for financial gain for individual, for example the accounting systems can be manipulated by persons to commit fraud [10]. The study also does not assess, which extent Nepalese NGOs have promoted transparent and accountable operations driven by ICTs.

Future studies need to be focused on the risk of ICT misuse and identify prevention and detection methods and the impact of ICTs on NGOs transparency and accountability in operation could be next topics for the researchers.

Reference

- [1] Abiola, J.O, "The Impact of Information and Communication Technology on Internal Control's Prevention and Detection of Fraud" Department of Accounting & Finance, 2013.
- [2] Abiola, J., "An Assessment of Information and Communication Technology Effectiveness in the Banking Sector: Lessons from Nigeria". International Journal of Liberal Arts and Social Science, Vol.2 No. 3, 2014.
- [3] Amudo, A., and Eno, L. I. "Evaluation of Internal Control Systems: A Case Study from Uganda". International Research Journal of Finance and Economics, Vol. 27, 2009, pp. 125-143.
- [4] Cawsey, D. National and Local NGOs. Environmental Education and Awareness. Retrieved from www.forumforthfuture.org.uk, (n.d).
- [5] Choi, J. "Making ICTs Work: A Study of Hong Kong NGOs in the Social Welfare Sector". 26th International Congress of Administrative Sciences Seoul, Korea: Center of Asian Studies, University of Hong Kong, 2004, pp. 14-18.
- [6] COSO: "Internal Control: Integrated Framework" Committee of Sponsoring Organizations of the Treadway Commission, New York, NY, 1992.
- [7] COSO: "Committee of Sponsoring Organization of Treadway Commission." Internal Control-Integrated Framework New York: AICPA, 1994.
- [8] COSO: "Internal Control -Integrated Framework". USA: Committee of Sponsoring Organizations, 2011.
- [9] IIA: (The) Institute of Internal Auditors, Available at www.theiia.org/index.cfm?doc_id=1617 , 1999a.
- [10] Hutchings, A., and Jorna, P. "Misuse of information and the public sector communications technology within the public sector". Australia's national research and knowledge centre on crime and justice, No.470 2015.
- [11] McNally, S: The 2013 COSO Framework & SOX Compliance. The Association of Accountants and Financial Professionals in Business, 2013.
- [12] Moorthy, K., Seetharaman, A., Mohamed, Z., Gopalan, M., and San, L. "The impact of information technology on internal audit". African Journal of Business Management, Vol. 5, No.9, 2011, pp.3523-3539.
- [13] NFN. NGO Federation of Nepal. etrieved from <http://www.ngofederation.org>, 2013
- [14] PricewaterhouseCoopers: State of the Internal Audit Professional Study: Pressures Build for Continual Focus on Risk, PwC Advisory Publication, 2007
- [15] Rabrenovic, A. "Financial Accountability as a Condition for EU Membership", PhD thesis. Glasgow: University of Glasgow, 2007

- [16] Schneider, K., and Becker, L. Using the COSO model of internal control as a framework for ethics initiatives in business schools, (n.d).
- [17] Shuhai, L., and Muhammad, N: Risk Management and Internal Control: A Case Study Of China Aviation Oil Corporation Ltd. University West. China: Department of Economics and Informatics, 2010.
- [18] SW. The Social Welfare Act, 2049, Social Welfare. Govt. of Nepal, 1992.
- [19] SWC: Social Welfare Council Lainchour, Kathmandu: Retrieved from <http://www.swc.org.np>, 2013.
- [20] Vanderwarren, K., "Financial Accountability in Charitable Organizations: Mandating an Audit Committee Function," Chicago-Kent Law Review, 2002, pp. 963-988.

Annex

Table: 1 Status of NGOs

Status of Organization	Frequency	Percentage
Local	53	45.7%
national	63	54.3%
Total	116	100 %

Table 2: Status of Organization and Information & Communication System Cross Tabulation

	Information and Communications System					Total
	Not at all	Somewhat small	Neither small nor large	Somewhat large	Very large	
Local	1	3	10	28	10	52
National	1	1	12	36	13	63
Total	2	4	22	64	23	115

Missing =1

Table 3: Number of years NGOs working in Nepal and Information and Communication System

organization working in Nepal	Not at all	Somewhat small	Neither small nor large	Somewhat large	Very large	Total
Less than 4 Years	1	0	0	2	0	2
5-9 Years	0	0	5	12	2	19
10-14 Years	0	3	3	18	6	31
15-19 Years	0	1	5	13	4	23
Greater than 20	1	0	9	19	11	40
Total Years	2	4	22	64	23	115

Missing =1

Table 4. Correlations of Number of years NGOs working in Nepal and Information and Communication

How many years this organization working in Nepal		
Information and Communications System	Pearson Correlation	0.068**

	Sig. (2-tailed)	0.471
	N	115

Correlation is significant at the 0.05 level (2-tailed).

Table 5: NGOs integrated component of internal control framework

	Control Environment	Information and Communications	Control Activities	Monitoring	Risk Assessment
Mean	3.51	3.88	3.66	3.90	3.28
Std. Deviation	1.054	.860	.972	.977	1.128

Table 6: The standard elements of internal control system followed by Nepalese NGO

Respondents opinion in range regarding their organization follow standard element of internal control	Control Environment	Information and Communication	Control Activities	Monitoring	Risk assessment
not at all	2.4	1.8	2.4	1.7	5.2
somewhat small	10.4	3.5	6.1	2.6	17.4
neither small nor large	32.2	19.1	28.7	27.8	31.3
somewhat large	37.4	55.7	46.1	38.3	33.9
very large	16.5	20.0	16.5	29.6	12.2

Table 7: Status of Organization and Annual Fiscal Year Audit Cross tabulation

NGOs	neither small nor large	somewhat large	very large	Total Count
Local	3	8	42	53
National	3	3	57	63
Total	6	11	99	116

Table 8: Status of Organization and Internal Audit Cross tabulation

NGOs	not at all	somewhat small	neither small nor large	somewhat large	very large	Total Count
Local	4	1	7	12	29	53
National	8	3	12	18	22	63
Total	12	4	19	30	51	116

Analysis of the Contribution of Community Forestry in Meeting People's Livelihood in Nepal

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Abstract

The main objective of the paper is to analyze the role of community forestry in meeting the livelihood needs of the poor people dependent on forest resources. The research based on primary and secondary data found that rural community people have little knowledge on developing entrepreneurship from the forest resources they have been managing. Do there is a strong need to reform micro-governance at Community Forest Users Group level. The knowledge, practice and attitude for the management of forest resources vary with the differing ethnical group, level of education, types of occupation, and religion.

Keywords:

Livelihood, Forest Resource, Community Forest, Non-timber Forest Products, Occupation

Introduction

Community Forestry is the active and meaningful involvement of communities in forests [7]. The key characteristics of Community Forestry are meaningful community involvement in, or control of, decision making about forest management and the retention of benefits of forest management and retention of benefits of forest use and management within the community[7]. The Government of Nepal has made provision to hand over the state owned forests to the local communities for a certain renewable period of time for conservation and sustainable utilization of forest resources, which we call community forestry.

More than half of world's poor depend heavily on natural resources for their livelihood, and in Nepal about 70% of people are forest dependent. There is a need to find an innovative ways for natural resource management for securing and enhancing livelihood.

Forestry sectors of Nepal have claimed to be contributed to the political, social, and environmental aspect of sustainability. In many cases, forest management are very much dependent on these aspect of environmental sustainability, and which can be observed more in case of community forestry as CF is managed by CFUG. Yet we know little knowledge

about whether or not these are integrated, and there is a potential for taking a more integrated approach in developing these community-based natural resource management entities in the context of environmental sustainability.

The rationale behind the provision of the Community Forestry and the CFUGs in Nepal was the consequences of the Government's incapability to conserve the forest and biodiversity effectively through its bureaucratic systems. In 1957, the Government nationalized virtually all forests and placing them under the legal authority of Forest Department. As a result, people were gradually lost all of their traditional right over the forests and were deprived from getting their subsistence needs of forest products. Resentment against nationalization contributed to unregulated extraction, creating conflict between villagers and DOF staffs[6, 7]. This distancing of people from resource management led to destruction of forests in Nepal[4].

Nepal's community forestry is a well-established decentralization system for sustainable forest management, where roles and responsibilities from state handed over to the local communities to make them more accountable in the management of proximate forest resources. It is three decades old practice [3, 8] and proved as a successful model. The community forestry program has met with some notable successes in terms of enhancing flow of forest products, improving livelihoods opportunities for forest dependent people, strengthening social capital, and improving the biophysical condition of forest. Because of these successes, Nepal's community forestry has moved beyond its original goal of fulfilling basic forest needs of the people including firewood, fodder, timber, and non-timber forest products (NTFPs), and hence Nepal is pioneer in terms of community-based natural resource management [3].

In this context, the main objective of this study is to analyze the role of community forestry to rural livelihoods of poor and disadvantaged people.

Literature Review

Forests, agriculture and livestock are integral parts of rural livelihoods in Nepal and elsewhere in the developing countries [8]. People from developing countries and particularly those who live in rural areas rely on forests for meeting their livelihoods needs. In Nepal rural people depends on trees for fire-wood, fodder, timber, wood fiber, fruits, seeds, herbs and compost manure to maintain and sustain the subsistence farming system. Farm, forests and livestock are the three highly integrated constituents of the farming system and cannot be separated from each other [1]. The fire-wood is the most important forest product for rural people in Nepal and often only one source of energy for cooking and heating. Hence, the forest is the backbone of Nepalese agriculture, sustaining the livelihoods of its rural people [4, 2](Gilmour and Fisher, 1991; Acharya, 2004). In the absence of these forests products, villages' life is unimaginable.

The statistical data shows that 87% of the total population (25 million) of the country lives in rural areas, and mostly they rely on forest products for their livelihoods. All these rural people are the element in the formation of CFUGs. Study shows that only 20 percent of the rural inhabitants are generally secure in their livelihoods in normal times[5] (Seddon et al., 2002). Most of them are socially backward, illiterate and shy people, and fall under the category of disadvantaged people. Deforestation and degradation is largely influenced due to market pressure, growing population and this applies to all forest management modalities.

Forestry policy in Nepal emerged in a series of milestones between 1975 and 1993; indeed some amendments are seen from 1993 to 2006. National Agriculture Policy (2004) has the provision of leasing marginal, pasture, degraded forest and unused common lands to the poor and marginalized target population for the cultivation of cash crops and horticulture-grass, forage, fodder, agro-forestry, medicinal plants, sericulture and other perennial tree crops, which would contribute to land improvement and poverty alleviation. It also calls for the improvement of degraded forests and natural water bodies for the bio-diversity conservation, as well as, utilization and development of the agro-forestry system. The targeted groups of income generating activities are poor people and thus they support government in its poverty alleviation program. But, participation of the target group in CF is not satisfactory because socially highlighted or elite groups capture the opportunities without full consent of the disadvantaged group.

Increasing values of NTFPs and expanding markets have created added opportunities as well as challenges to local level forest management. These new challenges and opportunities should be taken into account to foster sustainable, equitable and efficient management and utilization of NTFPs in community based forest management. Medicinal and aromatic plants are important products found in forest areas throughout the Nepal. During the past decade, a dramatic increase in exports of medicinal plants attests to worldwide interest in these products as well as in traditional health systems. A theoretical model illustrating the proposed interface between community-based forest management and resource management factors and desired end results through community-based interventions indicates the relationships amongst the key variables. The theoretical framework explains the relationship between national policy and people's participation in community forest, socio-economic context, national capital, financial capital, social/ political capital, physical capital and human capital.

Research Methodology

The study is the outcome of the Ph.D. research conducted in between 2012- 2015 in Nepal. In this study, description schedule, interview survey and focus group discussion method were used for data collection. A simple cross sectional descriptive exploratory study design was selected to examine, describe and predict the relationship among variables based on schedule. On the other hand, the quantitative data concerning community forest management and other related information were collected and analyzed using statistical tools. The information generated were related to community forest user group and livelihood among rural people of Nepal. Eight local forestry groups comprising of four community forest users groups, one leasehold forest users group, and one collaborative forest management group were selected. About 50 Households from each FUGs were interviewed. Various relevant literatures were reviewed as part of designing of research, and getting in-depth knowledge about the subject of study.

Results and Findings

The influence of the community forestry is considered as the driving factor for social change and livelihood. The studied households were categorized as rich, middle class, poor, woman led, Dalit, and landless to rate their economic level. The selection of households of different social and economic background has been illustrated in table 1.

Table 1: Economic Status of the Household

(Source: Field survey, 2015)

S.N	Economic Strata of the family	No. of households	Households %
1	Rich	25	7
2	Middle class	120	31
3	Poor	134	35
4	Woman led	42	11
5	Dalit	34	9
6	Landless	26	7
Total		381	100

Out of 381 households, the household of rich family, middle family and poor family were rated as 7%, 31%, and 35% respectively. Similarly, the household of woman led, Dalit and landless family were 11%, 9% and 7% respectively. The majority of the households were from middle and poor classes.

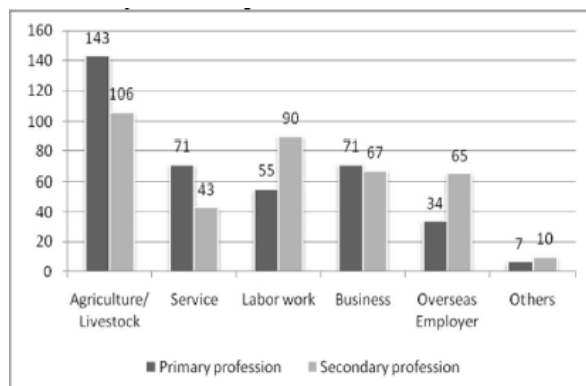
Primary and Secondary Income Sources of the family

Agriculture, livestock, service, labor work, business and overseas employment were recognized as major sources of the family in the sample areas.

Source: Field Survey, 2015

Figure 1: Trend of Primary and Secondary Income Sources of the Family

Out of 381 households, the main income source of 143 households rated agriculture and livestock as their



Primary profession and 104 respondents placed it in secondary source of income. Similarly, 90 households rated labor work as their primary source of income and 55 rated as secondary source. Besides these two major sources, 71 rated business as primary source and 67 rated as secondary source for their income. However, another 71, 31 and 7 respectively rated service, overseas employment and others as their primary source of employment. Majority of the people rated agriculture, livestock, business and labor works as their primary source of income.

Status of Income and Expenditure of the Family

The income and expenditure balance has been rated based on the saving the people make in each year, no save and no loss category, and loss in their income status. The status of income and expenditure of the family has been presented in table 2.

Table 2: Income Status of Households

S.N	Economic status of household	No. of households	No. of household (%)
1	Saving	150	39%
2	No saving and loss	56	15%
3	Loss	175	46%
Total		381	100%

Source: Field survey, 2015

Out of 381 households, 150 households that is 39% said that they have been able for saving their income and 56 household that is 15% said that they neither have saving nor loss. The remaining 175 household that is 46% said that they are living with loss; it means their lives are running very poorly and they have fell in vicious circle of poverty.

Yearly Saving Status of Households

The category of people who are able to save yearly has been ranged from below twenty thousand to above eighty thousand. Most of the categories of houses were from middle class to save some money yearly.

Table3: Yearly Saving Status of Households

S.N	Saving (yearly)	No. of saving households	Saving household %
1	Below 20 thousand	23	15
2	Below 40 thousand	45	30
3	Below 60 thousand	34	23
4	Below 80 thousand	22	15
5	Above 80 thousand	26	17
Total		150	100

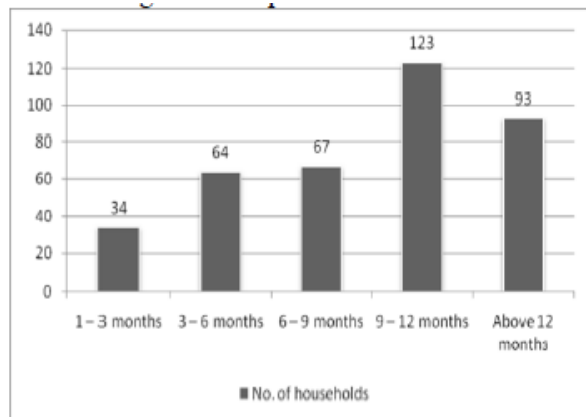
Source: Field survey, 2015

Out of 150 families 30% rated that they saved below forty thousand in a year. Similarly, 23% rated below sixty thousand, 15% rated below eighty thousand and 17% above eighty thousand to save every year. Most of the people of medium category save money with the range from forty to eighty thousand every year.

Food Production Status of Household

In the rural setting, the food produced by the family has not been found sufficiently even for their yearly food requirement. The category was rated from the sufficiency starting from three months interval

exceeding even more than a year. This table is only related to agricultural professional families.



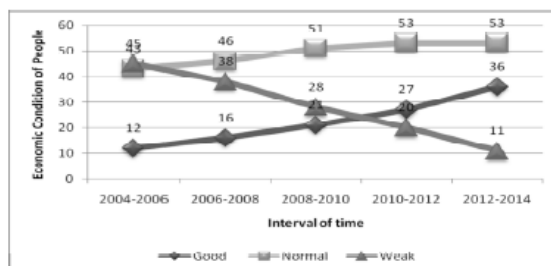
Source: Field survey, 2015

Figure 2: Food Production Status of the households

Out of 381 families, only 93 families rated that they have food sufficient for more than a year and majority of the families i.e. 123 families demonstrated that they have food sufficient for 9-19 months. The agricultural production of 34 families, 64 families, and 67 families has available food only for 1-3 months and 3-6 months and 6-9 months respectively. People who participated on the survey agreed that they have not yet set any food security plan and for emergency they need to import food from out of the village.

Trends of the Economic Status of Households

The economic condition of the people from the past ten years have been rated under three categories namely as good, normal and weak in the interval of two years.



Source: Field survey, 2015

Figure 3: Trends of Economic Status of the Households

In the beginning of ten years during 2004-2006, the economic condition of the people was rated as 12% good, 45% normal and 43% weak where as in 2006-2008, the level changed to 16% good, 46% normal and 38% weak. Similarly the trend of changing economic condition has been increased to 21% good, 51% normal but weak condition reduced to 28% in 2008-2010. This trend further continued to 27% good, 53% normal and 20% weak in 2010-2012. From 2012-2014, the economic condition has been found good by 36%, normal by 53% and weak condition has fallen to 11%.

The major influence of changing scenario has been realized due to community forest management as one of the effective change factor.

The various reasons have been identified behind the good income of some households in the region.

Table: 4: Reasons for Good Economic Status

Reasons for good economic Status	No. of household of good economic status	households of good economic status %
Increase in employee in national level	14	9%
Increase in overseas employment	17	11%
Increase in agricultural production	54	36%
Increase in business investments	21	14%
Increase in livestock keeping	34	23%
others	10	7%
Total	150	100%

Source: Field survey, 2015

Among the 150 families rated in the good economic status, 36% respondents realized that the increase in income is because of growth in agricultural production. Similarly, 23% of the participants rated that the increase in income is due to increase in livestock keeping and availability of fodder from the community forest. About 14% realized that their income has been good through increase in business investments and generation of employments. Some 11% respondents also agreed that overseas employment has also contributed them for having good economic status in the village. However, 9% respondents identified that because of increase in employee in national level with development interventions in the rural areas, the income has been good for them.

Expectations of households

The households were asked to respond different expectations regarding the socio economic status improvement strategies including provision of national employment, loan for overseas employment, modernization of agriculture sector, investment in business and investment in agriculture.

Table: 5: Expectation of Households

Expectation of households	No. of households	Household %
Provision of national employment	45	12%
Loan for overseas employment	46	12%
Modernization of	123	32%

agricultural sector		
Investment in business	56	15%
Investment in agriculture	102	27%
Others	9	2%
Total	381	100%

Source: Field survey, 2015

Out of 381 families, 123 families that is 32% rated that their expectation was modernization of agricultural sector, 102 families that is 27% agreed that their expectation was investment in agriculture and 56 families that is 15% said that the expectation for improvement of their present economic status is to provide investment in business. About 12% rated expectation of provision of national employment and another 12% expected the need of loan for overseas employment to raise their socio economic status.

Increase of the forest or green coverage as compared to past years

There were various reasons found behind the increase in the green coverage as compared to past ten years. The respondents indicated the various reasons including decrease in mobile farming, control of deforestation, community awareness, increases in reforestation.

Table 6: Reasons for Increasing the Forest Resources in the Past Ten Years

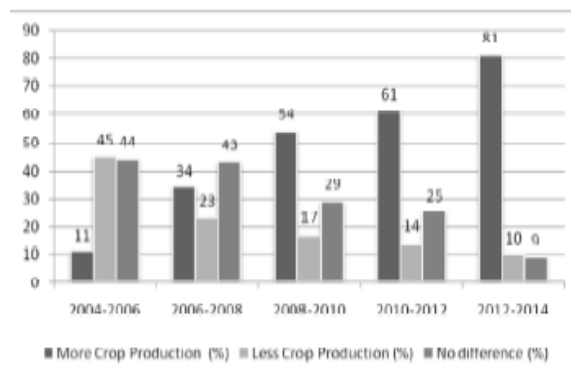
S.N	Reasons for Increasing	No. of Agreed participants	No. of Agreed participants (%)
1	Decrease in mobile farming	78	20
2	Control of deforestation	80	21
3	Community awareness	135	35
4	Increase in reforestation	67	18
5	Others	21	6
	Total	381	100

Source: Field survey, 2015

There were different views on the reasons behind the increase in the forest or green coverage. Out of 381 participants, 135 participants that is 35 percentage said that it is due to the community awareness in the recent years. Similarly, 80 participant that is 21 percent believed on controlling of deforestation, 78 participants that is 20 percentage responded on decrease in mobile farming and 67 participants that is 18 percentage said that it is due to increase in reforestation. 21 participants that is 6 percentage said that it is due to the help of governmental and non-governmental sectors on protecting trees in farming for grass and fire wood, supporting for plantation of trees and fruits, etc.

Crop production at different interval of time

The views of participants, about the quantity of crop production in the interval of past ten years are shown on figure.



Source: Field survey, 2015

Figure 4: The quantity of crop production in the interval of thirty years

Out of 381 participants, 45 % realized that there was decrease in production and 44% responded for no change during 2004-2006. Similarly, 43% responded that during 2006-2008, there were no change in increase in production but 34 realized that there was increase in production. However, because of forest conservation, in 2008-2010, 54% realized that there was increase in crop production in the region which was supported by 61% during 2010-2012. In 2012-2014 and in current year, 81% agreed that there was increase in crop production where one of the regions may be conservation of forest in the sample areas.

Keeping livestock at different interval of time

The view of participants, about the number of livestock keeping in the interval of last ten years, are shown on table.

Table No.7: The number of livestock keeping in the interval of ten years

Interval of time	More Livestock (%)	Less Livestock (%)	No difference (%)
2004-2006	12	43	45
2006-2008	33	24	43
2008-2010	52	18	30
2010-2012	59	15	26
2012-2014	79	11	10

Source: Field survey, 2015

Out of 381 participants 45% realized that there was no difference in keeping live stocks and in the same time 43% rated decrease of live stocks during 2004-2006. Meanwhile in 2006-2008, 43% rated constant number of live stocks and 33% realized increase in live stocks in their houses. Similarly, 52% participants said that

there was increase in livestock during 2008-2010 which was supported by 59% in 2010-2012 and 79% in 2012-2014. There seemed increasing trend of livestock in past ten years which was decreasing in the beginning.

Changing pattern of crop production

People from the past changed their pattern of crop production based on the resources available. Some people started the new crops as there was increase in irrigation facilities including cash crops, off season vegetables and other new crops in the nearby fields linked to the forest conserved areas by CFUG.

Table No. 8: The Changing Pattern of Crops with respect to Increase in Forest

S.N	Production of farming	No. of participants	Percentage
1	Increased in Varieties and Amount	46	15.03 %
2	Decreased in Varieties and Amount	201	65.69 %
3	No any difference	59	19.28 %
Total		306	100 %

Source: Field survey, 2015

The people realized that there is change in the pattern of crops produced by the community people. Majority of them, out of 381 participants, 65.69% agreed that there is increase in the production of crops. Similarly, 59 participants that is 19.28% said that there constant production of crops and only 46 participants i.e. 15.03% blamed that there is decrease in crop production due to the irregular rain fall pattern.

Reasons for increased crop production

The significant growth in the volume of crop production has been one of the symptoms of forest conservation, and balance of environment.

Table No.9: The reasons for increased crop production

S. N	Reasons for increased production	Participants	Percentage
1	Use of Fertilizers and pesticide	34	9%
2	Use of high quality seeds	24	6%
3	Proper irrigation	56	15%
4	Suitable climate	73	19%
5	All of the above	194	51%
Total		381	100%

Source: Field survey, 2015

The influence of the forest conservation has made proper irrigation, favorable climate for crop production into the areas as people rated in majority. Out of 381 participants, 73 participants that is 19% said that there is increase in the production of crops due to suitable climate and 56 participants i.e. 15% realized that there is proper irrigation that helped to increase the crop production. Majority people, 51% realized that the

combined effect of fertilizer use, use of pesticides, use of high quality seeds, proper irrigation and suitable climate made it possible to increase in the volume of crop produced to increase. use of chemical and organic fertilizers and pesticides.

Additional income and extra food production

People in the sample areas realized that before ten years they used to import various food to compensate their decrease in food production. The view of participants, about the alternative income and food for to recover the decreased production and to reduce import and increase export, are shown on table.

Table No.10: The alternative income and food production to recover the import

S.N	Additional income and food	No. of participants	Percentage
1	Labor work	39	10%
2	Service	18	5%
3	Overseas employment	71	19%
4	Medicinal herb production	56	15%
5	Cattle raising	54	14%
6	Seasonal Vegetables	30	8%
7	Cash Crops	67	18%
8	Others	46	12%
Total		381	100%

Source: Field survey, 2015

Out of 381 participants, 71 participants i.e. 19% rated that overseas employment has been one of the major income source in the areas, 18% participants believed that cash crops has been one of the immediate alternate income source at this moment and in the same way, 15% said that medicinal herbs produced from the collection from the community forest has made a vital income source. About 14% participants realized that cattle raising is supportive to them for increase in income and increase in food production. However, some 8% pointed out the seasonal vegetables has also contributed in their income and increase in food production.

Alleviation of poverty of Dalit, marginal, and excluded

One of the major contribution of community forest management through CFUG is that there is improvement in the poverty alleviation and increase in economic level of ultra poor in the areas.

Table No.11: The Poverty Alleviation Strategy to excluded and poor people

S.N	Strategies	No. of participation	No. of participation (%)
1	Forming the	129	34%

	CFUG		
2	Forming cooperatives	62	16%
3	Participating excluded in CFUG	107	28%
4	Utilizing agro forestry practice	56	15%
5	Others	27	7%
	Total	381	100%

Source: Field survey, 2015

The people living and involving in CFUG identified different possibilities of strategies used in managing forest resource in order to alleviate poverty so that the excluded and ultra-poor get maximum benefit for their economic growth. Out of 381 participants, 34% with majority of the participants said that forming CFUG with inclusion rights is the best way of alleviating poverty. Similarly, 28% people demanded the effective strategy is the reservation of excluded in the CFUG. However, 16% participants also showed that there is the effective action plan to alleviate the poverty by increasing the speed of present co-operative movement and in the same way 15% participants also rated that utilization of agro forestry practice has also contributed to alleviate poverty. Remaining 27 participants that is 7% said that there are other programs like poverty alleviation fund; NGOs/INGOs etc. addressing the increase in income.

Development of Agroforestry

People do not have differences in their social phenomenon considering cohesive among the diversity. They helped each other during the natural as well as human made disaster. Among the diversity there is uniformity in environment related activities. The perception towards forest conservation and environmental sanitation among different ethnicity, found less in aware in Muslim and Dalit communities. The multi sectoral intervention on the improvement of forest conservation practices was felt needed in the sample districts. The forest sector, agriculture and education were reported more complementary for the improvement of agro forestry in the CFUG for livelihood improvement.

The community people were trained to plant the herbal medicinal plants to make community forest group's income and use it for forest conservation management. The community forests were found safe in case of growing medicinal herbs that grow wild in the forests of different locations. They were found mostly in Dolakha, Sindhupalchowk, Baglung, Parbat, Lalitpur and Kaski. The possibility of water sources regeneration is more and the areas were found environmentally safe in Bara and Rautahat. They had prepared their constitution for handling forest products to manage for their livelihood improvement. The furniture and other products used in the household

purposes were not maintained properly. The nongovernmental organizations helped to maintain and manage the governance principles in the community through the drill and simulations.

Greenery Practices and Eco-tourism

The CFUG members gave priorities in Bara, and Rautahat for increasing greeneries with some plants in the open barren ground of the community forest boundaries. The forest of Bara and Rautahat were more prepared for maintaining greenery. The people from the areas of sample CFUG of Parbat, Baglung and Kaski said that they have managed eco-tourism practices in their areas. Home stay has been established to protect homely environment and preserving culture. They have placed different products for sale made from the forest resources. Their physical environment for healthful living was environment friendly. The landscape of the community forest in these districts was found in natural environment. The resorts were developed in some places but most of the lands were used for the forest conservation. The watering facilities were sufficient and children in the school reported that they get more access on the drinking water and water for cleaning toilets now a days. In case of the schools in Bara, and Rautahat, the schools were mostly following open defecation in nearby jungles. The community awareness and capacity building of the teachers about the environment protection felt needed.

Investment Priorities on Health and Education

People of sample forest user groups invested on socio-economic activities and for welfare schemes. There is a strong association between health facility delivery, children's education, and wealth quintile. About the basic care of students' knowledge increased based on level of education.

Increasing the percentage of health facilities is important for reducing retardation in growth arising from complications of stunting. The expectation is that if complications arise during growth in children in a health facility, a skilled teacher can manage the complication or refer the parents early to the next level of care. Hence, Nepal is promoting safe schooling through initiatives such as providing financial assistance through school incentives schemes to care in a health facility. SLC and higher level of education and those in the highest use of health facilities, and nutrition has been promoted.

Establishment of Industries Based on Forest Resource

The younger the age of people, more knowledge, practice and positive thinking, behaviour were found. The statement about the affordability and accessibility of health services, they perceived that these are not the problems, majority of people disagreed with these statements. The respondents of this research, most of them disagreed with families' contribution is less on

maintaining the health and environment of the school. Only the community forest resource has been the useful fund in crisis.

People of Kaski and Baglung district were found more knowledgeable, practicing good behaviour, and positive thinking about the health, health service and the service providers. They have started the industries which use raw materials from forest. It has increased the preservation of cottage industries and preservation of traditional arts and crafts. The indigenous knowledge has been preserved through forest conservation practices.

Conclusion

The management of forest resources from diverse perspectives linking social, economic and environmental factors made it possible a contributing factor for livelihood enhancement of poor and vulnerable people. The forest resources and their distribution to community members were found applicable to contribute to livelihood security. The community members confirmed that they used the resources which enable them to solve practical problems embedded with livelihood. The findings suggested that managing forest resources from the diverse points of view engaged community members in optimum use of resources and enriched their knowledge. Most significantly, several congruencies emerged between those themes and others, that is, community forest management perspectives and livelihood improvement principles respectively. The integrated management principles (optimization of resources, participatory management and livelihood improvement) determined the extent to which the community management concepts were successful. The implementations of the community empowerment strategies were in line with the management framework derived from the principles generated in the theoretical framework of the study.

References

- [1] Acharya, K. P. *Improving the Effectiveness of Collective Action: Sharing Experiences from Community Forestry in Nepal*. Collective Action and Property Rights (CAPRI), 2004.
- [2] Bhattarai, B. and H. Ojha, *Distributional Impacts of Community Forestry: Who is Benefiting From Nepal's Community Forests?* Discussion Paper, 1999.
- [3] Giri, K. and R. Ojha, *The effects of differing access for forest resource on the livelihood and capital assets of poor women*. Kala Publication: Kathmandu, 2001.
- [4] Gilmour, D. A. and R. J. Fisher, *Villagers, Forest and Foresters: The Philosophy, Process and Practice of Community Forestry in Nepal*. Sahayogi Press: Kathmandu, 1991.
- [5] Seddan, N. K., Shrestha, B. and P. Thapa, *Operationalizing Governance at the Organizational Level*. A Paper Presented in Fourth National Community Forestry Workshop, Kathmandu, 2004.
- [6] Springate, N. P., Luintel, H., Bhandari, K. and A. Thapalia, "Action and learning: An Approach for Facilitating a Change in Knowledge and Power Relationship in Community Forestry". *Journal of Forest and Livelihood*, 4(1), 2004, pp. 5-11.
- [7] Uprety, D. *Community Forestry, Rural Livelihoods and Conflict: A case study of Community Forest Users' Groups in Nepal*. Guthmann-Peterson buch verlag, Vienna, Austria, 2007.
- [8] Uprety, H., Krosnick, J., and B. Bowen, *An Introduction to survey Research, Poling, and Data Analysis*. Third edition, Sage Publications, New Delhi, 2010.

**Mobile Business Model for Future Economy:
The Use of Mobile Technology to Enhance the Capability of Nepalese Agro Entrepreneurs
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Abstract

With the growing dependency on technology mobile phone holds important role in everyone's everyday life. As the Smart phone technology is growing the utility of mobile is not confined only as a means to talk to each other, now a days one can handle almost all virtual presence through a mobile phone. In this context the paper will look after the trend of using mobile technology by small and medium entrepreneurs involved in agriculture. This paper tries to explore if there are possibilities to use mobile technology and develop business model and enhance the capabilities of Nepalese Agro-entrepreneurs.

Keywords:

Mobile, Technology, Agro-entrepreneurs, Economy

Introduction

Agriculture is important to the development of any nation, and Nepal being no exception, is based on smallholder family-owned farms that are mainly subsistence oriented and yet not capable of feeding the people and facilitating economic development for the country. Young people make up 39% of the population.

ICTs have a great role to play in agricultural development, food security and rural development. ICTs will allow farmers to show with globalization (e-trade, e-selling, e-learning, e-education). Despite a worldwide boom in mobile phone ownership, studies of the social and economic implications of mobile telephone use in the developing world are rare. As a telephonic device, the mobile enables access to information sources that may not otherwise be reachable. As an information platform to receive SMS, menu or voice message information, mobiles provides the ability to get connected to new knowledge and information sources not previously available with the possibility of real-time, highly tailored information delivery [1].

Figure 1: cartoon showing the use of sms



In Nepalese context, agro entrepreneurs have little knowledge and skills not enough to understand modern technology for the cultivating, and marketing the agriculture products. But with the growing need of agriculture products to cope increased population, there requires improved agricultural practices to produce more. This necessitates easily accessible technologies for communicating farmers.

Objective

The main objective of this research work is to explore the use of mobile technology to enhance the capability of Nepalese agro entrepreneurs.

Methodology

The research paper is a review based research work and adopted qualitative techniques. The researcher has reviewed related articles, journals and books.

Literature Review and Discussions

Today the government of Nepal is starting the telecentres from the rural areas of Nepal so that people can access to the world of information, technology and communication that helps people to get information about the world market and technology. Tele-centers are established with a view of providing communication technology to the people of urban and rural areas. Its main objective is to provide computer, internet, and email technology facilities to the people of under-privileged society. Farmers, consumers and others can get easily their required information at any time.

Figure 1: Agribusiness at Siraha (reporters Nepal, 2016/5/14)



Nepal is the agriculture based country, 80% Nepalese people depend upon agriculture.

How can these people involved in agriculture can be benefited has been studied. The list of potential benefits [3] covers numerous aspects of extension and agriculture development:

- Increasing smallholder productivity and incomes
- Making agricultural markets more efficient and transparent
- Linking poor farmers to urban, regional and global markets
- Improving services and governance for the rural poor
- Promoting – and including smallholders in – agricultural innovation
- Helping farmers manage a range of risks
- Improving land and natural resource management and addressing environmental pressures
- Helping poor farmers participate in higher-value agriculture
- Supporting the emergence of a more diverse rural economy, and supporting rural families' decisions about their mix of productive activities

The benefit is possible only when agriculture farmers are supported: they need financial and physical supports. However, in the absent of right information these supports cannot be obtained. Nepal Government has made some efforts out of which its policy is an important guideline. Rapid take-up of Internet and mobile wireless communications has been some of the key trends shaping the ICT landscape.

IT Policy [5] has declared that the role and significance of ICT industries and services (including telecom services) to increase in the Nepali economy with ICT value added (including digital content and service industry) accounting for at least 7.5% percent of GDP by 2020. Similarly the policy also boasts that entire population of Nepal would have access to internet by 2020.

Regarding ICT in agriculture the policy [5] states to bring appropriate programs to improve productivity, to

bring competitiveness in agriculture sectors, planning, implementation, monitoring, market expansion and the information delivery processes.

The policy [5] also address the rural areas of the country by developing the provision of ICT services including infrastructure in rural areas having marked intensity in agriculture related activities through the incentives. The policy has focused to develop marketing so states employ appropriate measures to exploit and integrate ICTs and other technologies into the operations and activities of the sector from production, through to processing, packaging, marketing and distribution

How government is addressing the agro based enterprise is shown in Table 1.

Table 1: Agribusiness Policies in Nepal

1	Giving priority to diversification, modernization, commercialization and promotion of agriculture sector
2	Involving private sectors to promote commercial farming.
3	Promotion of internal and external markets
4	Agri- business service centers establishment for quality agriculture inputs and services
	Infrastructure development for processing and marketing as a foundation for commercialization and diversification
5	Emphasis on special economic zones for agro- - industry development- -Commercial, Organic and Export Areas
6	Promotion of partnership approach between government and the private sector for agriculture development
7	Private sectors involvement for the export of quality goods and market network.
8	Focused on Market oriented and competitive agriculture

Adopted from: Sujana Piya, Achyut Luitel, Gehendra Gurung, Agribusiness in Nepal-Challenges and Opportunities

This type of program make more profit to farmers so that they can get their better price and also consumer also get their required things on reasonable price. This system will get ride upon conventional system. And this will create the better environment for developing the e-government in future.

As a developing country, Nepal has availed of the opportunity to rapidly develop various sectors such as education, health, agriculture, tourism, trade, among others, using information technology. It is very possible that the international community will extend its support to developing countries in the development of ICT. The extensive application of this technology will give rise to economically strong, development of democratic norms and values, proportional distribution of economic

resources and means and enhancement of public awareness. Hence, knowledge of ICT is required to develop IT society in the shortest time possible for the sake of the national economy.

We cannot imagine our day to day life without ICT. Undeniably to a large extent, the success of any sector or organization today depends on the application and effectiveness of the ICT. The scheme to provide ICT literacy and enhance the knowledge of ICT students and professional in Nepal has a slow progress and is not sufficient.

Case: How ICT in form of mobile technology can impact in agriculture

The mobile phone application—ICT for Agriculture—basically connects multiple stakeholders of the agriculture sector to a common platform and imparts knowledge about various aspects of agro business to the farmers. The event participants were designated to create applications under four categories—Agriculture, Corporate Solutions, Education and Tourism.

ICT for Agriculture is an android based mobile application that aims to connect farmers, traders, experts and agricultural extension agencies at a single platform to help with farm management and simplify market chain value while also ensuring food security in Nepal. The app helps farmers pre-harvest and post-harvest of crops by providing information about diseases related to their crops. It also provides a weather forecast linking farmers to the end consumers in the market [2].

Table 2: Current and Future Roles of ICT in Agricultural Marketing

Functions of ICT	Enabling or deliberate	technology	Future
Real-time market research	Enabling infrastructure	Fixed-line and mobile phones	Extending range of mobile phones and ICT, facilitated by infrastructure investment and policies
Coordination of logistics	Enabling infrastructure	Fixed-line and mobile phones	Specialist applications, training/producer organizations
Market information (price and supply)	Deliberate: Public and private sector	Web-based and SMS	Applications and public-private sector partnership, plus training and organization
Market intelligence	Deliberate	Web-based	Applications and development of market

			intelligence services, plus training and organizations
Inputs	Enabling infrastructure	Fixed-line and mobile phone	Targets SMS messaged by private sector, e-vouchers for subsidies

Adopted from ICT in Agriculture, Connecting Smallholders to Knowledge, Networks, and Institutions, World Bank, 2011

Report [4] indicates that Trends emerging around the use of mobile phones include: (1) farmers deal directly with wholesalers or larger-scale intermediaries rather than small-scale intermediaries; (2) farmers conduct market searches over a wider number of markets; and (3) farmers develop a broader network of contacts than their peers who do not own mobile phones.

World banks further states that with the help of ICT farmers become more empowered in relation to transportation and logistics of agro products, price and location, supply and demand, diversification of their product base, and access to inputs[4].

How it works, components can be revealed in Table 2. According to this table ICT develops agriculture Information center, market information system and central database development centre.

Agriculture Information center: This is a real information hub of the farmers. It provides enough information in the pre-harvest stage. The crop that farmers when plant goes to nearest Agricultural Information Center and registers. The IFA database will automatically send series of SMS about the follow-up of crops, possible disease and mitigation measures. Farmer can register the agro product when harvested with the expected selling price. Trader can search via SMS and find the farmer.

Through their simple mobile phones, farmers can get information of market, weather forecast, fertilizer usage, crop and animal disease information via SMS. Android phone holder farmers can access the information installing our application, IFA-Krishi Nepal from Google Play.

Market Information System: At every market centers, the hub of trader is the Market Information Center. Daily purchase price for varieties of agro products will be collected from multiple farmers and recorded to database. The farmer then can enquire the best price and find the trader contact via SMS or Mobile Application.

Central Database update, research and development: Here daily market and weather data are put into the database. New research result of crop and animal diseases will be studied and put into database. Similarly, continuous research is done in order to make

the ICT for agriculture the Technology friendly. There medium of delivering agriculture information are:

1. SMS
2. Mobile Application
3. Projector Agriculture Video Show
4. Digital Video Conferencing through Skype and Discussion Board

Empirical qualitative data with some of farmers, five in numbers who were ploughing their lands were enquired regarding the benefits of mobile. Their responses show that the benefits they were receiving are:

1. Improved prices
2. Wider markets options
3. Dissemination new
4. Time saving
5. Knowledge of technology
6. securing market information
7. Extension channel
8. Updated information
9. Enhanced networking
10. Timely access to information

Conclusion

In the context of Nepal, poor agro based entrepreneurs are working very hard to sustain their daily life. Due to lack of knowledge on recent ICT based technologies, market area and price; they have been cheated by middle man. This research article has explored that the use of ICT based technologies like mobile apps definitely help them to enhance their current capabilities.

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References

- [1] Anil, A. "ICT for Agriculture". Retrieved from <http://tech.aakarpost.com/2014/12/ict-for-agriculture-becomes-grand.html> (2014).
- [2] McNamara, K. S. " Mobile Applications in Agriculture and Rural Development _– Framing the Topic, and Learning from Experience", World Bank Workshop on Mobile Innovations for Social and Economic Transformation, (2009).
- [3] Mittal, S., Gandhi, S. and G. Tripathi, *Socio-Economic Impact of Mobile Phones on Indian Agricultur*. Indian Council for Research on International Economic Relations (2010).
- [4] World Bank. "ICT in Agriculture, Connecting Smallholders to Knowledge, Networks, and Institutions", World Bank, 2011.
- [5] Ministry of Information and Communication. "National Information and Communication Technology Policy" Ministry of Information and

Communication, Government of Nepal, Singhadurbar, Kathmandu, Nepal, 2015.

The Effect of Work-Life Balance on Organizational culture of Creativity and Innovation

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Abstract

Human being does work to live out and they have their private life because human has sociality. Both work and life are important to live out but they are on the trade-off relationship. Because keeping the balance between work and life is too hard, it has been interested by academic and practical areas. The Work-Life Balance (below WLB) of employee may be helpful to be an innovative company. On the other hand, imbalance of work-life may result in employee turnover and productivity decrease. Therefore, it seems that WLB of employee is an important factor in determining the capabilities of the companies. As the recent change in corporate and social environment, Innovative Culture of Organization (below ICO) has become an important factor for survival. So, in this study we aim to examine the relationship between WLB and ICO. To do so, we study for existing literatures on Work-Life Balance, Innovative Culture of Organization and so on. Based on findings, we establish some hypotheses and develop a research model.

Keywords:

Work-Life Balance, Organizational Culture, Creativity, Innovation, Innovative Capacity

1. Introduction

It is important for companies to cope with the rapidly changing environments. Innovations have always been essential for the organizations' long-term survival and growth and currently play even more crucial role in the company's future to follow the

rapid pace of markets' evolution[10]. Organizations look for various ways to attain the innovative capacities and there are a lot of elements to achieve it. In this study, we focus on the human as the most important elements for corporate innovative capacity. Human makes the culture and culture could make the different outcomes of an organization. For human in order to achieve Innovative Culture of Organization (below ICO), it is essential for human to keep and optimize their mental and physical stability. However, it is very difficult to maintain a stable mental and physical state.

The human in this study can be a member of the household. At the same time, they can also be a member of an organization which pursues profit. Human being works to live out and they have their private life because human has sociality[2] (Cho & Lee, 2013). They get mental and physical stresses from the need to perform the role required by each organization (work and home) they belong.

In order to achieve the optimal mental and physical state, keeping the employee's Work-Life Balance (below WLB) would be essential. The Definition of Work-life balance here is that balance or imbalance arising between work and life has no negative impact on their daily life.

In this study, we aim to examine the effect of Consequences of Work-Life Balance (WLB) on Innovative Culture of Organization (ICO). To do so, we try to find elements of WLB and ICO and verifying their relationships.

2. Theoretical Background

2.1 Work-Life Balance

There are three representative research areas related to WLB – Quality of Life (QOL), Quality of Working

Life (QWL), Work-Family Balance (WFB). QOL is most comprehensive concept among them and it includes the remaining two areas. QOL and QWL are too comprehensive and abstract to be measured and WFB does not applicable for workers without family. In recent years, the term Work-Life Balance (below WLB) has replaced what used to be known as “Work-Family Balance” [5]. For these reasons, we choose WLB for our research subject.

Work -Life Balance and Quality of Life has been the subject of interest in the field of Quality Of Life. WLB is the condition required by the individual’s career and life in balance. It plays a very important role in the lives of human beings to seek the economic stability and personal life [2]. Research has indicated that those workers who have some form of control over their working environment tend to suffer less stress-related ill-health, with clear implications for the concept of work-life balance [6].

The topic of Work-Life Balance is getting a great deal of attention in the academic and corporate worlds, and new research is continually being conducted.

To understand WLB, Professor Swiercz and Doctoral Candidate Ezzadeen of The George Washington University developed and tested a cognitive approach, the “Cognitive Intrusion of Work.” In simple terms, this means that WLB is not just about finding “physical time” to do all that needs to be done. Instead, and more importantly, it is about the “cognitive space” necessary to process, organize, and respond to the thinking demands of life within a complex society [12].

WLB is state of satisfaction and good functioning with minimum of role conflict between work and family [3]. WLB provides enough time to put in the work and family and claimed there are three phases of WLB – Determinants, Nature of the balance, Consequences [11].

Determinants mean the cause factors of WLB and it was divided by organizational factors and individual factors. Nature of the balance was divided by subject (balance of home and work, spillover) and object (work and free time, family role). Last one is Consequences (work and life satisfaction, mental health etc.) of WLB and it means the impact of WLB to employee.

In this study, we set Consequences of WLB as an Independent variable and by developing the findings of Balance of home and work, Work satisfaction, Life satisfaction and mental health are the dependent variables [11].

2.2 Organizational culture of Creativity and Innovation

Corporate culture can be viewed as the set of shared values, practice and belief. [11]. Firms are trying to

attain innovative capacity to sustaining their position in dramatically changing environments related to technologies. Especially they consider the organizational culture of creativity as a key factor of corporate innovation and they seek to achieve it.

A true innovative firm must be embedded of a strong culture that stimulates the engagement in innovative behavior. Innovativeness is hence comprised of two constructs –innovations and creative culture. Similarly, studies increasingly stress organizational culture as a key to managing innovation [9].

Researchers developed and validated KEYS which are : Assessing the Climate for Creativity, an instrument frequently used to examine creativity supports and implements in workplace climates [1]. The authors focused on three ingredients for creative output (individual behavior in the context of the organization): domain expertise, creative-thinking skills, and intrinsic motivation [13]. 2008).

Innovation is most likely to occur in organizations that (a) have integrative structures, (b) emphasize diversity, (c) have multiple structural linkages inside and outside the organization, (d) have interesting territories, (e) have collective pride and faith in people’s talents, and (f) emphasize collaboration and teamwork. [7]

3. Research Model

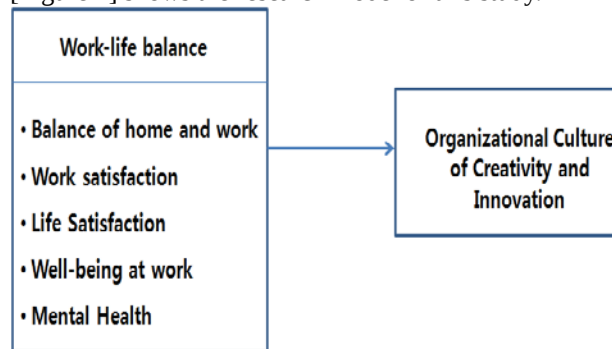
Given and the importance of creativity and innovation in organizations today, it is surprising to learn that relatively little academic work has focused on developing a culture of creativity and innovation [8]. Moreover, Work-Life Balance (WLB) should also be considered as an important research area for individual and organizational innovation.

In this context, this study attempt to examine the effect of employee’s Work-Life Balance (WLB) on organizational culture of creativity and innovation. Existing studies mainly were focused on achieving and optimizing individual’s Work-Life Balance (WLB). And they indicated the results of WLB as balance of home and work, work satisfaction, life satisfaction, well-being at work, and mental health.

Although the employee is most important element for firm’s competitiveness among numerous resources, few researches were conducted regarding to employee’s WLB and Firm’s innovative culture.

So in this study, we are going to find the effect of WLB on organizational culture of creativity and innovation. Contrary to existing studies, we focus on WLB’s positive effect to an organization. Furthermore, our goal is to highlighting the critical role of employee’s optimal WLB to be a successful company. Based on prior research and findings, a set of hypotheses is established.

[Figure 1] shows the research model of this study.



[Figure 1] Research Model

- H1-1: Balance of home and work has a positive effect on organizational culture of creativity.
- H1-2: Balance of home and work has a positive effect on organizational culture of innovation.
- H2-1: Work satisfaction has a positive effect on organizational culture of creativity.
- H2-2: Work satisfaction has a positive effect on organizational culture of innovation.
- H3-1: Life satisfaction has a positive effect on organizational culture of creativity.
- H3-2: Life satisfaction has a positive effect on organizational culture of innovation.
- H4-1: Well-being at work has a positive effect on organizational culture of creativity.
- H4-2: Well-being at work has a positive effect on organizational culture of innovation.
- H5-1: Mental health has a positive effect on organizational culture of creativity.
- H5-2: Mental health has a positive effect on organizational culture of innovation.

4. Research Method

Our research procedure is divided into two parts. First, as a quantitative analysis, we are going to conduct a survey to employees who work at IT related company. The survey measures individual's perception level of work-life balance and their firm's culture of creativity and innovation. After collecting the data, we are going to investigate the causality between independent variable and dependent variables by regression analysis.

Second, as a qualitative analysis, we are going to verify the first stage's result by conducting some case studies. In this stage, we are going to select some innovative firms and investigate whether the firm has WLB policies and employees have positive WLB. And then, we finally are going to verify our quantitative findings works or not.

5. Conclusion

Firms are trying to attain innovative capacity to

sustaining their position in dramatically changing environments related to technologies. As a core resource of organization, employee's Work-Life balance seems to be a key factor for achieve firm's innovation.

For employees to be creative and innovative, They need time for thinking, balance of home and work, mental health, work satisfaction and life satisfaction. Although the importance of employee's WLB for achieving firm's innovation, there were few researches about it. But rather existing studies on Work-Life Balance were focused on the individual's quality of life, work-family conflict and so on. They referred to negative effect of the imbalance of work-life balance with consequences of it.

So, we strongly suggest that Firm's innovation perspective research on Work-life balance should be conducted. In this study, we argued that there will be positive effect of Work-Life Balance on Organizational culture of creativity and innovation. To verify our suggestion, we are going to conduct a two-stage analysis – quantitative, qualitative.

By using our findings, we aim to deliver contributions to academic and practical fields. For the academic field, we are going to suggest the new perspective of firm level Work-life balance on organizational culture of creativity and innovation while existing researches were focused on individual level. For the practical field, we suggest that organizations should respect employee's various identities, and consider the hard workers if they have positive balance of work and home or not. Delivering satisfaction and mental health to employee would be a critical role for making an organizational culture of creativity and innovation.

References

- [1] Amabile, T.M., Conti, R., Coon, H., Lazenby, J., and M. Herron, "Assessing the Work Environment for Creativity," *Academy of Management*, Vol.39, No.5, 1996, pp.1154-1184.
- [2] Cho, N. and H. Lee, "A Study on the Effect of the Use of Mobile Office Systems on Work-Life Balance," *Journal of Information Technology Applications and Management*, Vol.20, No.1, 2013, pp.43-51.
- [3] Clark, S.C., "Work/Family Border Theory: A New Theory of Work/Life Balance," *Human Relations*, Vol. 53, No.6, 2000, pp.747-770.
- [4] David E. Guest., "Perspectives on the Study of Work-life Balance," *Social Science Information*, Vol. 41, No. 2, 2000
- [5] Hudson Resourcing. (2005). The case for work/life balance: Closing the gap between policy and practice. Hudson Australia and New Zealand available on www.hudson.com
- [6] Ioan, Lazar, Codruta, O., and R., Patricia, "The

- Role of Work-Life Balance Practices in order to Improve Organizational Performance,”*European Research Studies*, Vol.13, No.1, 2010, pp.201-2014.
- [7] Kanter, R.M., “When a Thousand Flowers Bloom: Structural, Collective and Social Conditions for Innovation in Organization,”*Research in Organizational Behavior*, Vol.10, 1998, pp.123-167.
- [8] McLean, L.D., “Organizational Culture’s Influence on Creativity and Innovation: A Review of the literature and Implications for Human Resource Development,”*Advances in Developing Human Resources*, Vol.7, No.2, 2005, pp.226-246.
- [9] Miha, S., Song, J. H., and Y. M. Lee, “Organizational learning Culture, Innovative Culture and Innovations in South Korean Firms,”*Expert Systems with Applications*, Vol.37, No.9, 2010, pp.6030-6403.
- [10] Santos-Vijande, M. L. and L. I., Alvarez-Gonzalez, “Innovativeness and Organizational Innovation in Total Quality Oriented Firms: The Moderating Role of Market Turbulence,”*Technovation*, Vol.27, No.9 2007, pp.514–532.
- [11] Marsick, V. J., “Developing a Culture of Creativity & Innovation,”*Business Development Research*, Vol.1, No.1 2008, pp.1-24.
- [12] Lockwood, N.R. (2003). —Work-life balance: Challenges and solutions. *Society for Human Resource Management Research Quarterly*, Alexandria, VA.

Work-Family Human Resource Bundles and Emotional Labor: Based on the Mediating Effect of Psychological Well-being of Hospital's Works

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1. Introduction

Various types of FFWPs are interrelated and complementary, and thus they should be considered as bundles regarding as the change of lifestyle, along with the societal change such as alternative family forms and change of employees' values [12]. FFWPs are able to attract and retain employees [9] and improve employees' job attitudes and work efficiency [12, 11]. However, work-life issues and service employees' emotional labor have been little focused on the field and empirical studies in non-western settings. Besides, it was raised that personal emotion and affect have been overlooked in the past studies on the work - life issues and FFWPs [15, 8]. For service employees, reciprocal job function having face to face contact with customers is emphasized as their job demand and emotional display rule is divided into two categories, surface acting and deep acting [3]. Deep acting of employees converts their emotion required as job duty to the genuine emotion by consuming energy and psychological capital [7, 6]. Although the researches were conducted on the negative effects of surface acting to either job attitude or psychological well-being of employees [16, 13] mixed findings were reported regarding on deep acting's effect on the organization outcomes, employees' job attitudes and customer's satisfactions [6].

Therefore this research will focus on deep acting which was turned out to be a factor to influence positively not only to organizations and their employees but also to customers, and also on the psychological well-being among positive affects closely related to deep acting. In addition, based on the signal theory, the mechanism of the black box affecting both FFWPs as strategic SHRM and employees' emotional labor will be discussed.

Until recently, very little researches were carried out on the SHRM system, emotional labor and psychological mechanism related to hospital works. Thus, professional and high-identifier human resources' emotional labors in hospital are needed to be studied on relationships with the FFWPs bundles. The job perceptions and attitudes of the employees who provide professional service build the image of the organization, and consequently, they link directly with the customer satisfactions, the productivity of organizations and their competitiveness [2].

2. Theories and Hypothesis

2.1 Informal supports and Family Friendly Work Practices

FFWPs are employer-sponsored policies and programs which are designed to help employees manage personal life demands and work [9]. They generally include dependent care assistance, counseling and referral services, leave arrangements and flexible work schedules [9, 11]. Organizations have come to view FFWPs as a retention strategy and effective attraction [11].

Some employees may not be aware of the existence of FFWPs, and the idea that using FFWPs may increase the work loads of their colleagues or managers may cause the emotional pressure to the employees and discourage them from using FFWPs eventually [9]. In this respect, this study suggests that the informal support from co-workers should increase the usability of FFWPs. FFWPs bundles operate as positive signal-based mechanism since they have symbolic meaning of official support from organization for the members [12]. It is conjecturable that the usability of policy is affected by both the encouraging atmosphere to use the policy and the informal support of the organization [9, 10].

Hypothesis 1. The informal supports of colleague and manager are positively related to the usability of FFWPs.

2.2 Psychological Well-being and Emotional labor

According to the 'conservation of resources theory', each individual desires to expand and keep the resources regarded as valuable [5]. The resources are defined as objects that are considered as valuable by individuals, conditions, personal characteristics, energy and all the means helpful for obtaining them [4].

The attentions and behaviors of employees are influenced by social support, autonomy, equity treatment and so on, through the cognitive process building or exhausting psychological resources [10]. Job resources from work and organization promote employees' positive thinking and emotions, which leads them to experience well-being in the working environment [6]. And also, the psychological resources built or exhausted through the cognitive process affect both surface acting and deep acting positively or negatively [1].

In consequence, the excessive consumption of emotional resources aggravates emotional depletion and stress resulting in hindrance to the performance of the emotional labor and expression [6, 6, 14]. Therefore, FFWPs are considered to enhance psychological well-being which is a positive capital of service employees.

Hypothesis 2. The informal supports of colleague and

manager are positively related to employees' psychological well-being.

Hypothesis 3. The usability of FFWPs is positively related to employees' psychological well-being.

Psychological well-being's mediating effect which influences on emotional labor is explained by SOC theory [2]. Based on the life-span perspectives, Batles invented the strategy model of SOC (Selection-Optimization-Compensation), integrated model of rebalancing growth and decrease process.[10] applied SOC theory to organizational behavior by defining that each individual selects goals he/she can achieve and tries best optimization for the goals and compensate the resources with other alternatives or schemes for the pursuit of effectiveness.

In accordance with SOC strategy, to maximize acquisition of higher standards of psychological resources, employees show their capability by integrating emotion, cognition and behavior following the SOC (Selection, Optimization, Compensation) process. Since Selection is a state for pursuit of goal in terms of SOC strategy, each employee chooses a goal for which he/she can use his/her capability and tries his/her best for optimization by means of psychological well-being. To increase efficiency during the process, FFWPs and unofficial support have compensation-effect for the resources. If job resources (FFWPs) are provided to the employees who recognize job requirements (deep acting, surface acting), it will bring energetic process which can reduce the negative effect such as burnout caused by job demands and improve motivational process for their devotion and engagement to the job.

A study has stressed that employees' deep acting is positively related to their well-being and suggested that employee's deep acting is more motivated by the higher job-fit [36]. It also insisted that job-fit and role identification may be the important factors for consistent deep acting [6]. Therefore, it is suggested that Psychological well-being by FFWPs has effect on managing the exhaustion of psychological resources, and moreover, reducing employees' surface acting and motivating deep acting.

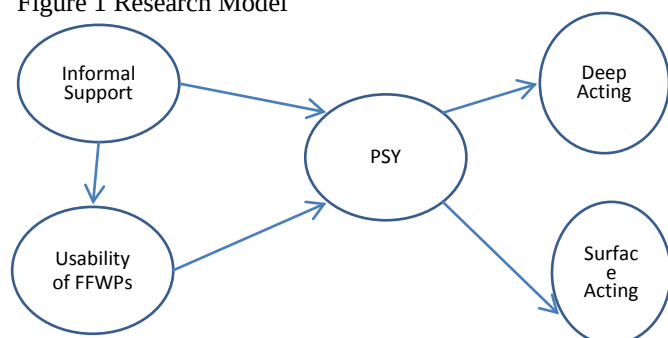
Hypothesis 4. Psychological well-being is positively related to deep acting.

Hypothesis 5. Psychological well-being is negatively related to surface acting.

Hypothesis 6. Psychological well-being is mediated to the relationships FFWPs and deep acting.

Hypothesis 7. Psychological well-being is mediated to the relationships FFWPs and surface acting

Figure 1 Research Model



3. Discussion of the results and Managerial implications

This research has proved that FFWPs as SHRM encouraged the psychological well-being of the employees by providing emotional, psychological signals to them along with informal support to the organization and team. In addition, the psychological well-being has become the precedence factor of mechanism as emotional resources that enable the deep acting.

This very research, as FFWPs especially in the service industry is perceived as a positive signal that respects the members of the organization and treats them as a valued individual of the team, suggests that FFWPs helps to focus more on the deep acting of the employees, amongst the emotional display rules required by the organization. Therefore, it is suggested to deviate from the short-sighted perception that FFWPs is expendable in the organization's performance due to the cost it generates in short term [9]. Also, because FFWPs has proven to play positive role in the organization in the aspect of service workforce of SHRM, such argument is no longer necessary. Usage of FFWPs bundle can be perceived as a state of excessive employment costs; however, employees with higher psychological well-being will show engagement as a high quality human resources.

References

- [1] Demerouti, E., Bakker, A. B., and M. Leiter, "Burnout and Job Performance: The Moderating role of Selection, Optimization, and Compensation Strategies. *Journal of Occupational Health Psychology*, 19(1): 2014, pp. 96-107.
- [2] Drucker, P. "Managing the non-profit organization". 1990
- [3] Grandey, A. A., "When the Show Must go on: Surface Acting and Deep Acting as Determinants of Emotional Exhaustion and Peer-rated Service Delivery. *Academy of Management Journal*, 46(1): 2003, pp. 86-96.
- [4] Hobfoll, S. E., "Conservation of Resources: A New Attempt at Conceptualizing Stress. *American Psychologist*, 44(3): 1989, pp. 513-524.
- [5] Hobfoll, S. E. "The Influence of Culture, Community, and the Nested-self in the Stress process", *Advancing Conservation of Resources Theory. Applied Psychology*, 50(3), 2001, pp. 337-421.
- [6] Humphrey, R. H., Ashforth, B. E., and J. M. Diefendorff, "The Bright Side of Emotional Labor". *Journal of Organizational Behavior*, 36(6): 2015, pp. 749-769.
- [7] Hülshager, U. R., and A. F. Schewe, "On the Costs and Benefits of Emotional Labor: A Meta-Analysis of Three Decades of Research. *Journal of Occupational Health Psychology*, 16(3): 2011, pp. 361-389.
- [8] Judge, T. A., Ilies, R., and B. A. Scott, Work-family conflict

- and emotions: Effects at work and at home. *Personnel Psychology*, 59(4): 2006, pp 779-814.
- [9] Kossek, E. E., Baltes, B. B., and R. A. Matthews,. How work–family research can finally have an impact in organizations. *Industrial and organizational psychology*, 4(3): 2011, pp. 352-369.
- [10] Luthans, F., Norman, S. M., Avolio, B. J., and J. B. Avey,. “The Mediating role of Psychological Capital in the Supportive Organizational Climate—Employee Performance Relationship”. *Journal of organizational Behavior*, 29(2), 2008, pp. 219-238.
- [11] Ngo, H. Y., Foley, S., and R. Loi,. Family friendly work practices, organizational climate, and firm performance: A study of multinational corporations in Hong Kong. *Journal of Organizational Behavior*, 30(5): 2009, pp. 665-680.
- [12] Perry-Smith, J. E., and T. C. Blum, “ Work-family Human Resource Bundles and Perceived Organizational Performance” *Academy of management Journal*, 43(6), 2000, pp. 1107-1117.
- [13] Scott, B. A., and C. M. Barnes, “A Multi Level Field Investigation of Emotional Labor, Affect, Work Withdrawal, and Gender”. *Academy of management journal*, 54(1): 2011, 116-136.
- [14] Wagner, D. T., Barnes, and C. M., Scott, “Driving it Home: How Workplace Emotional Labor Harms Employee Home Life”. *Personnel Psychology*, 67(2), 2014, pp. 487-516.
- [15] Zapf, D, Emotion Work and Psychological well-being: A Review of the Literature and Some Conceptual Considerations. *Human Resource Management Review*, 12(2), 2002, pp. 237-268.

Customers' Complaint Behavior on Social Media: Individualism versus Collectivism

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Abstract

Social media is a well-known arena for electronic word-of-mouth. It also becomes a potential place for people to address negative comments about products or services to their friends and family instead to companies directly. As social media has influenced on people's behavior, people with a different cultural background use social media differently. This implies that cultural differences influence people's usage behavior on social media. People in individualistic cultures are known to more freely express their feelings than those in collectivistic cultures. People in collectivistic cultures care more about what other people think of them before they express and behave in a certain way. This paper compares people's complaint and negative WoM behavior on social media from a collectivistic culture (South Korea) with one with an individualistic culture (Austria).

Keywords:

Complaint, Negative Word-of-Mouth, Social Media, Individualism, Collectivism

Introduction

People can express their dissatisfactions about a product or service through various channels: face-to-face communication, feedback surveys, evaluation forms, and customer service calls [3]. With the ongoing pervasiveness of the Internet, people can contact a company through emails, customer service websites, and social network sites (e.g., Facebook or Twitter). In addition, social media becomes a potential complaint channel but a risky place for companies. As social media is a well-known arena for electronic word-of-mouth, it becomes a potential place for people to address negative comments about products or services to their friends and family instead to companies

directly [4].

For these reasons, companies are interested to "listen" to their customers and encourage them to complain directly to them [3], so companies have a chance to convert customers' dissatisfactions to satisfactions. It is important for companies to retain their customers, because they are not only valuable sources for revenues but also information sources enabling them to improve their products and services [13].

Although companies need to encourage their customers to complain if the customers are not satisfied with their products or services, complaints on social network sites may be risky for them. As corporate social network sites are public and comments of users on the websites are visible and shared by all Internet users [6], people may be influenced by the complaint of a single user, even though they did not have the same experience the user had. With the uses of social media sites, companies are at risk of online firestorms [20] and finally of damaging their reputation [15].

A challenge for a complaint manager is to find the right way to respond to a complaint in order to restore her/his company's reputation. The worst case for companies is that they have not even had a chance to realize the existence of a complaint, because the customer can express her/his dissatisfaction only to her/his friends and family through her/his social network sites. Although social media provides many opportunities for companies, this may be a threat too. Therefore, companies are exposed to new challenges, because new media enables digital customers to freely express their dissatisfactions on social networking sites [14]. Especially, complaints and negative word-of-mouth (WoM) communications are risky for companies. Thus, it is important for companies to understand customers' complaint and negative WoM behavior on

social media.

Social media have not only influenced people's behavior, it can also be assumed that people with different cultural backgrounds use social media differently. This implies that cultural differences have influenced people's usage behavior on social media. People in individualistic cultures are known to express their feelings more freely than people in collectivistic cultures, because the latter cares much more about what other people think of them before they express and behave in a certain way [17]. Especially, complaining and saying a negative WoM are much sensitive, because it is also directly related to saving one's face, which is important in collectivistic culture. It is the goal of this paper to investigate if this assumption holds true. Accordingly, it compares people's complaint and negative WoM behavior on social media in a collectivistic culture (South Korea) with those in an individualistic culture (Austria).

Social Media Complaints

A complaint is defined as "an expression of dissatisfaction for the purpose of drawing attention to a perceived misconduct by an organization and for achieving personal or collective goals" [6]. Thus, dissatisfaction is a crucial factor for complaint behavior [18]. Customers can voice their feelings of dissatisfactions to their friends or family, directly to the company, or to other institutions. When a customer expresses her/his dissatisfaction of a product or service to her/his friends, family or other peer groups, this complaint is specially called a "negative word-of-mouth (WoM)". Negative word-of-mouth communication is defined "as a customer's effort to share negative or unfavorable feedback or opinions with friends, family and others" [1].

As complaints on social media are commonly public, the whole Internet population can read them. Meanwhile it is also common that people write their dissatisfactions about products or services on their blogs and social networking sites. Furthermore, a customer who wants to complain in an active manner creates a forum to collect other dissatisfied customers in order to share their unhappy experiences. For example, a group of dissatisfied customers created a complaint forum against United Airlines [13]. From the perspective of customers, social media is an effective medium for word-of-mouth communication, which can be a powerful weapon against companies. Thus, negative WoM on social media can lead to a major crisis for companies [11].

Companies are at risk of online firestorms [20]. An online firestorm is a phenomenon occurring on social media where large quantities of messages about complaints or negative WoM against a company arose [20]. If a company does not respond in an appropriate way when a customer complains, it may even intensify a negative WoM on social

media [11]. For example, a group of young people posted a video of a song about why they were switching from a French cell phone provider (Orange) to Free on YouTube. The video went viral and attracted more than 1.5 million views in two days, which was disastrous for Orange [11].

Instead of considering a complaint as an evil that has to be eliminated, a complaint can be used as a valuable resource for companies. First, a complaint is an important source of free information to identify failures of products or services [2]. Companies can use the complaint to improve the quality of their products or services. Second, a complaint provides an opportunity to improve the relationship with their customers. When a customer complains, the company gets a chance to communicate with the customer so that it can recover the consumer's satisfaction and enhance the consumer's loyalty [18].

Prior studies found that only few customers were willing to complain. Most customers tend to do nothing or to silently switch to another provider, because it takes efforts for customers to complain. In order to use the advantages of customers' complaints, it is necessary to encourage consumers to complain directly to the company when they are not satisfied with its products or services [11]. For this purpose, a company needs to provide customers complaint channels that are accessible and easy to use. Internet and social media have become new channels for customers to easily and effectively complain [11]. Consumers do not have to go to a store or to spend time on a waiting line or a phone [11]. They can write on a company's wall on Facebook or send a tweet [11]. With the diffusion of smart devices, it becomes even much easier for customers to voice their dissatisfactions anytime and anywhere. Given these benefits, more and more customers use social media to complain [15].

As mentioned, complaints on social media are visible to the general public. In order to avoid negative consequences of this general publicity of complaints on social media, companies need appropriate strategies to respond to these complaints. As complaining customers expect a company to offer a refund, an exchange of the product, or at least an apology [18], the company has to respond in an adequate way to satisfy these consumers. Therefore, an effective complaint management can even lead to benefits such as increasing customer retention, preventing the spread of negative word-of-mouth, or promoting a positive image of the company [13]. With these kinds of recovery efforts, companies can finally convert complaining customers to satisfied customers.

Types of Complaint Behavior on Social Media

A customer who is not satisfied with a product or service can either take no action or take an action as shown Figure 1. When (s)he takes an action, (s)he has a choice to take this action publicly or privately. As a private action, (s)he

can decide not to purchase a product or service from the company that (s)he had an unpleasant experience with. Another private action is spreading her/his negative experience through her/his personal network. For a public action, the customer can directly complain her/his dissatisfaction to the company; take a legal action against the company; or complain her/his case to a third party (e.g., consumer protection agency).

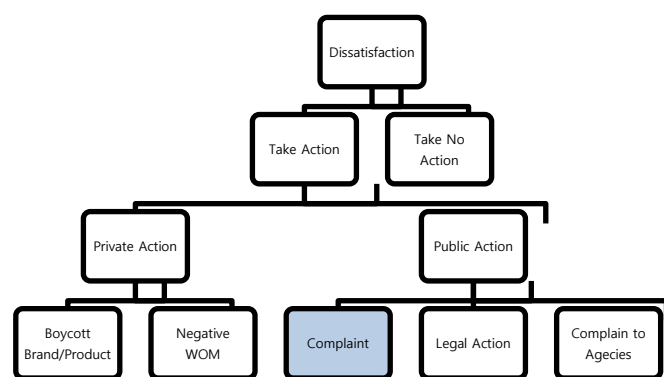


Figure 5: Consequences of dissatisfaction
Source: Foscht and Swoboda (2011): p. 243[9]

All these actions had been invisible to public before the existence of social media. Using social media, an online complaint and negative WoM are visible to public. According to Clark, the difference between them is if they can be recognized by a company. While a complaint that is directly addressed to the website or social media site of a company, as a consequence, can be realized by that company, a negative WoM that is not addressed to the company makes it difficult for the company to perceive it as such unless it becomes a rumor [5].

With the daily use of social media, one's personal network extends to a virtual world. In addition, a negative WoM is not just circulated within one's personal network, but it is widely diffused due to the nature of social media [15]. Therefore, a negative WoM cannot be simply ignored, even though it can be invisible to companies.

There is another way to classify complaints by using two criteria: private versus public and voiced versus hidden complaints. As is shown in Figure 2, there are privately voiced complaints, privately hidden complaints, publicly voiced complaints, and publicly hidden complaints. The most threatening category of complaint for companies is the publicly hidden complaint, because it can be known to public but not to the company. According to the previous classification, this is a negative WoM [5].

To avoid confusion, we will focus only on the following two categories according to Figure 2: publicly voiced complaints and publicly hidden complaints (negative WoM) on social media.

	Private	Public
Voiced Complaint	Privately Voiced Complaint Direct complaint to service provider via private channels (face-to-face, telephone, e-mail, postal mail, etc.).	Publicly Voiced Complaint Direct complaint to service provider via public channels (Facebook brand pages, twitter hashtags, etc.).
Hidden Complaint	Privately Hidden Complaint - Private complaints to friends, family, colleagues, etc., not addressed to the service provider. - Switching brands/providers (exit)	Publicly Hidden Complaint - Public complaints via review websites, weblogs, Facebook walls, etc., not addressed to the service provider. - Third-party action (Better Business Bureau, government agency, Media, etc.).

Figure 6: New taxonomy of complaint behaviour
Source: Hogreve et al. (2013): p. 521 [15]

Cross cultural comparison

Studies on cultural differences on complaint behavior often take the view of individualism versus collectivism [19]. People in an individualistic culture value their own goals, independency, and self-sufficiency. As a consequence, they emphasize directness and efficiency. They are less loyal to a group they belong to than people in collectivistic culture. People in collectivistic culture focus more on norms, values and goals of the community they belong to [19].

Customers of an individualistic culture are more likely to engage in a voiced response whereas customers of a collectivistic culture are more likely to engage in a privately hidden response, for example, telling or convincing friends or their family not to purchase products or services from companies that they are not happy with [19].

With social media, this kind of conventionally known behavior might change. Customers in individualistic countries are more likely to engage in negative WoM than customers in collectivistic countries [17], because the latter care about what they are expressing no matter it is in the public or private arena. In addition, people from a collectivistic culture tend to strive for more social support than people from an individualistic culture [16]. In this sense, people in a collectivistic culture are more careful expressing themselves on social media.

Due to these differences, people use social media differently according to their cultural background (individualistic versus collectivistic culture). This research will compare customers from Austria (representing a country with an individualistic culture) and those from

South Korea (representing a country with a collectivistic culture).

Three Distinguishable Characteristics of Collectivism vs Individualism

We choose the following three characteristics to distinguish collectivism from individualism: social anxiety, face concern, and agreeableness. These are factors that are very important for the behavior of people from a collectivistic culture. For example, what do other people think of me if I say something? Is what I am saying saving other people's faces? Is it acceptable to say something? We will investigate how these factors influence people to complain and say a negative WoM on social media. Furthermore, we will compare how these factors affect people's complaint behavior in collectivistic versus individualistic cultures and if there are any differences between them.

Social Anxiety

Social anxiety refers to "the discomfort that is associated with the awareness of other people's perspectives of oneself as a social object" [8].

Perceived social risk is a crucial factor why customers are not willing to engage in positive word-of-mouth communication on social media [7]. The decision to complain depends on potential negative consequences including social consequences [12]. Expecting such negative consequences will hinder customers to complain. In terms of complaint behavior, people who are socially anxious are less likely to complain, because they want to keep their reputations.

People in a collectivistic culture have more social anxiety than people in an individualistic culture, because their cultural norms reinforce them to be aware of other people's perspectives of themselves. Therefore, people in collectivistic culture are less likely to post a complaint and negative WoM on social media because of the openness of social media to others. For these reasons, we hypothesize:

H1: Social anxiety in a collectivistic culture is more negatively related to post a complaint and negative WoM on social media than social anxiety in an individualistic culture.

Face Concern

Face concern or face consciousness refers to "the projection of self-image or self-worth to others in relational context" [1]. People with high face concern value the opinions of others and perceive high social risks [1]. People who have a face concern tend to monitor and

control their expressive behavior in order to portray themselves as socially desirable images in the presence of others. In terms of social media, people who have high face concerns tend not to complain and say a negative WoM to save the faces of themselves.

People in a collectivistic culture have higher face concerns than those in an individualistic culture, because they care about faces of others, at the same time, they concern what other people think of themselves. Therefore, we hypothesize:

H2: Face concern in collectivistic cultures is more negatively related to post a complaint and negative WoM on social media than face concern in individualistic cultures.

Agreeableness

Agreeableness refers to characteristics such as altruism, tender-mindedness, trust, and modesty. Agreeable people tend to be cheerful, cooperative and supportive to others.

In the context of social media, there is a positive correlation between agreeableness and communication on Facebook. People who are agreeable tend to make friendly and positive comments and are characterized as friendly, warm and sympathetic. Thus, agreeableness is considered as a determinant for a positive WoM.

In the context of complaints, people who are agreeable are expected to have a lower propensity to complain than people who are disagreeable. This can be explained by two possible reasons. First, agreeable people may experience less dissatisfaction than disagreeable people. Second, agreeable people concern more about the interpersonal conflicts of complaining than disagreeable people. These arguments are also related to cultural differences. In collectivistic cultures, as agreeableness is required as a social norm, people tend to complain less on social media than those in individualistic culture. Therefore, we hypothesize:

H3: Agreeableness in collectivistic cultures is more negatively related to post a complaint and negative WoM on social media than agreeableness in individualistic cultures.

Research Plan

As research in progress, we plan to collect survey data from university students in Austria and South Korea to compare their complaint and negative WoM behavior on social media. To test hypothesis, we will partly adapt the constructs of "social anxiety", "face concern", "agreeableness" from the existing literature. In addition, we will also slightly modify the constructs of "attitude toward complaints", "usage of social media". Furthermore,

we will include other variables that may affect complaint and negative WoM behavior.

We hope that we receive valuable feedback by presenting our research in progress paper at this conference so that we can further develop our paper.

References

- [1] Balaji, M. S., Khong, K. W. and A. Y.-L. Chong., "Determinants of Negative Word-of-mouth Communication Using Social Networking Sites," *Information & Management*, Article in Press, 2016.
- [2] Bashar, A. and M., Wasiq, "E-satisfaction and E-loyalty of Consumers Shopping Online," *Global Sci-Tech*, Vol.5, No.1 2013, pp.6-19.
- [3] Bodey, K. and D. Grace, "Segmenting Service "Complainers" and "non-complainers" on the basis of Consumer Characteristics," *Journal of Services Marketing*, Vol.20, No.3 2006, pp.178-187.
- [4] Choi, J. H. and J. E. Scott, "Electronic Word of Mouth and Knowledge Sharing on Social Network Sites: A Social Capital Perspective," *Journal of Theoretical and Applied Electronic Commerce Research*, Vol.8, No.1 2013, pp.69-82.
- [5] Clark, J., "Conceptualising Social Media as Complaint Channel," *Journal of Promotional Communications*, Vol.1, No.1 2013, pp.104-124.
- [6] Einwiller, S. A. and S., Steilen, "Handling Complaints on Social Network Sites – An Analysis of Complaints and Complaint Responses on Facebook and Twitter Pages of large US Companies," *Public Relations Review*, Vol.41, No.2 2015, pp.195-204.
- [7] Eisingerich, A. B., Chun, H. H., Liu, Y., Jia, H. and Bell, S. J., "Why Recommend a Brand face-to-face but not on Facebook? How Word-of-mouth on Online Social Sites Differs from Traditional Word-of-Mouth," *Journal of Consumer Psychology*, Vol.25, No.1 2015, pp. 120-128.
- [8] Fenigstein, A., Scheier, M.F., and A.H. Buss, "Public and Private Self-Consciousness: Assessment and Theory," *Journal of Consulting and Clinical Psychology*, Vol. 43, No. 4, 1975, pp. 522-527.
- [9] Foscht, T. and B. Swoboda, , *Käuferverhalten. Grundlagen – Perspektiven – Anwendungen*, 4thed., Wiesbaden, 2011.
- [10] Fu, J.-R., Ju, P.-H. and C.-W. Hsu., "Understanding Why Consumers Engage in Electronic word-of-mouth Communication: Perspectives from Theory of Planned Behaviour and Justice Theory," *Electronic Commerce Research and Applications*, Vol.14, No.6 2015, pp.616-630.
- [11] Grégoire, Y., Salle, A. and T. M Tripp, "Managing Social Media Crises with your Customers: The Good, the Bad, and the Ugly," *Business Horizons*, Vol.58, No.2 2015, pp.173-182.
- [12] Hadwich, K. and F. Becker, "Überwindung von Beschwerdebarrieren Durch Innovative Technologien - Eine empirische Untersuchung am Beispiel von iFeedback," Bruhn, M./Hadwich, K. (Eds.): *Dienstleistungsmanagement und Social Media*, Wiesbaden, 2013, pp. 565-591.
- [13] Harrison-Walker, L. J., "E-complaining: a content analysis of an Internet complaint forum," *Journal. of Services Marketing*, Vol.15, No.5 2001, pp.397-412.
- [14] Hennig-Thurau, T., Malhotra, E. C., Friege, C., Gensler, S., Lobschat, L., Rangaswamy, A. and B. Skiera., "The Impact of New Media on Customer Relationships," *Journal of Service Research*, Vol.13, No.3 2010, pp.311-330.
- [15] Hogreve, J., Eller, T. and N. Firmhofer, "When The Whole World is Listening - An Ex-ploratory Investigation of Individual Complaints on Social Media Platforms," Bruhn, M./Hadwich, K. (Eds.): *Dienstleistungsmanagement und Social Media*, Wiesbaden, 2013, pp. 515-540.
- [16] Kim, Y., Sohn, D. and S. M. Choi., "Cultural Difference in Motivations for Using Social Network sites: A Comparative Study of American and Korean college students," *Computers in Human Behavior*, Vol.27, No.1 2011, pp.365-372.
- [17] Koh, N. S., Hu, N. and E. K. Clemons, "Do Online Reviews Reflect a Product's True Perceived Quality? An Investigation of Online Movie Reviews Across Cultures," *Electronic Commerce Research and Applications*, Vol.9, No.5 2010, pp.374-385.
- [18] Lala, V. and Priluck, R., "When Students Complain: An Antecedent Model of Students' Intention to Complain," *Journal of Marketing Education*, Vol.33, No.3 2011, pp.236-252.
- [19] Liu, R. R. and P. McClure, "Recognizing Cross-cultural Differences in Consumer Complaint Behavior and Intentions: An Empirical Examination," *Journal of Consumer Marketing*, Vol.18, No.1 2001, pp.54-75.
- [20] Pfeffer, J., Zorbach, T. and K. M., Carley, "Understanding Online Firestorms: Negative Word-of-mouth Dynamics in Social Media Networks," *Journal. of Marketing Communications*, Vol.20, No.1-2 2013, pp.117-128.

The Role of Relational Leadership and Social Alignment in Information Security Management

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Abstract

While information technology has increasingly created various innovation opportunities in organizations, these opportunities have caused serious risks associated with information security. Due to these potential risks, information security becomes a major concern among executives in organizations. From a perspective of social capital theory, this study aims to explore how relational leadership of IT (information technology) executive drives social alignment between non-IT and IT units, combined knowledge, information security effectiveness toward improving organizational performances. Specifically, we set out to study two central research questions: (1) what is the role of relational leadership of IT executives influence social alignment (composed of structural, cognitive, and relational linkage) between non-IT and IT? (2) How does social alignment influence combined knowledge, information security effectiveness, and organizational performance? Empirical data from government organizations confirms the profound impact of IT and non-IT social alignment and information security effectiveness, and organizational performance.

Keywords:

Information security, relational leadership, social alignment, combined knowledge, information security effectiveness, organizational performance

Introduction

Recently, as the growing dependence on ICT (Information and Communication Technology) of organizations, information security issues related to ICT becomes a core organization concern. In previous literature, information security management has been understood from the perspectives of technical and organizational aspects. Traditionally, the prominent counterplots have been in technical nature such as firewalls and cryptography against information hiding or cybercrime. The most effective strategy for information security is sophisticated technologies rather than people. A low level technical function operation is perceived as a prior security solution independently from the business unit. However, the lack of

alignment between non-IT tasks and technologies result in ineffective IT services and less IT business value [1]. Since then, organizations begin to perceive the importance of the balanced security solution through integrating technologies and business needs in socio-organizational context [2].

Despite the considerable research on alignment between non-IT and IT, two issues still remain obscure. *First*, there is insufficient understanding of what exactly alignment is [3]. *Second*, another vague question related to alignment is raised regarding how IT and non-IT alignment works and can be performed. Kearns and Sabherwal [4] points out that there has not been enough theoretical and empirical research conducted on relationships among enabler, alignment and outcome of IT and non-IT alignment. Therefore, this study considers alignment as social non-IT and IT linkages at a high executive by drawing upon the social capital theory. Hence, the authors suggest the integrated research model including enabler (i.e., relational leadership), social alignment and outcomes (i.e., combined knowledge, security effectiveness, and organizational performance) based on social capital theory and knowledge consideration.

Social Alignment between Non-IT and IT

While the abundant literature discusses the strategic alignment of non-IT and IT for optimization of information security (e.g., [5, 6, 7, 8]), the issue of social alignment based on social capital theory is a relatively recent view for alignment. Along with the basic premise of social capital theory, social alignment emphasizes the cross-domain interconnectedness between non-IT and IT units creating combined knowledge (e.g., [1, 3, 9]). Social alignment is also considered from three dimensions – structural, cognitive, and relational linkage [3]. The *structural linkage* between IT and non-IT employees indicates formal and informal network structure in meetings and project conferencing. Successful linking between IT and non-IT depends on direct personal face-to-face contacts and cross-functional project teams [10]. Moreover, the higher the density and connectivity of communication is, the greater the knowledge is created and exchanged. Empirical results support the connection between communication frequency and convergence in understanding [11].

The *cognitive linkage* refers to the extent to which IT and non-IT staff knows each other's codes, language, and perspectives [12]. Through shared language and vocabulary, and through the sharing of collective narratives, both IT and non-IT staff understand each other at a deep level and are able to participate in the others' key processes, and in turn respect each other's unique contribution and challenges [13].

The *relational linkage* indicates the particular relations people such as trust and trustworthiness [12]. Employees with high levels of trust are more willing to take risks in combining and exchanging different information. Thus, trust between IT and non-IT units enhances cooperation, and cooperation breeds trust. Consequently, trust and cooperation between both units develop the collective trust over time, and form intangible combined knowledge asset to help solve problems [14, 15].

Research Model and Hypotheses

This paper proposes a model of the relationships around relational leadership, social alignment between non-IT and IT, and outcomes of social alignment. This model combines the relational leadership theory [16, 17, 18] and the social alignment model between non-IT and IT [1, 3, 9] to predict information security effectiveness and organizational performances. We postulate that relational leadership is related with three linkage types of social alignment, and we further propose that the level of social alignment has a positive relationship with combined knowledge, information security effectiveness, and organizational performances. We review the key constructs of our conceptual model and describe the theoretical grounds supporting the relationships contained therein.

Relational Leadership and Social Alignment

Hypothesis 1: Relational leadership of IT executives will positively influence the level of social alignment.

H1.1: Relational leadership of IT executives will positively influence the level of structural linkage between IT and non-IT executives.

H1.2: Relational leadership of IT executives will positively influence the level of cognitive linkage between IT and non-IT executives.

H1.3: Relational leadership of IT executives will positively influence the level of relational linkage between IT and non-IT executives.

Social Alignment and Combined Knowledge

Hypothesis 2: The level of social alignment between IT and non-IT executives will positively influence the level of combined knowledge.

H 2.1: The level of structural linkage between IT and non-IT executives will positively influence the level of combined knowledge.

H 2.2: The level of cognitive linkage between IT and non-IT executives will positively influence the level of combined knowledge.

H 2.3: The level of relational linkage between IT and non-IT executives will positively influence the level of combined knowledge.

Combined Knowledge and Information Security Effectiveness

Hypothesis 3: The level of combined knowledge between IT and non-IT executives will positively influence information security effectiveness.

Information Security Effectiveness and Organizational Performances

Hypothesis 4: Information security effectiveness will positively influence organizational performance.

H 4.1: Information security effectiveness will positively influence financial performance.

H 4.2: Information security effectiveness will positively influence business performance.

References

- [1] Beck, J.C. and M. Wade, *Got Game: How the Gamer Generation is Reshaping Business Forever*, Harvard Business School Publishing, 2004
- [2] Cho, N., Joun H. and W. S. Yoo, "The Structure of Alliance Network in Regional Tourism Business: A Conceptual Analysis from the Perspective of the Duality of Technology," *J. of Information Technology Applications and Management*, Vol.16, No.3 2009, pp.87-100.
- [3] Clancey, W. J., "Transfer of Rule-Based Expertise through a Tutorial Dialogue," unpublished Ph.D. dissertation, Dept. of Computer Science, Stanford University, 1979.
- [4] Mahdavi, I. and H. Fazlollahab, "Dynamic Route Selection in an Agent base Multilayer Electronic Supply Chain Network," *Proceedings of the 3rd International Conference on IT Applications and Management*, Seoul, Korea, 2009, pp.23-29.
- [5] Rice, J. (1986). "Polygon: A System for Parallel Problem Solving," Technical Report, KSL-86-19, Dept. of Computer Science, Stanford University.
- [6] Tanlamai, U. and Hartijasti Y., "The Engineering of Qualitative Models," Forthcoming, 2010.
- [1] Kayworth, T. and Whitten D. (2010). "Effective information security requires a balance of social and technology factors," *MIS Quarterly Executive*, 9(3), 2012-2052.
- [2] Avison, D., Jones, J., Powell, P. and Wilson, D. (2004). "Using and validating the strategic alignment model," *Journal of Strategic Information Systems*, 13(3), 223-246.
- [3] Wagner, H-T., Beimbom, D. and Weitzel, T. (2014). "How social capital among information technology and business units drives operational alignment and IT business value," *Journal of Management Information Systems*, 31(1), 241-271.
- [4] Kearns, G. and Sabherwal, R. (2007). "Strategic

- alignment between business and information technology: A knowledge-based view of behaviors, outcome, and consequences," *Journal of Management Information Systems*, 23(3), 129-162.
- [5] Ein-Dor, P. and Segev, E. (1978), "Strategic planning for management information systems," *Management Science*, 24(15), 1631-1641.
- [6] Galliers, R. D. (1987). "Information systems planning in the United Kingdom and Australia: A comparison of current practice," in P. I. Zprkoczy (ed.), *Oxford Surveys in Information Technology*, 4, New York: Oxford University Press, 223-255.
- [7] Anthony, B., Terry Lewis, B. R., Bryan, R. W. and Byrd, T. A. (2006). "The leveraging influence of strategic alignment on IT investment: An empirical examination," *Information & Management*, 43(3), 308-321.
- [8] Bergeron, F., Raymond, L. and Rivard, S. (2004). Ideal patterns of strategic alignment and business performance. *Information & Management*, 41(8), 1003-1020.
- [9] Chan, Y. E. (2002). "Why haven't we mastered alignment? The importance of the informal organization structure," *MIS Quarterly Executive*, 1-2, 97-112.
- [10] Clark, B. R. (1972). The occupational saga in higher education, *Administrative Science Quarterly*, 17: 178-184.
- [11] Lind, M. and Zmud, R.W. (1991). "The influence of a convergence in understanding between technology providers and users on information technology innovativeness," *Organization Sciences*, 2, 195-217.
- [12] Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, 23(2), 242-266.
- [13] Reich, B. H., & Benbasat, I. (2000). Factors that influence the social dimension of alignment between business and information technology objectives. *MIS quarterly*, 81-113.
- [14] Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of democracy*, 6(1), 65-78.
- [15] Kramer, R. M., Brewer, M. B., & Hanna, B. A. (1996). Collective trust and collective action. *Trust in organizations: Frontiers of theory and research*, 357-389.
- [16] Balkundi, P. and Kilduff, M. (2005). The ties that lead: A social network approach to leadership. *The Leadership Quarterly*, 16(6), 941-961.
- [17] Offstein, E. H., Madhavan, R. and Gnyawali, D. R. (2006). Pushing the frontier of LMX research: The contribution of triads. In G. Graen and J. A. Graen (Eds.), *Sharing network leadership*, Vol.4. Greenwich, CT: Information Age Publishing.
- [18] Uhl-Bien, M. (2006). "Relational leadership theory: Exploring the social processes of leadership and organizing," *The Leadership Quarterly*, 17, 654-676.

Diffusing Portability and Mobility Constructs into Media Synchronicity Theory

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Abstract

This is a preliminary report from an on-going study that focuses on an enhancement of Media Synchronicity Theory (MST) for the newly emerging information communication technologies (ICT) such as Google Glass or Apple iWatch. These ICT present the idiosyncrasies - portability and mobility - that are not effectively addressed by MST. The theoretical constructs of portability and mobility and their reciprocal interaction effects with the existing constructs of MST may yield a more comprehensive version of MST. In this preliminary report, a motive, a discussion of portability and mobility, and a list of research issues are provided. The research contribution of this paper is to shed a light on the theoretical interpretation of mobile-mediated communication by ICT.

Keywords:

Portability, Mobility, Computer-mediated communication, mobile-mediated communication, Media synchronicity theory

Introduction

Media Synchronicity Theory (MST) is a well-known Information Systems (IS) theory and it has been a prominent theory for countless number of Computer-Mediated Communication (CMC) studies. Despite of its vital role in CMC studies, MST seems to fall short in addressing those newly emerging information communication technologies (ICT).

A smartphone offers plethora options in connecting with others and sharing data and information with others. Besides the smartphone's main function, voice communication, the data communication is showing a significant increase. For the global mobile data traffic, it is projected to increase from 3.7 exabytes/month in 2015 to 30.6 exabytes/month by 2020. For the revenue, it is projected to increase from 393 U.S. billion dollars in 2014 to 554 U.S. billion dollars in 2019 [22].

In the case of the consumer market, industry numbers and figures report that the consumption rate of mobile technologies is rapidly increasing. One industry report states

that worldwide smartphone sales reached 1.2 billion units in 2014, up 28.4 percent from 2013, and representing two-thirds of global mobile phone sales [12]. Similarly, the mobile operating system (OS) market is also exhibiting fast growth, with the Android OS topping all other mobile operating systems. Even the leading desktop OS, the Windows OS, has become much more mobile friendly [17]. In contrast, personal computer software sales and demand are experiencing a significant decline [20], [16].

Mobile technology has had a similar impact on the social media sector. The two leading social media platforms, Facebook and Twitter, both reported that the overwhelming majority of their users are mobile users; 80% of Twitter active users are on mobile [24] and 85% of Facebook daily active users are on mobile [9]. An industry report predicts that "Facebook is now so thoroughly a mobile service that its original website may soon become a footnote in the company's financial statements" [13]. Accessing social media such as Facebook or Twitter through smartphones or mobile devices is becoming the preferred choice of many people today. This is yet another example of the way mobile technology is significantly influencing consumer behavior and lifestyles, as well as the overall business environment.

Adding to the social media effect is the wearable technologies. The two well-known technologies are Google Glass and the Apple Watch. It is the consensus that many experts feel that this wearable ICT trend will continue to grow.

From all these new ICT devices and technologies, there are two characteristics that stand up: *portability* and *mobility*. The portability focuses on a technology's stealth characteristic that enables one to possess the technology without being overly conscious about the fact that the person is possessing the technology. The requirement is that a technology must fit into one's appearance and lifestyle. Unfortunately, this portability factor has not been regarded seriously in the early introductory period. For example, Google Glass when it debut, many expected that this particular technology would bring a new wave of wearable technology. The concept of the technology was well received, but Google Glass did not make a favorable impression due to its overly bulky appearance.

The mobility focuses on a technology's ubiquitous

characteristic, “anywhere-anytime.” Comparing to the conventional setting of PC, this clearly makes connection and sharing immensely effortless. Mobility also links to another cognitive variable, “A-ha” effect (discussed in more detail in the interaction effect section). The contextual situation, enabled by a device’s mobility, may provoke a new thought or idea. This phenomenon may lead to a new change of action or solution to pending circumstances.

Given these circumstances, there needs to be an adequate theory to conduct related studies. Currently, MST is the leading choice among other theories. MST is a well-known and respected theory in CMC. It has provided a solid theoretical interpretation to countless number of CMC studies, and it will continue to do so. Notwithstanding, when it comes to portability and mobility characteristics of a ICT, it falls short. MST is primarily focused on the medium’s intrinsic software-supported communication features, but not external hardware-enabled communication features and issues. For example, in order to send a message using a smartphone or iWatch, one can voice-drive the message-sending process while the person is in a transit (e.g. walking or running). This *physical ability* would invite more communication activities and may change the person’s attitude toward the device and device-ready communication.

With this research gap, this is an on-going study that identifies “missing” theoretical constructs of MST and develops those constructs – portability and mobility – to strengthen MST to address the new ICT categories. From a list of other constructs, this version of preliminary report spotlights portability and mobility. Following sections are provided: 1) literature review on other relevant CMC theories, 2) MST and a discussion of portability and mobility, 3) a discussion of MST enhancement, and 4) implications.

A Brief Review of Media Richness and Media Synchronicity Theories

Among CMC theories, the two most well-known ones are Media Richness Theory (MRT) and Media Synchronicity Theory (MST). For this preliminary paper, the theories’ brief descriptions are provided here.

MRT is based on two criteria: uncertainty and equivocality under an organizational setting [5]. Uncertainty is defined as the gap between what information is needed and what information is already available. Equivocality occurs when multiple, conflicting interpretations are present or when no one particular interpretation stands out. A medium is evaluated according to how well it integrates these two criteria following a scale of high and low. Thus, a medium with high media richness is one that exhibits both low uncertainty and low equivocality. For example, face-to-face communication is a medium that shows high media richness according to MRT, while an unaddressed document is a medium that shows low media richness.

Media Synchronicity Theory (MST) [6] divides media capabilities into the following categories: *transmission velocity*, *parallelism*, *symbol sets*, *rehearsability* and *reprocessability*. Transmission velocity refers to the speed by which the medium conveys its messages. Parallelism concerns the medium’s capability to simultaneously send multiple messages to different recipients. Symbol sets are the number of physical expressions that one can add to a message, such as a handshake, the nodding of the head or the closing of the eyes. Rehearsability is a measure of the degree to which the medium allows a message to be edited and rehearsed before sending. Similarly, reprocessability references the degree to which a medium allows a message to be re-evaluated again during decoding.

Proposing New Communication Capabilities

The two proposed constructs: portability and mobility can distinctively defined separately, but to all intents and purposes, they are closely intertwined each other. In this context, a number of ICT features can be a result of mixed combination of the two. Consequently, here are few medium capabilities to suggest: Cognizance of environment change (CEC), Modality-select (MDS), Accessibility readiness (ARD), Wearability-portability (WRB) and Visibility (VSB).

Cognizance of environment change (CEC) is one of the prime functions of mobile technology—the ability to react to changing locations [14]. Location-based data and information is a major function of mobile technology. In some mobile applications, this is exploited in order to create value. For example, the “Foursquare” mobile application gathers information about businesses and places around a person’s location [19]. Based on the ratings and comments of the previous visitors, a person may evaluate a certain business establishment nearby him before patronizing it. Another example is “Zalando” [15]. Equipped on a smartphone, this is an image recognition mobile application that enables a user to take image shots of people passing by in order to get information (such as brand names) on what they are wearing and where to purchase similar clothes.

Modality-select (MDS) concerns the user’s freedom to choose or switch from one communication mode to another in a two-way communication. For example, a person sending a message may choose to make a voice call, send a text message either by phone or through a social networking medium, or begin video conferencing. For example, if a person receives a text message, texting back is a common response. But, by her choice, a person may call the sender or invite the other party to a video conferencing instead. Today, there are certainly more communication modes for a person to initiate. Which communication mode to choose is based mostly on the message’s urgency, content and length. Furthermore, there are other influencing variables such as a person’s personal preference, age category, mode of

perception, past experience and other human factors. This versatility in communication modes will significantly influence a person's intention, choice of a certain mode and degree of communication enrichment.

Accessibility readiness (ARD) specifically refers to the number of physical steps a mobile technology requires a user take in order to send a message, from the point where the technology initially resides in normal use and to the point where a person successfully forwards a message to another person. In the personal computer era, it was typically the mouse or a similar device that was used to initiate action through a number of clicks, but now through touch-technology a user employs his/her thumbs to move through the screens. Thus, there are now fewer physical steps and a shorter timeframe for sending messages through mobile technology.

The "pull" technology is also utilized in some newer device such as Google Glass. It is the technology where a person or object is identified via image reading/recognition software, which then "pulls up" any associated data and information automatically, without the need for the user to initiate any physically-required steps. This pull technology is based on image-reading technology which is actively applied in mobile business applications [11], [15].

Wearability-portability (WRB) is a capability that is more concerned with the physical device itself. The early paradigm was portability: a device has to be portable for a person to carry it. This paradigm is rapidly shifting to wearability. While the mobile communications field is still dominated by portable smartphones and tablet PCs (e.g. the iPad), we are witnessing a major shift to wearable smart devices. The underlying idea that drives this paradigm has much in common with 'embedded computing' [3], [21], [25], where the communication is initiated as naturally and effortlessly as possible. This goal can be achieved if a device is not portable, but is wearable. In turn, WRB enhances the frequency of communication and encourages the intention of communication.

Finally, closely related to the wearability-portability attribute is Visibility (VSB). As the name suggests, this refers to a device's level of visual prominence: how visible (or how small) the device is and how it is perceived by others. The common consensus is that the smaller, the more hidden and the more intuitive the device is, the more it is socially accepted. The growing expectation of people who are consuming these technologies is that the smaller the device, the more naturalness it possesses. This paradigm explains the ever-decreasing size of emerging wearable mobile devices.

Interaction Effect of the Capabilities

The key point of the interaction effects between the existing medium capabilities of MST and our proposed medium

capabilities is that the portability and mobility characteristics enrich the existing capabilities. For example, parallelism, rehearsability, and reprocessability capabilities would be easier and may also be more frequent. The portability enables a person to trigger, edit, or rehearse a message at a moment when a person wants. Likewise, the mobility enables a person to trigger, edit, or rehearse a message when a certain location or context cues a person.

The fact is that we still receive, process, and interpret data and information regardless the external environment. Whether we are in a certain location, context, or in transit from one location to another, the act of data and information processing continues to take place and certain medium's capabilities should be able to capture these activities as an extension to others. A medium's portability and mobility enable a person to freely extend the data and information sharing network.

"A-ha" effect or also known as Eureka effect is another mechanism that plays a vital role in this interaction effect. It is defined as "A sudden comprehension that solves a problem, reinterprets a situation, explains a joke, or resolves an ambiguous percept is called an insight" [18]. Although essential neurological inner insight of the effect has not been known, it is generally accepted that it commonly happens when a person is exposed to certain external stimulus (e.g. a new idea while taking a shower). The "A-ha" effect signifies what situation or what location a person is exposed to. The portability and mobility characteristics enable a person with an "A-ha" effect to immediately engage in communication or data sharing with others.

For the symbol sets, the current list of symbols represents paralanguage. The additional symbol sets from portability and mobility will capture various statuses that describe a person in motion or in action (e.g. emoticon for "I'm walking to the library" or "I'm biking to the gym"). These symbol sets support a continuation of events episodically.

Research Issues

As this is a preliminary report of this research, there are a number of tasks to address. The first task is the validation of the new medium capabilities. Each of these capabilities must be validated under various different contexts and using different variables. In CMC, there have been a slew of various contexts and different variables by which such capabilities were tested—task type, group size, member dispersion, member familiarity, member attributes, member interaction, meeting or communication duration, anonymous identity, gender, meeting frequency, social influence, relevant background, member conflicts and more [23], [10], [7], [1]. In a similar manner, the new capabilities must be validated according to its expectation.

The second task is ascertaining salient behaviors and effects of the new medium capabilities. It is unknown and a mere

expectation, but for each new capability, it may cause certain user response(s) or behavior(s). Besides the expectation of easier engagement and frequent message sending behavior, there can be other tantalizing findings.

Third task is the effect on working relationships among workers in an enterprise setting. ICT and other similar technologies are being adopted by many organizations to support business operations. It can be a viable tool for group collaboration [4]. From an organizational perspective, an investigation of those after-effects of new medium capabilities can be initiated to better understand the group or organizational consequences. The expectation is that a worker being equipped as ICT with portability and mobility may expedite the given task more swiftly.

Fourth task is an investigation on the modality-selection (MDS). The theory of channel complementary talks about how a person chooses a certain medium based on the target data or information [8]. The pressing questions are what determines a user to choose a certain channel, and what influences portability and mobility bring to the decision-making process. Other attributes such as age groups, background, or technology-fluency may play a part in the decision-making. For example, young people prefer text messaging, but senior people favor voice calls. Another example is that certain places or situations recommend one mode over the others, such as our preference for texting rather than making a voice call when in a classroom, church or on public transit.

The last task is about wearability-portability (WRB) and visibility (VSB) capabilities. The inquiry is about what levels of visibility and wearability are acceptable for a person to engage in communication without being conscious about the device. iWatch features a wide range of designs that appear to be similar to popular watch designs. These designs allow people to wear iWatch without being too conscious. Additionally, there is a technical challenge. A recent report explains that the reluctance shown by the public towards embracing Google Glass is based on the people's concern about how others may perceive them when they wear the Google Glass [2]. The fact that Google Glass automatically "pulls" data and information about whoever comes in the range of the glasses made people uncomfortable.

Conclusion

This preliminary report addresses the introduction of portability and mobility into MST for studies in communication in mobile platform. Based on the two criteria, the proposed medium capabilities are: accessibility readiness (ARD), cognizance of environment change (CEC), wearability-portability (WRB) modality-select (MDS) and visibility (VSB). These capabilities are to be validated. Moreover, there are many research issues before these medium capabilities can collectively provide an

enhancement to MST for communication studies on mobile platform. Given the increasing ICT and its market sector, it is important to keep a par with theoretical side.

References

- [1] Alavi, M. "Computer-mediated collaborative learning: An empirical evaluation," *MIS Quarterly*, (18:2), 1994, pp. 159-174.
- [2] Barr, A. (2014). "Google Glass Loses Focus of Some Developers," *The Wall Street Journal*, Printed on November 14, 2014.
- [3] Beigl, M., Gellersen, H.W. and A. Schmidt, "Media cups: experience with design and use of computer-augmented everyday artefacts," *Computer Networks*, (35:4), 2001, pp. 401-409.
- [4] Choi, K. and I. Im, "A Comparative Group Collaborative Communication Analysis of Mobile Microblogging and Non-mobile Online Message Board," *International Journal of Electronic Commerce*, (19:4), 2015, pp. 1-24.
- [5] Daft, R.L. and R.H. Lengel, "Organizational Information Requirements, Media Richness and Structural Design," *Management Science*, (32:5), 1986, pp. 554-571.
- [6] Dennis, A.R., Fuller, R.M. and J.S. Valacich, "Media, tasks, and communication processes: A theory of media synchronicity," *MIS quarterly*, (32:3), pp. 2008, pp. 575-600.
- [7] DeSanctis, G. and Gallupe, R.B. "A foundation for the study of group decision support systems," *Management Science*, (33:5), 1987, pp. 589-609
- [8] Dutta-Bergman, M. J. The Antecedents of Community-Oriented Internet Use: Community Participation and Community Satisfaction. *Journal of Computer-Mediated Communication*, 11(1), 2005,97-113.
- [9] Facebook.com, 2015. <http://newsroom.fb.com/company-info/> Data retrieved May 22, 2015.
- [10] Fjermestad, J. and S.R. Hiltz, "An Assessment of Group Support Systems Experimental Research: Methodology and Results," *Journal of Management Information Systems*, (15:3), 1998, pp. 7-149.
- [11] Fowler, G.A. "One-Minute Review: Amazon's 'Flow' Image Recognition Beats Barcode Scans," *The Wall Street Journal*, Printed on February 5, 2014
- [12] Gardner Research, "Market Share: Devices, All Countries, 4Q14 Update." Date retrieved May 12th 2015, <http://www.gartner.com/document/2985017>.
- [13] Goel, V. (2015). "Facebook's Growth Slows Slightly, but Mobile Shift Intensifies," *The New York Times*, Printed on April 22, 2015.
- [14] Goldfarb, A. "The Internet Killed Distance. Mobile Computing Brought It Back," *MIT Technology Review*, Data retrieved May 31, 2015, <http://www.technologyreview.com/news/520796/the->

internet-killed-distance-mobile-computing-brought-it-back/

- [15] Gummer, C. "Zalando Testing Mobile Clothing Recognition App," *The Wall Street Journal*, Printed on August 29, 2014.
- [16] Hardy, Q. 2016. "Intel to Cut 12000 Jobs as PC Demand Plummet," *The Wall Street Journal*, Printed April 19, 2016.
- [17] IDC, "International Data Corporation (IDC) Worldwide Quarterly "Mobile Phone Tracker", Date retrieved May 11, 2015. URL <http://www.idc.com/prodserv/smartphone-market-share.jsp>
- [18] Kounios, J. and M. Beeman, "The Aha! Moment, The Cognitive Neuroscience of Insight", *Current Directions in Psychological Science* August 2009 (18:4), pp. 210-216
- [19] Marshall, J. (2015). "Foursquare Launches New Location-Based Ad Offering," *The Wall Street Journal*, Printed on April 14, 2015
- [20] McMillan, R. 2016. "PC Sales Drop to Historic Lows," *The Wall Street Journal*, Printed Jan 12, 2016.
- [21] Moran, T.P. and P. Dourish, "Introduction to This Special Issue on Context-aware Computing," *Human-Computer Interaction*, (16:2-4), 2001. pp.87-95.
- [22] The Statistics Portal, (2016). Facts and Statistics about the Mobile Communications Industry, Data retrieved May 30th, 2016. <http://www.statista.com/topics/1147/mobile-communications/>
- [23] Strauss, S. and J.E. McGrath, "Does the medium matter? The interaction of task type and technology on group performance and member reactions." *Journal of Applied Psychology*, (79:1), 1994, pp. 87-97.
- [24] Twitter.com, 2015. Date retrieved May 22, 2015 <https://about.twitter.com/company>
- [25] Yoo, Y. "Computing in Everyday Life: A Call for Research on Experiential Computing," *MIS Quarterly*, (34:2), 2010, pp.213-231.

Value Co-creation in Crowdsourcing: The Effects of Social Networks on Product Co-development Project Success

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Abstract

The emergence of social networking platforms and online communities has greatly impacted firms' core business activities such as product design and has fostered newer kinds of community-based business models. To examine the performance of collaboration networks in crowdsourcing ideation, we draw on the notion of network embeddedness and examine how the structural properties of crowdsourcing project teams affect product co-development performance. Using product co-development project data collected from Quirky.com, we specifically look at how an inventor's project affiliation and friendship network structures affect the likelihood of a project's success. The results suggest that in contrast to the positive network effect on performance in other collaboration contexts, cohesive networks can hinder creative idea generation in online crowdsourcing ideation, providing significant implications for crowdsourcing platform designers.

Keywords: Crowdsourcing; Product innovation; Online collaboration; Social networks

Introduction

This emergence of online social platforms and online communities has greatly impacted firms' core business activities, such as product design, and has fostered innovative community-based business models. Crowdsourcing is one such novel approach for involving consumers in the product design. The online crowdsourcing systems strive to source the "wisdom" (i.e., creative ideas for new products and services) of large "crowds" of individuals (i.e., consumers) on the belief that large groups of people working together are smarter than an elite few experts [11]. Two types of crowdsourcing approaches that are commonly employed are contest-based collections of innovation resources (e.g., InnoCentive and TopCoder) and community-based mass collaborations for idea generation and production [15]. While recent research has mostly focused on the economics and design of crowdsourcing contest [2], our understanding of the effectiveness of collaboration in crowdsourcing platforms is still limited. One of few studies examining individual participants' performance on product idea generation in crowdsourcing

context has examined the effects on an individual's past success on maintaining an ongoing supply of quality ideas over time [3]. Given that consumers co-create value together with peer participants in this new form of innovation process, we focus on the social structure that connects these participants and enables them to harness collective intelligence from online collaboration.

A deeper understanding of the performance driver of crowdsourcing is important at least two reasons. First, there is a significant limitation in understanding the factors attributing to the success and failure of crowdsourcing initiatives in which individual contributors collectively create innovation. Critics of crowdsourcing point out that the implementation rates of posted ideas are very low, partly because of users' limited knowledge of market demand and feasibility of their product ideas [12]. Second, in terms of collaboration, crowdsourcing initiatives have unique drivers affecting collaboration performance. Online collaboration research, such as open source software (OSS) literature, has examined the impact of network embeddedness on collaboration performance [18,7]. Network embeddedness represents the degree to which a person or project is connected to other people or projects in the network, referring to the role of social capital in production [6]. OSS studies suggest that cohesive network structures facilitate knowledge sharing across community members, which in turn, leads to OSS project success. However, cohesive groups tend to become homogeneous, resulting in such groups becoming more dependent on group judgment [5]. Because of the creativity of product ideas is an important success factor in crowdsourcing [3], the network effects can exhibit different performance outcomes in crowdsourcing initiatives. In this study, we capture the structural properties of collaboration and friendship networks in crowdsourcing communities to investigate how network embeddedness affects crowdsourcing performance.

In this paper, using product co-development projects on Quirky.com as an empirical context, we examine how project affiliation and friendship network structures affect the likelihood of product co-development project success. Similar to OSS projects and other collaboration contexts within project groups, a focal inventor initiates a project and community members voluntarily participate in online collaboration. This nature of the product co-development

projects on the crowdsourcing platform leads to the emergence of an affiliation network, also called a two-mode network (Wasserman and Faust 1994), as used in diverse collaboration contexts within project groups, such as OSS projects [7,18], Wikipedia article editing [17, 22] and Broadway musical productions [20]. What is unique and interesting in our context is that Quirky's crowdsourcing platform has adopted popular social networking features such as member profile pages and Twitter-like following and follower relationships to facilitate social interactions. On Quirky's website its community members are actively engaged in conversations on the member profile and project pages. Our study examines the structure of collaboration relationships and the overlap of collaboration affiliation and friendship networks. The results suggest that in contrast to the positive network effect on performance in other collaboration contexts such as OSS projects, a cohesive network structure is detrimental in creative idea generation, leading to a lower likelihood of product co-development success.

Literature Review

Given our focus on the performance drivers in community-based crowdsourced ideation, particularly relevant is the stream of research that examines the relationship between network embeddedness in collaboration networks and project success. While there is few empirical studies that have examined online crowdsourced ideation performance, an established related research stream in understanding online collaboration performance is the OSS project literature. Researchers have examined the relationship between the success of community-based model of open source software development and team composition from the network perspective, finding that the structure of collaborative relationship is critical for understanding the outcomes [7, 18]. In terms of innovation tasks and their required resources, research suggests that sharing expertise and resource is one of the most significant determinants of OSS project success [18]. One example explaining the underlying mechanism is code reuse that is extensively occurring in OSS projects [8]. In such a highly interdependent task context, network embeddedness in a collaboration network structure minimizes search costs for relevant software code and facilitates trustworthiness among developers, resulting in the positive impact of network embeddedness on collaboration performance.

In contrast, compared to OSS projects, in ideation type of projects where creative ideas are critical resources, research on behavioral decision making and brainstorming literature has found that people working separately tend to generate more creative ideas than groups because individuals often conform to the categories of ideas suggested by other group members in closely connected groups instead of exploring a more diverse set of ideas [16, 13]. Given that crowdsourced ideation projects require creative idea generation for new product design rather than access to and reuse current knowledge resource, we expect that network embeddedness does not necessarily lead to positive performance outcomes, thereby extending the extant literature by examining the

negative network effect on crowdsourcing project performance. While prior literature on community-based product design draws on behavioral decision-making theories such as cognitive fixation [3] and social judgment theory [10], there is a lack of empirical research on the role of network embeddedness in this context.

Theory Development

Research on project-based collaboration performance suggests that structural mechanisms (as inferred from the structure of collaborative relationships) are critical for determining project performance [20]. Regarding the role of community feedback on creative product ideation, a recent experimental research finds that community feedback in a community-based product design system leads to preference assimilation and convergence toward less unique products, resulting in customers' lower satisfaction of final products [10]. Their laboratory experiments show that inventors are influenced by community feedback and thus modify his or her initial product design. Especially, they find that the perceived competence and the likability of the feedback provider lead to greater preference assimilation. From the structural approaches regarding project affiliation networks, social network literature explains the network cohesion concept using transitivity among network connections. A recent lab experiment suggests that individual innovation performance diminishes as the level of clustering among other network neighbors [19]. Thus, we posit the following:
H1: High clustering among in project affiliation networks (i.e., high network embeddedness) is negatively associated with crowdsourcing project performance.

In online crowdsourcing communities, social interaction on the platform also affects independence in ideation tasks. In the crowdsourced ideation project contexts, project members who have social interaction through friendship network ties may support their neighbors' merely decent ideas, which lead to negative project performance outcomes in terms of creative product idea generation. This prediction of conformity is in line with the findings of prior research on idea generation in the contexts of brainstorming [16] and creative art activities [1]. Given the conformity effect in highly embedded networks (captured as highly overlapped friendship ties among project team members), we expect that network embeddedness can hinder independent idea generation, leading to less creativity of product ideas and thus lowered crowdsourcing performance. Thus, we posit the following:

H2: High friendship-tie overlap (i.e., high network embeddedness) is negatively associated with crowdsourcing project performance.

Data

Research Context: Product Co-development on Quirky.com

Our research context is Quirky.com, a US-based online crowdsourcing platform. On the Quirky's website individual inventors submit their physical consumer product ideas as shown in the example in Figure 1, and co-inventors among

its about 240,000 community members participate to evaluate the invention ideas and refine product designs. Quirky.com has two-stage product development processes. In the idea selection stage, community members submit their product ideas. Once an idea is evaluated and selected by the company's management team based on community voting and staff evaluation, the product ideas move to collaboration project stage where community members participate in the development of the crowdsourced ideas through multiple sub-project phases such as major or minor revision of the industrial design, market research and naming, or merely voting for ideas. For the final products that are selected to be implemented by the management team, the company manages patents and manufacturing and share 10 percent of all gross revenue from product sales with the focal- and co-inventors based on their relative contributions. The final decision on which project to move forward in manufacturing is made by the management team. The company claims that its staff evaluates projects based on the criteria, including design potential, market and viability, while considering community votes and comments. Such a decision somewhat looks like a black-box process, however, it is reasonable to presume that the management team makes a rational decision for product quality.

Data and Network Construction

We collected data from Quirky.com using a web crawler. Our data comprises all 234 projects completed by August 2012. As presented in Table 1, for these projects we also collected project information, such as project history and co-inventors, and all 244,909 community members' information, including inventors' earnings, participating projects and friendship ties.

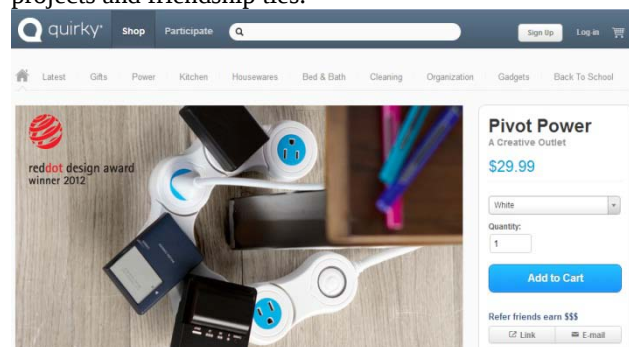


Figure 1– Quirky Product Example

Project Affiliation Networks

The two-mode affiliation network emerges from community members' collaboration for the product co-development projects. In the bipartite graph each focal project has a focal inventor who initiated project, and two actors are related if they work together on the same project [4]. Therefore, an affiliation network represents two different types of one-mode networks: an inter-inventor network and an inter-project network. As illustrated in Figure 2, we constructed the inventor-by-project affiliation network that represents the relationship between focal- and co-inventors and projects. To ensure that the benefits from a relationship

were availed after a relationship had been established, we constructed 22 two-mode affiliation networks each month by project start month. The final networks contain 188 focal inventors and 22,386 co-inventors. Given that identifying the timing of the formation of new projects is critical to construct accurate affiliation networks, constructing the networks in this way eliminates the potential for a simultaneity bias.

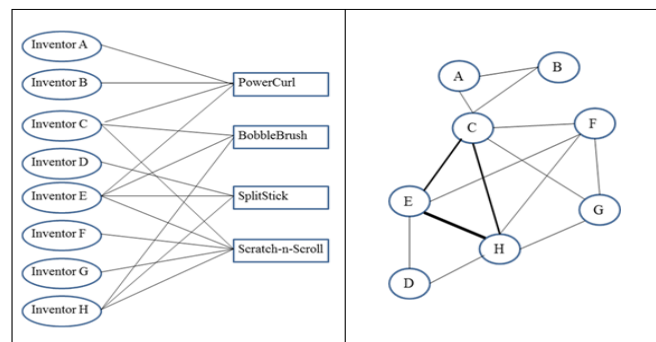


Figure 2 –Example of Project Affiliation Network

Friendship Networks

We collected all following and follower ties of all community members who registered until Jun 30, 2012 from its inception in May 2009. The friendship ties form a directed friendship network depicted in Figure 3. To mitigate possible causality issues concerning time order between friendship network tie formation and dependent variables, we created friendship network measures from the friendship networks constructed per calendar month by removing community members whose membership registration dates are later than the project completion dates.

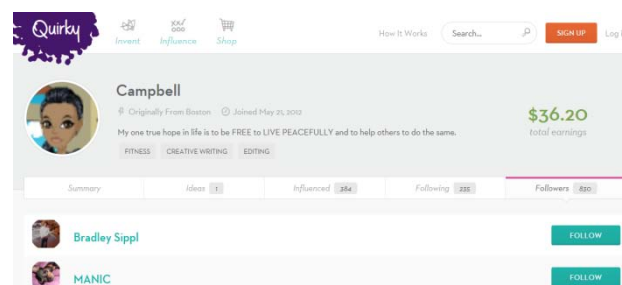


Figure 3 –Example of Quirky Community Activities and Friendship Network

Measures

Dependent Variables

Though measuring creativity can be subjective, research on innovation has argued that creative ideas should be both novel and potentially useful to an organization [20, 3]. In line with Bayus [3] we operationalize crowdsourcing performance as the success of product co-development projects that are observed by the selection of the project by the management team (i.e., whether or not an idea is actually implemented). The dependent variable is coded as "1" if a project is selected to go into production and as

“0”otherwise. For the idea selection equation, the dependent variable of idea selection is defined as 1 if an idea submission is selected to go into project stage for community development.

Project-level Independent Variables

We measure *clustering coefficients* that operationalize the cohesion the project affiliation networks. To examine the possible network influence that can results in conformity in cohesive networks, we develop a new metric that measures the degree of friendship ties within project teams. This metric proxies friendship activities such as commenting and giving feedback. The *friendship-tie overlap* score for project k is constructed as follows:

$$\text{Friendship Overlap}_k = \frac{\sum_{i=1}^{N-1} p_{ij}}{N}, \quad p_{ij} = \frac{\text{count}(S_i \cap S_j)}{\min(S_i, S_j)}$$

For project k , let the set of project member i 's followings be S_i and the number of project k 's members who have friendship ties be N . We take the average friendship-tie overlap between pairs of i 's alters so that the overlap proxy is independent of project team size. An example of friendship-tie overlap within a project team in the example project affiliation networks is illustrated in Figure 4.

Focal inventor-level Independent Variables

We use a *focal inventor's earning* as a proxy for the inventor's idea quality. To account for time effects because of different membership tenure, we calculated adjusted inventor earning by discounting the duration of membership tenure (idea submission date minus registration date in monthly interval). The variable is calculated as follow: $\text{Earning} \times \{(\text{idea submission month} - \text{focal inventor's community registration month}) / \text{duration in months}\}$.

Given that the friendship network is a directed network, we calculated focal inventors' friendship network position using normalized *indegree* and *outdegree centrality*.

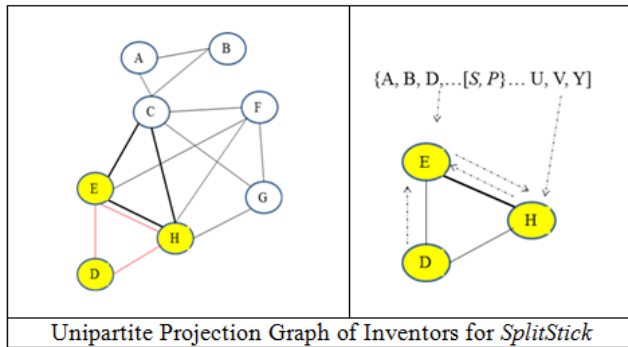


Figure 4 – Example of Friendship-tie Overlap within Project Team

Control variables

We control for alternative factors that can affect a project's success, including project team size and project team's average degree centrality. Following prior studies [20], we compute the average project team centrality measures by calculating the centrality for each team member, summing the centrality scores, and then dividing that sum by the project team size. Table 1 presents descriptive statistics for

the key variables.

Table 1 – Descriptive Statistics

Variables	Mean	SD	Min	Max
Project success	.909	.287	0	1
Idea selection	.021	.145	0	1
Clustering coefficient	.953	.182	.933	.996
Friendship ties overlap	.155	.182	0	.736
Indegree centrality	4.372	5.155	0	23.536
Outdegree centrality	.817	1.616	0	14.875
Inventor's earning	860.34 46	2758.7 27	0	42069. 59
Project team size	90.263	50.434	16	301
Project avg. degree centrality	.137	.056	.025	.312

Empirical Analysis

Model Specification

To test our hypothesis, we develop a project-level probit regression model for the likelihood of project success. The basic framework for the project success model captures the effects of network embeddedness. To avoid a possible reverse causality between network structures and outcomes, we included lagged network variables.

We further extend our empirical model by estimating a two-stage Heckman selection model. In our context, since we can observe the project information of only selected ideas at the idea selection stage, sample selection can arise as certain idea submissions can be more prone for selection by community member voting and staff evaluation. Prior literature has addressed the importance of focal project members' ability [20] and individuals' ideation efforts [3] in collaboration and crowdsourcing performance. Focal inventors' creativity and social interactions are likely to affect their idea selection, resulting in the sample selection problem in our estimation at the project-level. We control for this possible sample selection bias by including a selection correction term in our main equation [9]. We estimate a first-stage selection model for all product idea submissions using selection instruments and then enter the inverse Mills ratio into the project success model as a control for unobserved selection affected by the characteristics of focal inventors. In the idea generation stage, only focal inventor information is available, and the project variables are not yet generated. The focal inventor characteristics include idea quality (proxied by focal inventor earnings) and social interaction (captured by indegree and out-degree centrality in the friendship network). We estimate project success model using two-step method [9]:

$$Pr(\text{Idea selection}_i = 1|x) \quad (1)$$

$$= \Phi(\alpha_1 \text{Social interaction} + \alpha_2 \text{Idea quality})$$

$$Pr(\text{Project success}_i = 1|\text{Idea selection}_i = 1) \quad (2)$$

$$= \Phi(\beta X + \gamma Z + \tau D + \lambda(x; \hat{\alpha}))$$

where Project success_i is a binary dependent variable. Φ is the normal link for the probit model. X represents clustering coefficient, Z represents friendship-tie overlap, and D represents control variables. The inverse Mills ratio $\lambda(x; \hat{\alpha})$ is based on the probit estimates from Equation (1) and accounts for the fact that project success is only observed when a product idea is selected.

Results

Descriptive statistics for all the variables are in Table 1. Because focal inventor in degree centrality and out degree centrality measures are highly skewed, the squared terms of the variables are used in the estimation. To measure the severity of multicollinearity, we conducted Variance Inflation Factor (VIF) analysis. None of the variables generated a VIF greater than 5, which is below than the acceptable threshold of 10[14]. To account for the possibility that error terms might be correlated for observations involving the same inventor, we report robust standard errors that are clustered by the focal inventor.

As shown in Table 2, the results show the negative and significant coefficient for clustering coefficient, supporting H1. We also find that independence in project teams has positive effect on project success. The coefficient for the friendship-tie overlap is negative significant, supporting H2.

The results for the idea selection equation merit further discussion. The positive and significant estimated coefficient for a focal inventor's in degree centrality indicates that visibility of a focal inventor in the crowdsourcing community helps draw attention for his or her product idea in the community and get the community's support (e.g., voting). As an alternative argument, the results may imply that an inventor's high indegree centrality is associated with his or her reputation among community members. On the other hand, the coefficient for a focal inventor's out degree centrality is insignificant, implying that an inventor's community activities (e.g., subscribing to community members) are not a significant predictor for idea selection.

Table 2 –Heckman Probit Regression Results

Variables	Project success	Idea selection
Clustering coefficients	-18.64* (10.42)	
Friendship-tie overlap	-1.571** (0.684)	
Project size	-0.004 (0.004)	
Project avg. degree centrality	-2.288 (3.500)	
Focal-inventor in-degree centrality		-0.035*** (0.002)
Focal-inventor out-degree centrality		0.047 (0.029)
Focal-inventor earnings		0.000*** (1.86e-07)

Constant	20.38* (10.45)	13.21*** (0.718)
Number of Observations	234	10,819
Pseudo R-squared	0.122	0.067
Wald χ^2	6.02**	
Log likelihood	-1108.368	
Rho	0.851	

Note: All models include time dummy control variables. Robust standard errors clustered by the focal inventor are in parentheses. To control for skewedness, the focal inventor's in-degree and out-degree centrality variables are transformed to squared root terms. ***p<.01, **p<.05, *p < .1.

Contribution, Limitations and Future Research

Despite the popularity of implementing crowdsourcing platforms, little research has examined the determinants of crowdsourcing performance. Given the nature of community-based mass collaboration, we draw on the network embeddedness concept and analyze project affiliation network and friendship network structures. In contrast to the prior research on collaboration performance [20,18, 7], our findings suggest that a cohesive network structure is detrimental in forming diverse team composition and independent idea generation, leading to a lower likelihood of product co-development success. The underlying mechanisms of the prior findings are cohesive network structures affect mutual understanding and trust, which in turn facilitate knowledge sharing among community members, while our findings suggest that due to conformity the negative performance outcomes can occur in cohesive networks. This implication is aligned with the recent studies on user innovation communities [10, 3].

From a managerial perspective, our study provides implications for crowdsourcing platforms that the companies that they need more nuanced management of their communities using sophisticated data-driven monitoring tools. For example, platform managers can employ the structural implication of collaboration networks by identifying key players based on their network positions and provide firms' assistance of project team composition.

Our study also has limitations that guide future work. First, because like other crowdsourcing applications Quirky community has not been in existence very long, there is relatively small number of completed projects in our sample. An increased sample that includes newly completed projects can allow us to find additional insights and alternative empirical model specifications for robustness checks. Second, we operationalize project success as a binary selection of project for commercialization. Future research can investigate various aspects of crowdsourcing performance as studied in collaboration research, such as commercial success. Third, the causal mechanism we assume is that a network structure affects social interactions. However, we do not directly observe social interactions, such commenting, voting and reading friends' submissions, as well as actual skill sets or knowledge shared through

such social interactions. Future research can complement our network analysis by conducting field studies or controlled experiments. Finally, although Quirky's platform implements an interesting crowdsourcing business model, the generalizability of the specific results from this study may be limited. Future research may, therefore, attempt to confirm the findings found in this study in other settings.

References

- [1] Amabile, T. M. "Effects of external evaluation on artistic creativity," *Journal of Personality and Social Psychology*, Vol. 37(2), 1979, pp. 221-233.
- [2] Archak, N., and A. Sundararajan, "Optimal Design of Crowdsourcing Contests" *.Proceedings of the 30th International Conference on Information Systems (ICIS 2009)*.
- [3] Bayus, B. L. "Crowdsourcing New Product Ideas over Time: An Analysis of the Dell IdeaStorm Community," *Management Science*, Vol. 59(1), 2013, pp. 226-244.
- [4] Borgatti, S. P., Everett, M.G. "Network analysis of 2-mode data," *Social networks*, Vol. 19(3), 1997, pp. 243-269.
- [5] Coleman, J.S. "Social capital in the creation of human capital," *American Journal of Sociology*, 1988 pp. S95-S120.
- [6] Granovetter, M. "Economic action and social structure: the problem of embeddedness," *American Journal of Sociology*, 1985, pp. 481-510.
- [7] Grewal, R., Lilien, G.L., and G. Mallapragada, "Location, location, location: How network embeddedness affects project success in open source systems," *Management Science*, 52(7), 2006, pp. 1043-1056.
- [8] Haeffliger, S., Krogh, V. G., and S. Spaeth, "Code reuse in open source software," *Management Science*, Vol. 54(1) 2008, 180-193.
- [9] Heckman, J.J. "Sample selection bias as a specification error," *Econometrica*, 1979, pp. 153-161.
- [10] Hildebrand, C., Häubl, G., Herrmann, A., J.R. Landwehr, "When social media can be bad for you: Community feedback stifles consumer creativity and reduces satisfaction with self-designed products," *Information Systems Research*, Vol. 24(1), 2013, pp. 14-29.
- [11] Howe, J. "The Rise of Crowdsourcing," *Wired Magazine*, Vol. 14(6), 2006, pp. 1-4.
- [12] Huang, Y., Singh, P. V., Srinivasan, K. "Crowdsourcing new product ideas under consumer learning," *Management Science*, Vol. 60(16), 2014, pp. 1413-1433.
- [13] Kohn, N. W., Smith, S. M. "Collaborative fixation: Effects of others' ideas on brainstorming," *Applied Cognitive Psychology*, Vol. 25(3), 2010, pp. 259-271.
- [14] Kutner, M.H., Nachtsheim, C., and J. Neter, *Applied Linear Regression Models 4th Edition*. New York: McGraw-Hill Irwin. 2004
- [15] Malone, T., Laubacher, R., and C. Dellarocas, *Harnessing Crowds: Mapping the Genome of Collective Intelligence*. Working paper. 2009
- [16] Pinsonneault, A., Barki, H., Gallupe, R. B., Hoppen, N. (1999). "Electronic brainstorming: The illusion of productivity," *Information Systems Research*, Vol. 10(2), pp. 110-133.
- [17] Ransbotham, S., Kane, G.C., and N.H. Lurie, "Network characteristics and the value of collaborative user-generated content," *Marketing Science*, Vol. 31(3), 2012, pp. 387-405.
- [18] Singh, P.V., Tan, Y., V. Mookerjee, (). "Network effects: The influence of structural capital on open source project success," *MIS Quarterly*, Vol. 35(4), 2011, pp. 813-829.
- [19] Stephen, A.T., Zubcsek, P., J. Goldenberg, "Lower Connectivity Is Better: The Effects of Network Structure On Customer Innovativeness In Interdependent Ideation Tasks," *Journal of Marketing Research*, Vol. 53(2), 2016, pp. 263-279.
- [20] Uzzi, B., and J. Spiro, "Collaboration and Creativity: The Small World Problem1," *American Journal of Sociology*, Vol. 111(2), 2005, pp. 447-504.
- [21] Wasserman, S., Faust, K. *Social Network Analysis: Methods and Applications*. Cambridge university press, 1994
- [22] Zhang, X., Wang, C. "Network positions and contributions to online public goods: The case of Chinese Wikipedia," *Journal of Management Information Systems*, Vol. 29(2), 2012, pp. 11-40.

The Effect of E-Readiness Factors on Firm SNS Adoption in a Developing Country

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Abstract

With the global rapid increase of information and communication technology (ICT), social networking sites (SNS) are becoming an indispensable part of human society and electronic commerce (eCommerce) world. From commercial perspective, SNS is an important tactic which possibly brings social and economic values for the firms. Besides that, ICT development level of each country greatly impacts on its SNS adoption. For these reasons, this paper aims to investigate on electronic readiness (eReadiness) elements which influence the adoption of business SNS in a developing country.

The paper develops a structural model regarding to perceived organizational e-readiness (POER) as an organizational factor and perceived environmental e-readiness (PEER) as an external factor. In order to examine the effect of eReadiness factors on firm SNS adoption, POER considers awareness, incentive and promotion variables, while PEER includes government e-readiness, market forces e-readiness and network as their components. The result of this research is probably advantageous in perceiving the relationship of e-readiness to firm SNS, as well as being a valuable experience for developing country in the scenes of accepting and utilizing the world technology.

Keywords:

eReadiness factors; SNS; firm SNS adoption; developing country

Introduction

Introducing first on 1997, Social Networking Sites (SNSs) became a global phenomenon with its amazing applications, features and interconnections [2]. Over 20 years from the first appearance, SNSs somehow have created many changes in the world. Mark Zuckerberg – founder of Facebook, on his own Facebook post in 2015, states that: “A more open and connected world is a better world. It brings stronger relationships with those you love, a stronger economy with more opportunities, and a stronger society that reflects all of our values.” [19]. There is no doubt about the influence of SNSs on humanity; SNSs on the other hand strongly affect the business site. Hanafizadeh et al (2012) progress a literature review which suggest that the business impacts of SNSs are rising prevalently through marketing and advertising, knowledge management, social capital, relationship management, electronic commerce (eCommerce) and finally economic model [7].

Despite the sharp growth of social networking usage in developing countries, their impacts at firm level are more clearly recognized in developed countries. Reda et al (2012) analyze and compare the usage of SNSs in developing countries to developed countries. The result indicates that developing regions have the fastest connection growth with high internet access ratios, but the mobile access which is considered to be most important factor in connection of these developing countries, like Africa and Asia, is not quite high. Moreover, the e-readiness ranking of the country and their SNSs use in business have a

positive relationship [15], driving to the question of how the country electronic readiness (eReadiness) level can have effect on its firm SNSs adoption.

The question given above is also the reason for this paper. Comprehensively, this paper will investigate in the eReadiness factors that affect the adoption of SNSs at firm level, considering both internal and external factors.

Theoretical Background

E-readiness

There are quite a number of ideas on understanding e-readiness. Dada(2006) states that e-readiness is “a measure of the degree to which a country, a nation or economy may be ready, willing or prepared to obtain benefits which arise from information and communication technologies”[5]. Dada, in his paper, also stresses that the diversity of e-readiness definitions and e-readiness rankings are discovered in many research papers [5]. Choucri et al (2003) illustrate that e-readiness is the ability to seek the opportunity, to take advantages of using the internet [3]. Based on Purcell and Toland (2004), with the purpose of developing the economy and human environment, e-readiness can be used to define how ready a country is to benefit from information technology and e-commerce [14].

Generally, e-readiness (electronic readiness) can be seen as a measurement, an essential part for investigating the country’s ability to gain profit from the internet, information technology with their fast and high development.

SNS Adoption in Developing Countries

ITU (2015) suggests that for every internet user in the developed world, there are 2 in the developing world. They indicate that in 2015, there are 2 billion of users who are from developing countries, in the total of 3.2 billion internet users [8]. This number is impressively showing the importance of Information and Communication Technology (ICT) in developing nations. Specifically, people from developing nations are increasingly utilizing the SNSs, suggesting a quick adoption of social networks over there [15, 17]. Social networking transfers information, provides job opportunities and creates financial performance [4]. On the business point of view, SNSs are proved to enhance the firm social network connectivity and productivity [11]. However, some researchers assume the equality of information technology

(IT) adoption in analyzing SNSs adoption, admitting that it is limitation of their research as technology adoption is not equally distributed [12]. Upadhyay, A et al (2011) also illustrate that there is a gap between the use of social media and knowledge received by these activities [20]. This, it is important to understand how SNS adoption is affected by IT perceive.

Martins, J et al (2016) reveal a research model containing related factors that affect SNS adoption at firm level. This research model considers the context of both inside and outside the company [12]. The organization and environment context are both indicated to be validated and necessary for concerning SNS adoption. Additionally, Molla and Licker introduce a model, calling “Perceived E-Readiness Model” (PERM), exploring both internal and external eReadiness factors on IT adoption of the firm. The model is the foundation of this research [13].

Research Model

The PERM model is conducted by Mollar and Lickerin order to measure eReadiness of adopting eCommerce in developing countries [13]. The model is useful and has been reviewed by many other papers due to its consideration for both internal/organizational factors and external elements. The model creates 2 constructs which are Perceived Organization E-Readiness (POER) for organizational field and Perceived External E-Readiness (PEER) for external field. Taking the model as a base model, this research learns and generates its own variables which are believed to be appropriate for its own purpose. The research model is shown in Figure 1.

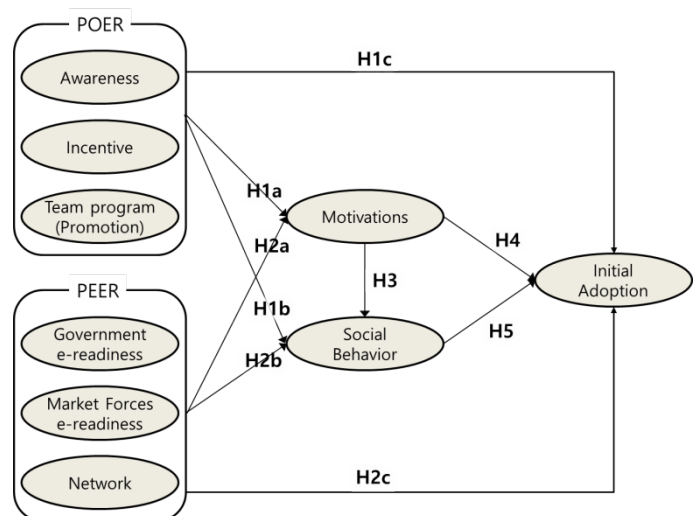


Figure 1– Research Model

Perceived Organization E-Readiness

Awareness

Awareness is believed to be the first step in deciding the technology innovation acceptance [16]. In here, awareness refers to the firm's knowledge, perception on the benefits or issues can rise from SNSs.

Incentive

Incentive can be understood as the advantages occur from adopting SNS for the business. The advantage can be commercial, financial or the term benefit. What does the firm receive when learning and using social networks? SNSs bring a huge benefit for the company in form of advertising [5]. The opportunities also express by marketing benefit as well as enhance the knowledge about customer's preference.

Team program (Promotion)

This is more related to user intention to visit the site and purchase products/services from the company. The promotion term raising from the appearance of SNSs.

Hypothesis

H1a: Perceived Organization E-Readiness has a significant impact on Motivations for SNSs.

H1b: Perceived Organization E-Readiness has a significant impact on Social Behaviors toward the use of SNSs.

H1c: Perceived Organization E-Readiness has a direct and significant impact on SNS initial adoption.

Perceived External E-Readiness

Government eReadiness

Government plays an essential role in the whole concept of external factor [8]. Decision of Government impacts SNS adoption as well as the level of innovation development over the country.

Market Forces E-Readiness

Market Forces eReadiness looks at an overall view of business environment [1]. It examines the SNSs responds from the company's stakeholders, including competitors, customers, suppliers and business partners.

Network

Network refers to the SNS network environment on business or national level.

Hypothesis:

H2a: Perceived External E-Readiness has a significant impact on Motivations for SNSs.

H2b: Perceived External E-Readiness has a significant impact on Social Behaviors toward the use of SNSs.

H2c: Perceived External E-Readiness has a direct and significant impact on SNS initial adoption.

Mediating variables

Motivations

There are many papers investigate in motivations to use SNSs. There are many reasons people are utilizing SNSs, it can be for entertainment, social support, generating social relationship and so on [10]. The business is probably motivated for commercial purpose, for connecting with stakeholders, especially customers.

Social Behaviors

Venkatesh et al (2003) develop the Unified Theory of Acceptance and Use of Technology (UTAUT) which indicating that the intention and social influence and some other components directly affect use behavior and technology acceptance [18]. Kim, Y et al (2011) conducts a research, proving that the purpose of approaching SNS is different from culture to culture [10]. Thus, the paper will explore the culture difference effect on social behaviors, which result in the initial adoption of SNS for business.

Hypothesis

H3: Motivation's effect on Social Behaviors

H4: Motivations have a significant impact on SNS initial adoption.

H5: Social Behaviors have a direct and significant impact on SNS initial adoption.

Research Method

Research Region

As business is the target of this research, the paper plans to focus on the business in Vietnam, those who benefit from selling products and services. Especially, these businesses are supposed to be using SNS on company's name with the purpose of bringing any kind of advantages for the company, including profits, reputations and relationships. For a reason, this paper is aimed at how the company relies on their SNS to make profits and how much the company can receive based on the expanding of SNS and recognition of people on their company via

internet. From that, the level of the firm SNS adoption can be discovered. In addition, all the targeted businesses should locate in Vietnam, specifically in big and more developed cities such as the heart of Vietnam – Hanoi, or Ho Chi Minh City and some cities around them. Due to the open and developing economy of Vietnam, it is becoming a potential place for new investment, new business with new opportunities. Thus, many businessman and investors choose big cities for their company. With that opportunity, the country is expanding the industry from big cities to areas around them too. Some big manufacturing companies and industries are now locating in the city near by the center city. Looking at the current situation, this paper decides to pick those areas for studying purpose.

Data collection

The data is expectedly taken with the size of 200 respondents. The respondents should be the top manager, or possibly manager in the company. Approaching SNSs can be seen as a way to benefit to company, therefore, managers who are in charge of R&D, Marketing and Strategy management are considered to be appropriate. The data will be collected by questionnaires. The question form will be sent directly to respondents via email, or their own SNSs. The research is about the SNS and internet related area, so collecting data via internet can be an interesting idea and also easier way. Furthermore, the language of the form will be written in English with attachment of Vietnamese translation beside every question items. English is global language, so everyone can have a better access to the paper. However, as the data is gathered in Vietnam, where the mother tongue is Vietnamese, many of Vietnamese respondents may choose to read questions in Vietnamese for better understanding. By that, it can lead to higher accuracy for the result.

The sample characteristics can be determined by first the distribution of the company. One big company can have few branches which are located in different cities. Some of the company may have their mother company in oversea. Their customer's areas can be also diversified. Moreover, the characteristics and the age of the firm should be recognized too. For example, how long the company has been established and which stage the company is in in its life cycle, or are they software companies, manufacturing companies? All those questions assist for a clearer view of the situation.

Model Analysis and Test

In order to test the significance of hypotheses that have been developed in research model above, a structural equation model (SEM) will be applied. All multiple relationships between constructs will be statically tested.

Expected Implications

This study is still in progress of development. The empirical result is hopefully expected to be positive. The authors also can make comparison of the significance to SNS adoption between all variables to find the most significant one. From that, further understanding and development can be built.

If the result supports the theory, the researchers and practitioners can have a broad understanding about the situation in Vietnam as well as in developing countries toward a better future development of the world. Also, they can experience and apply an appropriate model for the adoption of SNS from this study.

References

- [1] Au, Y.A and R.J Kaufman, , “Should we wait? Network externalities, compatibility and electronic billing adoption”, *Journal of Management Information Systems*, 2011, pp. 47 – 75.
- [2] Boyd, D. and Ellison, NB.. ‘Social Network Sites: Definition, History, and Scholarship’. *Journal of Computer-Mediated Communication*, Vol. 13, No. 1, 2007, pp. 210–230.
- [3] Choucri, N., Maugis, V., Madnick, S., Siegel, M., Gillet, S., O'Donnell, S., Best, M., Zhu, H and Haghseta, H. 2003. ‘GLOBAL e-READINESS - for WHAT?’. *Report of the Group for Globalization of e-Business*, Center for eBusiness at MIT, Sloan School of Management.
- [4] Chuang, Y., and L Chuang, ‘Social Networks in Developing Countries’. *Annual Review of Resource Economic*, Vol. 7, 2015, pp. 1-23.
- [5] Dada, D.. ‘E-Readiness for Developing Countries: Moving The Focus From The Environment To The Users’. *The Electronic Journal on Information Systems in Developing Countries*, Vol. 27, No. 6, 2006, pp. 1-14.
- [6] Eliaz, K and R, Spiegler, 2016, “Incentive-Compatible Advertising on a Social Network”, CEPR Discussion Paper, No. DP11223.

- [7] Hanafizadeh, P., Ravasan, A.Z., Nabavi, A., and M. Mehrabioun., 'A Literature Review on the Business Impacts of Social Network Sites'. *International Journal of Virtual Communities and Social Networking*, Vol. 4, No. 1, 2012, pp. 46-60.
- [8] ICT Facts and Figures 2015, 'MDGs 2000-2015: ICT revolution and remaining gaps'. *ICT Facts and Figures – The world in 2015*.
- [9] King, J.L, Gurbaxani, V., Kraemer, K.L; McFarLan, F.W, Raman, K.S and C.S Yap, , "The institutional factors in information technology innovation", *Information Systems Research*, 5, pp. 1994, pp.139-169.
- [10] Kim, Y., Sohn, D., S. Choi, "Cultural Difference in Motivations for Using Social Network Sites: A Comparative Study of American and Korean college students". *Computers in Human Behavior*, Vol. 27, 2011, pp. 365–372.
- [11] Magnier-Watanabe, R., Yoshida, M., T. Watanabe, "Social Network Productivity in the Use of SNS". *Journal of Knowledge Management*, Vol. 14, No. 6, 2010, pp. 910 – 927.
- [12] Martins, J., Gonçalves, R., Gonçalves, T., Cota, M., F. Branco,. "Understanding the Determinants of Social Network Sites Adoption at Firm Level: A Mixed Methodology Approach". *Electronic Commerce Research and Applications*, Vol. 18, 2016, pp. 10–26.
- [13] Molla, A. and Licker, P. "Perceived E-Readiness Factors in E-Commerce Adoption: An Empirical Investigation in a Developing Country". *International Journal of Electronic Commerce*, Vol. 10, No. 1, 2005, pp. 83-110.
- [14] Purcell, F. and Toland, J. "Electronic Commerce for the South Pacific: A Review of E-Readiness". *Electronic Commerce Research*, Vol. 4, No. 3, 2004 pp. 241-262. Kluwer Academic Publishers, Netherlands.
- [15] Reda, A., Shah, S., Tiwari, M., Lillie, A., and B. Noble, 2012. 'Social Networking in Developing Regions'. *Proceeding of the Fifth International Conference on Information and Communication Technologies and Development (ICTD 2012)*, Atlanta, GA, USA.
- [16] Rogers, E, M, *Diffusions of Innovations*, 4th ed, New York: Free Press. 1995
- [17] Tam, D. December 12, "Developing Nations Adopting Social Media Quickly". *CNET*. 2012
- [18]. Venkatesh, V., Morris, M., Davis, G., and F. Davis, 'User Acceptance of Information Technology: Toward a Unified View'. *MIS Quarterly*, Vol. 27, No. 3, 2003, pp. 425-478.
19. Zuckerberg, M. August 27, 2015. "We Just Passed an Important Milestone. For the First Time Ever, One Billion People Used Facebook in a Single Day". *Facebook*.
20. Upadhyay, A., P. Ilavarasan, 'Social Media, e-governance and Developing Countries: Insights from India'. *ICEGOV 2011, Proceedings of the 5th International Conference on Theory and Practice of Electronic Governance*, Tallinn, Estonia, 2011, pp. 351-352.

A Study on the Effectiveness of Omni-personalization in Omni-channel

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1. Introduction

Manufacturing, retail, finance, service companies that provide products and services to consumers have endeavored to execute effective marketing campaigns by accurately and swiftly understanding the end-customers' purchase and consumption patterns. However, since most enterprises, especially those in non-retail sector, depend on retail or channel partners for transactions with end consumers, they had difficulties in obtaining data of individual consumers. Thus, they relied on indirect market analysis methods such as sampling and surveys. However, with the advent of SNS and e-commerce sites accessed by smartphones, there have been dramatic increases in the number of business processes and solutions that can conduct individual behavioral targeting. eBay's ex-CEO John Donahoe had difficulties in obtaining data of individual consumers. However, these brands started to use personalization system across SNS, portals, and e-commerce websites to analyze the purchase pattern of end customers. Above all, smartphones and the Internet of Things (IoT) have allowed to acquire the quantity and quality of data from different channels in online and offline, which is dramatically increasing. With the improvement of computation cost and speed for different information technologies such as artificial intelligence and statistical analysis, the capability to predict consumer behavior has been dramatically enhanced. Companies that have established an integrated omni-channel management platform can monitor the entire purchase process of individual consumer across different channels, and make a more accurate prediction of purchase pattern by utilizing artificial intelligence technologies such as machine learning and rule based system. Enterprises are also increasingly installing processes that makes a real-time analysis of individual consumer's behavior and history, creates a customized offer based on the person's current location information or context, and sends the message to the customer through smartphone in real-time. As such process may be established, the companies providing long tail products to fulfill the different needs of consumers began to perceive the real-time analysis of individual consumer by individualizing as a key success factor of mass customization. In the light of such

environment, Cisco suggested hyper-relevance concept as a new paradigm that allows consumers to receive the right product at a right time in a right way. Hyper-relevance aims to have enterprises offering values to consumers across the entire phases of shopping in real-time.

Retailers have primarily developed the personalization trend, defined as monitoring the purchase history and behavior of individual consumer. However, some manufacturing brands producing consumer goods such as electronics, automotive, and fashion, and retail financial service brands have started to invest in personalization of end customers to provide better values. Compared to retailers that make direct transactions with end customers, brand enterprises had difficulties in obtaining data of individual consumers. However, some brands started to use personalization system across SNS, portals, and e-commerce websites to analyze the purchase pattern of end customers. Based on consumer data, these brands have increasingly made direct deliveries of customized advertisement and promotion to individual customers.

However, most companies are still used to the economy of scale. Thus, they prefer maintaining productivity by selecting and focusing based on target group segmentation to approaching the long tail market on the level of segment of one. Moreover, under the current MIS' view point, the companies conduct the market analysis and financial reports and analyses at a monthly or weekly basis. They cast doubts on "whether we really need a real-time system when we do not have even make the full use of weekly system." In addition, there exist many challenges on adopting personalization system, including economic and technical constraints caused by discriminating infrastructure levels and market environments across countries, privacy issue, and regulations. Under the this condition, this research aims to go beyond the previous studies that have been only focusing on personalization by retailers, and define omni-personalization in light of brand enterprises' efforts in the integrated omni-channel environment, and use Delphi Method to explore the omni-personalization using scenario, evaluation model, and plan for the effect maximization.

2. Related Literature

2-1. Omni-channel

1) Evolution to omni-channel

Omni-channel is an evolution of the multichannel (Piotrowicz & Cuthbertson, 2014). While the multi-channel divides between physical retail stores and online channels, customers in the omnichannel move seamlessly between the online (PC), mobile devices, and physical store (Rosenblum & Kilcourse, 2013; Fulgoni, 2014). Omni-channel had not been abruptly transformed from multi-channel, but rather has slowly evolved due to the development of the Internet and telecommunication devices, and the origin may be dated back to the emergence of e-commerce (Lazaris & Vrechopoulos, 2014). As the term “cyber-enhanced retailing” used in Otto & Chung (2000)’s research implies, the initial online system began in the form of supporting the traditional offline retail system. In early 2000, development of web started to create boom of the Internet Retailing 1.0, and enterprise management and researchers faced with challenges of inter-channel integration. Burke (2002) had argued that enterprises should complement functionalities between offline and online channels by integrating the two channels through researching on what type of channel consumers prefer. In a similar context, Patricio et al. (2008) materialized the concept of “Service Experience Blueprint: SEB” as channel specialization and channel integration. They argued that enterprises can enhance general customer satisfaction by understanding customer’s experience in service environment, and emphasizing, integrating, and interacting the features of each unique service interface (offline and online). Such channel management features seem to be similar to the currently known definition of multi-channel.

According to Neslin et al. (2006), the multi-channel management is defined as “the design, deployment, coordination, and evaluation of channels to enhance customer value through effective customer acquisition, retention, and development.” Such definition by Neslin et al. (2006) has influenced the researches over the next few years, and many scholars have studied in the effective management of multi-channel in various dimensions (Verhoef et al., 2015), such as the success of multichannel (e.g., Geyskens et al., 2002), and enterprise and customer satisfaction (e.g., Anderson et al., 2010). Such studies assume that unlike omni-channel, multi-channel environment may be able to divide between only few channels without overlap. For instance, Konus et al. (2008) assumed that multi-channel is composed of three channels: stores (offline), Internet (online), catalogue (direct marketing channel). They had

categorized multi-channel consumers as uninvolved shoppers, multichannel enthusiasts, and store-focused consumers, based on the demographic and psychographic variables and studies of various responses to channel of 364 German consumers.

On the other hand, the emergence of new digital devices and smartphones have led to the increase in a number of channels, allowed the consumers to access online at any time and place, and blurred the divisions between channels. As consumers are now using different channels interchangeably and simultaneously throughout information search and purchase decision making process, controlling individual channel seems to be extremely difficult or even impossible (Verhoef et al., 2015). Such channel environment is called as omni-channel, and enterprises help customer’s purchase behavior as concierge model, rather than focusing on exchange or delivery (Brynjolfsson et al., 2013). Verhoef et al.(2015) defined as omni-channel management “as the synergetic management of the numerous available channels and customer touch points, in such a way that the customer experience across channels and the performance over channels is optimized,” with drawing a clear line between omni-channel and multi-channel. Omni-channel is differentiated from multi-channel in various dimensions including the number of channel and customer touch points. For instance, whereas multi-channel manages performance objectives of individual channels, omni-channel manages the performances of entire channels (Verhoef et al., 2015), and thus the customers perceive interactions with brand stronger than those with channels (Piotrowicz & Cuthbertson, 2014). In addition, the communication channel between companies and customers is integrated. Mobile application is a key technology that fosters omni-channel environment (Brynjolfsson et al., 2013), which obscures the division between the traditional mass communication ways and two-way communication method (Verhoef et al., 2015). For example, consumers who watch TV home shopping network may also simultaneously search relevant information on mobile app or SNS, and can interact with suppliers or channel managers directly. <Table 1> is a summary of the features of different channel environments based on the previous studies.

	e-commerce	Multi-channel	Omni-channel
Features	Support traditional retail ecosystem through Internet	Categorized management and interactions among online, offline, traditional direct channels	Divisions between different channels and customer touch points are nonexistent
Management	Offline Stores	Manage Each Channel	Cross-Channel Integrated Management
Supporting Technology	Internet	Internet, Big Data Analysis	Internet, Big Data Analysis, Mobile App, GPS, VR, etc.
Relationship	Supplier – Channel	Consumer – Channel	Brand – Consumer – Channel

Table 1: Comparative Features of the Omni-Channel

2) Omni-Channel and Integrated Marketing Communication

As briefly mentioned above, the diversity and obscurity of division of channels have naturally influenced on the communication means between supplier and consumer. The development of omni-channel is relevant with the Integrated Marketing Communication (IMC), since the diversity of channels is closely related to the diversity of communication means.

Integrated Marketing Communication may be defined as “an audience-driven business process of strategically managing stakeholders, content, channels and results of brand communication program” (Kliatchko, 2008), and is crucial in cross-channel integration (Commins et al., 2016). In other words, IMC aims to achieve a common brand goal by integrating one-way or two-way communications between enterprises and consumers across various channels including mass media, mobile, print media, and direct marketing. All these different channels are operated by customer touch points, and two-way or one-way communication between customer and enterprise occurs at each touch point. The information provided at the communication process will affect customer purchase behavior at any way, and across different media such communication will occursimultaneously in the omni-channel environment. <Diagram 1> shows the connectives among communication channels that consumers use (customer touch points).



Figure 1: Relationship among the communication channels

(source: Sudhir Nikharge, 2016 Omnichannel Banking – Myths and Realities)

The primary reason consumer use various channels is different benefit each channel may provide. A simple example would be showroom and webroom. Showroom refers to acquiring information at offline and eventually buying products at offline (Bell et al., 2013), and webroom indicates browsing information online and purchasing goods online (Verhoef et al., 2015). Customers can easily acquire information such as price comparisons, but can have lower ambiguity by observing the physical product at offline. However, with the recent emergene of VR devices, the division between on- and off-line is also weakening. (Brynjolfsson et al., 2013). Cummins et al. (2016) argued that the communication manager should now consider how omni-channel environment influences enterprise performance and relationship, sales process, sales context, technological effects, and the roles of various communication tools and platforms. In the omni-channel environment, enterprises can connect and analyze the entire meaningful actions such as searches, and price and functionality comparisons on different channels and websites by individual consumers across the purchase lifecycle, and can execute relevant communication if necessary. In other words, enterprises can understand what values individual consumer prioritize based on what criteria, and thus can offer customized advertizements with more effective contents.

2-2. Personalization

1) Definition of Personalization

For effective communication with customers, companies have long segmented the market into several groups and

conducted relevant target marketing campaigns (Aaker et al., 2000). Traditionally, the fundamental variables for targeting were demographic variables such as ethnicity or race, and psychographic including values and characteristics. However, with the recent development of different IT technologies and the Internet, companies can monitor one's actions such as an individual's purchase or search behavior (Summer et al., 2016), thereby providing a customized information to "one individual" by combining user's individual information and behavior monitoring information (Yan et al., 2009). Such new targeting method is called Behavioral Targeting (BT), and may be defined as "using information about online behavior, including sites visited and interest in particular types of content" (Beales, 2010). BT has two unique

features, and is used along with the traditional targeting variable such as demographic and psychographic variables. Firstly, BT sends person-specific messages to individuals, as compared to previous mass-media makes mass-exposure of a single message (Digital Advertising Alliance, 2014). Secondly, companies can extract holistic information such as consumer's clicks, purchase pattern, and use of social media on different devices including mobile and PC. (Yan et al., 2009). BT is currently the most individually personalized communication way, unlike the traditional method that has assumed all consumers may be categorized in certain segment groups. Personalization is interpreted differently from various fields, as outlined in the Table 2. Table 2 Personalization Definition

Field	Definition
Tools & Information	The ability to provide content and services tailored to individuals based on knowledge about their preferences and behavior
Communication	The capability to customize customer communication based on preferences and behaviors at the time of interaction with the customer
Customer Relationships	About building customer loyalty and meaningful one-to-one relationship; by understanding the needs of each individual and helping satisfy a goal that efficiently and knowledgeably addresses the individual's need in a given context

Source: Berkovsky & Freyne, 2015

As such customization has allowed the monitoring of consumer's online activities that has been developed as a concept called web personalization in the field of MIS. Web personalization is defined as "the process of adapting web content to meet the specific needs of users and to maximize business opportunities (Korper & Ellis, 2001)." The concept is to deliver the right content to the right person and the right time (Tam & Ho, 2006). Web personalization primarily follows the following five steps: 1) user profiling, 2) log analysis & web usage mining 3) content management 4) web site publishing 5) information acquisition & searching (see Eirinaki & Vazirgiannis, 2003). The combined steps of user user profiling and web usage mining may be described as similar to BT. Web personalization also enables communication of analyzing individual data and sending recommended message to consumers in real-time (Ho et al., 2011). However, there arises a debate with the "right time"; whereas consumers primarily prefer the initially provided information, the

alternatives change during the searching process, thus declining the quality of personalization (Ho et al., 2011).

While the web personalization makes customization the consumer activities on the web, the emergence of devices such as smartphones have allowed the companies to make personalization with location based information (e.g., GPS) among customer activities offline (Riet et al., 2016). For instance, when a consumer visits a foreign region, the companies can recommend some restaurants or stores, or can even provide coupons used in nearby stores if the customer is located within a certain neighborhood. Such Location Based Advertisement (LBA) provides customized information to a specific person at a specific time in a specific location (Li & Du, 2012). Kölmel & Alexakis (2002) had highly valued the influence and potential of LBA by categorizing the formats of mobile advertisement into both location based and non-location based. In addition, as accuracy and scope of location tracking are improved, the services that utilize such individual location information are proliferating.

With utilizing the individual location information, LBA may be categorized as a type of personalization. But in the areas of web personalization and recommendation system, LBA is more focused on the online activities rather than offline locations. In the omni-channel environment where the division between offline and online is weakened, enterprises should develop customized system that can work with both offline and online activity information. In this respect, Cisco used the term “hyper-relevance” to argue that companies should understand rapidly changing consumer’s shopping activities in the omni-channel environment (Bradley et al., 2015). Hyper-relevance refers to the providing values to entire shopping lifecycle of the consumers in real time. This requires analytic-driven approach, and integration of all media and devices including sensors and smartphones (Bradley et al., 2015). In other words, “hyper-relevance” is making

real-time applications of individual contexts (e.g., location and circumstances) on the hyper-personalization analysis. Similarly, Hyper-personalization is defined as “the use of data to provide more personalized and targeted products, services and content” (Subramanya, 2015). This method processes bigger volume of data than existing personalization (e.g., demographic, psychographic, behavior etc.), and can be considered as taking a step closer to the segment of one phase. <Diagram 2> illustrates how the personalization has evolved. Following the arrow occurs the increase in the level of personalization, since the system can now process not only an individual’s basic data (e.g., demographic), but also the online and offline activities in real time, and thus a number of cases identifying specific individual has increased to an infinity.

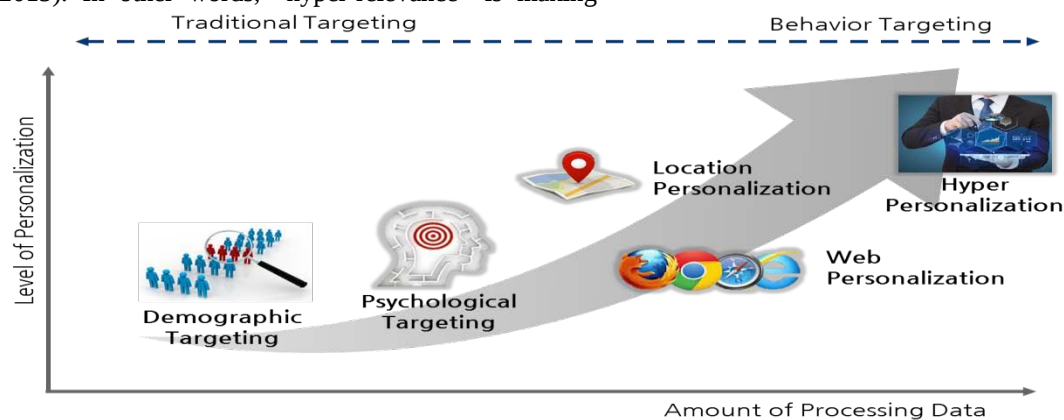


Figure 2 The Evolution of Personalization

2) The Effectiveness of Personalization

The customized advertisement and recommendation system offered in real time are increasingly widespread in everyday life (Esparza et al., 2012; Van Doorn & Hoekstra, 2013). For instance, the large credit card companies such as Visa and Mastercard are providing customized advertisements based on consumers’ purchase histories (past purchase activities) and personal information (Steel, 2011). Google and Amazon provide news or product information that consumers are likely to prefer in real-time, based on their content recommendation systems (Li et al, 2012). In the consumer’s side, such customized information can help the consumer’s purchase decision making process be more effective (Tam & Ho, 2006). However, as this approach is based on categorizing consumers to specific categories, the actual relevance fit has a difference of an individual and the category medium. VentureBeat had made a simple experiment on the value of the

personalization of a specific consumer, as compared to that of a category (Rogers, 2015). They found that by adding the names of the recipients, companies can increase the probability of these emails being opened by 29.3%.

However, there exist some challenges to overcome before maximizing the effects of extremely customized processes. They are largely divided into technical problems (e.g., Ho et al., 2011; Ding et al., 2015), and consumers’ psychological complexity (e.g., Van Doorn & Hoekstra, 2013; Limp & Voorveld, 2015). Technical issues are of the fundamental objectives of the personalization: ‘right person,’ ‘right content,’ and ‘right time’. They would come only after grasp the complexity in the consumer’s buying decision making process and interactions among various factors. A good example of this would be personalization timing. The number and timing of information provided can influence the customers at the end time of their buying decision making processes (Ho et al., 2011). Such effect indicates that the customized information based

on the real-time analysis of consumers' click activities affects the consumer's buying alternatives, and thus the fit between customer preference and recommended item decreases when information is provided. Ho et al. (2011) proposed that in order to optimize the recommendation time, the recommendation time in experimental and real-world setting, consumer's knowledge into the product, adaptation of the recommendation system should be controlled and interacted. They had discovered as the search time increase, while the quality of customization increases, the acceptance rate of recommendation system decreases. They also stated that other controlled variables, individual involvement of the consumers can also influence the effectiveness of the customized recommendation system.

On the other hand, personalization can bring about psychological and mental costs of consumers (Van Doorn & Hoekstra, 2013). Van Doorn & Hoekstra (2013) claimed that the customized advertisement offered online causes privacy concerns, and the customized information makes the customers feel intrusiveness, and these effects can pose negative influences on the purchase intent of the consumers. An interesting part of this research is that the level of intrusiveness felt diverges across different service categories. For example, the decrease in purchase intention caused by privacy concerns was more prominent in the financial services than telecommunication service. Limp & Voorveld (2015) had categorized LBA into pull LBA (receiving promotions on customers' request) and push LBA (receiving marketing messages regardless of the request), and experimented on how the concerns on location information privacy affects the customer's stance towards advertisements. Those who received pull LBA expressed less privacy concern than those who got push LBA, and the concern did not make a meaningful influence on the stance towards advertisement. On the other hand, the privacy concerns expressed by the customers who got push LBA imposed negative effects on the stance towards advertisement. The researchers described such phenomenon in the perspective psychological reactance. Thus, in order to maximize the effects of hyper-personalization, there should be an integrated studies in the factors described above.

3. Omni-personalization

3-1 Definition of Omni-personalization

The emergences of smartphones and big data analysis technology have opened up new horizons of personalization, and its accuracy and utilization has improved at the tremendous speed in the last ten

years. Table 3 shows the diversified perspectives and application areas of the personalization.

Table 3: multi-perspective views of Personalization Definition

Concept	Definition(author, Y)
Web-personalization	The process of adapting web content to meet the specific needs of users and to maximize business opportunities(Korper & Ellis, 2001)
Hyper-personalization	The use of data to provide more personalized and targeted products, services and content(Subramanya, 2015)
Hyper-relevance	A new paradigm that enables consumers to receive what they want, when and how they want it. And it is made possible by new IoT-enabled solutions and innovative business model in real time (Bradley et al., 2015)

The different definitions above have the common goal of better satisfying the consumer needs and improving the business performances, but the perspectives have expanded by embracing new technologies and environments. Thus, the different perspectives of personalization reflect the most important or promising technological background. Web personalization is part of the efforts by the companies to secure competitive advantage in the environment when Internet and online commerce market became widespread across the United States. As the big data analysis became feasible, hyper-personalization is an application of large volumes of data (e.g., personal information, consumption data) on the personalization activity. Also, It is the Internet of Things technology that underlies the hyper-relevance system. However, such definition is overly depending on technology. While it gives a detailed explanation of the personalization methodology of the time, its effectiveness decreases when the contribution by new technology increases. Therefore, a phenomenon-centered approach is needed to better support the activities for companies' long-term objectives. Moreover, the existing studies in personalization have been conducted primarily in the retailers' perspective (e.g., Chau et al., 2013(Recommendation system); Doorn et al., 2013(Online advertising); Limpf & Voorveld, 2015(Location-based advertising)). Such

trend occurred because the retailers (channels) can acquire consumers' personal information, and they are the means and contact points that enable enterprises to communicate with consumers. Therefore, besides the channels where they impose direct control, such as websites or social community pages, the brands were incapable of obtaining the holistic consumer data through the channels including department store, supermarket, or search engines. Such conditions caused an information asymmetry between manufacturing brands and retailers, and impose negative influence on the business performances (e.g., both manufacturer brand & retailer) (Mukhopadhyay et al., 2008).

The omni-channel environment has scattered the touchpoints with customers from a few main retailers to various retailers, devices, and brands, and thus allowed the manufacturing brands to gather some amount of customer personal information. Verhoef et al. (2015) pointed that one of the biggest changes to happen in the omni-channel environment would be the relationships among channel, brand, and customer. In this new market environment, there needs a new system that allows brands to gather the data of consumer's real-time individual activities across online and offline, understand the customer experience, and make customized advertisement and offer that best suit an individual's contexts and needs, without depending on the data provided by retailers or channels. Therefore, this study defines omni-personalization as "hyper-personalization in omni-channel environment managed by integrating different channels," and explores its features and evaluation models.

Omni-personalization: Capabilities to provide to relevant and meaningful contents and services tailored to individuals by understanding the needs of each individual at the right moment, right location and right context, using hyper-relevant personalization under integrated omni-commerce environment.

In other words, omni-personalization system is a system that allows companies to use hyper-personalization to understand individual contexts and needs, and deliver the most relevant and meaningful message to the person at the right time and right location, in an omni-commerce environment. Below is a list of features of the omni-personalization, and Diagram 3 is a visualization of the characteristics.

Brand's 1:1 communication for "Segment of One" in omni-channel environment.

Understanding and communication of individual context based on the analysis of location information

and review search.

Real-time, bilateral communication with no time latency.

Integration among online, offline, and omni-channel to ensure visibility of and analyze the individual purchase pattern.

End-to-end order-fulfilment visibility on shopping cart, order, delivery, return, loyalty.

Agile platform that allows acquiring, saving, and analyzing data in omni-channel environment.

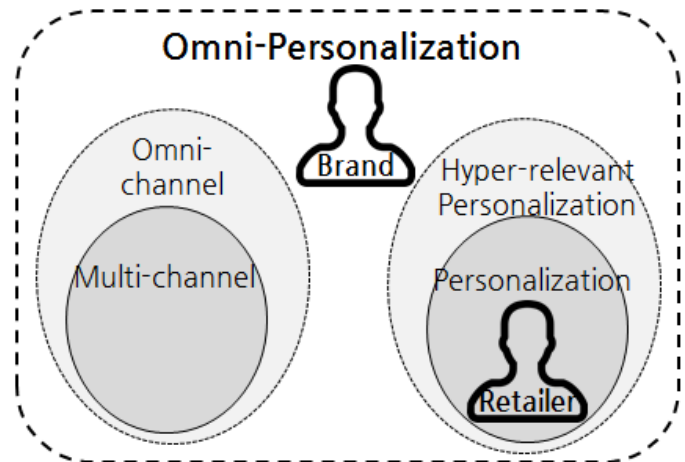


Figure 3 Concept of Omni-personalization

3-2. Omni-personalization Use Scenario

By establishing omni-personalization system, Samsung Electronics could directly acquire and analyze the consumer behavior information, which was previously obtained from retail partners, and respond based on preconfigured rules. If an individual searches, makes feedback, or compares prices of the products related to Samsung Electronics, Samsung could deliver a customized advertisement based on the past buying pattern and current context of the person.

Use Scenario

Minho Kim became interested in 60-inch UHD TV, and googled "60-inch UHD." From his initial search, he visits official websites of S electronics and L electronics, and browses on the specifications, prices, and product reviews of different options. The customer card record from Hi-Mart showed that Minho had made a positive experience when he compared Samsung's 60-inch TV with that of other electronic brands. Samsung's system accesses its CRM data, finds Minho's buying history and after-service data, and collects his writings on SNS. The system matches that the SNS profile is Minho's with 97% probability, and understands that he

is a classical music audio mania. Automatically, the system pushes a customized advertisement that offers a discount of TV with high quality speaker to Minh. On the back-end side, the company analyzes his purchase history and behavior pattern based on the SNS and CRM data, predicts the product that he will be interested in, crafts an individually customized advertisement, sends the message to him within 5 minutes, and connects to a nearby store once Minh accepts the offer. The AI system of omni-personalization improves the rule-based system to maximize the advertising effect by studying purchase histories and patterns of consumer individuals.

4. Omni-personalization System

4-1. Use Scenario of Omni-personalization System

Albert Avalos, Fortna's vice president, stated that "Consumers want the ability to order anything, anytime, from anywhere" (Napolitano, 2013). As commented by Albert Avalos, the transition into omni-channel environment is not a mere change in logistics and retail, but a transformation of the fundamental needs and behaviors of consumers. Ravi Begal, Director of Retail & Distribution at Verizon Wireless had shown some great insights of omni-channel in an interview with Harris (2012). He saw that in the transition from single channel to multi-channel, the functionalities of online and offline channels are being integrated. However, he predicted that such integration is merely in the middle of the whole progress, and the omni-channel will be the final phase of channel evolution, integrating various touch points and providing complete and holistic experiences. The keywords, integration of various touch points and providing holistic experience, indicate that customers can order products at any time and place, and can simultaneously take all related actions in omni-channel environment.

In the traditional perspective, channel is divided into communication and purchase channels. However, the divided channels are now integrating, and the concept of channel is now focusing on the role of customer touch point that offers the holistic customer experience (Li & Kannan, 2014). For instance, smartphones have become not only a prominent communication means between companies and customers, but also one of purchase channels. However, as the studies in omni-channel are still at an infant stage, there have not been empirical researches in how the omni-channel will exactly influence enterprises or consumer behaviors. A few existing studies claim that the previous researches on multi-channel should be applied in the omni-channel environment to identify the factors that influence

business performances (Verhoef et al., 2015), or propose that companies should utilize the newly commercializing technologies such as recommendation system, location-based service, or VR to respond to the omni-channel environment (Brynjolfsson et al., 2013). Therefore, a study on how omni-channel environment affects enterprises and consumers, and vice versa is required. The 2013 editorial in the International Journal of Advertising chose personalized communication as one of the upcoming hot topics in advertising (Taylor, 2013). Taylor(2013) had claimed that a more fine-grained targeting and communication are crucial both online and offline environments. Omnichannel indicates that the sources of obtaining customer information (e.g., activity information) will be integrated between online and offline, and the channels that deliver customized message based on acquired data will become complicated. Thus, this paper proposes the following research topic.

Topic 1: What would be an effective use scenario of the omni-personalization system in an omni-channel environment?

4-2. Evaluation Model of the Omni-personalization System Effects in the Omni-channel environment

The evaluation on the effects of omni-personalization system should primarily be targeted to measure the improving the enterprise activities and customer benefits such as increase in revenue and purchase satisfaction. While there has been a certain progress in the research in the effectiveness of personalization (Tam & Ho, 2006; Steel, 2011; Esparza et al., 2012; Van Doorn & Hoekstra, 2013; Limp & Voorveld, 2015), they have certain limitations. The customer information source and message delivery channel are largely limited in the online area, and the premise behind personalization is categorization instead of 'segment of one.' Thus, there needs studies on how the integrated platform of multi-channels and hyper-personalization will influence the enterprises, and how the companies should prepare for such trend. This research defines the 'hyper-relevance system' as the concept of changing trends 'segment of one, with the real time context,' and will study on the evaluation model of how the omni-personalization, hyper-personalization in omni-channel environment, will affect business performances. Hence, this paper proposes the following research topic.

Topic 2: What would be an evaluation model of omni-personalization system effects in omni-channel environment?

4-3. The Effect Maximization Plan of Omni-personalization in Omni-channel Environment

Most studies on web personalization view the effect

that personzliation imposes on business performance as positive (e.g., Tam & Ho, 2006; Steel, 2011; Baek & Morimoto, 2012; Esparza et al., 2012; Van Doorn & Hoekstra, 2013), a view that this paper also largely concurs. The reason why consumers are more likely to select and accept the information of recommendation or preferred products is that they form self-schema to the stimulants that they consider as relevant. Such imposes a powerful influence on cognitive process, such as memory, and behavior (Kuiper & Rogers, 1979). Therefore, a customized stimulant vitalizes self-schema and can make a positive impact on the buying decision making process (Tam & Ho, 2006).

In addition, the effects of the personalized communication may be maximized by the combination of supporting technologies such as GPS or VR. When consumers take photos of books or DVDs with smartphone cameras, Amazon Flow app provides the price information and consumer reviews on Amazon in real time. The eBay allows the customers to try on clothes in the virtual reality setting (Brynjolfsson et al., 2013). BestBuy and Google expose customized articles and product information based on real time analysis of online activities.

These services may look technically divergent. However, given that they require demographic, activity, location behaviors in the omni-channel environment, and enable communication between companies and consumers based on such information, the services have common challenges to overcome. First challenge is of whether the personal information may be extracted and utilized in an integrated format across channels. Second problem regards with the psychological anxiety and reactance of consumers on privacy (Van Doorn & Hoekstra, 2013; Limp & Voorveld, 2015). Furthermore, there would be needs more detailed discussions that arise on what factors should be considered for effective hyper-personalization in omni-channel environment.

Therefore, this paper proposes the following research topic.

Topic 3: What would be the maximization and risk factors of the omni-personalization effects in omni-channel environment?

5. Research Methodology

5-1. Delphi Method

Delphi method was initiated when the United States government tried to obtain the most reliable opinion consensus of a group of experts to solve defense related problems in 1950s (Dalkey & Helmer, 1963). It is used when relevant data is nonexistent or solving problem with social dilemma. The method aims to draw a consensus by repeatedly gathering opinions of a group of different experts from relevant fields (Gupta & Clarke, 1996). For instance, the Rand Corporation attempted to predict the international politics in the next 25 to 50 years by the collective opinion of a panel (Jolson & Rossow, 1971), and Kettering Foundation had used the method to conclude of the future changes in American education (Adelson et al, 1967). The method is based on the premise that a group's judgement is better than that of individual when lacking relevant knowledge or information, and possesses three qualities: 1) anonymity, 2) controlled feedback, and 3) group response (Jolson & Rossow, 1971). Anonymity aims to eliminate the influences by a few dominant opinions. The panels are notified of the result of collected responses in the previous rounds, and thus are less likely to be biased in their next round responses. Finally, the opinions are weighted equally among all panels (Jolson & Rossow, 1971). When using the Delphi method, since the conclusion is derived from the knowledge and collaboration of the panels, it is imperative to select the right experts for the successful process (Al-Qirim, 2008).

This research plans to use the Delphi method to explore the use scenario, evaluation model, and effect maximization and risk factors of omni-personalization in omni-channel environment.



Figure 4 Delphi Method Process

5-2. Research Design

1) Process

This research plans to use the Delphi method to explore the use scenario, evaluation model, and effect maximization and risk factors of omni-personalization in omni-channel environment, and

the process of the methodology is described in Figure 4. .

2) Survey

The first survey will clarify the concepts of omni-channel, personalization, integrated marketing communication, hyper-relevant personalization, and omni-personalization. The survey then makes open questions of the use scenario, evaluation model, and effect maximization and risk factors of

the omni-personalization system. After collecting the answers, the next step refines the opinions of the experts into data by simple frequency and technical analyses, and then applies the data analysis result to the second survey. The second questionnaire makes closed-end questions of whether the panel agrees with the categorized use scenario, evaluation model, and effect maximization and risk factors. When a general consensus has been reached from the responses to the second survey, the conclusion will be drawn from the analysis of the results, otherwise third survey will be conducted to draw the implications.

[Reference will be furnished upon requests]