MESSAGE FROM THE CONFERENCE CHAIR

On behalf of the organisers, it gives me much pleasure to welcome you to ICEB 2013.

The 13th International Conference on Electronic Business (ICEB 2013) is being held again after a hiatus, in Singapore at the Nanyang Technological University. From its inception in 2001, the purpose of the conference has been to bring together researchers and practitioners all over the world to share new ideas and present latest developments in the theoretical and practical areas of electronic business. This is traditionally in an informal, friendly environment. For the first time, as part of the conference, there will also be a separate Journals Joint Author Workshop and a networking coach tour on the 4th of December.

Electronic Business is no longer the buzzword it was when we started this conference in the year 2000. And despite the subsequent “dot bomb” phenomenon, we continued to stay ahead of the curve and today, e-business has indeed crossed the chasm and has become a “fabric of our daily lives”. Mobility, Big Data, Social Media, and Cloud Computing are examples of how e-business research has continued to draw from emerging technologies in order to grow and stay relevant to the needs of the research community.

I would like to thank Eldon Li, the Founder and Honorary President of ICEB, for his guidance and support throughout the planning and execution phases. It was his vision and continued oversight that has allowed the ICEB event to continue to thrive to this day.

In closing, we value your feedback and continued engagement. Please do not hesitate to let me know if we can assist you during your attendance at ICEB 2013. And do stay in touch with the ICEB community thereafter.

Ravi S. Sharma
Ravi S. Sharma
Nanyang Technological University, Singapore
The 13th International Conference on Electronic Business
1-4 December 2013
Nanyang Technological University, Singapore

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Regional V.P. France: Lee Schlenker, University of Lyon (EM Lyon), France
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1600 – 1900 : Registration & Welcome Reception at the Orchid Room 1 of Campus Clubhouse (next to Nanyang Executive Centre)
1900 – 2100 : ICEB Board Meeting at Fusion Spoon (Campus Clubhouse) – *Board Members only*

### 2-December-2013

0900 – 1030 : Opening Address, Keynote 1 & 2 (Lecture Room 1, Level 1 - Nanyang Executive Centre)
1030 – 1100 : Coffee Break @ NEC Foyer
1100 – 1230 : Plenary Speakers & Poster Sessions (NEC LR1)
1230 – 1400 : Lunch @ NEC Foyer
1400 – 1530 : Breakout Sessions 1.1 & 2.1 (Breakout Rooms 16 & 17 – Level 4 NEC)
1530 – 1600 : Tea Break @ NEC Foyer
1600 – 1730 : Breakout Sessions 1.2 & 2.2 (NEC BR 16 & 17)
1900 – 2200 : Conference Banquet at Orchid Rooms 1&2, Campus Clubhouse

### 3-December-2013

0900 – 1030 : Keynote 3 and Panel sessions (NEC LR1)
1030 – 1100 : Coffee Break @ NEC Foyer
1100 – 1230 : Plenary Speakers & Poster Sessions (NEC LR1)
1230 – 1400 : Lunch @ NEC Foyer
1400 – 1530 : Breakout Sessions 1.3 & 2.3 (NEC BR 16 & 17)
1530 – 1600 : Tea Break @ NEC Foyer
1600 – 1730 : Breakout Sessions 1.4 & 2.4 (NEC BR 16 & 17)

### 4-December-2013

0900 – 1730 : Post-Conference Workshop on Uncertainty Theory (NEC BR 16)
0900 – 1230 : Author Workshop and Doctoral Colloquium (NEC BR 17)
0900 – pm : City tour (to be arranged by SH Tours)

+++ end of programme +++
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<td>Tsai Chieh Huang, Wei Chun Tai, Jen Her Wu &amp; Yi Cheng Chen (The Impacts of Presentation Modes and Product Involvements on &quot;Line&quot; Short Message Service (SMS) Advertising Effectiveness)</td>
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<td>Christina Ling Hsing Chang &amp; Weng Yi Lang Hsiao (How to introduce on-line agricultural products navigation system on Google Earth)</td>
<td>Holger Schrödl &amp; Paulina Simkin (The Role of &quot;Service Return&quot;: An Exploratory Study on Cloud Computing for Logistics)</td>
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|         | (sponsored by Fuji Xerox Singapore)                                       |

- Sureerat Saetang, Abrar Haider & Ku Maisurah Ku Bahador, University of South Australia  
  (Building Effective Organizational Management with Bricolage and IT Governance on Technology Acceptance Model)
- Azadeh Pishdad, Abrar Haider & Ku Maisurah Ku Bahador, University of South Australia  
  (Organizational Maturity: Configurative and Other Isomorphic Pressures in Institutionalisation of ERP Systems)
- Kannika Torcharoen & Pimmanee Rattanawicha  
  (Product Information and Online Review: What is More Important to Consumer’s Trusting Belief and Purchase Intention?)
- Calvin M. L. Chan & Chong Guan (Open Data, Open Innovation, Open Innovation Ecosystem)
SOCIAL MEDIA IN USE: ASSESSING THE IMPACT OF SOCIAL MEDIA USE IN IRISH TECHNOLOGY START-UPS

Matt Glowatz, Lauryna Binderis, Mark Hopkins, University College Dublin, Ireland
matt.glowatz@ucd.ie, laurynas.binderis@ucdconnect.ie, mhopkinsdublin@gmail.com

ABSTRACT

After spectacular adoption of social media by individuals over the last decade, business use of social media has finally begun to catch up. The aim of this research is to develop a richer understanding of how Irish start-up organisations are utilising social media in order to gain sustainable competitive advantage in the global marketplace.

A sample of ten Irish high tech start-ups is interviewed to identify both organisations' primarily use of social media and associated challenges. The findings from this research provide strong evidence that Irish start-ups are using social media primarily for creating brand awareness and as an alternative sales channel. An analysis of the companies' Twitter feeds also provides empirical evidence of how social media is being used by coding their tweets and developing a classification of the key functions of Twitter updates: Information, Interaction and Promotion. Our research also identifies main challenges faced by management administrating social media initiatives.

In conclusion, this research suggests a "best practice" model for start-ups engaging in social media.

Keywords: Social Media, Business start-ups, Competitive Advantage, Twitter, Social Media Challenges

INTRODUCTION

From the ashes of the dot com bust in the early years of the 21st Century came Web 2.0 which moved beyond the static page metaphor and has given us rich interactive user experiences through the medium of the internet. Intrinsic to this new version of the Web has been the rise of social media and a return to seeing the web as a place for social interaction.

As social media begin to mature and the explosive user acquisition growth slows down, there are calls for reflection on the effects of these technologies on our lives and how we interact with each other (Turkle, 2011). In an organisational context, we find many examples of successful social media use; such as the Blendtec YouTube viral videos (Barwise & Meehan, 2010) or how the Grammy Awards used social media to achieve its highest TV ratings in years (Hanna, Rohm, & Crittenden, 2011). However, negative illustrations like the “United Breaks Guitars” viral video (Berthon, Pitt, Plangger, & Shapiro, 2012) have also become more apparent as organisations experience a learning curve in their rush to become active in social media. Amid the realisation that consumers exert ever greater influence over each other’s purchase considerations (Riegner, 2007), many organisations fear the new social media savvy consumer and the massive reach possible through digital word of mouth.

Our research takes place in the context of a growing start-up culture in Ireland. Strategic government initiatives to attract Foreign Direct Investment from large technology companies like Google, Twitter and Facebook have led to Dublin being termed “Europe’s Silicon Valley” and “the internet capital of Europe” (Boulden, 2011). A welcome bi-product of these world class technology companies locating in Dublin is an emergent local technology start-up scene. The city has become a hub of start-up incubation and accelerator programmes such as Dogpatch Labs and the NDRC’s Launchpad (Kennedy, 2011).

The overall aim of this research is to develop a richer understanding of how start-up organisations are using social media. More specifically, the key research questions are as follows:

Research Question 1: Identify how start-ups are using social media.

Research Question 2: Establish the main challenges start-ups associate with realising the espoused benefits of social media.

Research Question 3: Formulate recommendations for start-ups on the best practices for the use of social media.

Similar to previous research on non-profit organisations (Lovejoy & Saxton, 2012), our research will also focus on a key feature of organisational social media activity, the actual messages sent. A tweet-level analysis from a sample of start-up companies Twitter feeds will provide empirical evidence of how social media is being used by coding the individual tweets and developing a classification of the key functions of Twitter updates. In effect, this may be considered a sub-set of research question 1:

Research Question 1: sub-question: Develop a classification of the key functions of start-up Twitter updates.

LITERATURE REVIEW

2.1 Social Media
The World Wide Web has radically altered the way we share information by lowering the barrier to publishing and accessing documents on the internet (Bizer, Heath, & Berners-Lee, 2009). From its early origin as a simple portal to publish and share data it has grown into the interactive architecture commonly referred to as Web 2.0, a term which was originally coined by Tim
O’Reilly in 2005 and refers to a loose gathering of a wide variety of family-resembling technologies, services and products (Floridi, 2009). The original definition shows Web 2.0 as being intrinsically social. O’Reilly (2007, p.17) links a number of concepts which all contribute to the sense of Web 2.0 “going beyond the page metaphor of Web 1.0 to deliver rich user experiences” including:

- the network as a platform
- software applications that get better the more people use them
- the consuming and remixing of data from multiple sources, (including individual users)
- the creation of network effects through an architecture of participation

The rapid diffusion of social media applications along with this evolution of the web leads to some difficulty in defining the term social media. What is or isn’t social media? Indeed the web itself is now considered by some as the social web as social aspects have been integrated at the level of the design and development of websites (Porter, 2008). In fact, the Social Web is defined as the online place where people with a common interest can gather to share thoughts, comments and opinions and includes social networking sites, branded and corporate sites (Weber, 2009).

While Berthon et al. (2012) state that social media comprise both the conduits and the content disseminated through interactions between individuals and organizations. The key concept is that anyone can create, comment on and add to social media content unlike traditional one-directional mainstream media (Meerman Scott, 2011).

It is important to make a distinction between two similar terms which are commonly interchanged (particularly in business media), i.e. social media and social networking sites. Social network sites are web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (Boyd & Ellison, 2007). Social Media, in the meantime, can be regarded as the underlying infrastructure defining its key principles, such User Generated Content (UGC).

This research is based on the following social media applications:

- **Blog** - a blog is a web page that serves as a publicly accessible personal journal for an individual (Webopedia, 2012). Entries are normally listed in chronological order, are tagged by subject matter, and usually have the functionality for readers to post comments. Corporate use of blogs has increased as organisations seek another channel of communication with their audience.

- **Micro-blogging / Twitter** - Twitter is a real-time information network that uses short bursts of information called Tweets up to 140 characters long. Many users tweet directly from the twitter website or mobile application or use one of the many third party management tools available.

- **Facebook** - Facebook is the most used social networking service with over 955 million worldwide monthly active users (Facebook.com, 2012). Organisations can operate branded pages to interact with their customers as well as through Facebook’s targeted advertising products.

- **LinkedIn** – LinkedIn is a business orientated social network site which offers individuals and organisations the facility to create and interact with individuals of similar interests in Groups. Organisations can create company pages, engage with followers and target advertisements on the network using the LinkedIn advertising platform.

- **Google+** - Google’s social network platform which is becoming increasingly important due to its link to search engine results.

- **Content Communities** – These online platforms allow for the sharing of particular types of media within a community (e.g. Slideshare – presentations or YouTube – videos).

### 2.2 Espoused Ways of Utilising Social Media in Business

Much of the literature refers to the benefits of different ways of using social media. This section of the literature review will examine the most common ways described in the literature.

- **Customer Engagement** – Online platforms and social media are offering new ways to engage with customers and the world at large (Giamanco & Gregoire, 2012). It is clear that customers can now interact with an organization in multiple ways across multiple platforms, often in real time. This interaction is no longer one way, broadcast for the customer to view but rather is multi-directional with customers able to view, generate and share content themselves.

- **Reach** – Comparing the social media audience to word of mouth, Gillin (2009) suggest that individuals with a negative experience to share now have the potential word of mouth to reach 10 million people not just the 10 individuals previously thought possible.

- **Cost** – Related to the benefit of being able to reach such a huge audience is the relatively low cost of being able to reach this audience.

- **Brand Building** – Individuals sharing, resharing and commenting on brand content creates an amplification effect around a brands reputation (Barwise & Meehan, 2010). Social media provides a platform for brands to have a considerable impact, by starting and steering conversations with their customer communities (Beuker & Abbing, 2010).

- **Sales** – Social media can be described as a sales channel. Giamanco & Gregoire (2012, p. 91) quote a sales blogger who describes it thus: “a lead today can be a complaint on Twitter, a question on LinkedIn or a discussion on a Facebook page.”. There are many tools which allow organisations to monitor social media content and conversations to identify potential customers. Hunt (2009) also claims that having the high social capital generated through social media activity will help win customers and sell more.

- **Feedback & Customer Insights** – Social Media is seen as an opportunity for an organization to receive feedback from its customers. According to Qualman (2011) good companies view negative feedback as an opportunity to act and adjust whereas
bad companies view it as a nuisance. The tracking and analysis of communications mediated through social media also give organisations the ability to gain rich insight directly from their customers (Barwise & Meehan, 2010).

2.3 Social Media Challenges for Business
Although many organisations recognize the need to be active in social media, they are not confident in the details of exactly how to do it effectively or indeed how to measure its effectiveness. The challenges of using social media can be broadly categorized into 3 areas: Content, Control, and Complexity.

Content - The new creative consumer produces much of the content in the social media ecosystem (Berthon et al., 2012). In this environment, it is a real challenge for organisations to be authentic and engaging over a sustained period of time. Even if the organization heeds advice to be active, interesting and more honest, consumers are quick to point out when brands are not welcome on social media (Fournier & Avery, 2011). To quote Nigel Gilbert, CMO of Virgin Mobile:
“You can’t say one thing and do another, and then be a credible brand...it’s about reputation” (Howard, 2011, p. 18).

Control - By definition, social media allows for the creation and exchange of content and it is this freedom to create and share which gives rise to an interesting paradox. Fournier & Avery (2011) point out that in order to achieve their aim to gain traction or resonance with their audience, the organization must actually give up control of its message. The risk with ceding control of content is that it can be used and re-used in ways unintended by the organization, many of them negative. Facebook pages can be used as a forum for protest or content can be parodied in inappropriate ways. Employees charged with social media communications may also produce content or interact in ways which aren’t acceptable. Another obvious loss of control is that which media companies experience when their copyrighted content features on content communities such as YouTube.

Complexity - The fragmented and global social media landscape gives organisations a difficult task in getting the right message to the right audience at the right time on the right platform (Howard, 2011). It takes time and effort to understand where the organisations audience is and how best to engage with them there. Engaging on multiple platforms and managing multiple authors and audiences is an onerous task. It is also a challenge to integrate an organisations social media activity with its other marketing activities in order to avoid sending out contradictory or competing messages (Hanna et al., 2011; Kietzmann et al., 2011; Mangold & Faulds, 2009).

Finally, there is the issue of measurement of success and return on investment for organisations engaging in social media. Traditional media metrics like reach and frequency can be used but don’t provide a deep understanding of the value of dynamic social media activity. While Hoffman & Fodor (2010) argue that the social web is a highly measurable environment (e.g. number of clicks, blog posts, likes etc.); creating a link between these actions, the value to the organisation and the amount of time and money invested is still problematic to many organisations. However, the complexity of the social media environment leads to difficulty in identifying the specific metrics needed by the organisation for each particular activity and social media platform.

RESEARCH METHODOLOGY

This research is based on grounded theory which is attained by a series of qualitative interviews with Irish start-up organisations and by quantitative research of the same sample of start-ups actual social media activity. According to Strauss (2008) grounded theory is extracted from data, which is gathered in a systematic manner in the process of research. Bryman and Bell (2007) emphasise that data collection and research design should be driven by research questions. As such an effort has been made to design the interview questions to accommodate the relevant research questions and objectives. The purpose of this research is exploratory research; therefore the authors choose not to develop any hypothesis. As exploratory research, the purpose is to “build theory” i.e. to generate a richer understanding of how start-ups use social media and to propose a framework for best practices.

3.1 Data Collection
All third party data sources were carefully evaluated by the research authors to ensure the relevance and validity of the data. The authors of this research started collecting the secondary data in January 2012. Sources that are used in this research are generally available in UCD’s digital and physical libraries. In addition a variety of external literature as well as reputable online materials were used in order to ensure the comprehensiveness of literature review. The objective of the literature review is to define social media, outline the focus of the social media literature that is available and demonstrate the clear justification for our research question as to how start-up companies use social media.

For the purpose of this research the authors chose to adopt a pluralistic data collection method. The primary data for this research was collected through qualitative and quantitative methods. The reasons for the choice of this method are that the research in question is of an exploratory nature and the authors are aiming to build a rich understanding of the use of social media channels for start-up organisations.

The authors of this research executed data collection in two different ways:
1. In-depth semi-structured interviews were conducted with ten Irish start-ups. The aim of the interviews was to gather data on a number of themed topics related to the research questions.
2. Twitter feed analysis was conducted in order to find out how start-ups are using social media and develop a classification of the key functions of start-up Twitter updates.
DATA ANALYSIS

The primary research shows that well-known social media channels such as YouTube, Vimeo, SlideShare, Google+, Pinterest or Tumblr are much less utilised by the start-ups surveyed. Two key factors which influence the choice of social media channel are apparent from the responses given by our interviewees. Firstly, the use of a particular social media channel depends on the type of content they intend producing (e.g., photos, videos, text, etc.) and secondly, the appropriateness of the social media channel for reaching the companies’ target audience. For example, one of the start-ups indicated that they are using a lesser known social media channel called Chilled which allows pinning and organising videos into storyboards (similar to Pinterest). That particular start-up (Company J) produces software as a service that helps small and medium businesses to easily and quickly create promotional videos. Considering the nature of Company J’s business, Chilled is an appropriate platform for Company J to promote its video content and reach its audience that is passionate about or interested in video content.

4.1 Social Media Activity for Start-Ups

The research shows there are a number of functions of social media activity for start-ups; however, three main functions were identified by multiple respondents: Brand Awareness, Search Engine Optimisation and Lead Generation.

4.2 Social Media Management

The interviewees were asked a number of questions in relation to how they managed their social media activity. While three of the start-up’s interviewed had formally documented social media strategies in place, two of these were viewed as out of date and no longer relevant. Seven of the ten had no formal social media strategy of any kind. Four of the ten had more than one person in the company active on social media.

The start-ups surveyed are using tools that help to automate content publishing, social media monitoring, automatic report generation, automatic Twitter accounts’ following and un-following. Seven out of ten start-ups said that finding the time needed for using social media was a challenge and are using social media management tools to try to alleviate this problem. There was no dedicated social media marketing person in the majority of the companies surveyed with responsibility being shared across individuals or being undertaken by the founder of the organisation.

Two out of ten start-ups surveyed indicated that they are not using any social media management tools. Of the remaining eight start-ups seven are using a product called Hootsuite to manage their social media activity. Company J mentioned that they are spending a lot of time monitoring social media content and they intend to start using a social media management tool very soon. Company F uses the specific website for each social platform they use. Table 1 outlines major Social Media management tools adapted by organisations interviewed for this research.

<table>
<thead>
<tr>
<th>Management Tool</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hootsuite</td>
<td>Social media monitoring, analytics and alerts dashboard.</td>
</tr>
<tr>
<td>Buffer</td>
<td>Tweet Scheduling Application</td>
</tr>
<tr>
<td>TweetDeck</td>
<td>Application owned by Twitter that brings more flexibility and insight to power users. The functionality includes customisable columns and filters, tweet scheduling, notifications about new Tweets</td>
</tr>
<tr>
<td>Paper.li</td>
<td>Application enables people to publish online newspapers based on topics they like and treat their readers to fresh news and automatically publish it</td>
</tr>
<tr>
<td>Twilert</td>
<td>Application that enables you to receive regular email updates of tweets containing preselected keywords</td>
</tr>
<tr>
<td>Nutshelmail</td>
<td>Application that automatically sends a social media activity report to an email</td>
</tr>
<tr>
<td>Tweetbot</td>
<td>Application that helps to organise Twitter lists on a smartphone</td>
</tr>
<tr>
<td>Marsedit</td>
<td>Desktop blog editing client for the Mac</td>
</tr>
<tr>
<td>Netvibes</td>
<td>Social media monitoring, analytics and alerts dashboard.</td>
</tr>
<tr>
<td>Twitadder</td>
<td>Automated Twitter management software</td>
</tr>
</tbody>
</table>

Table 1: Social Media Management Tools

4.3 Social Media Challenges for Start-Ups

The results of our research highlights a number of areas which start-ups find challenging in relation to their social media activities. These are summarised in Table 2. Two key challenges are identified by our interviewees: Time and Content Creation.

**Time** - 70 per cent of our interviews cited the difficulties in managing how much time is required for social media activities, particularly in relation to curating interesting content to share or creating original content. Company J describes the challenge as follows:

“It can get time consuming and distracting. Let’s say you are on Facebook and you see a Mashable article that is related to video and you waste your time on reading what you shouldn’t be reading...”.

**Content Creation** - Seven out of the ten start-ups surveyed indicated that various aspects of content creation are a challenge. Producing quality content is something that requires multiple resources. Company A stated that the time required to create the content is a challenge because it requires contributions from different people in order to make the content interesting and...
appealing. Content creation requires skill, time and money.

**Other social media challenges** - A number of other challenges were mentioned during the interviews by individual organisations. These challenges are summarised in Table 2 below. It is worth noting that two of the Start-ups detailed their efforts to be consistent in their social media efforts but found it difficult to execute; partially due to lack of commitment to social media. This poses the challenge for organisations to be both active and consistent in their social media efforts. Consistency in social media execution was seen by most of the start-ups surveyed as a key social media tactic. Company E stated that they focus on things that are needed for generating sales immediately; therefore social media becomes a secondary activity. As a result there is no consistency in Twitter or blog posting which, they admitted doesn’t look well for their website visitors.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Subset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Needed to be active</td>
</tr>
<tr>
<td></td>
<td>Time to produce content</td>
</tr>
<tr>
<td></td>
<td>Maintaining Engagement</td>
</tr>
<tr>
<td></td>
<td>Timing &amp; Consistency</td>
</tr>
<tr>
<td>Content</td>
<td>Cost of production</td>
</tr>
<tr>
<td></td>
<td>Time to produce</td>
</tr>
<tr>
<td></td>
<td>Expertise problem</td>
</tr>
<tr>
<td></td>
<td>Authenticity</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td>Difficult when product not ready</td>
</tr>
<tr>
<td></td>
<td>Consistency</td>
</tr>
<tr>
<td></td>
<td>Hard to plan regularly</td>
</tr>
</tbody>
</table>

**Table 2: Social Media Challenges for Start-Ups**

### 4.4 Twitter Feed Analysis

According to the broad findings of the existing literature about the organisational use of social media (Jansen et al., 2009; Walters et al., 2009 cited in Lovejoy and Saxton, 2012) organisations seem to employ social media for at least two primary purposes - information sharing and dialogic relationship building. However, as highlighted in the Literature Review in Chapter 2, we don’t know how start-ups are using social media and how these information and dialogic functions are being expressed on their social media activities. In order to complement the qualitative interview research and answer the aforementioned question Twitter communication analysis has been carried out.

### 4.5 Twitter Feed Classifications

As shown in Table 3, our analysis has identified 12 different types of tweets in our sample of 794 tweets. From these types, we have formed 3 main functional tweet categories: Information, Interaction and Promotion:

**Information**

Information category tweets are defined as tweets that refer to general content usually from a third party source and are not of a direct promotional nature. The intention behind these tweets is simply to inform and the subject matter is generally related to the senders industry or has some relevance to the organisations stakeholders.

**Interaction**

The Interaction category is made up of tweets that promote dialogue and interactivity by attempting to build communities, foster relationships and create networks. The core function of this category is to spark interaction with followers via conversational messages.

**Promotion**

The Promotion category defines tweets that are of a promotional nature and serve to promote the account holding company, its content or third party content about the company. These tweets tend to take the form of referrals to the senders new blog posts, promotions of special offers or the highlighting of awards or praise the start-up has received.

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interesting facts</td>
<td>Physicists produce highest man-made temperature: 7 trillion degrees <a href="http://t.co/PE9rGVQ">http://t.co/PE9rGVQ</a></td>
</tr>
<tr>
<td>Tips</td>
<td>Thinking of Government tenders? Then check out Tender Scout <a href="http://t.co/SZmLar">http://t.co/SZmLar</a> and let them do the work! #smeInteraction</td>
</tr>
<tr>
<td>Event information</td>
<td>Looking forward to 'Expanding Your Online Experience Offline', interested? Signup</td>
</tr>
</tbody>
</table>
Table 3: Twitter Feed Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Example Tweets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational content</td>
<td>Polaris’ Dogpatch Labs locates in heart of Europe’s digital capital - Dublin.</td>
</tr>
<tr>
<td></td>
<td><a href="http://t.co/RTRxLaX">http://t.co/RTRxLaX</a>  #smeInteraction</td>
</tr>
<tr>
<td>Gratitude</td>
<td>thanks @dan_banta. Demo videos will be out soon. just a few more weeks before the</td>
</tr>
<tr>
<td></td>
<td>curtain rises :) #superexcited</td>
</tr>
<tr>
<td>Emotional</td>
<td>My fav @37signals post - and a great lesson for boot strapped startups. Money doesn't fix problems. <a href="http://t.co/K9bRL15">http://t.co/K9bRL15</a></td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>Congratulations @roleconnect on being Silicon Republic’s startup of the week?</td>
</tr>
<tr>
<td></td>
<td><a href="http://t.co/lA9qWZW">http://t.co/lA9qWZW</a></td>
</tr>
<tr>
<td>Call to action</td>
<td>Stay connected with Company H after @cipd HR software show - follow us on</td>
</tr>
<tr>
<td></td>
<td>@slideshare  <a href="http://t.co/OSb80M4">http://t.co/OSb80M4</a> #HRSS12</td>
</tr>
<tr>
<td>Blog referring</td>
<td>Blog: The new employee psychological contract <a href="http://t.co/Fv5GvBw">http://t.co/Fv5GvBw</a> #hrblogs</td>
</tr>
<tr>
<td></td>
<td>#connectingHR #careeredev</td>
</tr>
<tr>
<td>Sales promotion</td>
<td>An offer you can't refuse. 90 day free trial for simple and flexible performance</td>
</tr>
<tr>
<td></td>
<td>management software available at stand H36 #HRSS12</td>
</tr>
<tr>
<td>Event specific promotion</td>
<td>Great day at #CEIC2012! Tomorrow we are giving away a 16inch portable monitor at</td>
</tr>
<tr>
<td></td>
<td>3.15-drop by booth 325 to enter :)</td>
</tr>
<tr>
<td>Updates about the company</td>
<td>@sundaybusiness thanks for featuring Company D today in #donedeal much appreciated</td>
</tr>
</tbody>
</table>

DISCUSSION

Our study demonstrates that while the use of particular social media channels depends on the type of content the organisation is producing and the intended audience for that content, the major social media platforms dominate channel choice. Blogs, Twitter, Facebook and LinkedIn are the platforms of choice. Though many of the start-ups maintained a presence on Facebook; it is not seen as a key platform. However, this may be due to the B2B nature of many of our sample. Despite the recent growth of social networks such as Google+ and Pinterest, they are very much seen as niche players.

It is clear that start-ups are endeavouring to find their audience and engage with them, advice offered by Kaplan & Haenlein (2010) to be active wherever your customers are present. Start-ups see the key activity as creating original content on their blog and then seeding that into the social media ecosystem using Twitter, Facebook and LinkedIn updates. Hanna et al. (2011, p. 268) refer to “owned” (blogs) and “earned” (e.g. tweets or re-tweets) media. This concentration on owned and earned social media perhaps reflects the budgetary constraints start-ups operate under with very limited marketing budgets. Here we find that practice is indeed reflecting the espoused theory – start-ups practices are supporting the argument of Kietzmann et al. (2011) that blogs are about facilitating rich conversations. While microblog posts and social network status updates are being used to keep customers informed in the short term, blogs are being used to share deeper and richer information over longer periods of time (Weinberg & Pehlivan, 2011).

It is noteworthy that only one start-up had actually paid for advertising on any of the social media platforms, using LinkedIn ads to drive traffic to their website for a limited period of time as an experiment. Clearly start-ups do not have the budgets for paid advertising on social networks.

It is also worth noting that rather than using social media to engage in customer feedback (Mangold & Faulds, 2009), only one of the start-ups sampled consciously engaged in this practice. This is consistent with Kuikka and Äkkinen’s (2011) study of social media use in a large organisation which found that while customer feedback is seen as a potential use of social media, the actual expectations of this happening were low.

Brand Awareness

Our research finds that start-ups are overwhelmingly using social media as a brand awareness tool. This brand building takes a number of forms. Firstly, the start-ups aim to educate their audience on their products and services and broadcast what it is they do. However, as identified by Fournier & Avery (2011) there is also great wariness of using social media as a promotional vehicle as brands are not always welcome on social media. Start-ups are conscious of being genuine and authentic in their activity and not appearing selfish or too commercial in their updates, reflecting the notion that “social media is for people, not brands” (Ritson, 2010, p. 54). There is a clear focus on coming across as genuine and trustworthy. This is also evidenced by the fact that promotional material was only found in 21% of the tweets analysed, perhaps reflecting the assertion by Kietzmann et al. (2011) that Twitter is more about conversation than identity.

Our findings show that start-up organisations are not thinking about social media on a strategic level, with few organisations having a formal strategy in place. In fact, most admit that social media is undertaken on an ad hoc basis and is seen as secondary to the other duties of the individuals. This ad hoc approach is in contrast to the traditional, experimental and emergent approaches identified by Weinberg and Pehlivan (2011).

Search Engine Optimisation

An issue which has received little discussion in the literature to date is the importance of social media activity for the Search Engine Optimisation (SEO) strategies of organisations. Our research highlights that many start-up’s motivation for using social media.
media stems from the basic need to improve their website’s ranking in the search engines. The main search engines like Google, Bing or Yahoo evaluate the relevancy of a website by keywords being found on that website and links (backlinks) to that website from other search engine indexed websites that have high authority. While keywords can be easily adjusted using content management systems and widely available free SEO plugins, backlinks to the website are much more difficult to obtain. Start-ups are demonstrably overcoming this difficulty by being active on social media channels.

Social Media as a Sales Tool
As with SEO, our research highlights an area underplayed in the academic literature, namely how social media is being used as a tool to generate sales leads. This is particularly important where the product is offered online with the Software as a Service (SAAS) model. Using this model, start-ups are creating sales funnels and are using social media activity in a very strategic way to drive traffic to their website, i.e. into the funnel where they then use various optimisation techniques to increase their sales conversion rates.

In a more traditional sense, social networks are being used to find and contact potential customers. In particular, LinkedIn is seen as a valuable source of potential leads and many start-ups are paying for upgraded accounts to allow them greater flexibility in searching for and contacting relevant individuals. This notion of connecting with potential customers is also reflected in the start-ups discussions of event specific marketing and industry learning. Many of the Interaction focussed tweets analysed were centred on specific industry trade show events or promotional shows. The start-ups try to attract new followers by tweeting about a particular event, connecting with individuals attending the event and then actually meeting them in person. This online / offline dynamic is an interesting aspect of how start-ups use social media to build relationships. We find that start-ups are both connecting with followers and then meeting them in person and also meeting with individuals and then connecting online afterwards.

CONCLUSION & FUTURE RESEARCH

Our research highlights the ways start-ups are building their brands with social media. Firstly, they are creating rich content on their blogs and using social networks such as Twitter, Facebook and LinkedIn to share and promote this content. Secondly, they are using social media to become known as knowledgeable and an expert in their industry domain. They do this by sharing informative content, commenting on relevant community forums (e.g. LinkedIn groups) and by interacting with the community. Importantly, the research also reveals that the majority of start-ups are making little or no use of metrics or Key Performance Indicators in order to gauge the success or otherwise of their efforts.

The Twitter feed analysis provides an interesting insight into the actual use of social media in contrast to some of the findings of the research interviews. Our conclusion from this analysis is that start-ups need to be more aware of the nature of their Twitter use and relate this use to their strategic goals for using social media. In general, they should aim for a mix of Information, Interaction and Promotion tweets in order to gain the greatest value from this social media channel.

Our research has established that the main challenges start-ups associate with realising the espoused benefits of social media can be described as Time and Content Creation. While many of the start-ups related different individual challenges, the amount of time required to manage and maintain consistent social media activity and the various aspects of content creation are the over-riding themes. Indeed, these themes are bound together as the time required to produce quality content is also cited as a challenge.

Overall, we find that the key challenges start-ups experience in achieving successful use of social media are very much a function of the limited resources available to start-ups in terms of budget, human resources and founder(s) time. Moreover, there is a link to our findings to Research Question 1: by not strategically using metrics or Key Performance Indicators, the challenge of managing time and content creation becomes all the greater. In other words, by not measuring the value to the organisation of their social media activities, start-ups find it difficult to dedicate time and resource to the activity. It is clear that in order to overcome these challenges, many start-ups must review their social media practices and begin to focus on benefits which are easier to attain and more practical with smaller resources.

6.1 Implications for Practitioners
Our third research question was to formulate recommendations for start-ups on the best practices for the use of social media. Our research clearly shows that there is a need for start-ups to create a link between the social media activity they undertake and the desired outcomes they wish to achieve. Our study shows that the majority of start-ups are not measuring the value of their social media activity to the organisation. In order for the value to be demonstrable and transparent to the whole organisation, the activity must be measurable. If the value is clearly understood, the activity will gain more support and commitment in the organisation and issues such as time management and consistency of activity won’t be as problematic.

Our research also shows many start-ups are not thinking about their social media strategy on an ongoing basis. Many organisations document a strategy which then goes out of date quickly and is not referred to again. Overall goals and aims are not related to daily activity and success or failure to meet these goals is not measured.

6.2 Future Research
Given the fragmented nature of research in the field of social media already discussed in the literature review, there are a number of areas which would benefit from further academic research. While we hope that our exploratory research has contributed a greater understanding of how start-up organisations use social media, the research could be continued on a larger
scale in terms of sample size and location. Given that the majority of our sample are classified as B2B organisations, similar research could be undertaken with an emphasis on B2C organisations.

Our findings relating to the use of social media for SEO lead to an interesting area which could be studied; namely, to measure the effect of social media activity on SEO. Similarly, our finding that social media is being used as a sales tool by start-ups warrants further investigation to establish how widespread and how successful this practice is in other organisations. Likewise, it could be studied whether other organisation types also approach social media in the ad hoc manner of start-ups. Finally, it is hoped that the analysis done on the start-ups Twitter feeds contributes to the social media discipline by providing a basis for further research into the Twitter utilisation practices of other organisations. Our classification can be applied to different organisation types in order to measure their Interaction, Information or Promotion focus. The analysis and classification could also be generalised across other types of social media including blog, LinkedIn and Facebook posts. This would provide more valuable insight into how organisations are using social media. Indeed future research may examine the correlation between different factors (such as organisation size or B2B/B2C nature) and the focus of the social media activity.

REFERENCES


CAN LEGITIMACY HELP SMEs IN B2B COMMERCE?

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ABSTRACT

Survival and growth are the key challenges for SMEs on B2B platforms. As the entry barrier is low, the competition is keener than in the conventional business environment. Some SMEs adopt an aggressive competition strategy to ward off competitors. Whether competitive aggressiveness, which is a dimension of entrepreneurial orientation, improves performance and whether the legitimacy status of an SME helps its website gain acceptance in an environment of aggressive competition are hitherto unanswered questions. Conducting legitimate actions is both crucial and challenge for SMEs, as they have little reputation and no brand name to rely on. On B2B platforms, SMEs face a greater legitimacy problem than in the conventional context. A B2B service provider, such as Alibaba.com, provides a platform for SMEs to link to an e-marketplace. Consumers are more likely to trust the platform’s endorsement than the self-descriptions of the SMEs. It is thus common for an e-commerce platform to provide services to SMEs and help them acquire the trust of customers. For example, integrity protection seal is a kind of unofficial certification provided by B2B platforms that is widely accepted by buyers, sellers, and other stakeholders. Thus, if integrity protection seal has become a symbol of legitimacy, then SMEs who join integrity protection scheme may gain better acceptance from customers, suppliers, and other stakeholders on B2B platforms. We use secondary data collected from Alibaba.com, the largest B2B platform in China, to address these issues. We find that adopting an aggressive strategy, joining an integrity protection scheme, and obtaining a good credibility score improves SME website performance in B2B.

Keywords: B2B commerce, SMEs, legitimacy, integrity protection
E-TOURISM SERVICE QUALITY FACTORS: A COMPARATIVE STUDY OF THAI AND INTERNATIONAL TOURISTS

S. Rotchanakitumnuai, Thammasat Business School, Thailand, siriluck@tbs.tu.ac.th

ABSTRACT

This study focuses on the factors of E-Tourism Service Quality that enhance the Customer relationship between E-tourism service providers and Thai and International tourists. E-Tourism Service Quality relating to the website’s quality / social networks and the service from Thai electronic travel service provider increases of the retention international customer.

Keywords: E-Tourism Quality, E-tourism Service, E-Tourism Marketing Management Quality, Enhance Customer Relationships.

INTRODUCTION

The current business environment constantly changes and becomes increasingly more competitive. Organizations must look more closely and adjust quickly to survive in the digital age where information has an instant access. Many organizations have adopted information and communication technology (ICT) as a management tool to ensure efficient operations and reduce costs. Moreover, information and communication technologies (ICT) play a role in transforming operational processes and organizational effectiveness in many companies. Most organizations have developed websites and applications for customer to communicate, provide tourism and service information, and e-commerce transactions. This channel creates value to industry business because customers are able to access the service anytime and anywhere [22].

The United Nations Conference on Trade and Development [25] has identified the opportunities of using the electronic commerce through the internet for the travel industry, especially in developing countries. UNCTAD suggested tourism industry must increase the benefits of ICT by adopting electronic commerce and create communicative infrastructure in dealing with customers to improve revenue and reduce costs. The internet has significant capabilities to support business features and processes. The benefits of the internet to the tourism industry are the capability to provide continuous information and networking. This capability is particularly important because the tourism industry depends on linking information and services passed on to customers in the form of digital service.

In Thailand, the government has initiated a policy to help the economy recover in 2009 until 2010. The Tourism Authority of Thailand is the responsible agency. Recognizing the importance of Thai tourism, the Tourism Authority of Thailand has set up a Department of Tourism to urgently solve tourism related problems. Improving the quality of electronic tourism management is essential and beneficial to tourism development in Thailand.

The objective of the study is to study E-Tourism Quality from the perspective of foreign and Thai tourists related E-Tourism Service Quality relating to website’s quality / social networks and the service from Thai electronic travel service provider to both foreign visitors and Thai residents as a channel of customer communication.

LITERATURE

E-Tourism Service Quality

Service quality has been widely researched using "SERVQUAL" model [16] assessing the customer’s evaluation of service providers. Service quality consists of 10 factors which are reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understand customer, and tangible. These factors were grouped to five constructs, Reliability and Fast Service, Responsiveness, Empathy, Assurance, and Tangible. Grönroos [7] indicated the two main factors in the service quality were functional quality and technical quality. However, the traditional service quality where customers meet directly with service provider is different from the electronic service via internet because of factors, such as the channels of service provider, security, and ease of use through web services [20].

The concept of service quality has been applied to improve service quality over the Internet, or electronic service quality, such as ES-QUAL model [17], eTailQ model [28], SITEQUAL model [30], WebQual model [1], e-SQ model [31] and other researches [3] [10] [11] [12] [19] [26] [29] [31].

Electronic service quality includes site quality and data quality [10], other indicators include the data quality, beautiful design, immediate response, security and privacy [19] [31].

The quality management of websites cannot be guaranteed by E-service Quality. The results of research are mixed. Some studies only partially focus on quality. Electronic service providers must emphasis quality for each process in an electronic service. Electronic service quality consists of service design, customer support, web design and technology support [20].
Because communication channels vary through websites and social network studying both areas is needed. Any neglect of process quality may affect the performance of electronic services. Electronic service quality is more effective with continuous improvement and quality improvement in all service and after-service processes. In this research, the term Electronic Service Chain (E-Service Chain) relates to the services quality improvement process. Service quality will cover all services required for tourism including the website quality as a service channel, customer service quality, information technology quality that supports electronic services.

Social networking service quality in electronics tourism has four factors. These are Website Design Quality, Electronic Service Design Quality, Customer Service Quality, and Technology Support Quality.

Website design quality is the quality relates to the capability of the electronic service channel that the users need to access the service channel via the web. Quality website relates to a design with useful data, updated and easy to understand information relevant to the customer’s use and links for easy access to other web pages [6]. New information should be well-displayed for the best user experience [12] [19] [23].

Electronic Service Design Quality for product design or customer service must provide user-friendly processes [30]. The process should be simple with variety of services required according to the business nature. For example, banking services must include all the financial services such as deposit, withdraw and transfer funds, etc. Services must meet customer’s requirement through customization [21]. The service must be designed to attract for customers [23].

Customer service quality is expectations related before, during and after the service. Basically, when a user makes a transaction through electronic services, customers are concerned because of the uncertainty of the service. Customer feedback after the transaction is completed is essential. Customer service quality should include system-wide service support including various social networking channels [6] [17] [26].

In order to build trust for the users, technology support quality requires that electronic services system must be with secure, privacy guaranteed [6] [17] [21].

**E-Tourism Marketing Management Quality**

For E-tourism marketing management, the first factor is customer satisfaction and loyalty [24]. The most important marketing factor is pricing. Marketing research identifies price as the key factor of customer satisfaction [13]. When customers evaluate a service, they often consider the price. Unreasonable pricing or price changes create customer dissatisfaction. Reasonable price can be measured by the final result or service process that is considered fair [13]. If the customers receive the same level of satisfaction for what they pay, it is likely that a price increase is acceptable [9]. However, if the customers believe that the price increase is unreasonable for the level of the service. It affects satisfaction and loyalty [4] [13] [14].

Promotional strategy links price, promotional packages, advertising, branding of websites, and integration of communication channels to build a relationship with customers [2] [15] [18] [27] [5] [8].

**Research Hypothesis**

This study explores the differences in perception of E-Tourism Quality between Thai and International tourist. The T-test is used to analyze for the Null Hypothesis;

H0: Thai and Foreign Tourists don’t have significant different perceptions on Website Design Quality, E-service Design Quality, Customer Service Quality, Technology Quality, E-Tourism Management Quality and Customer Relationship Enhancement.

**METHODOLOGY**

A quantitative approach using questionnaire was designed. Thai and International Tourists in Thailand are surveyed. A survey was conducted to collect data on the difference perspectives in E-Tourism Quality and Customer Relationship Enhancements in Thailand. The questionnaire was developed from literature reviews and validated by E-tourism experts. This study used 800 respondents. A purposive sample of 300 Thai tourists and 500 foreign tourists were identified. The reason to include more international tourists is that they generate more revenue and higher spending than Thai tourists. Data collection will be from interview which is the most comprehensive approach. The data is collected from visitors in Bangkok and other provinces. Interviews foreign visitors conducted in English. Out of 269 respondents from Thai tourist, 56.9% are female. For the 486 respondents from international tourists in Thailand, 40.9% are female. The majority of tourist respondents are in age group of 30-40 years old, Thai tourist 51.1% and international tourist 42.8%. The respondents education level is at the undergraduate level, Thai 56.1% and international 78.6%). Details of the sample characteristics are describe in Table 1.

**Table 1: Sample Characteristics of Thai and Foreign Tourists**

<table>
<thead>
<tr>
<th>Background Variables</th>
<th>Thai Tourists</th>
<th>International Tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>153</td>
<td>56.9</td>
</tr>
<tr>
<td>Male</td>
<td>115</td>
<td>42.8</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 30</td>
<td>87</td>
<td>32.3</td>
</tr>
</tbody>
</table>

Additionally, tourists were asked to specify the period and frequency per year that they used website to search for tourism information. International tourist used website to search tourism information at an average of 10.62 years, while Thai tourist start using website to search tourism information later than foreign tourists, the average is 5.1 years. For the frequency of using website for tourism information, the international tourists use website more frequency than Thai tourists, international tourists average used is 27 times/year and Thai tourist average used is 19 times/year (Table 2).

Table 2: Experience of Thai and International tourists using websites for tourism information.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Average</th>
<th>Thai Tourists</th>
<th>International Tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durations that Tourists used website to search for tourism information (Years)</td>
<td></td>
<td>5.1</td>
<td>10.62</td>
</tr>
<tr>
<td>Frequency of using website to search for tourism information (Times/year)</td>
<td></td>
<td>18.86</td>
<td>26.73</td>
</tr>
</tbody>
</table>

DATA ANALYSIS

Factor Analysis

Exploratory Factor Analysis was used to identify the components for E-Tourism Quality related to E-Tourism Service Quality and E-Tourism Management Quality. Variables were examined by using principle component factor analysis and varimax rotation. To derive a stable factor, each factor must have an eigenvalue more than 1.0 and loading of 0.5 or higher on all items. Table 3 shows the result from factor analysis.

Table 3 :Factor Analysis from the perspective of Thai and foreign tourists

<table>
<thead>
<tr>
<th>Component/Indicators</th>
<th>Thai Tourists Factor Loading</th>
<th>International Tourists Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Website Design Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website provides easy to understand tourism information</td>
<td>.810</td>
<td>.763</td>
</tr>
<tr>
<td>The website provides up-to-date tourism information</td>
<td>.773</td>
<td>.833</td>
</tr>
<tr>
<td>The website provides complete tourism information</td>
<td>.655</td>
<td>.842</td>
</tr>
<tr>
<td>The website provides multiple languages of tourism information</td>
<td>.656</td>
<td>.461</td>
</tr>
<tr>
<td><strong>E-Service Design Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website is designed as a simple to use and make transactions</td>
<td>.704</td>
<td>.850</td>
</tr>
<tr>
<td>The website is aesthetic</td>
<td>.773</td>
<td>.759</td>
</tr>
<tr>
<td>The website is designed for easy searching to get related information</td>
<td>.645</td>
<td>.841</td>
</tr>
<tr>
<td><strong>E-Service Quality on Technology Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website provides good security technology</td>
<td>.716</td>
<td>.782</td>
</tr>
<tr>
<td>The website supports large volume of transactions</td>
<td>.556</td>
<td>.786</td>
</tr>
<tr>
<td>The website is fast to load</td>
<td>.720</td>
<td>.800</td>
</tr>
<tr>
<td>The website upholds its privacy policy</td>
<td>.734</td>
<td>.830</td>
</tr>
<tr>
<td><strong>Customer Service Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website provides immediate response to customer after transaction finished</td>
<td>.655</td>
<td>.863</td>
</tr>
<tr>
<td>The website provides 24/7 customer service.</td>
<td>.796</td>
<td>.898</td>
</tr>
<tr>
<td>The website provides social networks to communicate and share information with customers/between customers.</td>
<td>.712</td>
<td>.776</td>
</tr>
<tr>
<td><strong>E-Marketing Management Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The service provider uses lower price policy for transaction via website</td>
<td>.648</td>
<td>.540</td>
</tr>
<tr>
<td>The service provider uses digital channel for promotion / PR e.g. website / social network</td>
<td>.805</td>
<td>.784</td>
</tr>
<tr>
<td>The service provider uses digital channel to communicate with traveler/customer e.g. website / social network</td>
<td>.791</td>
<td>.803</td>
</tr>
</tbody>
</table>
The service provider offers variety of tourism’s products/services for target customers. The service provider offers to customize tourism program for individual.

In addition, both types of tourists appreciate an e-service design which is easy to use, gives quick information that is relevant and looks good.

For customer service quality tourists want immediate responsiveness 24/7 with an opportunity to network with other customers. The Thai and international tourists want customization and variety of services at a good price with extensive networking potential. For customer relationship for both groups continued use and retention is enhanced by e-service and e-tourism marketing.

Two factors are most accepted. The alternative hypothesis applies International tourists significantly emphasize website design quality for E-tourism Services. Thai tourists require higher Technology Quality for E-Tourism Services (Table 4).

International tourists are more concerned with clear, updated, and easy to understand information that is available in a language they understand.

Thai tourists require guaranteed security and privacy with good technical specifications.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Thai Tourist Mean</th>
<th>International Tourist Mean</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website Design Quality</td>
<td>4.175</td>
<td>4.323</td>
<td>.000</td>
</tr>
<tr>
<td>E-Service Design Quality</td>
<td>4.151</td>
<td>4.159</td>
<td>ns</td>
</tr>
<tr>
<td>Technology Quality</td>
<td>4.175</td>
<td>4.073</td>
<td>.037</td>
</tr>
<tr>
<td>Customer Service Quality</td>
<td>4.013</td>
<td>4.027</td>
<td>ns</td>
</tr>
<tr>
<td>E-Tourism Marketing Management Quality</td>
<td>4.028</td>
<td>4.104</td>
<td>ns</td>
</tr>
<tr>
<td>Quality Enhanced Customer Relationship</td>
<td>4.159</td>
<td>4.184</td>
<td>ns</td>
</tr>
</tbody>
</table>

**CONCLUSION AND IMPLICATION**

Thai E-Tourism Service providers can benefit from the likelihood that Thai and International tourists mostly prefer the same level of E-Service Quality in terms of simple, easy to use, and attractive design. They want immediate and continuous customer support with opportunity to network with other customers. They expect the E-Tourism provider to offer customized products with variety and high value for money. If the E-Service provider can deliver this level of quality, both international and Thai tourists would continue to use this provider. The E-Service provider would achieve higher customer retention.

They are significant difference in preferences that E-Service providers need to consider. International tourists want a high level of quality in the kind of four related informative provided. It should be updated and complete as well as accessible in a variety of languages. E-Service providers need to focus on Web Design Quality. Thai tourists are mostly concerned with security, privacy spread and volume. E-Service providers need to emphasize Technology Design.

**REFERENCES**


THE ANTECEDENTS OF EXPECTATION AND CONTINUANCE ON INTERNET GROUP BUYING INTENTION: AN EXTENDED PERSPECTIVE ON EXPECTATION-CONFIRMATION THEORY

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ABSTRACT

With the rapid growth and wide application of network technologies, group buying websites have emerged as a major approach in e-commerce by negotiating deals with product/service providers and featuring a “deal of the day” in a set number of consumers as well as anticipated exchange for discounts. For example, Groupon, the largest worldwide group-buying website, sold more than 33.01 million coupons in the third quarter of 2011 and generated global revenue of 430.16 million U.S. dollars. Through the group buying participation, consumers can leverage their collective bargaining power to acquire products or services at discount prices when a minimum numbers of people are willing to make the purchase collectively [1]. Even an individual consumer can aggregate the purchasing power with other potential buyers, then benefiting from economies of scale and lower prices as big businesses do [2] [3]. Instead, if an item is not ordered in a sufficient requirement of quality or dollar amount within a specified time period, the deal will not be agreed by sellers [4].

In recent years, due to the emergence of social media and increase in social interaction online, Internet shopping has developed from individual purchase activities to a collective and social commerce, known as a C2B (customers to business) model. Consumers not only seek and purchase the daily-deal item, but also can proactively act as an agent to organize a group buying plan and invite others to purchase in bulk together so as to gain better prices or ensure the availability of obscure items. As Hughes and Beukes [5] describe, consumers develop their social interaction and share life experiences on the Internet, leading to the “co-creators of value”. However, most Internet shoppers are strangers online. Product/service defects or deal deception might happen and impair their purchase intention. Accordingly, the success of Internet group buying is not merely related to the functionality of group buying websites, but also depends on the evaluation of possible gain or loss during group buying transactions.

Expectation-Confirmation Theory (ECT), which was originally proposed by Oliver [6] in the consumer behavior research to study the purchase decision process, articulates that the positive or negative conformation between expectations and performance have an influence on consumers’ post-purchase satisfaction and repurchase behavior. Drawing upon ECT, the four main constructs (expectations, performance, confirmation, and satisfaction) have been adopted in the discipline of information systems (IS) and also combined with distinct technology acceptance aspects, including individuals’ perceived usefulness, self-efficacy, subjective norm, etc. to assess the effects on IS product or service continuance intention [7] [8] [9]. However, in the diverse and changeful e-commerce environment, Internet group buying consumers make the purchase decision in a collective manner, affected not only by product price or utility, but also derived from individuals’ psychological and emotional evaluation [1] [10] [11]. Besides, most previous ECT-related studies focus on the effect of conformation on satisfaction and do not elaborate on possible antecedents of consumer expectations in the pre-purchase stage and examine the subsequent influence on consumer continuance behavior.

Considering characteristics of collective power in Internet group buying, this study attempts to incorporate consumers’ psychological factors with ECT in the Internet group buying context by addressing the questions of (1) whether trust, perceived risk and attitude are the antecedents of potential consumers’ expectations for Internet group buying; (2) whether Internet group buying confirmation will further affect consumers’ psychological factors, i.e. trust and perceived risk as well as subsequent cognitive processes, including purchase satisfaction, and continuance intention of Internet group buying; and (3) whether any difference exists in consumers’ psychological perceptions as well as their purchase/continuance intention between pre-purchase and post-purchase stages. This study has proposed a research framework by formulating hypothesized relationships between consumers’ psychological factors and ECT constructs. A survey methodology was conducted in Taiwan to collect and analyze empirical data (207 valid survey responses) from several Chines language-based Internet group buying sites. The research results demonstrate that, in the pre-purchase stage, consumers’ trust in group buying initiators and websites has significant impacts on their risk-perception and attitude towards Internet group buying, resulting in more positive expectations and group buying intention. Moreover, in the post-purchase stage, higher level of confirmation reflects higher trust and lower risk-perception. Consistent with ECT perspectives, consumers’ continuance intention of Internet group buying is significantly influenced by satisfaction. Finally, this study provides practical implication for Internet group buying vendors to identify critical psychological factors affecting group buying decision process and also extends ECT model with consumers’ psychological perceptions in e-commerce research.

Keywords: Internet group buying, Expectation-confirmation theory, Continuance intention
REFERENCES


A REFERENCE MODEL FOR MOBILE PRODUCT INFORMATION SYSTEMS

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ABSTRACT

This paper analyses the state of the art in research and practice on mobile product information systems. Based on literature review and multiple case study research, we design a reference model that is suitable for researchers and practitioners as a first reference point and recommendation for the construction and analysis of mobile product information systems.

Keywords: design research, mobile services, product information systems, reference modelling, Unified Modelling Language

INTRODUCTION

Product information is used for different purposes. In business-to-business (b2b) context, for example, it can be used for management, assistant or decision systems. In business-to-consumer (b2c) context, on the contrary, it can be used to provide consumers with information such as price or ingredients and to influence their buying decisions. Mobile devices are perfectly suitable for consumers to access product information at the point of sale (POS) since they provide mobile added values like ubiquity, context-sensitivity, identifying functions, and command and control functions [51]. The diffusion of smartphones and the cost-efficient access to mobile Internet services increases the usage of mobile services and applications (apps) rapidly. These developments have not only changed the nature of the apps offered but also transformed the way of searching for information. Apps for product information search support these developments. A mobile product information system is a software for mobile devices that allows users to access information on a product (e.g., ingredients, price) by scanning a barcode or using other search mechanisms.

The purpose of this paper is the development of a reference model for mobile product information systems. Based on literature review and multiple case studies, we design an according use case and class diagram. The developed reference model can be used from researchers as well as practitioners as a first reference point and recommendation for the construction of new and the analysis of existing mobile product information systems.

The remainder of this paper is organised as follows: Section 2 describes the methodology and the research process. Section 3 presents the state of the art in research and Section 4 the state of the art in practice. Based on the literature review and multiple case studies, we design a reference model for mobile product information systems in Section 5. Section 6 draws conclusions, discusses limitations, and proposes future research.

METHODOLOGY

Considering the aforementioned problem, the development of a reference model requires a design-oriented approach. Design research is a normative discipline that implies a usage concerning the design objective. It consists of three activities: (1) construction of artefacts, (2) evaluation of artefacts, and (3) reflection of results and theories [63]. Artefacts can be software, composite systems, user and application processes, organization methods and interventions [44]. The object of knowledge lies in socio-technical systems which consist of three types of objects and their relationships: humans, information and communication technology (ICT), and organizations. Knowledge objectives can be recommendations of action for the design and operation of information systems or innovations in such systems [45]. Result types are constructs, models, methods, and instances [39], [45].

In order to design a reference model for a mobile product information system, the first step includes the identification of actors and functionalities. Therefore, literature review and case study analysis are suitable. Multiple case study analysis [52] is chosen since it enables a holistic detection and analysis of activities [11], [66]. The outcome is a set of actors, use cases and objects necessary for a comprehensive mobile product information system.

Based on the identified actors, use cases and objects, the second step includes the modelling of the artefacts. The most common and standardised modelling language in the field of object-oriented software engineering is the Unified Modelling Language (UML). For presenting how the system is going to be designed and to show user interactions with the system and specifications of use cases, two UML diagrams are adopted: use case diagram and class diagram. The designed reference model can be used as a reference point and recommendation for the construction and analysis of mobile product information systems.

The main modelling elements for UML use case diagrams and UML class diagrams are shown in Figure 1.
Academic literature on product information in general can be divided into b2b and b2c research. While b2b research concentrates on product information search like product information assistance systems [4], product information management systems [53], corporate dynamic decision-making management information systems [7], information sharing systems supporting heterogeneous information sharing across departmental boundaries [70] or product information archive systems [58], we focus on b2c systems and services. Therefore, relevant literature can be found in three major areas:

- information search and search behaviour,
- mobile services and consumer acceptance, and
- mobile information search.

Research on information search and search behaviour is many-sided. Some authors focus on search engines (e.g., [14], [33], [34]) or related search behaviour (e.g., [29], [62], [67]). Furthermore, some research concentrates on differences in information search behaviour caused by consumer characteristics like culture (e.g., [10], [30]), personality traits (e.g., [16], [30]), age (e.g., [46]), gender (e.g., [5], [35], [41]), and product characteristics (e.g., [31], [40]). Moreover, some authors focus on information search and search behaviour in different shopping channels (e.g., [18], [25], [48]). Besides research on information search in retail, further research exists on product information search in financial (e.g., [28]), health care (e.g., [19], [24]), and travel service markets (e.g., [43]). Moreover, some authors examine search criteria and strategies (e.g., [12], [54], [61]) or focus on factors influencing the intention to use information search systems (e.g., [26], [36], [57], [60]). Further research focuses on the design and development of information search systems (e.g., [17], [27], [32]).

During the last years many researchers have analysed different types of mobile services and applications like mobile payments (e.g., [50]), location based services (LBS) (e.g., [9]), mobile social media (e.g., [20]), augmented reality (e.g., [15]), mobile ticketing and parking (e.g., [37]), mobile marketing (e.g., [47]), mobile loyalty (e.g., [38]), and mobile couponing (e.g., [3]). How mobile services have to be designed to be accepted by users is also content of many academic studies (e.g., [49], [65], [68]). The impact of mobile services on shopping experience is analysed by [21]. The results show that mobile services can improve consumers’ shopping experience both in general and at different stages of consumers’ decision-making process.

However, up to now, only a few academic papers focus on mobile information search. In doing so, some authors concentrate on b2b topics like production processes (e.g., [1]) or mobile sales assistants (e.g., [23]). B2c topics, on the contrary, focus on the influence of product information systems on consumers’ buying decisions (e.g., [8], [55]), user acceptance (e.g. [22]), attitudes (e.g., [64]), and location-based information (e.g., [30]). Design-oriented research on mobile information search includes, for example, the development of a mathematical model for describing the information search process through the Internet with or without mobile access [59], the design of a platform architecture of mobile e-commerce information search based on mash-up technology [69], and an approach to adapt mobile Web browsing [2]. [13] evaluate technological and socio-economic conditions influencing the development of the mobile search market. Findings show that substantial development work for creating new services is still needed. Identified key trends are: LBS, augmented reality, real-time information search, and social network search and recommendations. Even if there is a few literature on mobile product information systems, there is a lack of literature on the design of an according reference model.

STATE OF THE ART IN PRACTICE

In order to identify actors, use cases and objects necessary for the reference model, we examine existing mobile product information systems. Therefore, we analyse public information available on companies’ websites and app stores. So far, only a few mobile product information systems exist. In the following, we examine five of most known approaches in the market:

barcoo
With about 6 million downloaded mobile apps barcoo (owner: checkitmobile GmbH) is one of the most popular mobile product information system for different product categories like food, personal care, electronic, cars, pet food, toys, and household in Europe. It has implemented various external data sources categorised in basis information, health care information, price comparison, test reports, and ecological information. The data input and the supplement of product data is
carried out by users and/or by automated or manual assignment of external data sources. The data input by users is possible without any registration. The information is accessible through the (mobile) website, as well as iPhone, Android, Blackberry, Samsung, and Windows apps. Therefore, the user has to scan the barcode or QR code attached on the physical product. The system offers product pictures, price information, test reports, user ratings and reviews, food signal lights that show how healthy a product is, Wikipedia articles, ecological ratings, information on producers and retailers, store information, ingredients, weakly deals, and guides for various topics (e.g., fish, wine, packaging). The service is free of charge for users and financed by third parties via marketing and market research revenues.

**Codecheck**
The Swiss organisation Codecheck offers consumers information for more than 11 million products from different product categories like food, personal care, electronic, books, toys, pet food, stationary, and sport in the German speaking countries. The aim of Codecheck is the provision of an open information system for the public. It has implemented various external data sources like health care information, price comparison, test reports, and ecological information. The data input and the supplement or change of product data is carried out by users and/or by automated or manual assignment of external data sources (e.g., nutrition facts and food signal lights). The data input by users requires their registration. The information is accessible through the (mobile) website, as well as iPhone and Android apps. Therefore, the user has to scan the barcode or QR code attached on the physical product or executes a text search. The system shows ingredients and seals of quality as well as related expert reviews, advices customers of contents on endangered fish species or palm-oil. It also provides food signal lights, ecological information, test reports, nutrition facts, reports and guides for various products and product categories (e.g., fish), user reviews, product comparisons and recommendations for alternatives, cross-national price comparisons, closest stores (LBS), and the possibility to buy products online or mobile. The service is free of charge for users and financed by third parties via donations (users and foundations) and revenues from affiliate marketing.

**GoodGuide**
The US American product information system GoodGuide offers information for more than 170,000 products from different product categories like personal care, food, household, babies and kids, pet food, apparel, electronics, appliance, and cars. The system is based on a 0 to 10 rating system for products and companies on their health, environmental and social performance. The data input and the rating is carried out by GoodGuide itself. Users are allowed to enter own ratings as well. The information is accessible through the (mobile) website, as well as iPhone and Android apps. Therefore, the user has to scan the barcode attached on the physical product or executes a text search. The system shows the product with the related rating of GoodGuide as well as the user rating. An additional function is the shopping list. The service is free of charge for users and financed by third parties via marketing revenues.

**RedLaser**
The US American product information system RedLaser (owner: eBay Inc.) supports users by searching prices, deals and coupons for millions of products across online and local retailers. The information is accessible through iPhone and Android apps. Therefore, the user has to scan the barcode or QR code attached on the physical product or execute a keyword, voice or image recognition search. The system shows product pictures, prices, deals, coupons, nearest locations for a product, product descriptions, product ratings and reviews, nutrition facts, critical allergen information, and popular products scanned by other users. Additionally, users can compare products and search for alternatives, check out books at the library, scan and store loyalty cards, create personalised QR codes, shopping, wish and gift lists, share information with friends, and create archives for books, media or wine. Moreover, the system enables users to buy products mobile. The service is free of charge for users and financed by third parties via provisions and marketing revenues.

**ShopSavvy**
The product information system ShopSavvy searches for online and local prices in North America and Europe. The information is accessible through iPhone and Android apps. Therefore, the user has to scan the barcode or QR code attached on the physical product or execute a keyword search. If users are missing a special keyword, they can add it to the system. Moreover, users can edit wrong prices and submit them for review. The system shows product pictures, prices in multicurrency (USD, EUR, GBP), and allows users to organise lists. Additionally, users can receive information on local retailers (e.g., location, directions, phone number, price matching policies, in stock availability) and marketing offers (e.g., Groupon offers, shipping promos, coupon codes, rebates, weekend sales). Users can also write own product reviews and share information on products, prices and lists with friends via email, Facebook or Twitter. The service is free of charge for users and financed by third parties via provisions and marketing revenues.

**Evaluation**
The analysed mobile product information systems show similarities in the involved actors. They are characterised by a service provider, users, retailers, and producers. Most of the systems also cooperate with third parties like marketing agencies or health care organisations.

All analysed systems have a broad range of product categories in common. However, the systems differ on the amount of available products. While some systems offer information on online and local products, others just provide information on local or online products. The provided information depends on the purpose of the system, the offered product categories (e.g., food or electronic), the cooperating third parties (e.g., health care organisation), and the implemented data sources (e.g., test
Almost all systems provide product pictures, prices and reviews as basic information plus different additional information like marketing offers, lists, LBS, test reports, videos, in-stock availability, recommendations for alternative products, price comparison, ratings, and product guides.

The basic search process is similar for all systems. Users can scan a barcode or QR code attached on the physical product and execute a text search. RedLaser also enables a voice and image recognition search.

The kind and amount of functionalities differ strongly between the analysed systems. While all systems include search and rating functionalities, only a few systems offer additional functionalities like social media, mobile commerce, mobile payments, mobile marketing or LBS. Some systems also allow users to create an account, store loyalty programmes, perform reviews or create lists, archives and QR codes.

The usage requirements and user rights also differ between the systems. Most systems allow not only the information demand and performance of ratings and reviews but also the provision of additional product information and keywords without registration.

For the design of the reference model the following picture emerges.

**MODELING OF THE REFERENCE MODEL**

Based on the examined literature review and the case studies, we develop the reference model for mobile product information systems. Therefore, we derive and categorise typical actors and elements from the above described case studies. In doing so, we analyse the identified actors on their capabilities and the identified elements on their content and usage.

For the analysis and the design of the system, the UML offers a range of different diagrams that help to “specify, visualize, and document models of software systems, including their structure and design, in a way that meets all of these requirements” [42].

In order to design the derived actors and related use cases of the mobile product information system, we first model a use case diagram. To provide a more detailed view of the involved actors and objects, we present then a class diagram showing classes of objects with similar characteristics (attributes and operations) and connections between them. These models are chosen because of their applicability for system development.

**Use case diagram**

The use case diagram demonstrates the different types of users in the system and the way they interact with it. It provides a higher-level view of the system and presents graphical what the system must do. Thus, it is an appropriate communication tool for stakeholders [56]. The outcome is a model showing actors and related use cases of the mobile product information system.

The system contains of four major actors: user, service provider, seller, and third party.

The user is a customer who has to register for the system before using it. After authentication, a user can buy products (mobile commerce), search for product information (e.g., via keyword search), create own lists (e.g., wish lists), archives (e.g., bought products) and QR codes (e.g., business cards), provide own information (e.g., pictures), send and receive messages (e.g., via email), scan and store data (e.g., loyalty cards), and redeem received marketing offers. The service provider is the owner and administrator of the system. He is responsible for administration of user accounts, can add new products and product categories, provide, change and delete product information, present users search results, send and receive messages, and provide LBS. The seller is a retailer or producer selling products and sending marketing offers to users as well as providing information (e.g., product data such as nutrition facts). The third party is an actor like a health care or test organisation providing additional product information to the system (e.g., test reports). The actors with their related use cases are presented in detail in Figure 2.
Class diagram
The class diagram demonstrates classes, ports and connections between them. It is used to abstract objects and describes objects with similar structures and characteristics [42]. Thus, in the object-oriented analysis and design a class diagram enables the modelling of a defined system.

The class diagram presents six classes of objects similar to the actors shown in the use case diagram: user, service provider, retailer, producer, third party, and product. All classes are specified by a set of attributes and operations. The classes user, service provider, retailer, producer and third party are connected to the class product.

The system is shown on paramount abstraction level in Figure 3. For a more detailed analysis and design it can be specified on a more detailed abstraction level (e.g. by specification of additional objects like lists, reviews, etc.).
Implications for research and practice

For researchers and practitioners the presented model can be used as basis to develop, analyse and compare mobile product information systems according to their actors, objectives and use cases. It can be combined with additional mobile B2B and B2C services like mobile inventory, mobile marketing, mobile payment or mobile social media.

The presented mobile product information system supports consumers by their shopping decision at the POS. Thus, users of the system can request and share additional information on the product (e.g., price and ingredients), the producer (e.g., ethical standards), and the retailer (e.g., opening hours). This information allows consumers to compare products, producers and retailers and therefore supports the complete information in the market.
CONCLUSION

In this paper, we used literature review and multiple case study research to identify relevant actors, use cases and objects of a mobile product information system. Based on that, we designed an according reference model using two UML diagrams (use case diagram and class diagram) showing the functionalities and data objects of the mobile product information system. The developed reference model can be used from researchers as well as practitioners as a first reference point and recommendation for the construction of new and the analysis of existing mobile product information systems. It promotes the analysis and comparison of mobile product information systems as well as the purposeful construction of such systems. The implementation phase of a mobile product information system can be supported by a continuation of the aforementioned introspective analysis, resulting in a top-down deduction of requirements for system architectures.

In this paper, we limited the design of the mobile product information system to the main actors and functionalities in order to provide a clear overview. In the future it might be possible that a provider of a mobile product information system will integrate additional services. However, the reference model allows an extension of the analysis, design and development of such a system and thus an integration of additional functionalities. Therefore, future research should include the analysis and design of the mobile product information system on a deeper abstraction level to provide the complete functional and technical survey of the system. Further research could also include the validation of the presented reference model by experts.

ACKNOWLEDGEMENTS

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REFERENCES


AN EXAMINATION OF ATTRIBUTES OF MOBILE PAYMENTS AND THEIR INFUENCE ON CONSUMER INTENTIONS TO ADOPT THE NEW WAY TO PAY: A CASE FROM THE UNITED KINGDOM

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EXTENDED ABSTRACT

This research uses a multiple regression model to predict which attributes of mobile payments are predictors of the consumer adoption intentions of this new consumer technology. The results from a consumer survey conducted in the United Kingdom in early 2013 indicate that consumers who perceive higher degree of relative advantage, compatibility, and observability of mobile payments will be more likely to adopt the technology and thus contribute to its diffusion in the future.

Keywords: mobile payments, adoption, diffusion, innovation attributes.

INTRODUCTION

The increasing use of smart phones presents a significant opportunity to facilitate technologies to allow consumers to pay for goods and services with their mobile devices. For the purpose of this study, mobile payments are payments for goods, services, and bills with a mobile device such as a mobile phone, smart-phone, or other mobile device by taking advantage of wireless and other communication technologies [1]. While there is a growth trend in using mobile phones for payments, especially in Europe, most consumers continue to use more traditional methods such as cash and credit or debit cards. The potential growth in mobile payments is inhibited by several factors, including limited interest by banks to implement the technology because of concerns with commercial viability, limited near-field-communication (NFC) infrastructure and its questionable security at the point of purchase, lack of standardization, and regulatory uncertainties. Yet another set of factors that may facilitate or inhibit the speed of diffusion of mobile payments relate to consumer perceptions of the payment method. Rogers identified five innovation attributes that play a role in facilitating diffusion of new products and services: relative advantage, compatibility, observability, trialability, and complexity. Relative advantage is the degree to which the innovation is perceived as being better in its usefulness, convenience or ease of use than the previous product satisfying the same need or want. Compatibility refers to degree to which the new method is perceived by consumers as consistent with their existing values, past experiences, and needs. Observability describes the degree to which the results of use of the innovation are visible to others or simply ability to see others successfully interacting with a new product. The attribute of trialability is the degree to which one can experiment with or try the new product or service on a limited basis, before making a longer term commitment to it. Finally, complexity describes consumer’s perception of how difficult the innovation is to understand and to use [2].

The purpose of this study, conducted in United Kingdom in March 2013 among a representative sample of general consumers, is to identify the extent to which the attributes of mobile payments might predict the intentions to adopt this relatively new payment technology by consumers. According to Gx (a London-based research and consulting group specializing in payments), the UK is one of the most promising markets in terms of the potential of utilization of mobile payments by consumers because of high rates of smart phone penetration, high levels of income, and a well-developed payments infrastructure.

METHODOLOGY

Using a representative UK consumer panel, we collected survey data from 283 validated respondents. Qualtrics survey software was used to collect the data. In this sample, 63 percent (n=178) respondents indicated that they have not yet used a mobile phone to make a payment for goods or services. These non-user respondents are of significant interest here since the purpose of this research is to determine how the various perceived attributes of mobile payments might influence consumers’ intentions to adopt the new technology. Further, for this analysis, we eliminated additional 68 respondents (24 percent from the entire sample) who indicated that they would be very unlikely to adopt the technology, because they simply are not in the pool of potential adopters in the foreseeable future. Thus, a sample of 110 consumers, who indicated some degree of likelihood to adopt the new payment technology, was used for further analysis. Using the theory of diffusion of innovations proposed by Rogers [2], we developed a multiple regression model where the dependent variable was consumer intention to adopt the mobile payment, measured by five item scale with strong internal reliability (Cronbach’s α=.96). The four independent predictors included relative advantage (α=.94), compatibility (α=.95), observability (α=.97), and complexity (α=.94).
Trialability was not included in the model because we have not obtained a reliable measurement for this variable.

All variables included in the model met the assumption of normality for multiple regression purposes with Skewness and Kurtosis on all measures within an acceptable range of -1.0 to 1.0. We have also examined collinearity statistics of the independent measures to ensure lack of multicollinearity. All variance inflation factors (VIF) were below 4 and tolerance indices ranged from .270 to .688. The Durbin-Watson indicator was 1.92 (an index of 2 indicates lack of multicollinearity). These results indicate a reasonable lack of auto-correlations between the variables in the model. We have also examined partial regression residual plots and established that all four independent variables meet the homoscedasticity assumption for multiple regression analysis. The resulting predictive model is statistically significant, indicating that approximately 56 percent of the variation in the intention to adopt mobile payment variable is explained by the four predictors. The analysis of standardized beta coefficients indicates that relative advantage, compatibility, and observability (but not complexity) are statistically significant predictors (p<.05) in the model (see Table 1 for multiple regression results). Table 2 presents all correlations between the variables in the model.

### Table 1: Multiple regression model predicting the intentions to adopt mobile payment technology

<table>
<thead>
<tr>
<th>Unstandardized Beta</th>
<th>Std. Error</th>
<th>Standardized Beta</th>
<th>t-value</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative advantage</td>
<td>.262</td>
<td>.128</td>
<td>.254</td>
<td>2.042</td>
</tr>
<tr>
<td>Compatibility</td>
<td>.283</td>
<td>.117</td>
<td>.307</td>
<td>2.426</td>
</tr>
<tr>
<td>Observability</td>
<td>.206</td>
<td>.070</td>
<td>.231</td>
<td>2.957</td>
</tr>
<tr>
<td>Complexity</td>
<td>.080</td>
<td>.087</td>
<td>.080</td>
<td>.923</td>
</tr>
</tbody>
</table>

R square=.561
F=33.529, p<.001

### Table 2: Correlations between variables in the predictive model

<table>
<thead>
<tr>
<th>Relative advantage</th>
<th>Compatibility</th>
<th>Observability</th>
<th>Complexity</th>
<th>Intention to adopt (DV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative advantage</td>
<td>.843*</td>
<td>.510*</td>
<td>.642*</td>
<td>.682*</td>
</tr>
<tr>
<td>Compatibility</td>
<td>.543*</td>
<td>.638*</td>
<td>.698*</td>
<td></td>
</tr>
<tr>
<td>Observability</td>
<td></td>
<td>.431*</td>
<td>.562*</td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td></td>
<td></td>
<td>.539*</td>
<td></td>
</tr>
</tbody>
</table>

*All correlations are significant at p<.001.

### DISCUSSION

The results of this study indicate that three of the four innovation attributes are statistically significant predictors of consumer intentions to adopt mobile payments to pay for purchases. This means that companies, who plan to promote mobile payments to consumers who have not yet tried this technology, should emphasize relative advantage of the method by focusing on its convenience, ease of use, security, and speed. Another attribute perceived as an important predictor of intention to adopt is compatibility. It means that consumers who perceive mobile payments as consistent with past experiences and current needs will be more likely to embrace this technology. Therefore communicating comfort of use, compatibility with the existing infrastructure, likeability and fit of the new technology in the context of shopping experience will be important in convincing consumers to use mobile payments. Additionally, social influence and ability to see others using their smart phone to pay for purchases will help consumers to accept it as a method of payment. Thus, it will be important to initially provide strong incentives to the innovators and early adopters to use the new technology frequently, so other consumers will feel at ease to try it as well.
REFERENCES


WHAT INFLUENCING CONSUMERS TO RESIST USING MOBILE BANKING

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ABSTRACT

This study employed the theory of innovation resistance as a research basis to investigate main factors that influence individuals to resist using mobile banking. Compared to that numerous researches used innovation adoption theories to investigate what affects individuals to adopt mobile banking over the past ten years, this empirical study could advance current knowledge on the non-adoption of mobile banking. Besides, from innovation resistance perspectives to explore the mobile banking adoption and non-adoption, this study could provide banks valuable clues to develop elaborate and differentiated service, marketing, and business strategies in the mobile banking context.

Keywords: Innovation resistance, mobile banking, technology-based services.

INTRODUCTION

After extensively perusal of the literature, this study learned that almost all existing research adopted the positive innovation adoption perspective. Research from the innovation resistance viewpoint investigating what affects individuals to resist the adoption of technology-enabled new services or products is scant. Contrary to academic literature revealing little works in innovation resistance while large works in innovation adoption, market and industry reports have indicated that most of technology-enabled new services and products have suffered failure while only a small fraction of the services and products have been commercially successful [5][6][14][15][16][26][44][47][58]. In reality, the resistance to change is a normal consumer response and the vast majority of consumers have no a prior desire to change [6][15][16][26][36][47][64]. That is why consumer resistance to innovation has long been considered natural [4][14][18][40][46][48][50][52][57]. Particularly in technology-enabled innovative services or products, most consumers express higher resistant response and less enthusiastic response [69][36].

Additionally, some literature [36][57][60][64] further pointed out that the main research stream adopting the innovation adoption perspective might suffer pro-change bias, which assumes that the innovation is good, consumer resistance to an innovation is a temporary response, and consumers will adopt them with the time. Kuiska et al. [29] contended that research adopting the innovation adoption perspective is due to the biased idea that all innovations are improvements and add values for the majority of consumers. Garcia et al. [16] observed that even the innovation may have clear advantages over existing products or services, consumers may resist it when the innovation conflicts with consumer belief structures, requires large learning or changes routine behaviors. Consequently, the pro-change assumption is not always true [36] and even untrue at most of time, because most of innovations have failed in the marketplaces.

Motivated by the above, this research selects mobile banking as a study object to explore why people resist adoption of a technology-enabled innovative service. Two reasons exist for choosing mobile banking as the research subject. First, given that rapid advances in wireless communication, smart phones, and tablet computers as well as the intensive penetration of cell phones have motivated banks to realize that continual and quick advances in wireless communication environments have stimulated and created various commercial opportunities for banks. Therefore, banks have placed large investment on developing mobile banking systems and promoting mobile banking services to their customers during recent years. Meanwhile, mobile banking was still marginally adopted [3], the adoption rate for mobile banking remained substantially lower than the expected [12][59], and relatively few studies have empirically examined the situation [74]. Second, mobile banking perhaps was the first commercial mobile service [63] and introduced immediately after short messaging service and wireless access protocol [13]. Since mobile banking inherits attributes from both the wireless communication technology and the Internet bank, mobile banking services are frequently deemed as technology-enabled innovative services [61][66][75]. Therefore, the findings obtained from this proposed empirical study would be also useful to other technology-enabled innovation services.

THE THEORY OF INNOVATION RESISTANCE

In contrast to the consumer innovation adoption coming from the innovation diffusion theory (IDT) initially presented by Rogers in 1962 [60], the concept of consumer innovation resistance was first proposed by Sheth in 1981 [14][58][64]. IDT applies a process-oriented viewpoint to explain how an innovation (defined as an idea, practice, product, or service) can be accepted and diffused within a social system [1][22][60]. IDT contends that innovation adoption begins with end-user awareness of the innovation, and diffusion is a process through which an innovation is communicated via certain channels over time among members of a social system [60]. An innovation is defined as an object that is perceived as new by individual, while communication describes the process through which messages are transferred from a source to a receiver, time traces the sequential flow of an innovation through a social system, and social system is an organizational structure through which members communicate innovation adoption decisions.

In contrast to Rogers’ IDT considering consumer resistance to an innovation as a temporary response and even emotional or illogical response [14], Sheth [64] argued that the vast majority of people have no a prior desire to change to adopt an innovation and only a small minority of individuals seek change to embrace an innovation. Sheth [64] theorized consumer innovation resistance by two psychological constructs: habit toward an existing practice and perceived risks associated with innovation adoption. In the model of innovation resistance [57], habit toward an existing practice includes a series of behavioral stream from being aware of an innovation (such as idea, practice, product, or service), assessing the innovation, and making a decision (for example, selecting, acquiring, and using an existing alternative). As for perceived risks associated with innovation adoption, three major types of risks: (1) aversive physical, social, or economic consequence; (2) performance uncertainty; and (3) perceived side effects associated the innovation are occurred when a person encounters an innovation [57][64].

Contrasting to IDT, consumers’ resistance begins with their awareness of the innovation incurring either potential changes from a satisfactory status quo or conflicts with their belief structure [58]. Therefore, consumer innovation resistance is a rejection to an innovation rather than temporary response [64], a choice made by consumers [58], measured as three forms of rejection, postponement, and opposition [68], and considered as four levels ranging from apathy, passive resistance, active resistance, and aggressive resistance [31]. In this respect, Gatignon and Roberston [17] measured consumer rejection and adoption in their research and concluded that adoption and rejection are two different variables (rather than mirror images) in explaining why individuals adopt or resist an innovation. Herbig and Day [21] and Kleijnen et al. [26] supported that consumer resistance cannot be simply deemed as the obverse of adoption. The obverse of adoption is non-adoption instead of resistance [53]. As a result, it is inappropriate to conclude why consumers resist adopting an innovation directly from the conclusions culled from the adoption-based studies [17][26][58].

Even though some literature heeded the above phenomena and suggested the need for paying more attention to consumer innovation resistance instead of innovation adoption [14][26][57][64], innovation adoption literature is dominant in the past two decades and only several empirical studies regarding consumer innovation resistance have been conducted [26][31][34][36][68]. As a result, there is a need to have more researches on investigating consumer resistance behavior from the perspective of innovation resistance.

**HYPOTHESIS DEVELOPMENT**

Through extensively reviewing the literature, this study discovered that the earliest theory-based research regarding the adoption of mobile banking was conducted in early 2002 in South Africa [8], followed by a study conducted in the summer of 2002 in Finland [67]. The previous theory-based mobile banking studies are briefly summarized as the following table.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Theories</th>
<th>Sampling &amp; Countries</th>
<th>Main Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown et al. [8]</td>
<td>IDT and Decomposed TPB*</td>
<td>162 questionnaires collected from convenience and online sampling in South Africa</td>
<td>Relative advantage, trialability, number of banking services, and risk significantly influence mobile banking adoption.</td>
</tr>
<tr>
<td>Suoranta and Mattila [67]</td>
<td>Bass diffusion model and IDT</td>
<td>1253 samples drawn from one major Finnish bank by the postal survey in Finland</td>
<td>Information sources (i.e., interpersonal word-of-mouth), age, and household income significantly influence mobile banking adoption.</td>
</tr>
<tr>
<td>Laforet and Li [30]</td>
<td>Attitude, Motivation, and Behavior</td>
<td>300 respondents randomly interviewed in the streets of six major cities in China</td>
<td>Awareness, confidential and security, past experience with computer and new technology are salient factors influencing mobile banking adoption.</td>
</tr>
<tr>
<td>Luarn and Lin [43]</td>
<td>Extended TAM**</td>
<td>180 respondents surveyed at an e-commerce exposition and symposium in Taiwan</td>
<td>Perceived self-efficacy, financial costs, credibility, easy-of-use, and usefulness had remarked influence on intention to adopt mobile banking</td>
</tr>
<tr>
<td>Laukkanen and Pasanen [35]</td>
<td>Innovation Resistance</td>
<td>1525 respondents collected with a large Scandinavian bank customers in Finland</td>
<td>Usage and value are the most intense perceived barriers inhibiting individuals to adopt mobile banking, and aging is related to perceived risks of mobile banking.</td>
</tr>
<tr>
<td>Laukkanen [33]</td>
<td>Mean-end theory</td>
<td>20 qualitative in-depth interviews conducted with a large Scandinavian bank customers in Finland</td>
<td>Perceived benefits (i.e, location free and efficiency) are main factors encouraging people to adopt mobile banking.</td>
</tr>
<tr>
<td>Amin et al. [3]</td>
<td>TAM</td>
<td>156 respondents obtained via convenience sampling in Malaysia</td>
<td>Perceived usefulness, easy-of-use, credibility, amount of information, and normative pressure significantly influence the adoption of mobile banking.</td>
</tr>
<tr>
<td>Laukkanen and Pasanen [35]</td>
<td>Innovation adoption categories</td>
<td>2675 questionnaires completed via the log-out page of a bank in Finland</td>
<td>Demographics such as education, occupation, household income, and size of the household do not influence mobile banking adoption, while age and gender are main differentiating variables.</td>
</tr>
<tr>
<td>Yang [73]</td>
<td>Rasch measurement model and Item response theory</td>
<td>178 students selected from a university in South Taiwan</td>
<td>Adoption factors are location-free conveniences, cost effective, and fulfill personal banking needs, while resist factors are concerns on security and basic fees for connecting to mobile banking.</td>
</tr>
<tr>
<td>Cruz et al. [12]</td>
<td>TAM and theory of</td>
<td>3585 respondents collected through</td>
<td>The cost barrier and perceived risk are highest rejection.</td>
</tr>
</tbody>
</table>
In contrast to abundant literature based on innovation adoption viewpoints, this study extensively reviewed literature and then found only two works based on the perspective of consumer innovation resistance to investigate the mobile banking. Drawing from the theory of innovation resistance proposed by Ram and Sheth [58], Laukkanen et al. [36] summarized 18 factors into five barriers, namely Usage, Value, Risk, Tradition, and Image barriers. The theory of innovation resistance, proposed by Ram and Sheth [58] and adapted from the psychology and the IDT of Rogers, aims to explain why customers resist innovations even though these innovations were considered necessary and desirable. Through investigating 1525 usable respondents from a large Scandinavian bank, Laukkanen et al. [36] identified that the value and usage barriers were the most intense factors influencing consumers to resist mobile banking, while tradition barriers (such as preferring to chat with the teller and patronizing the banking office) were not significant factors to incur consumers to resist mobile banking.

Considering prior research indicated that consumers not use Internet banking due to not receiving enough information from the bank and lacking of knowledge and training concerning the innovation, Laukkanen and Kiviniemi [34] presented five hypotheses to test whether information offered by the bank has a negative effect on the usage barrier, value barrier, risk barrier, tradition barrier, and image barrier. After collecting 1551 valid responses, Laukkanen and Kiviniemi [34] examined the hypotheses using structural equation modeling and found all hypotheses were supported except for Hypothesis 4. That is, information offered by the bank significantly lowers the usage, value, risk, and image barriers but not the tradition barrier. Notably, the above literature review on mobile banking adoption and resistance clearly indicates that studies regarding the mobile banking have majorly focused on adoption and employed the perspective of innovation adoption while only two articles studying consumer innovation resistance in the mobile banking context. Considering this situation and mobile banking can be deemed the extension of online banking, this study expanded literature review into literature that employed the perspective of consumer innovation resistance to investigate what influence people resist adopting online banking. As expected, compared to numerous studies on online banking adoption, literature regarding resistance to online banking is also rare and only three another works were found and discussed as follows.

By in-depth interviewing 30 customers of a large Scandinavian bank, Kusima et al. [29] used the means-end approach to identify two functional barriers (usage and value barriers) and three psychological barriers (risk, tradition, and image barriers) which cause consumer resistance to banking online. After analyzing these barriers and interviews, Kusima et al. [29] contended that some barriers are connected to Internet banking and some are connected to Internet channel. Besides, resistance to change seems to be a personal characteristic of a respondent generating resistance to online banking as well as both consumer characteristics and communication characteristics may generate barriers.

Through collecting 390 valid samples from a large bank in Finland, Laukkanen et al. [32] found that those who resist online banking think internet banking would hardly enhance the ability to deal with financial matters, attach negative image to the new service in general, and like to going to the bank in person. By grouping resisters into postponers, opponents, and rejectors, Laukkanen et al. [32] further discovered that usage, value, tradition, and image barriers were significantly different among consumers.
To investigate how customers experience and perceive different kinds of resistance to Internet banking, Laukkanen et al. [37] performed a postal survey and collected 302 Finish bank customers who have not adopted Internet banking services in November-December 2006. Laukkanen et al. [37] separated 251 valid respondents into four groups: non-resistors, functional resistors, psychological resistors, and dual resistors. Through statistical analysis, Laukkanen et al. [37] discovered that functional resistors resist online banking mainly due to the functional characteristics of the service, psychological resistors resist adoption primarily due to that Internet banking causes consumer changes in their banking traditions and routines. Their study reported that Internet banking causes consumer changes in their banking traditions and routines. Their study reported that Internet banking causes consumer changes in their banking traditions and routines.

Building in the above and relying on theory of innovation resistance proposed by Ram and Sheth [58], this study put two core resistance constructs (functional and psychological barriers) into the research structure. Under the psychological construct, there are two barriers of tradition barrier and image barrier. Meanwhile, the functional construct contains usage barrier, value barrier, and risk barrier. Accordingly, the following hypotheses are posited:

H1: Psychological barriers significantly affect individual intention to resist using mobile banking;
H1a: Tradition barrier significantly affects individual intention to resist using mobile banking;
H1b: Image barrier significantly affects individual intention to resist using mobile banking;
H2: Functional barriers significantly affect individual intention to resist using mobile banking;
H2a: Usage barrier significantly affects individual intention to resist using mobile banking;
H2b: Value barrier significantly affects individual intention to resist using mobile banking;
H2c: Risk barrier significantly affects individual intention to resist using mobile banking;

The Table 2 shows the profile of respondents.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>159</td>
<td>66.8%</td>
</tr>
<tr>
<td>Female</td>
<td>79</td>
<td>33.2%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 20-year-old</td>
<td>17</td>
<td>7.1%</td>
</tr>
<tr>
<td>20-30 years old</td>
<td>121</td>
<td>50.8%</td>
</tr>
<tr>
<td>30-40 years old</td>
<td>51</td>
<td>21.4%</td>
</tr>
<tr>
<td>40-50 years old</td>
<td>34</td>
<td>14.3%</td>
</tr>
<tr>
<td>above 50 years old</td>
<td>15</td>
<td>6.3%</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT-related Sector</td>
<td>21</td>
<td>8.8%</td>
</tr>
<tr>
<td>Banking/Financial/Insurance</td>
<td>9</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

**Table 2. PROFILE OF RESPONDENTS**

Following previous literature, this study developed survey questionnaire through the following three steps: (1) items to measure each corresponding construct were culled from the earlier empirical research and reworded to fit the mobile banking resistance; (2) the focus-group interview and panel discussion involving mobile banking executives and scholars were executed to verify and, if necessary, revise the research structure and constructs (Taking this step is heavily because the pertinent literature on the mobile banking resistance is rare and considered insufficient to provide a highly validated research foundation for this work); and (3) a pretest were conducted by inviting several academics and practitioners who are familiar with mobile banking in order to refine the survey questions and check the wording.

Following respondent feedback, the questionnaire was slightly reedited to strengthen clarity and completeness. As a result, the formal questionnaire was organized into two sections, comprised of 28 questions. The first section contained 20 questions used to evaluate six constructs of traditional barrier, image barrier, usage barrier, value barrier, risk barrier, and intention to resist mobile banking. All questions in the first section were measured using a five-point Likert scale, ranging from “strongly disagree” to “strongly agree”. Of the seven questions in the second section, the first five questions were used to collect respondent demographic variables of gender, age, occupation, education level, and income level. The sixth question was to ask respondents whether they had used mobile banking or not. If the respondents answered “Yes”, they were deemed as mobile banking users. The seventh question was to ask respondents whether they had used smart phones or not. After ensuring that the questionnaire is clearly verified and effectively reflect the research purpose as well as each construct is concretized by the corresponding items, this study performed online sampling to collect data. Advantages of online surveys over paper-based mail survey have been discussed in many online studies [11][62], but a common problem in questionnaire survey is the response rate and non-response bias [11][23][62]. Based on past experience, offering monetary incentives is an effective approach for increasing response rate, while the uniformity of the responses in relation to date of receipt will be examined for non-response, the IP addresses of respondents will be examined for double submissions, and unanswered questions in incomplete questionnaire will be examined for item non-response bias.

After one-month survey in 2013, 238 valid samples were collected based on a structured questionnaire. The basic data of respondents is summarized in Table 2.
### Sector Distribution

<table>
<thead>
<tr>
<th>Sector</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education/Culture Sector</td>
<td>3</td>
<td>1.3%</td>
</tr>
<tr>
<td>Medical/Hospital/Bio-Tech Sector</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Retail/Distribution Sector</td>
<td>3</td>
<td>1.3%</td>
</tr>
<tr>
<td>Restate/Construction Sector</td>
<td>6</td>
<td>2.5%</td>
</tr>
<tr>
<td>Media/Publishing Sector</td>
<td>9</td>
<td>3.8%</td>
</tr>
<tr>
<td>Military/Police Sector</td>
<td>8</td>
<td>3.4%</td>
</tr>
<tr>
<td>Student</td>
<td>69</td>
<td>29.0%</td>
</tr>
<tr>
<td>Government/Non-Profit Sector</td>
<td>20</td>
<td>8.4%</td>
</tr>
<tr>
<td>House Keeping/SOHO</td>
<td>19</td>
<td>8.0%</td>
</tr>
<tr>
<td>Other Manufacturing Sector</td>
<td>21</td>
<td>8.8%</td>
</tr>
<tr>
<td>Other Service Sector</td>
<td>34</td>
<td>14.3%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>1.3%</td>
</tr>
<tr>
<td>Medical/Hospital/Bio-Tech</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior High Diploma or Below</td>
<td>33</td>
<td>13.9%</td>
</tr>
<tr>
<td>Associate Bachelor Degree</td>
<td>42</td>
<td>17.6%</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>107</td>
<td>45.0%</td>
</tr>
<tr>
<td>Master Degree</td>
<td>53</td>
<td>22.3%</td>
</tr>
<tr>
<td>Ph.D. Degree</td>
<td>3</td>
<td>1.3%</td>
</tr>
<tr>
<td>Annual Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than NT$ 250,000</td>
<td>81</td>
<td>34.3%</td>
</tr>
<tr>
<td>NT$ 250,001 – 500,000</td>
<td>68</td>
<td>28.6%</td>
</tr>
<tr>
<td>NT$ 500,001 – 1,000,000</td>
<td>49</td>
<td>20.8%</td>
</tr>
<tr>
<td>NT$ 1,000,001 – 1,500,000</td>
<td>25</td>
<td>10.5%</td>
</tr>
<tr>
<td>Over NT$ 1,500,000</td>
<td>15</td>
<td>6.3%</td>
</tr>
<tr>
<td>Have you used mobile banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>101</td>
<td>37.6%</td>
</tr>
<tr>
<td>No</td>
<td>157</td>
<td>62.4%</td>
</tr>
<tr>
<td>Have you used smart phone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>214</td>
<td>82.9%</td>
</tr>
<tr>
<td>No</td>
<td>44</td>
<td>17.1%</td>
</tr>
</tbody>
</table>

### DATA ANALYSIS AND DISCUSSION

The partial least squares (PLS) path analysis (also known PLS path modeling), a prediction-oriented structural equation modeling (SEM) technique, is selected to examine the hypothesized model. As a SEM technique, the PLS approach allows researchers to assess model parameters and structural path coefficients simultaneously. Different from covariance-based SEM, PLS is variance-based SEM and focuses on maximizing the variance of the dependent variables explained by the independent ones in place of reproducing the empirical covariance matrix (Haenlein and Kaplan, 2004). Another advantage is that PLS makes minimal demands in terms of sample size to validate a model compared to other SEM (i.e., LISREL and AMOS). The sample size of PLS requires ten times the largest number of independent variables impacting a dependent variable or the largest number of formative indicators [10][42]. Therefore, this study modeled all latent constructs as reflective indicators. Consistent with recommendations [10], bootstrapping was also performed to determine the statistical significance of each path coefficient using t-tests.

After running the PLS, the generated figures reveal that all factors in the measurement model had adequate reliability and convergent validity because all factor loading were greater than 0.7, the composite reliabilities exceeded acceptable criteria of 0.6, and the average variance extracted were greater than the threshold value of 0.5 in all cases. Since each construct is culled from literature and assessed using a multi-item five-point Likert scale, the content validity for each construct was also supported. The cross-correlation analysis (i.e., whether the square root of the average variance extracted for each construct exceeds the squared correlation between any pair of distinct constructs) was checked to verify the discriminant validity. As Fig. 1 displays, the generated $R^2$ adjusted was 0.365 accounted for the variances explained in Resist to Mobile Banking. In Fig. 1, * represents p-value < 0.05, ** represents p-value < 0.01, and *** represents p-value < 0.001.

The empirical results show that H1 is fully supported and H2 is partially supported. Fig. 1 displays that all factors in psychology side hold very significant influence (p-value < 0.01), while not all factors in function side hold statistical significance (p-value < 0.05). However, the most important barrier is risk barriers which hold extremely significant influence (p-value < 0.001). In the order of influencing strength, risk barriers, traditional barriers, and image barriers are salient factors impacting people resistance to use mobile banking. Given that mobile banking operates in an impersonal and technology-enabled environment which let customers may feel more uncertainties and unseen risks in mobile banking context than physical banking office, this study empirically discovered that risk is a crucial factor when people deciding to use or not use mobile banking (which is also verified in vast literature based on innovation adoption perspectives).
Additionally, this study empirically discovered that psychological barriers play an important role. This reveals that offering consumers opportunities using mobile banking is an effective strategy. Once they have experience using mobile banking, their habits and cognition may be changed and adapted to use mobile banking. Regarding the image barriers, the results indicate that peers and the public opinions still affect people willingness in the context of mobile banking. Therefore, executing testimony strategy could reduce individual resistance to mobile banking. Given that consumer resistance and adoption are two sides of whether a new technology-enabled product and service could be successfully commercialized, investigating the factors about consumers resist adopting an innovative technology-enabled product/service is as important as understanding why consumers are willing to adopt a new technology-enabled product/service. Thus, compared with tremendous studies in the past decades have explored the potential influences on individuals to decide whether or not to adopt a new technology-enabled product or service, this study could help banks more in-depth understanding consumer resistance to mobile banking. In line of this thinking, since most studies have focused on innovation diffusion, this research on consumer innovation resistance to mobile banking could advance current knowledge about what influences people discourage using mobile banking services.

REFERENCES


THE MATURITY OF INFORMATION TECHNOLOGY COMPETENCIES: THE CASE OF A MALAYSIAN PUBLIC UNIVERSITY

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ABSTRACT

Information technology plays a significant role in the accounting industry. Accounting graduates, therefore, are expected to possess necessary IT competencies to execute the day-to-day activities. However, IT competencies have been viewed as a uni-dimensional construct, with the focus on imparting technical knowledge. There is a difference between the ability to operate IT and IT competencies. IT competency refers to the use of technology for the execution of routine business, so that it contributes to the sustenance, growth and evolution of the business. Therefore, IT competencies should be viewed as a multi-dimensional construct wherein technical ability is complemented by organisational, people and conceptual skills. This study reports the results of a study which analysed the maturity level of IT competencies embedded in existing accounting curriculum in a Malaysian public university. These IT competencies were examined by reference to four major dimensions, namely: technical skills, organisational skills, people skills, and conceptual skills. In doing so, this study presents a scorecard of IT competencies and highlights the underachieving areas of the results of this case study; thus, enabling learning and working as a role map for the continuous improvement of the incorporation of IT competencies in the curriculum. This study makes a significant contribution to the academic and professional body of knowledge and provides an empirically-tested basis for developing IT competencies for knowledge workers in general and professional accountants in particular.

Keywords: Information technology, maturity, skills, competencies, accounting academics, accounting graduates

INTRODUCTION

Advances in information technology (IT) have transformed many organisations’ business processes including organisations/firms in the accounting professional service industry. The International Education Guideline (IEG) 11 issued by the International Federation of Accountant (IFAC) Education Committee states that IT “is pervasive in the world of business” and claims that “competence with technology is imperative for the professional accountant”. This has led academics and accounting practitioners to empirically analyse current university practices in order to detect the extent to which the importance of IT competency has been absorbed by the accounting curriculum [29]. This also includes the expectation that accounting graduates will possess a diverse range of IT skills and attributes in order to maintain a competitive advantage in a dynamic business environment.

IT has changed the way data is collected, processed, stored and aggregated for the preparation of accounting and finance-related information required by management to control and manage business activities [38]. The importance of IT skills to the accounting profession has been highlighted by many parties, including accounting practitioners, academics and professional bodies [17][11]. In a joint statement, the CEOs of the six largest international audit firms stated that, “today, it would be almost impossible to find an auditor [accountant] without a personal computer, or without the skills to operate any of a wide variety of software programs that companies now use to organise and analyse information about their operations” [32, p. 8] The present study adopted an interpretive paradigm with a qualitative approach through a case study of a Malaysian public university in order to identify the level of maturity of IT competencies embedded in existing accounting curriculum offered by higher academic institutions in Malaysia.

This paper is structured as follows. The first section provides an overview of the related work on IT competencies based on the relevant literature. The second section presents the research methodology. The third section is the main focal point of the paper, presenting the case study findings on IT competencies within the accounting curriculum. Finally, the conclusions from the case study are drawn.

RELATED WORK

The involvement of IT-related skills development in the accounting curriculum of higher learning institutions is widely recognised as a means of reflecting the realities of the use of various forms of information systems that are increasingly required in the current business world. The National Information Technology Taskforce in Australia predicted that the role of accountants will change significantly, and new skills will need to be developed in order to adapt to technological advancements [19]. According to [1], IT was not included in the accounting curriculum as existing accounting programs were already overcrowded. However, advancements in data/information management and the need for more efficient systems in conducting business have resulted in educators modifying the accounting curriculum and incorporating more exposure to IT [11].

In the 1980s and up until the early 1990s, studies on the IT-related skills of accountants focused on systems development and programming-related areas [28]. Rai et al. [28] revealed that accountants perceived systems initiation, design, implementation and control as the most necessary IT topics. This finding was supported by Van Meer and Adams [36] who stated that systems analysis, design and development, IT applications, internal control, documentation, IT audits, spreadsheet, and basic hardware and software components should be included in the accounting curriculum. Despite Ainsworth’s [1] observation of an overcrowded accounting curriculum without IT integration, Mohamed and Lashine [27] believed that knowledge of basic technology not only made entry-level accounting trainees “creative” in the workplace, but also helped them to adapt to the new environment faster. The study by Burnett [8] of the future of accounting education indicated that IT or technology-related skills were becoming important for accounting professionals. The study found that skills in spreadsheet software (e.g., Microsoft Excel), Windows, word-processing software (e.g., Microsoft Word) and the World Wide Web were the top four technology skills, in order of importance, considered by employers and CPA practitioners. These findings were in line with Helliar et al. [16] who stated that accounting graduates were required to attain skills in using word processors, spreadsheets and presentation software when entering their profession. These basic technology skills help accountants to adapt to the new environment, rather than just making them creative in their workplace [27].

Greenstein-Porsch and McKee [14] conducted a literature review that resulted in the identification of 36 critical information technologies. Their study focused on determining IT knowledge levels and perceptions of accounting information systems among auditing academics and audit practitioners in the US. The authors found a relatively low level of knowledge of e-commerce and advanced technologies and audit automation constructs among both the educators and practitioners, but a relatively high level of knowledge of office automation and accounting firm office automation constructs. They also identified a potential “learning gap” between educators and practitioners in five of the 36 critical technologies that they examined. Greenstein-Porsch et al. [15] extended that study by comparing the US results with their results in Germany. Their study showed a relatively low level of knowledge for the general constructs of e-commerce, system design and implementation and audit automation technologies for both the German and US auditors. However, the knowledge of the German auditors was found to be higher for e-commerce technologies than the US auditors, while the knowledge of the US auditors was found to be higher for system design and implementation and office automation technologies than the German auditors. Mgaya and Kitindi [26] reported on a study completed to identify the level of IT skills of practitioners and accounting educators in Botswana. The results indicated that the self-reported IT skills of practitioners and accounting educators were lower than they thought practising accountants should have.

Ismail and Abidin [18] attempted to coordinate the alignment between IT knowledge and importance to current accountancy roles (as auditors) in Malaysia. Their findings indicated that the respondents perceived the highest level of knowledge in general office automation and accounting firm office automation skills, while knowledge in audit automation, and systems development skills was low. Overall, the IT knowledge levels of the respondents were lower than the perceived importance of these skills in their careers. Another study on alignment between IT importance and knowledge levels was conducted by Rai et al. [28] in Australia. Overall, the IT knowledge levels among the Australian accountants were lower than the perception of the importance of IT knowledge. Their study indicated that accountants had high levels of IT knowledge in email and communication software, and in electronic spreadsheets, while knowledge of systems development and programming tools was low.

**Information Technology Skills and Competencies Required by Accounting Graduates**

IT competencies can be identified as a set of IT-related knowledge and experience that a knowledge worker possesses [5]. Carnaghan [9] viewed IT competencies as the qualities which are demonstrated by activities such as the capacity to create a spreadsheet or database for a particular purpose, or the ability to use software. According to the IFAC [17], accounting practitioners are expected to possess necessary IT competencies. In fact, the credibility of the accounting profession in general depends on their success in fulfilling this obligation. Thus, every professional accountant is expected to act as a user, designer, manager, planner or evaluator of information systems, or a combination of these roles [37]. The advancement of technology is the greatest element that changes accountants’ roles from merely information provision to extended information facilitation, planner or evaluator of information systems, or a combination of these roles [37]. The advancement of technology is the greatest element that changes accountants’ roles from merely information provision to extended information facilitation, planner or evaluator of information systems, or a combination of these roles [37]. The advancement of technology is the greatest element that changes accountants’ roles from merely information provision to extended information facilitation, planner or evaluator of information systems, or a combination of these roles [37]. The advancement of technology is the greatest element that changes accountants’ roles from merely information provision to extended information facilitation, planner or evaluator of information systems, or a combination of these roles [37].

Knowledge of and experience in IT is at the core of all these skills. However, there are certain organisations which prefer their accountants to also possess professional skills such as people, organisational and conceptual skills in order to make appropriate and optimal use of IT skills in organisational settings. For example, for an accountant, skills and competencies in the use of spreadsheets, taxation software or accounting software is required. However, these software packages are process-dependent and take input from various other areas of the organisation, at the same time provide output to additional areas of the organisation. In these circumstances, an individual needs to have complementary teamwork as well as interpersonal and analytical skills in order to understand the information requirements of the process, to comprehend process handoffs and interfaces, and to process information in order to produce useful output.
Table 1: Skills required by accountants

<table>
<thead>
<tr>
<th>Skills</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Skills</td>
<td>Advanced word processing and desktop publishing, spreadsheet, presentation software, operating systems, data communication, information search and retrieval techniques, taxation software, database operations, record lifecycle management, information quality management, data analyses, reporting, querying and business intelligence, information system development, e-commerce applications, accounting packages, data auditing, financial audit automation tools, network configuration and management, IT security, project management software and techniques, workflow automation and business process re-engineering, enterprise resource planning systems, IT governance</td>
</tr>
<tr>
<td>Organisational Skills</td>
<td>Time management, project management, business process re-engineering, change management, resource management, prioritisation, planning, organising/designing, and controlling</td>
</tr>
<tr>
<td>People Skills</td>
<td>Delegation, leadership, teamwork and collaboration, communication and negotiation</td>
</tr>
<tr>
<td>Conceptual Skills</td>
<td>Problem Solving, Creative Thinking, Critical Thinking, Decision Making and Crystallized Cognitive Ability</td>
</tr>
</tbody>
</table>

Source: Developed for this study

RESEARCH METHODOLOGY

This research aimed to identify the maturity of IT competencies in the existing accounting curriculum offered by higher academic institutions in Malaysia. The research therefore focused on the real case scenario of IT skills and competencies embedded in the existing accounting curriculum at one university, referred to as “University J”. This study adopted a qualitative approach which used an interpretive research paradigm wherein the interactions between the phenomenon and context were analysed and interpreted. Such research is explanatory by nature and requires effective understanding of detailed real-life behaviour [39]. This study also employed questionnaires as a complement to the data collected through interviews to increase the credibility of the research findings, in an effort to reduce bias. According to Yin[39], a survey produces quantitative data as part of the case study evidence. Therefore, a survey was useful in this study to complement the data that could not be achieved by a case study. The survey instrument measured the level of maturity of skills in maximising the use of IT (directly or indirectly imparted to students) in the accounting curriculum. Each respondent (academic) was asked to rate each of the skill dimensions (see Figure 1) using a single/multi-dimensional scale adapted from the Capability Maturity Model (CMM), with influencing factors from the Information Technology Infrastructure Library (ITIL) and Control Objectives for Information and Related Technology (COBIT). A similar scale/measurement was adapted by Baskarada [6] in his research into information quality management capability maturity models. An average of the ratings was used to assess the maturity level of a specific competency. For example, a score of 3.3 indicated that the respondents believed University J was between the DEFINED and MANAGED ranges for the specific competency.
The participating university that provided an accounting program was the main data collection source. This was because the university was one of the higher academic institutions directly involved in the preparation of accounting graduates in Malaysia. In addition, the program was established and developed following the requirements of the accountancy professional bodies in Malaysia such as the Malaysian Institute of Accountants and the degree was fully recognised by the Malaysian Government as a professional qualification. Semi-structured interviews were conducted through a one-to-one interview which averaged approximately one hour each. A total of seven interviews were conducted with accounting academics from the university. Academics including the head of department, program coordinator, and senior and junior lecturers who were involved in imparting accounting courses at this university were interviewed. The respondents were asked to identify the incorporation level of each dimension in the existing curriculum. The interview questions were prepared before the interviews were conducted. Interviewing academics from different departments allowed for deeper understanding, description and explanation of IT skills and competencies by obtaining in-depth insights into different aspects and identifying problems in delivering accounting courses to students. Analysis of the case under review allowed the researcher to capture the viewpoints of the respondents with respect to the skills and competencies for using IT that should be obtained by accounting graduates to ensure compliance with regulations and professional standards. The analysis involved multiple processes, namely: firstly, calculating the mean of each skill dimension (refer to Table 1); and secondly, categorising them through the level of maturity based on the scale/indicator illustrated in Figure 1. Then, the most critical process was the interpretation of the interview transcripts in order to validate or support the findings with the findings from the quantitative data.

Structure of the Accounting Degree Program at University J
The undergraduate program structure at the Faculty of Accountancy is illustrated in Figure 2. It shows two major areas that should be fulfilled by accounting students in order to obtain their degree, that is, the university core and program core. To fulfil the university’s academic requirements and the Malaysian accounting profession’s accreditation requirements when graduating from this program, students were required to complete all the major areas and sub-areas of the curriculum within eight semesters with an emphasis on the inter-disciplinary approach to accounting.
Table 2 presents the IT competencies elements embedded in the accounting program structure at University J. An assessment for each subject revealed that between 0%-25% weighting is assigned to individual oral presentations in tutorials, participation in group assignments and presentations, pop quizzes and lab evaluations. The balance of the assessment indicated that the lecturers placed significant emphasis on teaching students through a focus on context-specific outcomes, which were assessed through the problem-based learning (PBL) approach such as reports, peer evaluations and presentations.
<table>
<thead>
<tr>
<th>Course/Subject</th>
<th>Direct Skills Imparted</th>
<th>Indirect Skills Imparted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting Information Systems</td>
<td>• Information needs &amp; decision-making</td>
<td>• Communication skills, critical and creative thinking skills, problem-solving skills, teamwork skills, leadership skills, time management skills, controlling skills, project management and planning and organising skills</td>
</tr>
<tr>
<td></td>
<td>• Strategic analysis model</td>
<td>• In order to impart the above skills, group work, group discussion, PBL, project work, case study, assessment and presentations are implemented in the learning process and moderated by academics</td>
</tr>
<tr>
<td></td>
<td>• Value chain model</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input, process, storage, output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Internal control &amp; system security</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Threat &amp; fraud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Computer fraud /classifications/techniques control components (control components, risk assessment &amp; risk response, control activities, Information &amp; communication monitoring)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Information security concepts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Preventive, detective &amp; corrective controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Confidentiality &amp; privacy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Controls for active threats/processing integrity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Controls for passive threats/availability (system downtime and disaster recovery &amp; business continuity planning)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Change management controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UBS accounting software</td>
<td></td>
</tr>
<tr>
<td>Accounting System</td>
<td>• CASE tools</td>
<td></td>
</tr>
<tr>
<td>Analysis and Design</td>
<td>• Microsoft Project</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Microsoft Access</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ABC Flow Charter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Project management/system development lifecycle</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Teamwork skills, leadership skills, communication skills, critical and creative thinking skills, problem-solving skills, time management skills, controlling skills, project management and planning and organising skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• These skills are imparted in various activities such as PBL, group work, group discussion, tutorial, project work, lab evaluation, integrated case study, assessment and presentations and moderated by academics</td>
<td></td>
</tr>
<tr>
<td>Quantitative</td>
<td>• Decision analysis</td>
<td></td>
</tr>
<tr>
<td>Communication and Negotiation in</td>
<td>• Negotiation skills</td>
<td>• Negotiation skills, teamwork skills, leadership skills, communication skills, critical and creative thinking skills, problem-solving skills</td>
</tr>
<tr>
<td>the Workplace</td>
<td>• Communication skills</td>
<td>• To gain these skills, group work, group discussion, assessment and presentations are actively implemented in the learning process; these activities are moderated by academics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Business Analysis | • Linear programming  
• CPM/PERT and inventory management | thinking skills, problem-solving skills, time management skills, planning and organising skills  
• High participation of students in group work, group discussion, case study, e-learning website, assessment and presentations for imparting these skills; these activities are supervised by academics |
| Speech Communication | • Develop speeches and oral presentations (verbal and non-verbal communication skills)  
• Presentation video aids (PowerPoint) | • Teamwork skills, leadership skills, communication skills, critical and creative thinking skills, problem-solving skills, time management skills, planning and organising skills, resource management skills, project management and controlling skills  
• These skills are imparted through group work, group discussion, PBL, project work, case study, e-learning website, assessment and presentations; these activities are moderated by academics |
FINDINGS AND DISCUSSION

The integration level of IT and related competencies at University J was found to be at the DEFINED level, with the mean score of 3.03 (Figure 3 and Table 3). People skills were ranked with the highest score (3.13), whereas conceptual skills were given the lowest score of 2.93. This highlights that this university had formal recognition and understanding of the importance of the skills that were critical for students. However, there was no formal agreement about how to instruct/impart these skills to the accounting students and the skill level was inconsistently embedded throughout the curriculum.

![Figure 3: IT competencies embedded in the University J curriculum](image)

Table 3 presents the mean score for each skill/dimension as perceived by the respondents. The mean value range (overall scores) was between 2.87 and 3.32. This suggests that the majority of respondents perceived there was a moderate level of skills embedded in the curriculum. The findings showed that technology elements were not fully integrated in the curriculum. It appeared that only two technology-related courses were offered by this university, namely, Accounting Information Systems and Accounting System Analysis and Design (refer Table 2). This implied that the university was focused on the development of accounting technical knowledge (for example, new standards and regulations for financial reporting) compared to soft skills and interpersonal and technology skills development. Although an effort was being made by the university to integrate the skills, these skills were only being indirectly imparted through learning instructions (as seen in Table 2), which to some extent was delaying the enhancement of these skills among accounting students. This suggests that University J did not provide an appropriate environment for students to establish IT and related competencies prior to employment.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Technical Skills</th>
<th>Organisational Skills</th>
<th>People Skills</th>
<th>Conceptual Skills</th>
<th>Overall Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 1</td>
<td>3.59</td>
<td>3.19</td>
<td>3.58</td>
<td>2.93</td>
<td>3.32</td>
</tr>
<tr>
<td>Respondent 2</td>
<td>3.09</td>
<td>2.70</td>
<td>3.08</td>
<td>2.73</td>
<td>2.90</td>
</tr>
<tr>
<td>Respondent 3</td>
<td>2.73</td>
<td>2.89</td>
<td>3.17</td>
<td>2.80</td>
<td>2.90</td>
</tr>
<tr>
<td>Respondent 4</td>
<td>2.77</td>
<td>3.07</td>
<td>3.25</td>
<td>3.00</td>
<td>3.02</td>
</tr>
<tr>
<td>Respondent 5</td>
<td>3.05</td>
<td>2.96</td>
<td>2.92</td>
<td>2.93</td>
<td>2.96</td>
</tr>
<tr>
<td>Respondent 6</td>
<td>2.77</td>
<td>3.07</td>
<td>3.33</td>
<td>2.73</td>
<td>2.98</td>
</tr>
<tr>
<td>Respondent 7</td>
<td>3.68</td>
<td>3.33</td>
<td>2.92</td>
<td>3.07</td>
<td>3.25</td>
</tr>
<tr>
<td>Respondent 8</td>
<td>2.50</td>
<td>3.11</td>
<td>3.00</td>
<td>3.00</td>
<td>2.90</td>
</tr>
<tr>
<td>Respondent 9</td>
<td>2.86</td>
<td>2.74</td>
<td>3.42</td>
<td>3.13</td>
<td>3.04</td>
</tr>
<tr>
<td>Respondent 10</td>
<td>2.50</td>
<td>3.00</td>
<td>2.92</td>
<td>3.07</td>
<td>2.87</td>
</tr>
<tr>
<td>Respondent 11</td>
<td>3.05</td>
<td>2.93</td>
<td>2.83</td>
<td>2.87</td>
<td>2.92</td>
</tr>
<tr>
<td><strong>Σ</strong></td>
<td><strong>2.96</strong></td>
<td><strong>3.00</strong></td>
<td><strong>3.13</strong></td>
<td><strong>2.93</strong></td>
<td><strong>3.03</strong></td>
</tr>
</tbody>
</table>

Technical Skills

The technical skills at University J were at the EMERGING level of integration with an overall mean score of 2.96 (Figure 4). The majority of respondents indicated the EMERGING level, although it was relatively close to the DEFINED level. All the respondents gave a score of between 2.50 and 3.68 which showed that all the academics shared the same opinion regarding the level of integration of technical skills within the curriculum.
The results, as presented in Table 2, indicated that technical skills were imparted directly through two technology-related courses. For example, lessons on UBS accounting software (accounting package), internal controls and system security were found in the Accounting Information Systems course, and Microsoft Project, Microsoft Access and project management/system development lifecycle were included in the Accounting System Analysis and Design course. This was consistent with the high scores for accounting packages, project management software and techniques, database operations and IT security (see Table 4). One of the objectives of the university was to produce accounting graduates who can play an important role in workplaces where these skills and knowledge are often used routinely, not only for recording accounting transactions, but also for work involving clients’ project-based tasks. The Head of Accounting Information System, Audit and Taxation at University J commented on this as follows:

“It is important that accounting graduates be taught how to operate systems and software that is often used in the workplace. Graduates who have skills to use variety types of accounting-based systems and have the ability to operate audit and taxation system would be an advantage.”

Head of Accounting Information System, Audit and Taxation

However, the results included a relatively low score for the integration of important technical skills such as data analyses, reporting and querying, information quality management and record lifecycle management. This was also reflected in the view expressed by one of the senior lecturers, who admitted that the curriculum placed more emphasis on elementary technical skills:

“This university does not focus to some important technical skills in accounting curriculum. It seems that the same and basic technology have been embedded for several years. It should be revised… I was a bit worried that our graduates cannot provide good quality in their job since technology is always facing rapid changes. For example, a technology such as social media is noteworthy in our teaching because it [social media] helps the growth of business activity.”

Senior Lecturer 2

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mean Score</th>
<th>Maturity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced word processing and desktop publishing</td>
<td>4.00</td>
<td>Level 4</td>
</tr>
<tr>
<td>Spreadsheet software</td>
<td>3.82</td>
<td>Level 3</td>
</tr>
<tr>
<td>Presentation software</td>
<td>3.45</td>
<td>Level 3</td>
</tr>
<tr>
<td>Data communication/sharing (email, social networks, Web 2.0)</td>
<td>3.36</td>
<td>Level 3</td>
</tr>
<tr>
<td>Information search and retrieval techniques</td>
<td>2.55</td>
<td>Level 2</td>
</tr>
<tr>
<td>Taxation software (tax return, tax reconciliation, direct and indirect tax)</td>
<td>3.36</td>
<td>Level 3</td>
</tr>
<tr>
<td>Accounting packages (Mind Your Own Business, User Business System Accounting(UBS, Bizztrak))</td>
<td>3.73</td>
<td>Level 3</td>
</tr>
<tr>
<td>Data auditing (audit trail, fraud control, etc.)</td>
<td>3.09</td>
<td>Level 3</td>
</tr>
<tr>
<td>Financial audit automation tools (generalised audit software and embedded audit module)</td>
<td>3.18</td>
<td>Level 3</td>
</tr>
<tr>
<td>Project management software and techniques</td>
<td>3.45</td>
<td>Level 3</td>
</tr>
<tr>
<td>Database operations (creation, manipulation and management of data; data coding, data dictionary, data control and extraction; ETL; data warehouse)</td>
<td>3.55</td>
<td>Level 3</td>
</tr>
<tr>
<td>Data analyses, reporting, querying, and business intelligence</td>
<td>2.91</td>
<td>Level 2</td>
</tr>
<tr>
<td>Information quality management (including data cleansing, purification, aggregation, etc.)</td>
<td>2.36</td>
<td>Level 2</td>
</tr>
<tr>
<td>Record lifecycle management (creation exchange, storage retrieval and retirement/ deletion)</td>
<td>1.91</td>
<td>Level 1</td>
</tr>
<tr>
<td>Information system development/procurement lifecycle</td>
<td>3.45</td>
<td>Level 3</td>
</tr>
<tr>
<td>E-commerce applications (electronic payment system, customer relationship management, website development/maintenance)</td>
<td>2.45</td>
<td>Level 2</td>
</tr>
</tbody>
</table>
Workflow automation and business process re-engineering & Level 2
Operating systems (Windows and Linux) & Level 2
Network configuration and management & Level 2
IT security (antivirus software, firewall, backup and recovery, etc.) & Level 3
Enterprise resource planning systems & Level 2
IT governance (IT resources management, risk management, IT performance evaluation, IT value delivery, business IT alignment) & Level 2

Organisational Skills

Figure 5 presents the results from the respondents regarding their perception of the levels of integration of organisational skills into the accounting curriculum. The overall result was a score of 3.00 (Figure 5), with the individual scores ranging between 2.70 and 3.33. This overall score represented the DEFINED level of integration, indicating that the university did not appreciate the multi-dimensional view of technical, organisational, people and conceptual skills/dimensions. As a consequence, a relatively low level of technical skills and organisational skills was indicated by the respondents for this university. This is quite alarming as organisational skills are vital for accounting work. Such skills enhance students’ ability to handle projects in progress and plan new projects so that they can manage their time and resources. Senior Lecturer 1 commented on this point as follows:

“When they [students] doing their tasks, they need to reflect on a real scenario and relate to topic of a problem. It takes time if they do it manually, they need to use any kind of systems that can assist them in managing their time, resources, cost as well as planning their strategy. Otherwise, they will not punctual, not meeting deadlines for their projects or assignments.”

Senior Lecturer 1

Organisational skills are imparted indirectly throughout the existing curriculum, with explanation-based instruction such as group discussions and presentations involved in this process. For example, in one learning strategy, a small group was given a 45 minute timeframe to discuss a complex problem in their course that had not yet been resolved. This learning strategy was aimed to provide students with skills in time management and planning. One of the senior lecturers commented about this type of strategy as follows:

“I will make sure my students work in small group. This method not only to complete the task given, but also encouraged students to become active rather than passive learners by developing collaborative and co-operative skills, and lifelong learning skills. This will promote them to save time, to plan strategy for problem solving and requires a shared workload.”

Senior Lecturer in Auditing

Since technical skills were not fully embedded in the curriculum, it had a profound flow-on effect on the level of integration of organisational skills in the curriculum. It is hypothesised that the low levels of integration of business process re-engineering skills (2.55), resource management skills (2.64) and prioritisation skills (2.36) (Table 5) were reflected in the low scores for data analyses, reporting and querying (2.91), information quality management (2.36), record lifecycle management (1.91) and workflow automation and business process re-engineering (2.27) (refer to Table 4). It was also indicated that these scores were influencing the low level of creative thinking skills (2.91), decision-making skills (2.87) and crystallised cognitive ability skills (2.45) within the category of conceptual skills (refer to Table 7). Therefore, the results appeared to indicate that the university should consider the TOPC dimensions for the development of IT and related competencies by integrating more IT skills/elements in the curriculum and by increasing the number of tasks or activities given to students such as project-based tasks, integrated case studies and presentations in order to nurture skills development.
Table 5: IT competencies embedded in terms of organisational skills (University J)

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mean Score</th>
<th>Maturity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time management skills</td>
<td>3.35</td>
<td>Level 3</td>
</tr>
<tr>
<td>Project management skills</td>
<td>3.39</td>
<td>Level 3</td>
</tr>
<tr>
<td>Business process re-engineering skills</td>
<td>2.55</td>
<td>Level 2</td>
</tr>
<tr>
<td>Change management skills</td>
<td>3.09</td>
<td>Level 3</td>
</tr>
<tr>
<td>Resource management skills</td>
<td>2.64</td>
<td>Level 2</td>
</tr>
<tr>
<td>Prioritisation skills</td>
<td>2.36</td>
<td>Level 2</td>
</tr>
<tr>
<td>Planning skills</td>
<td>3.13</td>
<td>Level 3</td>
</tr>
<tr>
<td>Organising/designing skills</td>
<td>2.91</td>
<td>Level 2</td>
</tr>
<tr>
<td>Controlling skills</td>
<td>2.94</td>
<td>Level 2</td>
</tr>
</tbody>
</table>

People Skills

Unlike technical and organisational skills, people skills were recorded at the DEFINED level of integration in the curriculum. The overall mean score was 3.13, with the individual scores ranging between 2.83 and 3.58 (Figure 6).

A moderately mature level of integration was perceived by respondents on people skills, which may have been due to the fact that these skills were considered to be important and that they should be acquired by accounting graduates and imparted directly into the existing curriculum. The recognition of this importance was reflected in the availability of two courses, namely, Communication and Negotiation in The Workplace, and Speech Communication (refer to Table 2) which had been established to develop the communication and negotiation skills required in job-related situations. Thus, it was likely that the establishment of both courses had influenced the respondents’ perceptions about the level of integration of skills in communication, negotiation, and teamwork and collaboration, which recorded scores of 3.45, 3.65 and 3.12 (Table 6), respectively. The respondents made a number of comments about the necessity of people skills in the workplace. Some stated that it was wise for students to start developing these skills during the period of formal learning at university. For example:

“It is vital to develop communication and negotiation skills during their [student] degree. There was so much group discussion and problem based learning that require a lot of teamwork, negotiation cooperation, and presentation work must be performed by students, especially involved with projects/assignments... moreover, at present, employers consider graduates should have ‘complete package’ before seeking for a job. Of course, they want graduates who are able to provide returns commensurate with the value of their investment.”

Senior Lecturer in Financial Accounting (University J)

At the same time, delegation and leadership skills were perceived to have a low level of integration; scoring 2.59 and 2.82, respectively. This was not surprising as these skills were only imparted indirectly through the learning process (see Table 2). One of the lecturers expressed the view that it was difficult to include these skills in the curriculum and, therefore, the active learning strategies such as group discussion and working in groups were applied in order to give them experience in tasks that simulated the workplace environment and developed their skills as leaders. Such learning strategies enhanced the social skills and interactions among the students. However, the tendency to assign too many tasks and projects to the students had made them more focused on completing their work as quickly as possible rather than on applying these skills to perform their tasks. As commented by a senior lecturer:

“I would like to say that students have given too much projects. Each course has own project requirements. My students often complained they have less time to fulfil their work. One of the strategies they are taking is by dividing the individual projects to each other [within group]. This means that each member of the group will focus on different projects. This strategy
might good with time constraints, but it difficult to enhance student skills such as leadership, communication and delegation, which are very useful in their future employment.”

Senior Lecturer in Audit and Information Systems

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mean Score</th>
<th>Maturity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delegation Skills</td>
<td>2.59</td>
<td>Level 2</td>
</tr>
<tr>
<td>Leadership skills</td>
<td>2.82</td>
<td>Level 2</td>
</tr>
<tr>
<td>Teamwork and collaboration skills</td>
<td>3.12</td>
<td>Level 3</td>
</tr>
<tr>
<td>Communication skills</td>
<td>3.45</td>
<td>Level 3</td>
</tr>
<tr>
<td>Negotiation skills</td>
<td>3.65</td>
<td>Level 3</td>
</tr>
</tbody>
</table>

Conceptual Skills

In regard to conceptual skills, University J recorded an EMERGING level of integration within the accounting curriculum. As shown in Figure 7, all the respondents perceived the level of integration to be between EMERGING and DEFINED with the scores ranging between 2.73 and 3.13. This level of integration was likely to be influenced by the integration of technical skills in the curriculum such as data analyses, reporting, querying (2.82), information quality management (2.09) and information search and retrieval techniques (2.18) (see Table 4). Another possible reason for this result was that some of the academics believed that these skills were being developed in other courses in the curriculum (unrelated to the accounting curriculum), and therefore, they were not concentrating on the skills in their own courses. A program coordinator commented on this point as follows:

“I think some other courses have been emphasising on development of skills, especially in problem solving and decision making among students… whether the courses have been offered by this faculty or other faculties as elective courses.”

Program Coordinator in Accounting Program (University J)

Table 7 illustrates the scores for the integration of each conceptual skill as perceived by the respondents. The results indicated that the integration of problem-solving, critical thinking and creative thinking skills was probably reflected by the high scores for data communication, project management software, database operations, information system development lifecycle (see Table 4), time management skills, project management skills, planning skills (see Table 5), teamwork and collaboration skills, communication skills and negotiation skills (see Table 6). One explanation for this from Accounting Information Systems (AIS) lecturer was that some of these skills, such as negotiation, critical thinking and creative thinking skills, were imparted directly in the accounting program; therefore, students were assigned a number of tasks for these particular skills. For example, through problem-based learning and case studies, students from diverse backgrounds were given the opportunity to be heard, share experiences and skills, and to participate in unique ways to encourage the development of their conceptual skills. In these ways, alternative ideas and points of view could be generated and students could learn to think critically and analytically when they handled challenges in completing the assignments and tasks.

Table 7: IT competencies embedded in terms of conceptual skills (University J)

<table>
<thead>
<tr>
<th>Elements</th>
<th>Mean Score</th>
<th>Maturity Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem-solving skills</td>
<td>3.26</td>
<td>Level 3</td>
</tr>
<tr>
<td>Creative thinking skills</td>
<td>2.91</td>
<td>Level 2</td>
</tr>
<tr>
<td>Critical thinking skills</td>
<td>3.15</td>
<td>Level 3</td>
</tr>
<tr>
<td>Decision-making skills</td>
<td>2.87</td>
<td>Level 2</td>
</tr>
<tr>
<td>Crystallised cognitive ability skills</td>
<td>2.45</td>
<td>Level 2</td>
</tr>
</tbody>
</table>
CONCLUSION

This study was motivated by the observation that failure and success in the provision of accounting services can often be attributed to a lack of IT skills and competencies. The case study explained the issues and challenges within a Malaysian public university with regard to developing IT competencies in the accounting curriculum. In order to reduce the impact of poor accounting and business-related services on client service and professional decision-making, a number of themes emerging from the case study should be given serious consideration. Firstly, accountants should understand and recognize the specific issues regarding services to clients and the related elements of IT skills. This recognition will enable them to determine which elements of IT skills and competencies are relevant to the issues and to ensure the level of services are at a satisfactory level. Secondly, universities should create a development plan for a comprehensive IT competency program for each stage of an accountant’s lifecycle. This program should provide accounting graduates with the ability to recognize issues in delivering services identify root causes and construct possible solutions, thereby embedding these skills as part of their jobs.

REFERENCES

Instructional Pedagogies, 1 – 10.


[34] Sürmen, Y & Daştan, A 2007, ‘The Relationship Between The Historical Development of Accounting Information System and Its Applications and Information Technologies'.


THE EFFECTS OF CONSUMER PERCEIVED VALUE ON PURCHASE INTENTION IN E-COMMERCE PLATFORM: A TIME-LIMITED PROMOTION PERSPECTIVE

Lifang Peng, Xiamen University, China, lfpeng@xmu.edu.cn
Shuyi Liang, Xiamen University, China, lsy90624@163.com

ABSTRACT

In order to stimulate consumption, most e-commercial giants of China conduct sales promotions centered on “price war”, thus impeding the healthy development of e-commercial enterprises to some degree. Under this condition, it’s every e-commercial enterprise’s top priority to understand the perceived dimension of the central value of the customers’ purchase intention and thus reposition their marketing direction. Therefore, centered on the customers’ purchase intention, this paper structures a four-dimension (i.e., price, functional, emotional and social) model of the perceived value; and, in the meantime, considering the time-limit characteristic of the promotion, as a moderator variable, time pressure is used in the model to conduct the empirical analysis. According to the study, among the dimensions of the perceived value, only the price value and emotional value have a significantly positive influence on the customers’ purchase intention, and the influence by emotional value is bigger than the other. In different time pressure, the influence on purchase intention by perceived value makes significant difference. When there is difference in product category, the time pressure adjustment makes big difference too.

Keywords: E-commerce platform, price promotion, time pressure, perceived value, purchase intention.

INTRODUCTION

Rapid development of China’s e-commerce sector has been playing an increasingly important role in the country’s economic and social life and, thus, becoming a new engine to drive the Chinese economy. According to the report, by the end of 2012, China’s population of online shoppers was 242 million; the ratio of online shopping netizens has increased to 42.9% [1]; while the total value of the e-commerce market’s transactions in 2012 reached 7850 billion RMB which was 30.83% more than in 2011 [2]. However, since macro economy in 2012 grew slowly and capital market cooled down, e-commerce businesses held various sales promotions centered on “price wars” in order to simulate consumption, attract more users and increase market shares. As a result, Taobao became the biggest winner creating the sales record of 19.1 billion RMB per day. Though price promotions have made the sales surge, e-commerce businesses suffer constantly increasing costs in sales promotions in order to maintain low prices. Fierce market competition has caused pain to the whole industry.

The main purpose of this paper is to discuss the influence of the consumers’ perceived values in terms of all dimensions related to the purchase intention under the context when e-commerce businesses hold frequent price promotions. With an increasingly intensive market competition, centering sales promotions on the prices has become an important way of attracting customers. As a matter of fact, the expenditure on promotion has exceeded advertising expenses taking the largest part of the enterprise marketing expenditures with price discount promotions comprising 60-70% of the overall promotion budget [3]. Price promotions are deemed as an important approach to increase sales. For the sales persons, nothing is more effective than manipulating the price. Since the customers’ shopping behaviors are often intra-personal comparative behaviors, purchase intentions often depend on the customers’ perceived values [4]. Price promotions do not only stimulate consumption, but also temporarily change consumers’ perceived value of certain goods, thus, directly affecting their purchase intentions. In fact, customers’ perception has concerned scholars in the marketing field for a long time already [5]. The perceived value, as a good explanation of customers’ preferences and purchase behaviors in certain contexts, is an important factor that predicts the consumers’ purchase behaviors [6]. In addition, it is a better factor to explain customers’ preferences and purchase behaviors. Meanwhile, Chinese scholars [8] have also explained the critical influence of the perceived value on customers’ behavior. Similarly, the study about the consumer perceived value and purchase intention on the e-commerce platform also plays an important part in the marketing area [9].It means that the perceived value still exerts a noticeable influence on the online consumers’ purchase intention [10]. With regard to the real-world enterprise operations, the perceived value also attracts major attention from the entrepreneurs. Creating and providing a good perceived value for the consumer has brought the enterprises a new means to enhance competitive advantage and increase profit [11]. Therefore, under the context where e-commerce businesses carry out sales promotions, it is theoretically and practically meaningful to study the influence of the customers’ perceived value on their purchase intention.

Previous researches hold the view that price promotion can be used to motivate consumers’ to purchase commodities, thus, stimulating their purchase behaviors and leading them to purchase more and faster. This method is especially effective in product trials. Previous studies concerning price promotions principally have focused on the following issues: the various ways (e.g. price discount, discount coupon and buy-one-get-one-free) price promotions influence the consumers’ purchase behavior and perception [12], the influence of different types of price reduction descriptionon the customers [13], the influence of the discounts and price reductions on the consumers’ perception [14], etc. In addition, some studies have also pointed out that excessive and frequent price promotions might bring negative effects for the customer [15]. As for the studies...
researching the customer perceived value, they often have focused on the classification of the perceived value dimensions [5][16][17][18] and the relation between the perceived value and purchase intention [8][19], etc. Therefore, with regard to the price promotion influence on the perception, previous studies have mainly placed emphasis on how the enterprises change the manifestation of its products’ objective attributes to influence the customers’ perception. The purpose of the period studies were to design marketing schemes by manipulating the customers’ objectives, rather than carrying out customer-oriented research to get insights into the customers’ perceptions and hierarchy of needs. Thus, there is a research gap in the promotion context regarding the degree of influence of the customers’ perception dimensions in on their purchase intention. Furthermore, it is important to inspect and clear up the central value perception of the consumers’ purchase intention. This way, the managers could achieve better understanding of the consumers’ demands and accordingly formulate more appropriate marketing strategies. Fundamentally, at the same time, promotions are temporary, which means they are conducted for a certain limited time; however, few of the previous studies have taken this into account. Furthermore, flash sales have recently become a necessary marketing method emerging along with the price promotions of the e-commerce business. This marketing method makes customers feel time pressure during the purchasing process what in turn significantly degrades the quality of decision-making [20]. Therefore, it’s quite necessary to take the time pressure into the account of the study under the context of price promotion. This study is aimed at deeply discussing the consumers’ angle the influence of all dimensions of the consumer perceived value on purchase intention. Meanwhile combining the time-limit characteristic of price promotion, by taking time pressure into the model as a moderator variable. In order to reveal the consumers’ purchasing psychology during the price promotion and thus provide reference and assistance to China’s e-commercial enterprises which have to undertake price wars presently.

CONCEPTUAL FOUNDATIONS

Perceived value

Perceived value was firstly introduced by Monroe and Krishnan who have proposed that whether consumers make a purchase or not would depend on the correlation between the gains they get from the product they want to buy and the cost they pay for it. The more perceived gains exceed the perceived cost, the higher consumers’ perceived value. The researches focusing on the perceived value were mainly conducted from two different perspectives – rationality and sensibility. The majority of the studies on the rational side have concerned perceived value as a balance between the gains and the cost [5]. But the sensual side have argued that consumers are moving from the practical rational consumption to the emotional consumption which means pursuing mental satisfaction. It is relatively narrow to define perceived value in terms of price or functions only. This way, the phenomenon that products are used to meet the consumers’ emotional needs cannot be explained. Besides the consumers’ rational thinking which refers to the perception of products, there is also an emotional factor that means satisfaction of the emotional needs. It is insufficient for the companies to define the perceived value as a balance between the price and quality if they seek to gain competitive advantage. In addition to price and functions, businesses should also consider the effect of emotional and social factors. Previous studies that have researched perceived value dimensions are shown in Table 1. This paper mainly focuses on the consumer perception within the specific context. In order to cover both rational and perceptual aspects, it mainly sees the perceived value as a multidimensional concept referring to the perceived value dimensions of Sweeney & Soutar [16] who based their classification on the consumer value orientation. Specifically, perceived value can be divided into price value, functional value, emotional value, and social value. The four dimensions can be described as follows. First, price value is the utility derived from the product due to the reduction of its perceived short term and longer term costs. Second, functional value is the utility derived from the perceived quality and expected performance of the product. Third, emotional value is the utility derived from the feelings or affective states that the process of buying a product generates. Finally, social value is the utility derived from the product’s ability to enhance social self-concept.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Perceived value dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zeithaml (1988)</td>
<td>Benefit, Payoff</td>
</tr>
<tr>
<td>Ha &amp; Jang (2010)</td>
<td>Hedonic, Utilitarian</td>
</tr>
<tr>
<td>Sweeney &amp; Soutar (2001)</td>
<td>Functional (Price/Quality), Emotional, Social</td>
</tr>
<tr>
<td>Petrick (2002)</td>
<td>Quality, Monetary price, Behavioral price, Emotional, Reputation</td>
</tr>
<tr>
<td>Fan &amp; Luo (2003)</td>
<td>Perceived Value=f (Functional(Price/Quality), Emotional, Social)=f (Benefit, Payoff),</td>
</tr>
<tr>
<td>Sanchez et al. (2006)</td>
<td>Functional (installations, professionalism, quality and price), Emotional, Social</td>
</tr>
<tr>
<td>Weiping Chen (2013)</td>
<td>Emotional, Social, Quality, Health, Epistemic, Educational</td>
</tr>
</tbody>
</table>

Time Pressure

As a deadline to complete the task is approaching, the decision maker starts feeling anxious. That is how Svenson & Edland [24] defined time pressure. On the other hand, Svenson & Maule [20] considered time pressure as a constraint of needed resources when decision maker needs to make a judgment or a decision. The first definition places emphasis on subjective feeling by recognizing time pressure as an anxiety level, while the second one emphasizes an objective phenomenon and considers time pressure to be a limiting condition. Meanwhile, time limit by itself cannot affect consumers’ buying behavior, unless the individual has perception of the time limit and that produces emotional reactions. The reason why we hesitate in making decisions is that we are fear of inaccurate results by quick decision and loss of opportunity by slow decision. Therefore,


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we believe that the time limit of promotion forms time pressure by affecting the customer’s perception. Then as a moderator variable, it affects purchase intention through the perceived value.

**RESEARCH MODEL AND HYPOTHESES**

At present, China's major e-commerce platforms use "price wars" as a marketing tool to attract consumers. This kind of promotion has two characteristics: material incentives and limited time [25]. Material incentives refer to the price reduction, while limited time means that the duration of promotion is not long and has a deadline. Previous studies have showed that price promotion influences consumer’s perception of the price. However, as quality of life has improved and researches have become broader and deeper, perspective on consumer behavior is not limited to "economic" point of view only. Rather, it also contains the "emotional" point of view in consumers’ purchase decision theory. When a consumer makes a substantially emotional purchase decision, he or she will pay less attention to pre-purchase information. On the contrary, the decision has to do more with the current state of mind and feeling. Therefore, we believe that in the context of price promotions the impact of changing consumers’ perception on purchasing decision should be investigated by including both the rational and emotional aspects and the four above-mentioned perceived value dimensions (price, functional, emotional, and social).

Furthermore, time constraints are a prominent feature of promotion. Under the conditions of time limit and material incentives, people tend to make intuitive decisions and search for information based on experience. This leads to the so-called intuitive decision-making bias [25]. Therefore, we introduces time pressure as a moderator variable, researching the different influence making by perceived value on purchase intention. In summary, we propose the following research model (Fig.1).

![Proposed research model](image_url)

**Price value and purchase intention**

The price of a product or service carries the information of their value and is the main factor influencing consumers’ decision-making. Price reductions encourage consumers to try new products and make the decisions regarding the purchasing faster. For those consumers who have a higher perception of price, the amount of money they have to pay is the key factor in decision-making process. Reducing their expenses means increasing their perceived value, i.e. price value [8]. It is easy for consumers to realize that the price will rise if they miss the promotion. Meanwhile, low price of the product may make consumers feel that the product is very affordable. Thus, price promotions may result in raising the perceived value of the product or service and having an effect on consumers’ purchase intention. Therefore, we propose that:

H1: Price value is positively related to purchase intention.

**Functional value and purchase intention**

Of all the product value dimensions, functional value meets consumers’ requirements for the product’s quality and functions. It helps consumers to satisfy their desires. Decision-making is based on the consumers’ functional value demands. The higher is perception of product’s functional value, the stronger is consumer’s purchase intention. Hence, we propose that:

H2: Functional value is positively related to purchase intention.

**Emotional value and purchase intention**

After viewing the consumers from the economic perspective, marketing specialists turned their attention to the emotional side of consumers’ decision-making. Consumers who were promoters of practical rational consumption are leaning now towards perceptual consumption to satisfy their psychological needs. Similarly, pleasant emotions play an important role in online shopping. As a result, considering the situational factor in addition to the consumer and product characteristics may improve the interpretation of consumer behavior. Consumers’ emotional responses play an important role in the purchase decisions being a cause of impulse buying as well [26]. Emotional information theory points out that emotions play a role of information sources. Compared to a careful information collection and evaluation, emotional judgment is quicker and more predictive. In some cases, consumers will form the overall evaluation of a product or service based on the emotional clues of stimulation. The more positive is the evaluation, the more likely that purchase intention will originate [26]. Therefore, we hypothesize:

H3: Emotional value is positively related to purchase intention.

**Social value and purchase intention**

Social value stems from the utility produced by consumers’ perception of the product’s ability to reinforce consumers’ social
life. In specific scenarios, consumers tend to have herd mentality. They buy a product to be accepted by a certain social group or by conforming to social norms. Researchers regarding current fashion network herd behavior also have been done. It is easy to follow or to conform to behavior online where flock effect, group identity and reference value significantly affect consumers’ purchase decisions. Considering the Oriental traditional culture – namely, paying more attention to social self and emphasizing the relationship with others – consumers in the East are even more easily influenced by other people. It means that consumers can achieve self-improvement and access to social value through the reference groups they aspire to be a part of and specific consumption behavior. In other words, consumers can identify themselves with the reference group through similar consumption behavior and to establish contact with the community or make an impression to that group. Therefore, we hypothesize:

H4: Social value is positively related to purchase intention.

The moderating effects of time pressure

With the time limited, consumer will balance the speed and the accuracy of decision-making. Otherwise, Time pressure has a complex effect on the cognitive process of consumer [27] and reduces the quality of decision-making. In addition, making decision in a limited time will lead to emotion and experience that influence the quality of decisions [20] and the choice of buying strategies [28]. The more obvious the time pressure is, the more easily a consumer will adopt to impulsive purchasing behavior.

In the context of price promotion, the reason behind people’s quick decision-making process lies in the temptation produced by material benefits (discounts) of such promotion. In this case, time limit of promotional activities would transfer into pressure for decision-making through consumer’s perceptions of time, hence a fundamental impact on the decision-making process. Some researchers regard the stimulation of money as the incentive for implicit time pressure and have investigated the further impact of time pressure on information searching. The result has shown that the process of decision-making is faster with money stimulation than without it, however, the quality of decision-making is the other way round [15]. In other words, consumers will come up with the idea of “missed opportunity”, which makes the sales volume seems to immense increase while the deadline is approaching. This means when under time pressure, in consumers opinion, if they don’t buy the product now, they should pay a higher price after the promotion. Therefore, the effect of perceived value on decision-making behavior varies. On the other hand, there are also studies indicating that the greater the time limit for individual decision-making, the greater the limit on decision-making time, the more inclined the consumers will be to postpone decisions. Hence, we propose that:

H5: When time pressure differs, the impact of perceived value on purchase intention differs significantly.

Moreover, due to the difference of product categories, the level of consumer’s impulse buying under time pressure varies. Therefore, in order to conduct a more in-depth study of whether or not the impact of product categories will produce differences on the moderating effect of time pressure, in this paper, the concept of product involvement is introduced to categories products. Zaichkowsky defined product involvement as the degree of correlation among personal inherent needs, value and perceived interests underlying a particular product, reflecting consumer’s degree of attention to it [29]. He believes that different product involvement could affect consumer’s information processing mode. Previous studies have found that product involvement for different product categories would make a significant difference in consumer’s buying behavior. Thus, it is believed that consumer tends to be more serious with regard to high product involvement items. Even under huge time pressure of promotion, consumers do not readily purchase for the sake of prudence. Hence, we propose that:

H6: With regard to different product categories, the regulating effect of time pressure is different.

RESEARCH METHOD

This paper employs the method of experimental scenarios and group experiment. In experimental scenario setting, time pressure is divided into three days, one day and one hour before promotion date ends, which is based on the current China’s large shopping sites popular promotional period and pilot work. Product categories are based on past studies, selecting laptop as high degree product involvement items and books as low involvement products. In addition, considering the low price promotion features, prices are set in accordance with real promotional discounts on “Double Eleven” Day holiday promotion on most sites, which is a 50% discount. Experimental scenario describes in detail the end of promotion time, product price and product features.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Value</td>
<td>PV1</td>
<td>Would be economical</td>
<td>[16]</td>
</tr>
<tr>
<td></td>
<td>PV2</td>
<td>Offers value for money</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PV3</td>
<td>Is reasonably priced</td>
<td>[16][23]</td>
</tr>
<tr>
<td>Functional Value</td>
<td>FV1</td>
<td>Has consistent quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FV2</td>
<td>Is what I really need</td>
<td>[16][23]</td>
</tr>
<tr>
<td></td>
<td>FV3</td>
<td>Would perform consistently</td>
<td></td>
</tr>
<tr>
<td>Emotional Value</td>
<td>EV1</td>
<td>Would be a fashionable behavior</td>
<td>[16][18]</td>
</tr>
<tr>
<td></td>
<td>EV2</td>
<td>Would make me want to buy it</td>
<td>[23]</td>
</tr>
<tr>
<td></td>
<td>EV3</td>
<td>Would make me feel good</td>
<td></td>
</tr>
</tbody>
</table>
Participants are randomly divided into six equal groups (time pressure *product category), 65 people in each group for different scenario experiments. Subjects were asked to stimulate real shopping mental experiences, and fill out the questionnaires afterwards. The graduate students from Xiamen University are invited to participate in the survey. Three hundred and fifty-five valid questionnaires are returned. We extensively review the literature to list the candidate constructs and measures that are used in prior research. A questionnaire is developed (Table 2). Each item is measured in a five-point Likert scale.

**DATA ANALYSIS AND RESULTS**

**General statistics**

The demographic data of the sample is reported in Table 3. The respondents were mainly 19-24 years old and most of them had either one to three or three to five years of the Internet using experience. Thus, the respondents were relatively young and quite experienced. Overall, our sample matched the characteristics of online customers reported in iResearch [30].

**Table 3. General statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Classification</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>male</td>
<td>189</td>
<td>53.2%</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>166</td>
<td>46.8%</td>
</tr>
<tr>
<td>Age</td>
<td>≤18</td>
<td>29</td>
<td>8.2%</td>
</tr>
<tr>
<td></td>
<td>19-24</td>
<td>313</td>
<td>88.2%</td>
</tr>
<tr>
<td></td>
<td>25-30</td>
<td>12</td>
<td>3.4%</td>
</tr>
<tr>
<td></td>
<td>≥31</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td></td>
<td>≤1</td>
<td>20</td>
<td>5.7%</td>
</tr>
<tr>
<td></td>
<td>1-3</td>
<td>179</td>
<td>50.4%</td>
</tr>
<tr>
<td></td>
<td>3-5</td>
<td>131</td>
<td>36.9%</td>
</tr>
<tr>
<td></td>
<td>5-7</td>
<td>22</td>
<td>6.2%</td>
</tr>
<tr>
<td></td>
<td>≥7</td>
<td>3</td>
<td>0.8%</td>
</tr>
<tr>
<td>Internet experience</td>
<td>3-5</td>
<td>131</td>
<td>36.9%</td>
</tr>
<tr>
<td></td>
<td>5-7</td>
<td>22</td>
<td>6.2%</td>
</tr>
<tr>
<td></td>
<td>≥7</td>
<td>3</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

**Instrument reliability and validity**

In the first phase, we examine the reliability of the questionnaire by SPSS18.0. We identify the Corrected item-total correlation of EV1 is only 0.394 and if the item is removed, the Cronbach’s alpha of Emotional value will be improved. So, we decided to delete EV1. All Cronbach's alpha are above 0.7 (Table 4). Thus the paper agrees the instrument is reliable.

Second, we test the convergent validity using confirmatory factor analysis by Amos 17.0. The criteria of good convergent validity are: factor loading > 0.7, the average variance extracted (AVE) > 0.5 and the combination validity (CR) > 0.6 [31]. We adjust the model through deleting the item which factor loading is less than 0.7 one by one. Table 4 shows the finally convergent validity result. There are still 4 factor loadings less than 0.7, but all of the AVE and CR are meet the standards and which don’t meet condition are very close to standards recommended. So the paper approximately considers the instrument has acceptable validity.

**Table 4 Results of convergent reliability testing**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Factor loading</th>
<th>AVE</th>
<th>CR</th>
<th>Cronbach's alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Value</td>
<td>PV1</td>
<td>0.839</td>
<td>0.661</td>
<td>0.796</td>
<td>0.789</td>
</tr>
<tr>
<td></td>
<td>PV2</td>
<td>0.786</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Value</td>
<td>FV1</td>
<td>0.720</td>
<td>0.504</td>
<td>0.753</td>
<td>0.749</td>
</tr>
<tr>
<td></td>
<td>FV2</td>
<td>0.701</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FV3</td>
<td>0.709</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Value</td>
<td>EV2</td>
<td>0.684</td>
<td>0.614</td>
<td>0.825</td>
<td>0.817</td>
</tr>
<tr>
<td></td>
<td>EV3</td>
<td>0.825</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EV4</td>
<td>0.832</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Value</td>
<td>SV1</td>
<td>0.827</td>
<td>0.543</td>
<td>0.779</td>
<td>0.796</td>
</tr>
<tr>
<td></td>
<td>SV2</td>
<td>0.687</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SV3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase Intention</td>
<td>PI1</td>
<td>0.768</td>
<td>0.543</td>
<td>0.780</td>
<td>0.758</td>
</tr>
</tbody>
</table>

Peng & Liang

*The Thirteenth International Conference on Electronic Business, Singapore, December 1-4, 2013*
Model fitness
Using structural equation modeling, we tested the hypotheses in Amos17.0. Firstly, we need to examine overall fitness of the model. All of the indices used to estimate the model fit were higher than the standards recommended by the literature \(p=0.00\), \(\text{CMIN/DF}=2.055\), \(\text{RMSEA}=0.055\), \(\text{GFI}=0.948\), \(\text{NFI}=0.937\), \(\text{IFI}=0.967\), \(\text{TLI}=0.954\), \(\text{CFI}=0.966\)[31]. Considering the sample size, our model is reasonably acceptable to assess the results.

Hypotheses testing
Hypotheses 1 to 4 are tested by the structural equation model (Fig. 1). Price value and emotional value have significant effects on the consumers’ purchase intention (Fig. 2). Besides, emotional value had a significantly greater coefficient than price value. We test H5 and H6 with Multiple-Group Analysis using Amos17. First, all samples are divided into 3 groups according to the time limit for the test of the moderating effect of time pressures. Second, all samples are divided according to the products’ category to test the moderating effect of time pressures. All of the RMSEA of these models are less than 0.05 which mean each model fit the data well (Table 6). The \(p\) values of the measurement weights model are higher than 0.05 in all of these 3 analysis, indicating that with different kind of time pressure there are no significant difference in the measurement model coefficients (Table 7)[31]. There are no significant differences at the impact of the questions for measuring the four dimensions of perceived value to their latent variables, at the significant level of 0.05.

Assuming model measurement weights to be correct and without consideration of the product category, we test the structural weights model. The \(p\) value of the structural weights model is 0.031 (< 0.05), which means with different time pressure there are significant differences at the coefficients[31]. H5 is supported. In comparison, we find that the emotional value only has an effect on the consumers’ purchase intention in the ‘one-day group’ and the ‘one-hour group’. And the coefficient of one-day group (0.509) is higher than that in one-hour group (0.328).

When taking the product category in consideration, the \(p\) value of the structural weights model of high-involvement product (laptop) is 0.230. And the one of low-involvement product (book) is 0.045. The moderating effect of time pressures is not significant in high-involvement product, while it is significant in low-involvement product. H6 was supported. In the group of high-involvement product, emotional value had no impact on the consumers’ purchase intention no matter what kind of the time pressure is. In the group of low-involvement product, only when the promotion is one-day left there was a significant impact of emotional value on the consumers’ purchase intention.

**Table 5 RMSEA value of model**

<table>
<thead>
<tr>
<th>Model</th>
<th>All</th>
<th>Laptop</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconstrained</td>
<td>0.039</td>
<td>0.037</td>
<td>0.045</td>
</tr>
<tr>
<td>Measurement weights</td>
<td>0.037</td>
<td>0.033</td>
<td>0.045</td>
</tr>
<tr>
<td>Structural weights</td>
<td>0.038</td>
<td>0.033</td>
<td>0.045</td>
</tr>
</tbody>
</table>

**Table 6 P value of model**

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Laptop</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement weights</td>
<td>0.563</td>
<td>0.939</td>
<td>0.134</td>
</tr>
<tr>
<td>Structural weights</td>
<td>0.031</td>
<td>0.230</td>
<td>0.045</td>
</tr>
</tbody>
</table>

**DISCUSSION AND IMPLICATIONS**

Based on the marketing technique which is widely used in the Chinese e-commerce platform, this paper explores the effect that various perceived value dimensions have on consumers’ purchase intention. We take the time pressure as a moderator variable in the model and tested it with experimental simulation combined with questionnaires. After completing data analysis and testing the hypotheses, we draw the following conclusions.

The first conclusion of the study suggests that though both price value and emotional value have significant positive influence on purchase intention, the effect of emotional value exceeds that of the price value. This means that while low price can promote consumption, the satisfaction of emotional value has a bigger power in stimulating purchase. What's more, an excessive low price can do harm to the interest of business, but a good emotional atmosphere will only bring about more purchase. This provides a new perspective and direction for our current e-commerce platform which means that we should not only treat consumers from an economic or passive point of view but also understand consumers from an emotional perspective and that we pay more attention to consumers’ emotional appeal.

Marketers still tend to treat consumers from an economic view thinking that their consumption is based on economic rationality, selfish motives or marketers’ efforts on sales promotions. However, consumers are willing to connect their feelings and emotions with specific purchases or possession. These feelings and emotions are highly involved. For example, previous researchers have found the initiative motive of consumers’ bargaining is to gain better price, but it is believed that the motives are relevant with the need of achievement, dependence, and controlling now. This is similar to the price wars fought by the current players in the e-commerce platform. Companies view consumers from economical perspective believing that only low price can attract customers. However, we correct this misunderstanding by finding out that it is the inner emotional appeal that drives consumers’ purchase decision more. The needs of the Chinese online consumers shifted towards the emotional aspect. Sales promotions based on the price cut only are failing to meet consumers’ needs. This is the reason why “shopping without money” promoted by Suning and Jingdong failed to compete with Taobao’s claim that one could be good to oneself through shopping on Singles’ Day, when all three companies conducted sales promotions. Taobao created emotional resonance and hit the target.

Consequently, it is critical for online marketers to take advantage of marketing communication strategies to arouse consumers’ emotional needs, which means the communication tools will be employed to recall consumer’s needs. In other words, price promotions should be based on emotional communication. Furthermore, this change could help the Chinese e-commerce platform to get rid of the rate war dilemma and maintain a sustainable development. In the marketing communication context, consumer behavior indicates that consumer’s evaluations of events, behavior or characteristics is subjective and rely on their sentimental value. They could be fabled but they should be paid attention by consumers. Furthermore, marketing theories point out that value cannot be judged as right or wrong as this value judgment can be changed. Therefore, based on the situation that Chinese online customers pay much attention to sentimental value, e-commerce platform should feel free to attract consumers by changing the product’s objective attributes. In other words, marketing strategies should be carefully designed by redescribing events and circumstances in order to make products congruent with the consumers’ sentimental value judgment. It would be much easier to boost the consumers’ purchase intentions in this way rather than trying to change their perceived value.

The second conclusion of the study suggests that time pressure has a significant regulating effect. According to the addictive theory of impulsive purchase, when a consumer’s goal matches his or her way of pursuing, he or she will has a stronger intention, resulting from the addictive effect. Therefore, time restriction becomes a critical factor which cannot be ignored during the course of sales promotion. Especially how to make a “flash sale” impression on consumers to give full play to the policy-promotional regulating effect of time pressure. However, what we should note is that a tighter limitation of time doesn’t necessarily boost purchase intention. Group experiments show that emotional value has a bigger impact on purchase intention during the last day than the last hour of sales promotion. That’s because the more limited consumers feel in making a decision, the more likely they are to delay a decision. This is probably one important reason for the sales surpass of Taobao in one day to Jingdong in three days.

The third conclusion shows time pressure has strikingly different regulating effects on different product categories. For high-involved product categories, the regulating effect of time pressure is indistinctive. Besides, the emotional value has not obvious influence on purchase intention regardless of time pressure. However, for low-involved products, the reverse is true, possibly because high-involved products can better meet consumer’s internal needs Consumers would be more concerned if failure of purchase leads to bigger risk. Therefore, the possibility of impulse purchasing is smaller. That is to say, even if non-purchasing means missing a low price, consumers wouldn't make decisions within short time. At the same time, since the cost of purchasing high-involved products are relatively high, consumers tend to be more rational, which explains why emotional value has little impact on purchase intention. The cost of purchasing low-involved products is low. Perception value raised by circumstances can well stimulate purchase intention, thereby enhancing the regulating effect of time pressure. What’s more, the marked impact of emotional value on purchase intention takes place one day before the end of sales promotion also fully proves that the time limit of sales promotion should not be too short. At the same time, since the cost of purchasing high-involved products are relatively high, consumers tend to be more rational, which explains why emotional value has little impact on purchase intention. The cost of purchasing low-involved products is low. Perception value raised by circumstances can well stimulate purchase intention, thereby enhancing the regulating effect of time pressure. What’s more, the marked impact of emotional value on purchase intention takes place one day before the end of sales promotion also fully proves that the time limit of sales promotion should not be too short. To conclude, different marketing strategies should be applied to different product category. Shopping websites which mainly sell high-involvement products should stop trying to boost sale by exaggerating low price or time-limited promotion. For excessive low price will arouse doubt in consumers the quality of products and time-limited promotion leaks the possibility of unreliable after-sale service. Shopping websites which mainly sell...
low-involvement products should give close attention to the selection of promotion time limit and the cultivation of emotional atmosphere. They should elevate consumer’s emotional value by cultivating marketing environment and give full play to the regulating effect of time pressure. In this way, they can avoid harming business’s interests brought about by low price and thus increase the overall efficiency.

LIMITATIONS AND FUTURE RESEARCH

This paper focused on the effect that four dimensions of perceived value have on consumers’ purchase intention, and taking the time pressure as a moderator variable in the model. The model proved to be scientific and had a good fit. Due to objective conditions, the study has the following limitations:

1. Consumers' purchase intention is investigated using the four dimensions of perceived value what grasped the core problem, however, is not fully comprehensive. In further researches, other relevant aspects need to considered.

2. In the selection of moderator variable, we only select time pressure in the context of a limited time promotion ignoring other factors such as frequency and form of the promotion. They should be considered in the future researches.

3. In the study, students are selected as the survey sample. Although students constitute the majority of online shoppers, it is not comprehensive. In the future, it is important to expand the sample to be able to come up with more generalizable conclusions.

REFERENCES


THE RELATIONSHIP BETWEEN IT CAPABILITY AND FIRM PERFORMANCE IN DIFFERENT E-BUSINESS MODES

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ABSTRACT

Based on the technology typology view, this study propose three e-business modes: process-oriented EB, relationship-oriented EB, and knowledge-oriented EB. Then, they can be referred to different industry types (e.g., manufacturing, financial industry, and service, respectively). Further, the effects of IT capability on firm performance in these EB modes are compared. The preliminary empirical results shows that IT capability-enabled firm performance is more significant in process-oriented EB and not significant in relationship-oriented EB. The findings encourage firms to re-think different IT strategy according to the characteristics of their EB modes rather than only adopt a more general strategy (e.g., the development of IT capability).

Keywords: E-business (EB) Mode, IT Capability, Firm Performance, Technology Typology View.

INTRODUCTION

Although many researchers have deeply studied in E-business (EB)–related topics, they usually relied on the SCM-ERP-CRM architecture (e.g., [4, 11, 14]) and focus on manufacturing. However, E-business in other industries (e.g., financial services) should also be pay attention and the technologies that they use can reflect the differences between manufacturing and other industries [35]. In addition, Motiwalla et al. [24] also focus on the industry analysis of EB effectiveness and found out that there are indeed some performance differences of EB adoption between industries. These all shows that EB has been applied in various industries (not only in manufacturing). We should use a wider viewpoint to take care of EB in various industries and clarify the differences between them to derive the corresponding IT strategy.

For this reason, this study is based on Thompson’s [33] three technology typologies (i.e., long-linked technologies, mediating technologies, and intensive technologies) to propose three e-business modes (i.e., process-oriented EB, relationship-oriented EB, and knowledge-oriented EB) according to the jobs that these technologies mainly address. In addition, these EB modes can represent different industry types (e.g., manufacturing, financial industry, and service, respectively) [7, 18]. The characteristics of these e-business modes are also further discussed in this study. Among them, the process-oriented EB (e.g., ERP) is most often studied, but the alternate two modes are relatively seldom mentioned [13]. If these EB modes can be reviewed thoroughly, we can understand the mechanism of EB value in different industries (i.e., a contingency (context) analysis [31]).

On the other hand, many researchers have adopted the resource-based view and believed that the development of superior IT capability is an important IT strategy for firms to strengthen their IT value (e.g., [2, 5, 29, 30]). However, the effectiveness of IT capability-enabled firm performance has been challenged and re-thought in recent years [6, 25, 26]. This study attempts to adopt the viewpoint of E-business modes to explain this phenomenon. Further, IT capability-enabled firm performance in the three EB modes will be compared. Similar to the industry-level moderators-related IT value studies (e.g., [1, 9, 15]), IT-enabled influences in different industries are also an important question that many researchers and practitioners want to know.

Overall, this study has two main objectives. We first propose and define three different E-business modes and their corresponding job types and industries are extended. Second, the effects of IT capability on firm performance in different EB modes are compared. We attempt to use them to explain the contradiction phenomenon of IT capability-enabled performance in recent years.

BACKGROUND

IT Capability-enabled Firm Performance

Studying the link between IT and firm performance has been an interesting subject for IS researchers [17, 31]. Many researchers adopted the resource-based view to believe that the variation of performance was due to IT capabilities [19, 22]. Further, firms are encouraged to develop superior IT capabilities to gain IT-enabled firm performance. The argument of IT capability-enabled firm performance was also confirmed by Bharadwaj [2], Bhatt and Grover [5], Ravichandran and Lertwongsatien [29], and Santhanam and Hartono [30]. However, this argument has been challenged in recent years [6, 16, 25, 26]. Chae et al. [6] found out that the significant level of IT capability-enabled firm performance may be not significant in recent years due to the highly standardized and homogeneous IT resources. Then, firms may be difficult to get differentiation performance from these IT resources. However, seldom study uses a viewpoint of contingency to concern the fitness
conditions of IT capability, although this viewpoint has been highlighted in IT value literature in recent years (e.g., [17, 31]).

IT Value in Various Industries

Although many researchers deeply contribute to the concept of IT capability, they usually use a whole viewpoint to examine the mechanism of IT capability (e.g., [5, 29]). That is, the contexts or contingency factors (i.e., moderator) are seldom considered. Many studies mention that the characteristics of industries are an important factor that may moderate the effects of IT strategy on firms’ success [8, 9, 23]. For example, Im et al. [15] and Dehning et al. [10] both adopted event study method to examine the stock price reaction of IT investment announce in different industries. Their findings show that the payoff of IT investment in various industries may be different. In addition, Lee et al. [18] also found out that industry type will moderate the effects of IT outsourcing strategy dimensions on outsourcing success. However, seldom studies focus on the relationship between industry type and IT capability-enabled performance. We believe that the argument that firms should develop IT capability to strengthen their competiveness is a more general concept. The viewpoint of fitness may be added to examine the effectiveness of the development of IT capability. For example, if IT capability is developed in a high routinization environment, the effectiveness IT capability will be more significant. Otherwise, if IT capability is developed in a project-based or knowledge-based environment, the effectiveness of IT capability will be limited due to the worse conditions of fitness. That is, non-structure jobs (relative to structure jobs) are relatively difficult to be addressed by information technology. Therefore, the fit conditions of IT capability should be further studied.

RESEARCH FRAMEWORK

Thompson’s [33] proposes three different technology typologies: long-linked technologies, mediating technologies, and intensive technologies. Further Chatman and Jehn’s [7] and Lee et al.’s [18] base on Thompson’s [33] technology typology view to classify three types of industries. First, long-linked technologies focus on “prescribed ordering of tasks” [7, 18]. They are the most typical and traditional mode of information systems. Their primary activities are a sequential value-added process. These processes are highly routinized and have been totally embedded in the information systems according to standard operating procedures (SOP). Gottschalk (2006) also mentioned that ERP and SCM can best represent this technology typology. Further, we believe that they also can be referred to “process-oriented e-business mode”. That is, these technologies mainly help firms to deal with process-related jobs. Then, these firms gain IT-enabled performance by improving their process effectiveness or process performance [23]. Finally, these technologies are visible in industries characterized by assembly, e.g., manufacturing [7, 18].

Second, mediating technologies focus on “categorizing clients and inputs and standardizing processes for each category” [18]. For example, financial industries (e.g., bank and insurance) can be referred to this typology [7, 18]. The platform model can be used to analyze this type of industries. It serves as a mediator for customer linkage (e.g., debtors and creditors). SOA (service-oriented architecture) and CRM may be the most appropriate systems for this modes [13]. From the viewpoint of e-business mode, these technologies mainly provide relationship-related assistance for firms and can be referred to “relationship-oriented e-business mode”.

Third, intensive technologies attempt to “address project-specific demands, requiring extensive customization and problem solving” [18]. According to these descriptions, KM and DSS are the most appropriate systems to address these jobs [13]. Compared to process-oriented jobs and relationship-oriented jobs, these jobs are low routinization and required more human operation. Today’s technology capabilities are relatively difficult to totally embed them into information systems. Further, from the viewpoint of e-business mode, intensive technologies can be referred to “knowledge-oriented e-business mode”. Many service-related industries (e.g., consulting firm and hospital) can be classified as this mode [7, 18]. They don’t produce any products or maintain many client relationships to be mediators. But they focus on their professional knowledge to provide problem solving service for their customers.

Based on Thompson’s [33] three technology typologies, three different e-business modes (i.e., process-oriented EB, relationship-oriented EB, and knowledge-oriented EB) are derived according the job characteristics that these technologies address. The comparison of these modes are summarized in Table 1. Further, Lee et al. [18] believed that the level of routinization of jobs will moderate the success of IT outsourcing because highly routinized jobs are easy to articulate their IT need and then the outsourcing contracts are relatively easy to execute. Similar to their argument, we also believe that these three e-business modes represent a continuum ranging from process-oriented EB through relationship-oriented EB to knowledge-oriented EB. If the level of routinization of jobs that EB mainly addresses is high, their fitness for IT capability is higher. That is, the modes of E-business will strengthen or weaken the relationship between IT capability and firm performance and the research hypothesis is proposed as the following.

Research Hypothesis: E-business modes will moderate the effects of IT capability on firm performance. Specifically, IT capability-enabled firm performance will be more significant in process-oriented e-business mode (e.g., manufacturing).
Table 1. The Comparison of Three E-business Modes

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Technology Typology [33]</td>
<td>Long-linked Technology</td>
<td>High</td>
<td>Mediating Technology</td>
<td>Intensive Technology</td>
</tr>
<tr>
<td>Routinization of Jobs [7,18]</td>
<td>Medium</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example of Industries [7,18]</td>
<td>Manufacturing</td>
<td></td>
<td>Financial Industry (e.g., bank and insurance)</td>
<td>Service (e.g., consulting firm and hospital)</td>
</tr>
</tbody>
</table>

EMPIRICAL STUDY

This study follows Bharadwaj [2] and Santhanam and Hartono’s [30] methodology to use InformationWeek as our sample source. InformationWeek is an important magazine that surveys the use of IT among U.S. companies [4, 21] and its IT leader rankings are recognized by many top IS journals (e.g., MIS Quarterly and Management Science) to represent firms with superior IT capability. Bharadwaj [2] and Santhanam and Hartono’s [30] also adopted InformationWeek’s lists and believed that these leader firms combine IT-related resources to create the whole IT capabilities and can be used as the sample of the firms with superior IT capabilities. These leader firms’ performance are indeed better than the other firms without superior IT capabilities according to their empirical studies. Therefore, the top 250 IT leader list from InformationWeek from 2006 to 2011 is used as this study’s leader sample. By the initial comparison with the Compustat database (which provides firm performance data), each of the 408 firms has been listed on the top 250 at least once in the six years.

Further, the 408 leader firms are classified into different E-business modes according to their industry characteristic (NAICS code). Manufacture-related industries are classified as the process-oriented mode, financial-related industries (e.g., bank and insurance) are classified as the relationship-oriented mode, and service-related industries (e.g., consulting firm and hospital) are classified as the knowledge-oriented mode. Their sample sizes are 147 firms (36%), 172 firms (42%), and 89 firms (22%), respectively. In addition, the firms that are not on the leader list (the 408 firms) in the Compustat are regarded as the firms without superior IT capabilities [2, 30]. These firms are further matched to the leaders according to their industry codes and used to examine the difference between the two groups (i.e., leader groups and control groups).

Finally, as for the measurement of firm performance, return on assets (ROA) and return on sales (ROS) are adopted in this study. These indicators have been commonly used in previous studies [9, 20]. Therefore, we use the two indicators to measure these samples’ firm performance.

RESULTS

Bharadwaj [2] and Santhanam and Hartono’s [30] test method is followed. The independent parameter test (Wilcoxon Rank Sum Test) is used to examine the year-by-year differences between the leader groups and the control groups. The results are shown in Table 2. The results show that the effects of IT capability on different EB modes are inconsistent. For example, the effects on process-oriented mode are all significant from 2006 to 2009. The effects on relationship-oriented mode are not supported in all years. The effects on knowledge-oriented mode are slightly significant (only in 2009 and 2010). Overall, IT capability-enabled firm performance in process-oriented mode is the most significant.

Table 2. The results of the independent parameter tests

<table>
<thead>
<tr>
<th>Year</th>
<th>E-business Mode</th>
<th>Process-oriented</th>
<th>Relationship-oriented</th>
<th>Knowledge-oriented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>ROA</td>
<td>ROS</td>
<td>N</td>
</tr>
<tr>
<td>2006</td>
<td>134</td>
<td>0.0143 **</td>
<td>0.0748 *</td>
<td>163</td>
</tr>
<tr>
<td>2007</td>
<td>139</td>
<td>0.0857 *</td>
<td>0.0873 *</td>
<td>161</td>
</tr>
<tr>
<td>2008</td>
<td>139</td>
<td>0.0129 **</td>
<td>0.0062 ***</td>
<td>161</td>
</tr>
<tr>
<td>2009</td>
<td>137</td>
<td>0.0029 ***</td>
<td>0.0037 ***</td>
<td>153</td>
</tr>
<tr>
<td>2010</td>
<td>134</td>
<td>0.1979 *</td>
<td>0.1455 **</td>
<td>151</td>
</tr>
</tbody>
</table>
DISCUSSION

The preliminary empirical findings shows that IT capability-enabled firm performance is more significant in process-oriented EB than in relationship-oriented EB and in knowledge-oriented EB. The results are similar to Lee et al.’s [18] findings that mention outsourcing success just in industries using long-linked technologies. This shows that industries characterized by process-oriented mode have highly intensive routinization jobs. These jobs can be become SOPs and embedded in IT systems well. Therefore, IT capabilities are more important for firms with process-oriented EB (e.g., manufacturing). However, firms with the other two modes indeed should re-think new IT strategy (i.e., different to the development of IT capability) to strengthen their competitiveness.

In addition, two interesting points are found from the empirical findings. First, according to our empirical findings, the effects on knowledge-oriented EB are significant in recent years (2009 and 2010). Maybe, we can infer that IT capabilities, which can address knowledge-related jobs (non-structure jobs), have progressed in recent years. For example, KMS and DSS may be more mature and can play more important roles in firms that adopt knowledge-oriented EB. Second, we also find out that the effects on relationship-oriented EB are all not positively significant. Maybe other factors also moderate the relationship. For example, the architecture of relationship-oriented EB is the most openness to maintain a large number of relationships. Further, they may be difficult to maintain their own advantages due to the homogeneity of technologies (e.g., ATM). Nevertheless, this study propose a new viewpoint to examine the moderating effects between IT capability and firm performance. Then, the argument that IT-enabled performance in various EB modes is different is indeed confirmed.

Research Contributions

Echoing our research objectives, this study first propose three different EB modes. According to the comparisons of these EB modes, we can find out that the e-business architectures are obvious different in various industries. Specifically, the “jobs” that firms use e-business systems to address have different attributes in various industries. For example, process-oriented jobs, relationship-oriented jobs, and knowledge-oriented jobs are three different types of jobs. The previous studies usually adopted Porter and Millar [28]’s information intensive view to believe that IT value will be more significant in high information intensive industries (e.g., [12, 15]). However, their empirical findings are not all as their expectations. They only considered information-related jobs and non-information-related jobs and believed IT is more close to information-related jobs. In this study, we believe that information-related jobs can further be classified according to the level of the routinization of jobs (e.g., process-oriented, relationship-oriented, and knowledge-oriented jobs). Specifically, IT capability is more close to process-oriented jobs. Indeed, we also find out that the highly routinized jobs promote the effects of IT capability on firm’s performance.

Next, based on our argument of EB modes, we propose a new viewpoint to explain the insignificance of IT capability-enabled firm performance in recent years. Indeed, the relationship between IT capability and firm performance in manufacturing is still strong according our preliminary empirical findings. This is also an interesting phenomenon that the previous studies never notice. If we can combine these concepts, we will more understand the IT value mechanism of different industries (e-business modes).

Implications

First, the importance of IT capabilities should be re-thought. Specifically, IT capability-enabled firm performance is more significant in manufacturing, not in financial industry. Therefore, is the development of IT capability still a general IT strategy for all firms? Second, based on this question, we believe that the fitness conditions with IT capability-enabled performance should be explored. For example, this study attempt to propose the routinization of jobs to explain the conditions. Maybe there are another conditions can be found out in the future.

Finally, although IT capability-enabled performance is not significant in some industries according our argument, this should not encourage firms in these industries to stop their IT-related projects. This just encourages them to re-think their IT deployment strategy (i.e., different to the development of IT capability) that can indeed strengthen their competitiveness. For example, the development of IT agility, knowledge management capability, and IT innovation, which is also usually discussed by IS researchers in recent years, may be a better alternate solution for some industries. Overall, the IT strategy should be re-thought and refined for different industries.

Limitations and Future Research

This study also has some limitations and some issues that can be extended in the future research. First, we only use manufacture-related industries, financial-related industries, and service-related industries to represent the three EB modes. Whether the samples can appropriately represent all the E-business modes must be considered. Or, some firms may have two

---

<table>
<thead>
<tr>
<th>2011</th>
<th>130</th>
<th>(0.4455)</th>
<th>(0.2878)</th>
<th>149</th>
<th>(0.0572)</th>
<th>(0.0055)</th>
<th>70</th>
<th>0.1379</th>
<th>0.1674</th>
</tr>
</thead>
</table>

Note: The value indicates the single tailor p-value of the independent parameter test. In addition, significance is indicated at: * 10%, ** 5%, *** 1%, and () represents the negative influence.
different EB modes at the same time. These issues should be considered rigorously in the future. However, we believe that the idea of the three different e-business modes is more important and thought-provoking. Second, because firms with revenues exceeding 500 million dollars are considered by InformationWeek’s survey and this study follow its rule, the empirical findings do not reflect the situation for small firms. Although these SMEs may use IS more effectively, this issue should also be noted as a limitation. On the other hand, due to the same issue of data source, the data of the independent variable (IT capability) is collected from InformationWeek. The data only shows the whole IT capability and cannot further distinguish between various types (items) of IT capability. If the more rigorous data can be obtained in the future, the effectiveness of the empirical study can be strengthened. In addition, this study uses only one test method to examine our argument. If more different and rigorous test methods can be used to conform the hypothesis in the future, the argument will be stronger.

Third, this study only focus on the characteristic of the three e-business modes to propose a new viewpoint that can explain the variance between industries. Maybe there are other factors (e.g., the imitation or homogeneity of IT resources [27, 34]) that also can the explain industry-level variance or the relationship between IT capability and firm performance. If these factors can be controlled or addressed well, our argument can be examined more rigorously.

Finally, this study just proposes an idea to describe E-business in different industries and test them in the scenario of IT capability-enabled performance. Can these three modes represent all e-business modes well? Or, can these three modes be further extended to another attributes? These issues are also worthwhile to be studied in the future.

REFERENCE


THE IMPACT OF THE KNOWLEDGE SHARING IN SOCIAL MEDIA ON CONSUMER BEHAVIOUR

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Gao Wei, Nanyang Technological University, Singapore, wgao2@ntu.edu.sg

ABSTRACT

In the recent years, there is a significant rise in the usage of social networking sites for organizations to organize marketing campaigns. It is necessary for advertisers to structure their information well in order for consumers to accept the message or product information. This study investigated the consumer purchasing process and knowledge flows between individuals in social media, at the same time considering the different type of proximity that affect it. Using the consumer purchasing decision process[1] as a source of credibility, this study will analyze from several research papers to test its hypothesis related to the different types of proximity. Results and theories have shown that advertisement and product information in social media are affected by the different types of proximity plays, which is creating an impact in the consumer purchasing decision process.

Keywords: Proximity, Consumer Purchasing Decision Process, Social Media.

INTRODUCTION

The objectives for this paper are:
1. To explore the impact of social media on making purchasing decisions
2. To explore the relationship and the way how word of mouth transfer from one to another in the social media. There will be a conscious attempt to understand how proximity affects the consumer purchasing decision process.

With the growth in social media marketing[4], there is a high impact of social media on consumer behavior, and therefore, it has become a wide discussion and research opportunities in business communities and academies.

According to[1] customers will go through five stages of purchasing decision process in term of making a decision of purchasing a product or service. The five stages are: Problem/need recognition, information search, evaluation of alternatives, purchase and post purchase evaluation. And with the presence of social media, it plays a role in each of the stage of the consumer purchasing decision process.

In a study reported in Wirthlin Worldwide[5], it shows that products or services recommended by friends is one of the trustable source for information source compared to direct mail and celebrity endorsement. Hence, one of the challenges for marketing team today is to be able to identify the characteristics of the personal sources possessed that will buy the customers’ trust and belief.

Polanyi[6] and Nonaka[7] referred explicit knowledge as knowledge that can be easily articulated, expressed formally in words and transferred through codification or written documentation. In addition, individuals can generate, codify and transfer knowledge in a form of reflection of framed experience, values and contextual information[8]. Hence, posting of personal experiences and comments about a product or service is considered as an explicit knowledge. The explicit knowledge in social media will trigger needs or desires of another person, affecting one’s evaluation of alternatives and information search. Hence, posting of user experience is a form of sharing knowledge in explicit form which affects all or most stages in the purchasing decision process.

Sternberg[9] and Gordon and McCann[10] suggested that proximity informal information sharing are affected by geographic proximity. In fact, trust about the information shared and proximity does affect one another because one way to gain trust is to have more face-to-face meeting, knowing one’s value and culture.

In this paper, we focus on the different types of proximity affecting consumer purchasing decision process rather than what is being bought. The five proximities that we are going to examine are Cognitive proximity, Organizational proximity, Social proximity, Institutional proximity and Geographical proximity.

LITERATURE REVIEW

Several related studies have been conducted by other researchers previously as this is one of the popular research topics in recent years. In this section, we will conduct a literature review of the related work. The literature review is divided into three sections: Social media, Consumer Purchasing Decision Process and The Impact of Social Media on Consumer.
Social Media

Social media consist of a group of Internet applications that enable individual to create and generate their content[11]. Today, social media have been rank as one of the top most powerful tools in terms of getting news updates. There are different types of social media, for example, social blogs, social network sites, social bookmarking, virtual social world and content communities. According to Kaplan and Haenlein[11], there are six types of social media. Collaborative projects such as Wikipedia where people contribute the content to the public; Blog and microblogs such as Wordpres where people write about things that they want to express; Content communities such as YouTube where people contribute videos to the public and allow them to comment; Social networking sites such as Facebook where people update themselves on the medium to inform their friends; Social gaming world such as WarCraft where people from different part of the world play together; Virtual social world such as Second Life where people socialize in the virtual world and trade virtual property with another.

Social media has four basic characteristics: Openness, Conversation, Community and Connectedness[12]. Social media has a characteristic of openness because the most common functionality is that social media are open for comments, participation and sharing of information. It is common that contents are usually not password protected. The other characteristic is a conversation because social media is a two way communication channel unlike traditional media where the main approach is broadcasting of messages. The next characteristic is that social media allows people to build community within a short time and discuss their interest. Lastly, social media make use of links in other websites to connect people and resources. With these characteristics, it has motivated people to participate in social media to express themselves and entertainments (See Appendix Figure 8). In addition, research has shown that social media provides stickiness and to a certain extent, addictive[13] because people have a fear of losing out[14] on the updates that are available in the social media.

Social media facilitates knowledge sharing. As mentioned by Polanyi[6] and Nonaka[7], knowledge exists in two forms: Tacit and Explicit. However, as the knowledge in different forms, it may affect the effectiveness of knowledge transfer. In social media such as blogs, it is ideal to transfer explicit knowledge as it is codified in physical forms (as information) and knowledge flow occurred when someone commented on the piece of information. On the other hand, tacit knowledge transfer which usually resides in people’s mind has more challenges when it comes to knowledge transfer. It is believed that this type of knowledge will be able to transferred better with the increase in social proximity (social interactions) and geographical proximity (face-to-face meeting)[15].

Consumer Purchasing Decision Process

According to Kotler & Armstrong[1] customers go through five stage of purchasing decision process when making a purchase decision. The five stages are illustrated in Figure 4.

![Figure 8: Consumer Purchasing Decision Process](image)

The first stage is known as Need Recognition. The need derived from an existing problem (for example, when you are hungry, you need food) or attracted by some marketing stimulus (for example, when you pass by The Coffee Beans, you are attracted by the aroma of the coffee and you realized that you need a nice coffee).

The second stage is information search. In this stage, customers who are interested to solve their need’s issue will decide how much information is needed by searching around.

One of the peers to peer advertisements with high influential channel is the Word-of-mouth marketing[16]. It happens when customers who are satisfied with the product and service will tell others about the usefulness of it and would create hype among people[17]. Today, with social media, customers have more information sources such as blogs, tweets which can be having positive and negative[18], leaving an impression of the product in the reader’s mind. In Mirza’s[12] study, blogging is the channel with the highest respondents in term of expressing themselves (See Appendix Figure 9) and sharing of experience is something that the respondents are looking for in social network (See Appendix Figure 10 and 11). Research has also suggested that customers believe information that comes from personal sources (from friends, acquaintances, family and co-workers) rather than commercial sources (from advertisement, sales people)[5].

The next stage in the consumer purchasing decision process is the evaluation of alternatives where customers evaluate all the information gathered in the previous stage. The information gathered can be information, not just from one product, but multiple products. Tanner & Raymond [19] suggested that the level of involvement is an important determinant towards the extent of evaluation. For example, the high-involvement purchase such as car which involves high expenditure will take a longer time to evaluate the information gathered with much carefulness in the evaluation process. On the other hand, low involvement purchases such as purchasing soft drink will take a shorter and frank evaluation process while rests will take longer process.

The next step will be making decision to buy the product. Hence, it is common that people to assume that when a customer walk in to the store and customer already know what customer want in own mind because customer already did all the research and has make a decision what customer are going to buy.
After customer purchasing the product, it is common for consumers to raise concern about the product and start to compare alternatives. This is referred as cognitive dissonance[20]. Those who are satisfied with the product will tell others how much it helped them when people ask them for opinion, or post opinions on any social network website to express their satisfaction. The cycle will restart by itself when one experience cognitive dissonance as customer begins to realize the need for another product to solve their current issue. As for those who are satisfied, it will trigger others to buy either by desires[21] or need recognition.

THE IMPACT OF SOCIAL MEDIA ON CONSUMERS

As mentioned previously, social networking sites connect people to people. Motivating individuals for a product as explicit knowledge is part of knowledge sharing. Hence, relationship plays a critical role in this case. An effective relationship is necessary for transferring knowledge because it indicates the efficiency and success of knowledge transferring[22].

Existing studies have indicated that there is a connection between social interaction and framing of consumers’ opinion[23]. As mention before, consumers rely on personal sources such as “recommendation by friends”[24] to make purchases. The word friends’ in social media can be referred as Para-social interaction (PSI). PSI refers to the illusion face-to-face relationship using media as a platform[25]. In social media, Rubin[23] suggested that when there is a high PSI, it improves both objectives and thoughts because it has the similar impact as word-of-mouth. Studies indicated that a high PSI will have a lot of readers and participants for comments[26]. For example, in Facebook, the number of ‘Likes’ and comments posted; in blogs, the comments and details posted. Hence, when participant posted a negative comment, it will be answered back, thus shaping readers’ mind that the negative comment is not having a significant impact. The negative comment will be lost its presence when more participants answering.

One of the factors affecting PSI is word-of-mouth. Consumers focus more on who is the person who send the message[27] and the most important criteria for persuading listeners is the sender’s credibility[28]. Credibility is valuable especially for consumers who has no knowledge about the product, and one of the “inside information” that he can get is from people who has the knowledge. This is extremely valid for online store as people are not able to see the physical product as compared to a brick and mortar store[29]. Besides product, it is also extremely valuable for services because the service is intangible, and the only way to get more information is either to try the service (if possible) or from a person who has experience with the service.

In June 2009, Dell announced that $3 million of sales were made from Twitter and by December 2009. The sales revenue doubled, achieving a total of $6.5 million[30]. Aligning to the statistic, a study was conducted by ROI Research[31] showed that 58% of users in Twitter and 53% of users in Facebook will likely to buy a product after following on a company’s product on the social networking sites. In addition, 59% of users in Twitter and 53% of users in Facebook will recommend the product online and there is a high possibility that they will be actively involved in conversations related to the product. Another study conducted by Knowledge Network[32] shows that 38 million of U.S. adult (ages 18 to 80) will seek assistance from social media in the process of making purchase decision. In addition, 23.1 million of the population will use social media as a source of learning about a new product. Research conducted by Mirza[12] has also indicated that same analysis (See Appendix Figure 12).

Different types of proximity affect the effectiveness of knowledge transfer between individuals. The reason is that proximity can be part of culture factor which can be linked with values shared by a different group of people, which provide guidelines for their behaviors[22]. Problems such as lack of shared values should be considered in order to communicate well. This is mainly due to individuals might interpret differently for the same word or sentence, which may lead to misunderstanding and hence, the knowledge that is supposed to shared was not shared in the expected manner.

CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Research Questions and Conceptual Framework

To address the research objectives that we had mentioned earlier and with the reference of the literature review, we have developed one critical research question:

Research Question: How different types of proximity affect the consumer purchasing decision process in social media?

There are five types of proximity, which will be considered for the hypotheses to answer this research question. The five types of proximity are Geographical, Cognitive, Social, Organizational and Institutional. The main reason for choosing proximity as the main criteria for this study is that proximity determines one’s attitude towards an object[33] and individual’s awareness and knowledge is determine by its social being such as culture and education[34].

Understanding the impact of social media towards consumer purchasing decision process, it is necessary to examine the influential factors. Research suggested that there are several factors that influence the attitude towards a particular advertisement and these factors are: recipient’s mood, reliability and perception towards ads or sponsor[35]. Studies defines proximity has a positive effects towards the attitude of an object when the receiver identified that it is close to him[33]. This can be illustrated by the dual process model which popular in psychology and marketing research literature. This model has been used to analyze behaviors[36], persuasion[37], opinions[38], social judgment[39], stereotype and bias[40], decision making[41] and thinking process[42].
Artz, Tybout, & Kehret-Ward[43] found that the extent of motivation in advertisement is impacted by the perceived pictorial distance. This explains why most of the advertisements are edited or re-shot for different countries. Artz, Tybout, & Kehret-Ward[43] reasoned that if the receiver feels that the advertisement is distant, he will requires more “high-order” evaluation of the advertisement.

According to Boschma[44], there are five types of proximity: Geographical, Cognitive, Social, Organizational and Institutional. With all the analysis done, we proposed that the different types of proximity can be the key influencers that will affect the affective reactions towards the product information or message in social media. Figure 9 shows the overall conceptual framework for this paper, stating the position of the respective hypothesis in relation to the influential power towards the participants’ (consumers) purchasing decision process.

**Geographical Proximity and Purchasing Decision Process**

Angeli, Grimaldi, & Grandi[15] suggested that tacit knowledge should transfer better with the increase geographical proximity because tacit knowledge is non-codified knowledge[7]. Specifically, the key decision factor to determine the ease of transfer is the message complexity.

A lot of research suggested that geography proximity helps to develop mutual trust[45] because trust is usually established through face-to-face interaction such as golf events. Sociologists argued that when physical proximity decreases, trust and reciprocity development increases among community members[46]. Hence, it is believed that as geographic proximity increase, relational ties with knowledge provider and receiver will decrease and vice versa[47].

However, in geographically concentrated industry cluster where it consists of hundreds of firms for exchanging of knowledge, it is almost impossible to create strong relational ties with all firms[48]. In addition, in most of the research papers related to marketing relationship, geographic proximity is always not the main issue associating with relationship, trust or commitment[49] [50].

As for social network site, there are two content-driven characteristics of advertising messages[51] that will motivate consumer in term of needs recognition: perceived informativeness and entertainment.

In the context of product or service knowledge sharing on social media, messages are usually explicit such as user experience and evaluation of products. In social media, the source of the message can be generated in another country which can be distant. The geography proximity is eliminated with social media because it connects people to people in a different part of the world and the messages will be brought to individual’s attention with increasing ‘Followers’, ‘ReTweets’, ‘Likes’, ‘Share’ or ‘Comments’. Individual from different places, regardless of the distance, are able to access the product information and knowledge generated by different individuals in a different part of the world. Hence, in the information search stage, individuals are able to get more information and knowledge (including others’ post purchase and user experience information and knowledge) about it.

In the first two stages of consumer purchasing decision behavior, individuals in the social media are motivated to the products by the explicit knowledge created by others and much of the information will be collected during the information stage. Hence, we concluded that geographic proximity does not have an enormous impact on the initial two stages of consumer purchasing decision behavior and the following hypothesis was derived:

**H1a:** Geographic proximity between the sender and receiver has a weak influence on the initial two stages of consumer purchasing decision process.

However, during the evaluation of alternatives before making a purchasing decision, geographical proximity will be taken into consideration. It is mainly due to the product will have some modification in different regions (For example, Coke in India is sweeter than Singapore; hence an Indian who came to India might not want to buy Coke because of the difference in taste but
otherwise in India). This is argued by Hoch and Lowenstein[52] where geographical proximity causes consumers to adopt the product message or information partially and causes a shift in the reference point which may eventually leads to eliminating the product as an alternative during evaluation. This is true because certain product will have to adapt to the country’s culture, infrastructure, values, belief, trends and climate before deciding to purchase. As for post purchase evaluation, it mainly allows individual to express their experience with the product or service. Hence, geographic proximity can play a pivotal role because consumers can exchange general knowledge beyond boundaries via social media. However, to exchange detailed product knowledge, other proximity plays a more prominent role such as cognitive and social proximity due to the trust and understanding of lingo. With this, we concluded that geographic proximity has an impact in the stage of evaluating of product and the following hypothesis was derived:

**H1b:** Close geographical proximity between sender and receiver has a positive impact on the last three stages of the consumer purchasing decision process.

![Figure 10: Impact of Geographical Proximity on Consumer purchasing decision process](image)

**Cognitive Proximity and Purchasing Decision Process**

The concept of cognitive proximity lies in cognitive theory which suggested that individuals will develop different mental model due to the different environments[53]. This means that the greater the cognitive proximity, the greater the similarity between individuals’ mental model because they have the common lingo. Hence, in terms of knowledge creation and distribution, most of the authors agreed that cognitive proximity is a requirement for both senders and receivers. This concept is further emphasized by Cowan, David, and Foray[54] in the role of epistemological communities where technical jargon used by certain professionals are only made known to experts of a related field who can communicate well regardless of distance. However, it does not mean that with higher cognitive proximity, the effectiveness and efficiency of knowledge sharing increases. Boschma[44] listed two reasons to keep a cognitive distance. Firstly, as mentioned in previous section, marketing messages has to be informative. This means that there should be some differences in the messages so that new knowledge can be generated[55]. In addition, cognitive proximity might lead to cognitive lock-in when the messages generated are similar. In the need recognition stage, people are motivated by comments that individuals made. Motivation increases when their questions are being answered and understood. As their concerns are answered, these answers are recorded as part of their information gained during information search. However, if the information was too difficult to understand by the consumer, whom would lose interest because it might be too time consuming to digest the information and eventually drop the idea of purchasing.

In the context of product or service knowledge sharing on social media, when an individual (message sender) expresses its experience with a certain product, the other party who commented is usually a friend of the sender, who is usually a co-worker, classmates, friends with similar interest, friends of friends or sometimes, it is a fan. Hence, certain level of cognitive proximity is there for understanding purposes. As a result, we concluded that lower and upper limit are required in cognitive proximity in order to create some discussion and attract more individuals to participate which will then leave an impact on the consumer purchasing decision behavior (for example, motivation to buy or serve as an information source). Thus, the following hypothesis was derived:

**H2:** The cognitive proximity between the sender and receiver has a positive impact on consumer purchasing decision process up to a certain threshold.

![Figure 11: Impact of Geographical Proximity on Consumer purchasing decision process](image)

**Social Proximity and Purchasing Decision Process**

Granovetter[56] defines social proximity as the degree to which the relation is socially embedded between two actors. The
term embedded is related to the bond that is bringing them together in the society[57]. For example, two individuals are socially proximate to the extent that their relationship is surrounded by a third person. In the context of social media, a straightforward example will be two persons having common friends.

Trust is a key factor in social proximity and knowledge sharing which is often generated from friendship, kinship and experience with the other party [44]. Hence, personal interaction and shared experiences are two common ways to available trust, which will lead to social proximity.

In social media and consumer purchasing decision process, trusting of a source is determined by the duration the person interacts with the source. By interacting, individuals begin to make friends with another by participating or leaving comments in the page. With more discussion, brands can take advantage of the individuals’ social proximity to generate more contents about their products.

Since social media are a medium to share product knowledge in explicit form, it is crucial to identify the reliability especially when it is generated by individual. In order to motivate people to have a need, the message should consist of ‘Followers’, ‘ReTweets’, ‘Likes’, ‘Share’ or positive ‘Comments’ so that trust and reliability can be generated. With more ‘Followers’, ‘ReTweets’, ‘Likes’, ‘Share’ or ‘Comments’, it is easily to capture the information in social network sites such as the newsfeed in Facebook. As a result, consumers are able to capture such information during the stage of information search. In addition, with more ‘Followers’, ‘ReTweets’, ‘Likes’, ‘Share’ or ‘Comments’, it serves a strong piece of reason or persuasion for individual to buy the product which play an crucial role during the evaluation of alternatives stage Lastly, when the consumer bought the product, when they find out that it is not satisfying, there will be others users (the network effect theory) or members of the organization will be able to assists or direct them.

With the above, we concluded that social proximity has an impact on the consumer purchasing decision process. Thus, the following hypothesis was derived:

H3: The increasing social proximity between the sender and receiver has a positive impact on consumer purchasing decision process.

Organizational Proximity and Purchasing Decision Process

Organizational proximity is defined as the degree to which contexts are shared within an organization or between organization[44] for learning. Organizational proximity plays a more prominent role between and within organizations because it determines new knowledge creations and develops of the learning organization. However, organizational proximity can be treated as a broad category, which can be related to the same room of relations which is based on effective interaction in different ways[58].

Organizational proximity helps to avoid uncertainty[59] and handling information and relationship in social media can be one of the uncertainties that can be avoided. According to Brown and Duguid[60], organizational practices and norms can be shared. Norms such as tackling consumer’s motivation to recognize needs, structuring of information to facilitate effective and efficient sharing of information and knowledge are extremely powerful in their of consumer purchasing decision process. As mention in the previous section, the key to motivate people to reach about the advertising market in order to motivate need recognition is to have the informative message. Also, in order for consumers to take in consideration of information for evaluation purpose, people must be able to compare with your competitors products easily. If the message is regarding end users unhappiness towards the purchase, it is advantageous to understand how other organization responds to the comments. Thus, tackle the weakness and learn about the strength.

In the context of organizational proximity and consumer purchasing decision process via social media, it encourages businesses to have an open discussion with consumers. By interacting, individuals will identify features and functionality that they are expecting for the product and generating needs by comparing what they have now and what they expect. With more discussion, brands can take advantage of sharing more knowledge with consumers in the social media to build a closer relationship (include the trust of the business).

With more ‘Followers’, ‘ReTweets’, ‘Likes’, ‘Share’ or ‘Comments’, consumers are able to capture such information and gain the product knowledge during the stage of information search. In addition, by having more discussion and interaction, it shapes the individual’s needs and during the evaluation of alternatives stage, alternatives might be eliminated due to the low organizational proximity with other companies. Lastly, when the consumer bought the product, when they find out that it is not satisfying, there will be linked back to the business’s social network page to comments and seek for assistance.

With the above, we conclude that organizational proximity has an impact on the consumer purchasing decision process. Thus, the following hypothesis was derived:
**H4:** The level of organizational proximity between the sender and receiver has a positive impact on consumer purchasing decision process.

![Figure 13: Impact of Organizational Proximity on Consumer purchasing decision process](image)

**INSTITUTIONAL PROXIMITY AND PURCHASING DECISION PROCESS**

Institutional proximity can be related to something formal (such as copyright or ownership rights) and informal which can actually influence social and economic behavior[61]. It is a fact a collective action that helps to provide incentive or reduce uncertainty and transactional costs. David and Dasgupta[62] argued that by operating in different institutional organizations (For example, universities, governments and hospitals) will increase the incompatibility in incentive. This issue can be reduced by collaborating with the different institutional organizations in order to increase incentive or reduce uncertainty.

An example of intuitional proximity is the purchasing of cars in Singapore. In Singapore, car manufacturer has to accommodate to the regulations set by the Land Transport Authority in Singapore (one example will be cars in Singapore should be the right hand drive). However, the main product does not change much, and the key benefits usually do not change. The need recognition such as the functionality and luxury of the car reminds and information of the car will still be obtained during the information search. Hence, we concluded that institutional proximity does not have an enormous impact on the initial two stages of consumer purchasing decision behavior and the following hypothesis was derived:

**H5a:** Institutional proximity between the sender and receiver has a weak influence on the initial two stages of consumer purchasing decision process.

However, during the evaluation of information before making a purchasing decision, institutional proximity will be taken into consideration. It is mainly due to the product will be having some modification in different regions. Hence, during the evaluation of alternatives, a sport car might not be scoring as well as a luxury continental car and this will affect the purchase decision. When a post purchase evaluation exists, it is necessary to know the institutional proximity related in order to tackle each cognitive dissonance. With this, we concluded that institutional proximity has an impact in the last three stages of consumer purchase decision process and the following hypothesis was derived:

**H5b:** Institutional proximity has a strong influence between the sender and receiver on the last three stages of consumer purchasing decision process.

![Figure 14: Impact of Intuitional Proximity on Consumer purchasing decision process](image)

**Methodology**

This research will begin by gathering and analyzing some background information related to the consumer purchasing decision process and the knowledge role that social media is playing in the Web 2.0, paying much attention to the five types of proximity. The results will be collected from the available sources (secondary data) and discussed in order to draw conclusions related to the research question and objectives.

**Research Protocol**

The critical inquiry went through the seven steps from resource selection to the formulation of research question. We will
discuss each step in this section.

Step 1 – Resource Selection
This research is conducted based on analyzing several research papers available, using data such as literature and articles that is collected by researchers and institutions. This is a secondary data research[63] where data are available on the Internet and Library Database. Based on the available data sources, several research papers published by different authors such as Yang[64], Pooja, Black, Jiangmei, Berger, & Weinberg[65], Mirza[12] from different academic websites such as Journal of Computer Information System, Journal of Marketing and etc are used. While we are collecting related research papers, data collections are also required to perform analysis for the hypothesis. The data were collected from various social media sources such as Facebook and Twitter.

Step 2 – Verifying available data
Further identification of the available data is required in order to provide substantial evidence and literature review for this critical inquiry paper. Gathering statistic is one of the key functions because it serves as a support to the theory mentioned in this critical inquiry paper. Statistics and figures from Socialnomics, CNBC news and CBS news is some of the sources for available data. In addition, identifying the appropriate papers were based on several requirements such as social media impact, availability of data such as statistics and result analysis, factors affecting consumer purchasing decision process, sociology of knowledge (for theoretical foundation) and, knowledge sharing and transferring.

Step 3 – Data Collection
As for the data collection, content analysis was conducted as part of the qualitative analysis by scanning through the comments and tweets in the messages posted in social media.

Table 8: Criteria for identification

<table>
<thead>
<tr>
<th>Proximity</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic</td>
<td>H1a: The product announcement globally before reaches any store.</td>
</tr>
<tr>
<td></td>
<td>H1b: Product available for purchasing at the local store.</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Product technical specification confirmed and shared with public before they reach consumer hands.</td>
</tr>
<tr>
<td>Social</td>
<td>Personal/small business sales based on Facebook or promoted by Facebook. Social connection was most critical to their business.</td>
</tr>
<tr>
<td>Organizational</td>
<td>Company is one of subsidiary of another large company where they are well connected with main company, having pleasurable and active interaction between company social website and customer.</td>
</tr>
<tr>
<td>Institutional</td>
<td>H5a: Independent website, which introduce a new product not been approved by the local agency. Consumer interest is low, and the product itself could be rejected by the local agency.</td>
</tr>
<tr>
<td></td>
<td>H5b: Independent website, which conduct a review with post sales matter, consumer shows strong interests on the product itself.</td>
</tr>
</tbody>
</table>

Step 4 – Classification of influences
As for the rate of influence, we use three classification to identify the influence rate since users usually have four actions to perform after reading a message: comment, marked as like or favorite, retweet/share or no action (we omitted no action as there is not enough information stating how many people has read the message and did not perform any action). We classified that when users replied or commented the post, it has a strong influence because according to Meredith, Teevan, & Panovich[66], users in social media usually answer questions for the top three reasons of being friendly or sociable, sharing of knowledge and showing interest. As for those users who are marked the message as favorite or like the message, it means that the message has a little worth or influence to them, and they might want to monitor some updates notifications. Lastly, for those people who share or retweet, we said that there is neutral feeling for it because they shared as they might think that it is suitable for discussion or information/knowledge sharing. Hence, the following table was used to determine was drawn:

Table 9: Rate of influences

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>People reply or comment directly to the post.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influence</td>
<td>People mark it as like or favorite</td>
</tr>
<tr>
<td>Neutral</td>
<td>People retweet, share it on Facebook, Google+, Pinterest or email sharing</td>
</tr>
</tbody>
</table>

Step 5 – Identification of factors affecting proximity
Knowledge sharing, social media and consumer purchasing decision process have several factors affecting each other. Factors identified are trust, critical mass, law of few, power of like, power, proximity, culture and etc. We have identified that proximity is one of the factors that has limited research or have direct link to this research. In addition, proximity can lead to elements such as trust, culture.

For geographical proximity, there is culture and product difference between two countries and it will be appealing to be able to identify how this factor affects consumer purchasing decision process. In cognitive proximity, we will be examining messages about a well known product against a not so well known product. As for social proximity, we will be looking into how believers such as friends or customers helping companies to clarify complaints. By clarifying the complaints, it shows that trust
is built between the entities by interaction. Next, with organizational proximity, we will identify the effect of open discussion with the consumers over social media. Lastly, we will look into the rate of influences towards products that are restricted by standards.

Step 6 – Result analysis
Analyses were conducted from the data taken from various resources in the social media, to analyze each of the hypothesis developed.

Step 7 – Discussion of research
The final step is to form the discussion about the research question where hypothesis was tested. Using the research question as a direction, the team analyses and discusses the analysis in order to achieve the research objectives.

ANALYSIS AND RESULT

This paper study uses secondary data to identify factors that address proximity and consumer purchasing decision process. We analyze the different messages posted on the different types of social media. There were a total of 70 numbers of posts (10 posts for each hypothesis) with the corresponding comments analyzed, and we chose 2 posts for each hypothesis to discuss in this report. Firstly, we classify each of the post by identifying the proximity involved. After which, we will determine the rate of influence according to the content and comments.

To determine if the geographic proximity affects the initial two stages of consumer purchasing decision process, we identified posts that are related to the product itself in general (not localized information) and comments made were mainly from users in the different part of the world. Using the three classifications determined in Table 2, we classified those users who comment the post has an influence towards identifying of their needs or motivating them to get interested to the product (stage 1 of the consumer purchasing decision process). The result shows that strong influence is only between 0% to 0.2% (See Table 3a and 3b). As for people who are marked the message as favorite, it means that the message is still necessary to them, and they would like to read it if there are any updates. This is considered as part of information search (stage 2 of the consumer purchasing decision process) because in the process of reading, information is gained. There are approximately 16% to 28% of the users performing this action. Lastly, the function of retweet is to share the message according to other people and it is more for sharing purposes with others. According to our findings, there are 72.12% to 83.58% of users performing such action. With these data, we conclude that message related to product information (See Figure 6a, 6b) has a weak influence toward the first two stages of consumer purchasing decision process (H1a).

Table 10: Low influence on the first two stages of consumer purchasing decision process (highest number of influences)

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1932</td>
<td>5034</td>
</tr>
<tr>
<td>0.20%</td>
<td>27.68%</td>
<td>72.12%</td>
</tr>
</tbody>
</table>

Source: https://twitter.com/SamsungMobile/status/255356462019272704

Table 11: Low influence on the first two stages of consumer purchasing decision process (lowest number of influences)

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>121</td>
<td>616</td>
</tr>
<tr>
<td>0.0%</td>
<td>16.42%</td>
<td>83.58%</td>
</tr>
</tbody>
</table>

Source: https://twitter.com/SamsungMobile/status/240864520866766849/

For the last three stages of consumer purchasing decision process (H1b), the data indicated that more users expressing interest as compared to the previous one. Figure 16 and 17 is related to a message posted from Samsung Singapore. We observed that consumers who replied to the post directly are approximately 8.15% to 26.88% (See Table 5 and 6) and replied were mostly related to the fourth stage of the consumer purchasing decision process, which is making a decision to purchase. Comments related to post purchase evaluation from previously experience were brought up in order not to be disappointed. As for users who are marked the message as favorite, it means that the message has a little worth to them and they might want to monitor some updates as a form of considering whether to purchase or not. There are approximately 70.96% to 86.59% of the users performing this action. And by commenting and ‘Like’, it informs the user about the updates of the post, we concluded that he has some interest in knowing the opinion of others, and in both Table 3 and 4, it has less than 45% (adding strongly influence and influence in each table). Lastly, the function of retweet is to share the message according to other people and it is more for sharing purposes with others. According to our findings, there are 2.15% to 5.25% of users performing this action. With these data, we concluded that message related to product information within close proximity (Figure 16 and 17) have a slightly positive influence towards the last three stage of consumer purchasing decision process (H1b).

Table 12: Positive influence on the last three stages of consumer purchasing decision process (highest number of influences)

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>66</td>
<td>2</td>
</tr>
</tbody>
</table>
As for cognitive proximity, Figure 18 show that the message posted requires certain prior knowledge in order to discuss about it. It requires knowledge regarding the model of the mobile phone that is described in the message. And with the reference to the Table 7 and 8, people who simply ‘retweet’ or share the message has a lot of users. This can mean that people shared in order to spread the news because by sharing, they will not get any updates from the original message.

According to Table 7, there are about 33.6% of users commented in the message and by commenting the message, it indicates that people are either clearing doubts or simply sharing of related knowledge. However, there are different limits regarding the stopping point of the comments. In Table 4, there is an approximately 8.47% of users commented and this has indicated that level of interest (limit) and after which, most people will simply share with their friends.

As for the evaluation of alternatives stages, cognitive proximity between the message and consumer is important because if the consumer does not understand the content, he will lost the interests and simply do not want to take the risk by purchasing it. As for post purchase evaluations, we can see that those who voiced out their comments or answers some of the related questions formed the number (33.6% and 8.47%). In addition, we found that consumer who commented “not interested” due to the problem or issue on the reliability of the product. People who ‘Like’ or mark as favorite will be able to receive an update. This means that they might want to have updates but interest level might not be as high as those who commented.

With the analysis, we concluded that social proximity is critical in order to draw interest, individuals must know that it is a trustable source and having different users commenting and if there are friends commenting, it will be more reliable. Having users expressing their stand on the message, this means that people who have like, favorite or commented will be able to update and set it as part of their information search result. Hence, when it reaches the stage on evaluation of alternatives, it impacts consumers because alternatives are eliminated based on the knowledge and also the trust toward the piece of knowledge. This will leads to making a decision of whether to make a purchase. In the post purchase evaluation stage, the consumer will post their evaluations a message or comment to the previous message that he has either like, comment or favorite. There will be more people who are willing to answer the enquiries on the post. With these data, we conclude that message related to product information within close social proximity (Figure 18 and 19) have a positive influence toward consumer purchasing decision process until a certain limit, beyond which the impact will be negative (H2).

Table 14: Positive influence on the consumer purchasing decision process (highest number of influences)

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>488</td>
<td>262</td>
<td>769</td>
</tr>
<tr>
<td>32.13%</td>
<td>17.25%</td>
<td>50.63%</td>
</tr>
</tbody>
</table>

Source: http://www.engadget.com/2012/10/26/lg-nexus-4-manual-8gb-16gb/

Table 15: Positive influence on the consumer purchasing decision process (lowest number of influences)

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>122</td>
<td>548</td>
</tr>
<tr>
<td>8.47%</td>
<td>16.67%</td>
<td>74.86%</td>
</tr>
</tbody>
</table>

Source: http://www.engadget.com/2012/10/26/xiaomi-phone-2-china-launch/

For social proximity, the gap between the lowest and highest is lowest among the three categories. In Figure 20 and 21, there are supporters of the business and commented positively regardless of the negative comments. Hence, the increasing social proximity will positively impact the consumer purchasing decision process from the sharing of product knowledge.

Social proximity plays a part in drawing motivation to buy products as attentions is gained when people see it on their wall post after they login. According to Table 7 and 10, the lowest for strongly influence and highest influence is 30% and 40.54% respectively. As mentioned, the range is smaller as users in the social media usually will help each other, or when they see their friends’ comment updates in their wall, it will trigger some attention and eventually join in to make a comment. By making a comment by asking a question and when a question is answered, it triggers friends’ attention especially for breaking news such as the issue on the reliability of the product. People who ‘Like’ or mark as favorite will be able to receive an update. This means that they might want to have updates but interest level might not be as high as those who commented.

With the analysis, we concluded that social proximity is critical in order to draw interest, individuals must know that it is a trustable source and having different users commenting and if there are friends commenting, it will be more reliable. Having users expressing their stand on the message, this means that people who have like, favorite or commented will be able to update and set it as part of their information search result. Hence, when it reaches the stage on evaluation of alternatives, it impacts consumers because alternatives are eliminated based on the knowledge and also the trust toward the piece of knowledge. This will leads to making a decision of whether to make a purchase. In the post purchase evaluation stage, the consumer will post their evaluations a message or comment to the previous message that he has either like, comment or favorite. There will be more people who are willing to answer the enquiries on the post. With these data, we conclude that message related to product information within close social proximity (See Figure 20 and 21) has a positive influence towards consumer purchasing decision process (H3).
For organizational proximity, we classified messages that are posted for open discussion for social media users as part of it because the messages facilitate regular discussions and sharing which increase the interaction (thus, lower the organizational proximity). With regular discussion (Figure 22), company will be able to measure the gap between the product and the customers. Thus, able to identify the needs of customers and also knowing how to motivate the customers to buy or get interest to the product. However, the range of percentage of comments received is wide. One of the reasons for a low strongly influence rate might due to the message is technical and consumers have difficulties understanding (at the same time related cognitive proximity). In addition, it serves as part of information capturing during information search stage. The total percentage of users who participated will be updated about the post is approximately 93.18% to 94.44%. Being strongly influence and influence, these users are able to receive updates whenever there are new comments. Hence, when the consumer wants to make a purchase, they will take the information as a measure to conduct the evaluation of alternatives process. As for post purchase evaluation, commenting on the post is one of the most common alternatives for them to their cognitive dissonance or praise the product that they have bought. With these data, we concluded that message related to product information within close social proximity (Figure 22 and 23) has a positive influence toward consumer purchasing decision (H4).

For institutional proximity, Figure 24 and 25 is related to a message posted from Samsung Galaxy Premier and Seagate respectively. Figure 24 is related to one of the new Samsung mobile introduction which is not popular model yet. In this scenario, Federal Communication Commission (FCC) is the regulatory agency which regulates international communication and the release of the mobile phone to the market has to be approved by them. The result for the impact on consumer purchasing decision process by institutional proximity shows that low influence is between 0.43% to 3.18% (See Table 13 and 14). As for users who are marked the message as favorite, it means that the message is still important to them and they would like to read it if there is any updates which is consider as part of information search because in the process of reading, information is gained. There are approximately 7.77% to 8.74% of the users performing this action. With these data, we conclude that message related to product information (Figure 24 and 25) have a weak influence towards the first two stage of consumer purchasing decision process (H5a).

As the last three stages of consumer purchasing decision process (H5b), the data did shows more users expressing interest as...
compared to the previous one. Figure 26 and 27 is related iPhone’s accessories and IOS6 bug fix. In Figure 26, it describes about the additional accessories which is previously launched in Europe will be launched for the new generation Apple product in US. This shows that there is a control in term of releasing (intuitional proximity). We observed that people who had replied to the post directly are approximately 16.45% to 29.34% (See Table 15 and 16) and the discussions were mainly about the use adaptor, new cable or low cost alternatives. There are approximately 19.94% to 52.09% of the users marked the message as favorite (influence), it means that they might want to monitor some updates while considering whether to purchase. And since by commenting and liking will inform the user about the updates of the post, we will say that he still have some interest in knowing the opinion of others, and in both Table 15 and 16, it has approximately 36% to 81% (adding strongly influence and influence in each table). Lastly, the function of retweet is to share the message according to other people and it is more for sharing purposes with others. And according to our findings, there are 18.54% to 63.61% of users performing this action. With these data, we conclude that message related to product information within close proximity (Figure 26 and 27) have a positive influence toward the last three stage of consumer purchasing decision process (H5b).

<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>87</td>
<td>31</td>
</tr>
<tr>
<td>29.34%</td>
<td>52.10%</td>
<td>18.56%</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Strongly Influence</th>
<th>Influence</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>156</td>
<td>189</td>
<td>603</td>
</tr>
<tr>
<td>16.45%</td>
<td>19.94%</td>
<td>63.61%</td>
</tr>
</tbody>
</table>

Source: http://www.engadget.com/2012/11/01/iphone-5-otterbox/

CONCLUSION

Before social media became a highly popular media, consumers have limited resource to collect product information. Despite being a buyer or seller, they predefined the direction and content of supply because most purchasing happened locally. Geographical, social, cognitive proximity impacts consumer purchasing decision process. The motivation to change consumer is based on their needs is stimulated by proximities and home market characteristics. Both organizational and institutional proximities act as brainstorm media, which impacts consumer purchasing decision but within limited geographical location. Social media has become increasingly prominent as it is not just a virtual space for individuals to interact but also a channel for advertising[66], sharing of information and knowledge, and building of relationship between consumer and advertiser. This study discovers that different proximity influences consumer purchasing decision process in different manner. Despite the limitation of this research, it identifies a direction towards a better understanding of the influencing factors toward consumer purchasing decision process and the role of each type of proximity.

In this research paper, we studied five proximities and explored its impacts throughout the purchasing decision process. We highlighted the importance of each of the proximity, which helps marketers to ensure that every message that is brought across to consumers in the social media will impact to the right audience, creating significant influence during their purchasing decision process. Proximity has been affecting consumer’s purchasing decision process since the past. It is more interesting to note that, with the highly populated influence of social media, proximity will continue having impact on consumer’s purchasing decision process, and this impact will be increasingly further and deeper.

LIMITATION AND FUTURE RESEARCH

Although we have taken rigor research methodology, some limitations still exist. One of limitations is that more sophisticated analysis can be done to reveal the relationship between proximity and consumer. This analysis can be done by gathering some available statistics and performing it with some data mining technique such as clustering to describe more about the data or classification technique to predict if the message will attract people to make a purchase.

This study proposed two suggestions for future research which is engrossing and significant to advertisers and researchers. Firstly, further research may investigate on the structuring of the information or message accordingly, taking in consideration of prioritizing the different types of proximity. Secondly, further research should examine the advantages and disadvantages for types of proximity in each stage of the consumer purchasing decision process together with other theory such as the critical mass[67] to identify the impact.

REFERENCES


## APPENDIX

### Appendix 1: How social media influence purchase decision

#### 35. Crosstab between Q21 and Q2

**Q21. Social Media - what motivates you? X**

**Q2. Please indicate your age?**

![Figure 15: Motivation to Social Media](image)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Var 1</th>
<th>Var 2</th>
<th>Var 3</th>
<th>Var 4</th>
<th>Var 5</th>
<th>Var 6</th>
<th>Var 7</th>
<th>Var 8</th>
<th>Var 9</th>
<th>Var 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25 years</td>
<td>35.000%</td>
<td>25.000%</td>
<td>90.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>75.000%</td>
<td>10.000%</td>
<td>25.000%</td>
</tr>
<tr>
<td>26-35 years</td>
<td>85.000%</td>
<td>80.000%</td>
<td>90.000%</td>
<td>80.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>75.000%</td>
<td>80.000%</td>
<td>25.000%</td>
<td>10.000%</td>
</tr>
<tr>
<td>36-45 years</td>
<td>50.000%</td>
<td>35.000%</td>
<td>90.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>75.000%</td>
<td>10.000%</td>
<td>25.000%</td>
</tr>
<tr>
<td>Total 100</td>
<td>50.000%</td>
<td>35.000%</td>
<td>90.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>85.000%</td>
<td>80.000%</td>
<td>75.000%</td>
<td>10.000%</td>
<td>25.000%</td>
</tr>
</tbody>
</table>

**Legend:**

- Creating relationships and friendships = Var1
- Someone who cares about the same things they do = Var2
- Entertainment and relaxation = Var3
- Providing a place where they can freely share their ideas = Var4
- Providing a sense of community and mutual support = Var5
- Sounding board for someone who cares about their interest = Var6
- Providing access to information and advice they could not get = Var7
- Opportunity to be involved in a case they care about = Var8
- Recognition, a place where they can share their intelligence = Var9
- None of the above = Var10

**Inferences:**

- At 81.30%, the variable 3 seems to be the motivation behind this age group 18 to 25
- Creating relationships and friends seems to be the motivation behind the age group 26 – 35 age
- Providing a place where they can share their ideas is another motivational factor for the age 36 to 45.

*Figure 15: Motivation to Social Media*[12]
13. **Q16. How do you express yourself creatively?**

![Figure 16: Express Creatively][12]

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentages</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blogging</td>
<td>52.16</td>
<td>35</td>
</tr>
<tr>
<td>Uploading videos</td>
<td>29.24</td>
<td>30</td>
</tr>
<tr>
<td>Sharing musical playlists</td>
<td>31.58</td>
<td>34</td>
</tr>
<tr>
<td>Mobile internet usage</td>
<td>11.7</td>
<td>2</td>
</tr>
<tr>
<td>Email/MMSs</td>
<td>11.7</td>
<td>2</td>
</tr>
<tr>
<td>Regular work</td>
<td>11.7</td>
<td>2</td>
</tr>
<tr>
<td>Photos</td>
<td>1.54</td>
<td>4</td>
</tr>
<tr>
<td>Writing</td>
<td>1.17</td>
<td>2</td>
</tr>
</tbody>
</table>

**Inference:**
- Majority of the respondents have said they share music, videos and blogs to express themselves creatively online.
- Of these some of them have included their 'regular work' that has something to do with spending most of their time online.
- Almost 2% have written creative writing.

**Recommendation:**
- We need to figure out ways to drive our generation to better express themselves like encourage writing etc.

Figure 16: Express Creatively[12]
17. Q20. What do you look for on a social network?

![Bar Chart]

**Legend:**
- Content on demand = Var 1
- Whenever, wherever access = Var 2
- Participate = Var 3
- Share experiences = Var 4
- Content I can play with and pass it on = Var 5
- More Authority = Var 6
- High levels of interaction = Var 7
- Usefulness = Var 8
- More Links = Var 9

**Inference:**
- 17% respondents have said they look for sharing experiences online using a social network.
- Almost 36% have opted for usefulness as criteria they look for while registering on a social network.
- Followed by 14% who say they look for content on demand while on a social network.

**Recommendation:**
- There are loads of social networks out there.
- It is time for them to take a note and start reacting to attract new users to their networks.
- Marketers are always on the lookout for newer mediums to advertise to reach out to their TGs anyhow.

*Figure 17: Motivation in Social Network[12]*
35. Crosstab between Q21 and Q2
Q22. Please indicate your age?

![Motivation Diagram]

<table>
<thead>
<tr>
<th>Var 1</th>
<th>Var 2</th>
<th>Var 3</th>
<th>Var 4</th>
<th>Var 5</th>
<th>Var 6</th>
<th>Var 7</th>
<th>Var 8</th>
<th>Var 9</th>
<th>Var 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 - 45 years 20</td>
<td>35.00%</td>
<td>25.00%</td>
<td>40.00%</td>
<td>45.00%</td>
<td>15.00%</td>
<td>40.00%</td>
<td>35.00%</td>
<td>10.00%</td>
<td>10.00%</td>
</tr>
<tr>
<td>18 - 25 years 32</td>
<td>63.00%</td>
<td>36.00%</td>
<td>40.00%</td>
<td>42.00%</td>
<td>42.00%</td>
<td>11.00%</td>
<td>36.00%</td>
<td>14.00%</td>
<td>43.00%</td>
</tr>
<tr>
<td>Total 100</td>
<td>54.00%</td>
<td>31.00%</td>
<td>53.00%</td>
<td>35.00%</td>
<td>32.00%</td>
<td>26.00%</td>
<td>36.00%</td>
<td>32.00%</td>
<td>35.00%</td>
</tr>
</tbody>
</table>

Legend:
Creating relationships and friendships = Var1
Someone who cares about the same things they do = Var2
Entertainment and relaxation = Var3
Providing a place where they can freely share their ideas = Var4
Providing a sense of community and mutual support = Var5
Sounding board for someone who cares about their interest = Var6
Providing access to information and advice they could not get = Var7
Opportunity to be involved in a case they care about = Var8
Recognition, a place where they can share their intelligence = Var9
None of the above = Var10

Inference:
✓ At 81.30%, the variable 3 seems to be the motivation behind this age group 18 to 25
✓ Creating relationships and friends seems to be the motivation behind the age group 26 – 35 age
✓ Providing a place where they can share their ideas is another motivational factor for the age 36 to 45.

Figure 18: Motivation [12]
20. Q28. What do you look for on the Internet?

**Figure 19: Purpose in the Internet[12]**

![Graph showing purposes on the Internet](image)

**Legend:**
- Health - Medical information = Var1
- News or information = Var2
- Information on politics = Var3
- Information on religion/spiritual information = Var4
- Make donations = Var5
- Shopping = Var6
- Pleasure = Var7
- Education = Var8
- Office work - Email etc. = Var9
- Others = Var10

**Inference:**
- 17.86% say they look for news or information on the Internet
- 14.03% say they shop online
- 16.07% say they look for education related information
- 14% say they are busy with their office work checking emails etc.
26. Q35. Does a social medium influence your purchase decision?

Inference:

✓ 41% respondents agree that social media influences their decision making process and hence their purchase
✓ While 9% believe it doesn’t influence their purchase decision

27. Q36. If yes, how likely are you to purchase?

Figure 20: Social media influence on purchase decision[12]
Appendix 2: Hypothesis testing

Figure 21: Slightly positive influence on the first two stage of consumer purchasing decision process (Geography proximity)

Source: https://twitter.com/SamsungMobile/status/255356462019272704
Figure 22: Slightly positive influence on the first two stage of consumer purchasing decision process (Geography proximity)
Source: https://twitter.com/SamsungMobile/status/2408645208666766849/
Figure 23: Positive influence on the last three stages of consumer purchasing decision process (Geography proximity - lowest number of influences)

Source: https://www.facebook.com/SamsungMobileSingapore/posts/10151317623282625
Figure 24: Positive influence on the last three stages of consumer purchasing decision process (Geography proximity - highest number of influences)

Source: https://www.facebook.com/SamsungMobileSingapore/posts/10151317623282625
Figure 25: Positive influence in the consumer purchasing decision process within a certain limit (Cognitive proximity)

With all these Snapdragon 8Q phones popping up here and there, Xiaomi’s finally announcing its launch plan for the retail version of its very own: *Xiaomi Phone 2* aka Mi Two, which is also powered by Qualcomm’s APQ8064a SoC. Here’s what’s going to happen: on October 30th, the company’s online store will release the first 50,000 units, followed by another 200,000 units (approximately) in mid-November. Additionally, the device will be offered in both 16GB and 32GB flavors, which are priced at ¥1,999 (about $320) and ¥2,999 (about $470), respectively. folks who reside in China can now register online for a quota, but it’ll probably be just a matter of time before we see them on eBay, anyway.

Source: http://www.engadget.com/2012/10/26/lg-nexus-4-manual-8gb-16gb/

**Figure 26:** Positive influence in the consumer purchasing decision process within a certain limit (Cognitive proximity)

Source: http://www.engadget.com/2012/10/26/lg-nexus-4-manual-8gb-16gb/
Figure 27: Positive influence on the consumer purchasing decision process within a certain limit (Social proximity)
Source: https://www.facebook.com/photo.php?fbid=353556881400557&set=a.353556871400558.84417.100002387446774&type=1
Figure 28: Positive influence on the consumer purchasing decision process within a certain limit (Social proximity – lowest number of influences)
Source: https://www.facebook.com/photo.php?fbid=10151287079102363&set=a.176178552362.153587.176161277362&type=1
Figure 29: Positive influence on the consumer purchasing decision process (Organizational proximity – highest number of influences)
Source: https://www.facebook.com/pfingo/posts/1015065062646864
Figure 30: Positive influence on the consumer purchasing decision process (Organizational proximity – lowest number of influences)
Source: https://www.facebook.com/photo.php?fbid=10151231210602962&set=a.381551177961.160828.14121632961&type=1
Figure 31: Low influence on the first two stages of consumer purchasing decision process (Institutional proximity – lowest number of influences)
Source: https://www.engadget.com/2012/11/02/samsung-galaxy-premier-reaches-the-fcc-without-the-lte-we-crave/
HOW TO PERSUADE NON-MOBILE SHOPPERS INTO MOBILE SHOPPERS: A TRUST ENHANCING PERSPECTIVE

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Yu Cheng Tu, Chaoyang University of Technology, Taiwan, tyuc@cyut.edu.tw
Che Yen Huang, National Central University, Taiwan, yanaynwade@gmail.com

ABSTRACT

Mobile shopping is getting popular and pervasive. However, the number of mobile users is not parallel to the number of mobile shoppers, because consumers frequently concern about security while conducting mobile transactions. The current study aims to elaborate in what trust enhancing message designs can be used to persuade non-mobile shoppers into mobile shoppers. Drawing on social judgment theory and the model of persuasion, our study has the potential revealing that consumers’ negative attitudes toward ubiquitously using credit cards over the air can be improved by persuasive messages if they are added into the checkout page of a shopping website.

Keywords: mobile shopping, non-mobile shopper, mobile shopper, social judgment theory, the model of persuasion

INTRODUCTION

Mobile internet access is getting more and more pervasive around the world. According to the survey conducted by Meeker and Wu [12], there are more than 1.5 billion mobile users worldwide up from 1.1 billion a year before with 30 percent growth and these users so far contribute to mobile traffic about 15% of all Internet traffic which is predicted to surpass that of Internet access using a traditional desktop PC by the end of 2015. Despite the number of mobile users expands rapidly, a survey of 2,166 US adults found that 72% of mobile users concerned more about privacy on their mobile devices than they were one year ago [20]. Another survey conducted by Econsultancy [5] also reported that 39% of 1,000 UK consumers concerned about security on their smartphones as one of the main barriers to mobile commerce. More specifically, a total of 1,406 online consumers failed to complete a mobile transaction due to obstacles encountered during checkout, while 51% of them stated that entering credit card information at checkout is one of obstacles that they feel uncomfortable to do so [7]. Obviously, all above findings have revealed the importance of trust assurance and uncertainty mitigation during the checkout stage of mobile shopping. This is consistent with the proposition of Chase and Dasu [2] that service encounters should end satisfactorily and that negative experiences should be overcome as soon as possible, because events (e.g., expressions of security concerns) that occur near the end of an encounter (e.g., checkout stage) have a more profound impact than earlier events on the overall shopping experience. Previous studies however pay very scant research effort on how to persuade consumers with security concerns that the websites they conduct mobile credit card shopping are safe. The current study takes a step further ascertaining in what situations non-mobile shoppers can be persuaded into mobile shoppers. The concept of trust transfer [18] serves as theoretical underpinning to address how a thruster’s trust in one subject can be transferred to another subject, while social judgment theory [14] and the model of persuasion [4] are applied to clarify consumers’ attitude changes after receiving persuasive messages. We postulate that consumers’ trust in traditional online shopping is transferable to mobile shopping if trust enhancing messages presented on the checkout page of desktop shopping can be stretched out to that of ubiquitous shopping. Our expected findings contribute to the relevant literature by discovering theoretical phenomena and offering managerial implications that help both researchers and practitioners to understand how to persuade non-mobile shoppers into mobile shoppers. In other words, the findings are beneficial to the ones who are striving to build consumer trust in mobile shopping.

THEORETICAL FUNDATION

Trust Transfer

Trust transfer refers to a cognitive delivery process that an individual’s trust is able to be transferred from a known entity to an unknown entity [18]. Previous studies have confirmed that trust transfer frequently occurs within or between trusting channels. For example, Perks and Halliday [13] identified that consumers who trust a product of the brand bought in one store will trust a new product of that brand sold in another store. Similarly, Stewart [19] found that trust is transferrable from a trusted e-commerce website to an unfamiliar one if they are affiliated by hyperlinks. In these two cases, trust is transferred within the same channel (e.g., offline/offline or online/online). On the other hands, trust can also be transferred between different channels. For example, Lee et al. [8] documented that trust can be transferred from offline banking to online banking or from online retailing to offline retailing. Although these studies shed light on trust transfer within or between trusting channels, there is a lack of research whether consumers’ trust in traditional online shopping can be transferred to mobile shopping with the exceptions of Lin et al. [9] and Lu et al. [10]. The concept of trust transfer in mobile shopping is considered to be relatively new and is expected to have the potential alleviating consumers’ security concerns about mobile transactions because
is transferrable from one familiar party to an unfamiliar party as mentioned earlier [18].

Social Judgment Theory
Social judgment theory defines attitude change as the stands the individual upholds and cherishes about objects, issues, persons, groups, or institutions [14]. The essence of the theory is that the degree of attitude change caused by receiving information depends on how the recipient evaluates that information. Attitude change can be a two-step process. First, individuals who hold a position on an issue indicate this position by marking an anchor point on an attitude continuum ranging from acceptance to no commitment to rejection. Where the mark is placed dictates the relative likelihood of assimilation and contrast. One of these two effects occurs when a discrepant viewpoint is expressed in the receiving information. The closer the information is to the anchor point, the more likely it is to be assimilated; the more distant it is, the more likely it is to be contrasted. Thus, the second step involves the information recipient mentally measuring the distance between the anchor point and where the information falls on the continuum. If the message is dissuasive and the recipient’s anchor point (ex-ante attitude) represents acceptance of the message, assimilation occurs. If the message is persuasive but the recipient’s anchor point is in the rejection region, contrast occurs. Thus, if the distance between the two points is too little or too much, attitude change is unlikely. On the other hand, attitude change is likely if the recipient’s anchor point is placed in the no-commitment region and the message is in either the acceptance or rejection region, or if the message falls in the no-commitment region and the recipient’s ex-ante attitude is in the region of acceptance or rejection. Although social judgment theory is useful for understanding attitude change, its focus is exclusively on evaluating the distance between the individual’s anchor point and the location of the message; it is not on the message’s content per se [16]. Thus, we apply Cialdini’s model of persuasion to guide the design of message content.

The Model of Persuasion
There are seven principles that persuaders can use to improve the persuasiveness of their messages [4], including reciprocity, commitment, liking, social proof, authority, contrast, and scarcity. Although reciprocity, commitment, liking, and social proof have been shown to be valid [3], we were interested in the source and proximity of the message, which are addressed by the last three of Cialdini’s principles. The principle of authority is the extent to which a persuader has a certain level of prestige, reputation, or expertise. Recipients generally believe that accepting information from a persuader with recognized authority decreases the probability of making a wrong decision. The authority principle can be represented by trustmarks that reflect the prestige, reputation, or expertise of the shopping website [15]. Contrast refers to information that can be used to distinguish the pros and cons of whatever is being compared. For example, if people first lift a heavy stone and then a light stone, they will feel the second stone to be lighter than they would had they not lifted the heavy stone first. Thus, applying the contrast principle in trust enhancing messages is expected to inform mobile shoppers that the website has better security than competing sites. It should be noted that contrast here is different from contrast in social judgment theory. For Cialdini, scarcity refers to objects of persuasion that are both valuable and rare. It has been shown that objects and opportunities become more valuable as they become less available [11]. The scarcity principle explains why trust-promoting protection mechanisms are safe: they are seldom descrambled by hackers.

RESEARCH MODEL AND HYPOTHESES
Based on the integration of Cialdini’s principles with social judgment theory, we used three types of persuasive messages operationally defined as the psychological distance between the message content and the consumer’s ex-ante attitude, they are authority only, authority+contrast, and authority+contrast+scarcity. In addition, it is hypothesized that consumers’ ex-post attitudes are affected by their ex-ante attitudes and the relationship between these sequential attitudes are moderated by the levels of message persuasiveness. Figure 1 illustrates our research model and hypotheses.
In evaluating consumers’ attitudes about a service, Bolton and Drew [1] commented that a customer’s attitude about a service offering at time t depends on her or his prior attitude at time t-1. This is because that prior experience with a service provider serves as an anchor for subsequent attitudinal evaluation [6]. When consumers perceive that the actual performance of the receiving service outperforms their expectations about that service, it is likely to result in attitude improvement (from negative to positive) as well as attitude strengthening (from positive to positive). In the context of mobile shopping, we postulate that consumers with negative attitudes about using credit cards over the air are affected by their ex-ante negative attitudes toward the same behavior, because they are the ones who obstinately conceive such a transaction as a dangerous adventure. We therefore proposed the following hypothesis:

**H1.** Consumers’ ex-ante attitudes toward using credit cards over the air significantly affect their ex-post attitudes toward using credit cards over the air.

In our contention, the authority message itself is the weakest persuasive message because it conveys only a pictorial logo to consumers (i.e., trustmark). The authority+contrast message however presents not only a trustmark logo on the checkout page, but also conveys a comparable message to inform consumers that the website has better security than other websites they might visit. As for the authority+contrast+scarcity message, it is considered to be the strongest persuasive message in that it presents not only a trustmark logo and a comparable message, but also provides additional trust-enhancing message that informs consumers that the website is definitely safe because hackers will take a trillion years to decode the credit card information. Urbany et al. [21] have demonstrated that the more information consumers receive before their transactions, the less uncertainty of those transactions they perceive. In our research context, we argue that the stronger the trust enhancing message is, the more likely consumers’ negative toward using credit cards over the air will be alleviated. We therefore propose the following hypotheses:

**H2a.** Trust enhancing messages that are encapsulated by authority, contrast, and scarcity create more attitude improvement than trust enhancing messages encapsulated by authority and contrast alone.

**H2b.** Trust enhancing messages that are encapsulated by authority and scarcity create more attitude improvement than trust enhancing messages encapsulated by authority alone.

For consumers originally possess positive credit card usage attitude, a stronger trust enhancing message may lead their attitudes to become more positively strengthened that a weaker message does, because a stronger message help those positive attitude consumers confirm that their decision to use credit card over the air is correct, while a weaker message may not be able to produce such an attitude reinforcement. We therefore propose the following hypothesis:

**H3.** Trust enhancing messages that are encapsulated by authority, contrast, and scarcity produces higher attitude strengthening for consumers with positive attitude toward using credit cards over the air.

**EXPECTED CONTRIBUTIONS**
Theoretical Contributions

Previous studies have evaluated the likelihood of trust transfer using mobile shoppers as research subjects (e.g., [9] [10]), the current study however uses non-mobile shoppers to be our research target. It is reasonable to believe that trust enhancing messages needed by non-mobile shoppers should not be parallel to the ones needed by mobile shoppers. Deriving mobile shopping behavior from experienced consumers does not necessarily guarantee that inexperienced consumers will perform the similar behavior because they project attitudes on two extremes of the continuum, ranging from favorable to mobile shopping to very unfavorable to mobile shopping. Thus, our expected findings are closer to the fact and are more able to practically address the phenomenon why consumers get involve in online shopping but not in mobile shopping. Furthermore, unlike prior studies mainly focus on the relationship between trust in online shopping and trust in mobile shopping, our expected findings contribute to mobile shopping context elaborating what persuasive messages can be applied to achieve trust transfer across channels. More specifically, the present study applies social judgment theory to monitor in what situations consumers with negative attitudes toward using credit cards over the air can be persuaded into the ones who are willingly using the same tool to transact ubiquitously.

Practical Implications

Practically, our expected findings have the potential to reveal that consumers’ negative attitudes toward ubiquitously using credit cards over the air can be affected by the persuasive messages they receive. In other words, providing them with additional messages that address their security concerns can facilitate attitude change, because trust enhancing messages gives consumers the opportunity to reassess their ex-ante negative attitudes toward incoming persuasive messages, creating the potential for attitude change. In addition, the levels of message persuasiveness also provide the way in which practitioners can use to bring out attitude change. For authority only message, it may give consumers no reason to accept the persuasive message, and thus it produces very little attitude change. This premise seems straightforward, but the trustmarks used by most mobile websites contain on or only authority information. We expect that consumers with negative attitudes may want to receive strengthening enough messages, because consumers generally feel that a trustmark is just a symbol, and they lack any specific understanding of its meaning [22]. Logically, the more deficient the explanatory capacity of a message, the less persuasive it is [17]. Although the manipulation of authority+contrast+scarcity is expected to be the most persuasive combination, consumers with positive attitudes of credit card usage over the air should also be taken into account, because they contribute more to market share than their counterparts do even though such a combination is expected to produce attitude strengthening to them rather than attitude change. In sum, our expected findings help shopping websites reevaluate their trust assurance and improve it by adding persuasive elements.

REFERENCES


SOCIAL NETWORK SITE VALUE DELIVERANCE FEEDBACK LOOPS

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ABSTRACT

This paper considers the harnessing of operational feedback loops across the business and its social network site (SNS). Built for structural equation modeling investigation, an expectations-value-outcomes (EVO) measurement approach is adopted as an approach to capture the feedback loops generated by SNS’s consumers as they engage at one of two large marine and a farm machinery portal-style social network sites.

Keywords: expectations, value, satisfaction, trust, loyalty, social network, electronic commerce

INTRODUCTION

Previously Hamilton and Tee [3]; [4] considered the deliverance of value within social network sites (SNSs). Their models typify a three stage approach with prior expectations leading to values acquisitions and resulting on consumer outcomes as shown in figure 1.

Recently, their pre-activity considerations have expanded to include information systems approaches of consumer experience [1] and the SNS’s believed usefulness to the consumer. When considering value a five dimensional approach is derived, and this is framed as at-activity (or during-activity) consumer capture. Assessments deemed by the consumer to have been acquired include their reflective views on satisfaction, the trust they have now established in using this SNS, and the loyalty they believe they are and will display concerning this SNS. In Hamilton, Prideaux and Tee’s [5] study, and in most other EVO studies, this consumer-changing EVO process is considered as a one-way process – leading to an outcomes decision set, and a changed perceptive position now held by this consumer.

In this paper we pursue a cyclic improvement to our data capture, and seek to build a two way EVO feedback modeling approach that allows a strengthening the EVO business solution over-time. As per figure 2 we include three major feedback loops, and we describe several minor loops that may hold significance within SNS business-specific applications.

First we deploy the time shift approach embedded in the EVO model and recognize that the time shift from ‘pre-activity’ engagement (expectations), to ‘at-activity’ actioning, and through to ‘post-activity’ considerations regarding the experiences encountered can be suitably framed to capture all three-stages of opinion within the one survey. Next, we add the post stage feedback loops and determine how these may be gauged, and finally, we set the agenda for our next SNS research benchmarking developments and our other business-specific applications.

FIGURE 1: SNS expectations-values-outcomes (EVO) timeline

FIGURE 2: Major feedback SNS loops in the EVO model
Time Sequencing of EVO Models
Before a consumer participates in a SNS engagement they adopt a pre-activity position. This position depends on their skillfulness in using an information technology approach [7]. In addition the consumer is about to enter an uncertain domain, but chooses to do so because of a pre-activity determination (or perception) of the SNS’s usefulness in allowing the consumer to gain the required insight they are seeking. This motivation to consume then links into the psychological aspects of consumer behavior [2], and these two SNS activators work in conjunction with the consumer’s expectations concerning the SNS and its community’s deliverance capabilities. This suite of expectations is captured as intentions (or directly expected deliverables) and extensions (or additional features that go beyond the expected deliverables). Thus four constructs frame the consumer’s pre-activity SNS input perceptions, and these are modified over time by the consumer directed SNS feedback loops.

During the activity or at the activity a value acquisition arises where the consumer gains value through a performance experience, through experiencing a quality dimension, by experiencing an economically worthwhile situation or reward, by sharing in a servicing experience and by participating across emotionally satisfying experiences. In framing these positions the consumer benchmarks them individually (or collectively as one overall values benchmark) against their expectations suite.

These five value dimensions [3]; [10] combine to deliver a suite of three main outcomes (or construct) measures. First, the consumer frames a reflective view as to how satisfying was the SNS experience, and as to what level of value they perceive it to be worth. Next, through the consumer’s actioning behaviors and reflective satisfaction considerations [9] a level of trust is established against the SNS [8]. Finally, a level of loyalty is developed [6] – hopefully with the consumer being sufficiently tempted to revisit the SNS in the near future. For each of these outcome construct a degree of values reflection is adopted and a degree of revisit intention is unleashed. Hence a new resultant EVO feedback model emerges as shown in figure 3.

![SNS EVO model with major and minor feedback loop paths](image)

**FIGURE 3:** SNS EVO model with major and minor feedback loop paths

EVO Questioning Approaches
The development of the EVO questionnaire is applied under pre-activity, at-activity, and post- activity questioning techniques – in line with Hamilton, Prideaux, and Tee’s [5] and Hamilton and Tee’s [3]; [4] modeling – but applied to SNSs. The SNS feedback loops are applied as post-EVO timeline divisional action loops. To frame their relative feedback strengths we pursue consumer responses such as: when I reuse this SNS I perceive it:

- performing as I expected
- giving me the quality experiences I expected
- being economically worthwhile in achieving my aims
- treating me to the servicing engagements I expected
- leaving me feeling the personal values I’ve experienced are as I expected
- leaving me satisfied to the level I expected
- offering engagements that give me the level of satisfaction I expected
- always sharing trustworthy information between its community of users
- connecting me with other loyal users who share similar interests.

Validation Approaches
This study is approached using on-line surveys at two significant Australian SNSs – one in the marine industry and one in the farm machinery area. Both sites tap different users and each has an active social network. Each SNS’s community of users...
(consumers) exceeds 70,000. The communities are asked to complete identical questionnaires and a raffle prize is offered to drive the response rate towards one per cent. The two data sets are to be sectioned into their corresponding calibration and validation sub-sets of around 350 cases each. Each structural equation modeling construct is built through factor reduction. The structural equation modeling approach adopted aligns to Hamilton and Tee’s [3] technique and exposes significant individual path strengths, the total effects of each construct, and the significant feedback loops. Qualitative questions are included in the survey as an additional triangulation measure. Support questions further determine the consumer’s capabilities, motivation, and consumptive desires against the demographic divisions collected under this study.

**DISCUSSION**

This study first expands the understanding of the consumer and their interactions within a business’s SNS. It provides a new and broader capture of pre-activity constructs and provides a competitive pre-status from where the business can develop its target market strategies and then present its selected value offerings to the consumer as an at-activity experiential suite captured in five dimensions. The subsequent post-activity assessment phase provides the business with a consumer-assessed determination (satisfaction, trust, and loyalty) concerning the successes (or failures) of its strategically targeted suite of experiential value offerings. The feedback loop inclusions offer new dimensions to this type of approach. They now allow the business to reassess its offerings based directly on the interpretations of its SNS consumers, rather than by a business assessment of a one-way EVO process. These consumers are most likely the committed adopters of this business SNS and they likely provide a leading edge feedback interpretation for the business. In the future these feedbacks can then contribute to the build of a repositioned process. These consumers are most likely the committed adopters of this business SNS and they likely provide a leading edge offerings based directly on the interpretations of its SNS consumers, rather than by a business assessment of a one-way EVO process. These consumers are most likely the committed adopters of this business SNS and they likely provide a leading edge feedback interpretation for the business. In the future these feedbacks can then contribute to the build of a repositioned competitive edge for the business. Hence, this study’s EVO feedback loops approach brings a capability to release new dynamics concerning the next change processes that likely warrant management consideration if management is in pursuit of competitive edge for the business. Hence, this study’s EVO feedback loops approach brings a capability to release new dynamics concerning the next change processes that likely warrant management consideration if management is in pursuit of enlisting a rapid response strategy to consumer shifts as portrayed within their SNS environment(s).

**CONCLUSION**

Understanding feedback loops in EVO models and in SNSs enables the business to adjust to its consumers changing preferences and to include additional value drivers where and when required. EVO feedback loop activations allow the business to make considered decisions and to pursue agile solutions - thereby shifting in line with and in close proximity to the changing focal points of the SNS and its consumer’s activities.

**REFERENCES**


PREDICTING E-COMMERCE ADOPTION USING DATA ABOUT PRODUCT SEARCH AND SUPPLIER SEARCH BEHAVIOR

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ABSTRACT

In this paper we use a semi-supervised learning model to predict whether a person thinks buying a specific product online is appropriate. As input, information is used about the channels one deems appropriate to find product information or to find suppliers. Both online and offline channel preferences are found to be valuable to predict e-commerce adoption. The practical consequence of the work is that (binary) data about a user’s preferred channel for information retrieval can be helpful to estimate the probability the person is interested to buy a specific product online so that publicity for an online shop is only shown to people who actually believe buying that product online is appropriate. The predictive performance of our approach is considerably better than that reported in earlier research. Our results also show that semi-supervised learning has advantages in terms of predictive performance compared to supervised learning.

Keywords: E-commerce, channel acceptance, graph based semi-supervised learning, implicit network analytics

INTRODUCTION

Online sales are rising. According to Forrester research, online retail sales will reach $262 billion in 2013 in the US and €128 billion in Europe. While this number is increasing with about 10% every year, online sales still make up less than 10% of the total retail sales. Clearly, not all people think buying online is appropriate for all products. As a consequence, it is important to target publicity for online shops to people who are actually interested in buying a specific product online. In an attempt to do that, companies nowadays can use big amounts of data concerning consumers. For example, big phone companies are selling data they gather about their subscribers’ locations and web-browsing habits. This paper investigates a way to predict whether a person is interested in buying something online or offline. More specifically, we investigate whether knowledge about channel choice in early data-gathering steps of the buying process is useful to predict whether a person will actually make the purchase online.

Marketing literature distinguishes several steps in the buying process. In this paper we investigate the relation between media used in three steps of that process: (1) the medium used to search product information and (2) to search supplier information and (3) to make the purchase in the end. When we talk about “e-commerce adoption” in this paper, we then refer to the use of online media in the purchasing process step where the purchase is actually made.

Prior research aimed at explaining (rather than predicting) e-commerce adoption by considering it as a specific case of technology acceptance with marketing elements [13]. The theory of planned behavior (TPB) has been extended to explain that the e-commerce adoption process is affected by product information seeking behavior [13]. This paper, however, did not investigate the predictive power of this information with appropriate predictive measures [14][15]. Vendor information seeking has been studied as well because vendor information is useful for choosing a channel to buy [7]. On the other hand, many firms attempt to participate in e-commerce by moving part of their business from offline to online platforms, e.g. Walmart acquired online service providers Oneops and TastyLabs. Still, many products and services are conventionally promoted and sold offline. This brings both opportunities and challenges for research in e-commerce adoption.

In practice predicting e-commerce adoption is a difficult task since there are many people browsing without actually purchasing. With growing attention in data analytics using machine learning and data mining techniques, we discuss predictive modeling with the semi-supervised learning paradigm to classify potential e-commerce adopters. Previous studies have shown that information of users’ social ties is useful to predict e-commerce adoption [18][19]. That information, however, only has limited predictive power (the average AUC reported was 0.62; see below). Hence, other approaches with more predictive power are welcome. Given the attention that was given in prior research to channel choice for product information seeking and supplier information seeking, it is interesting to investigate whether such information is useful to predict e-commerce adoption. Hence we formulate these research questions:

- Is information about channel preferences for finding product information valuable to predict e-commerce adoption?
- Is information about channel preferences for finding supplier information valuable to predict e-commerce adoption?

In what follows we first discuss related literature. Subsequently we introduce the modeling details and discuss the design of the experiment to assess the predictive power of our model by contrasting different data mining models from different paradigms. Finally we discuss and summarize our work in the conclusions.
RELATED WORK

E-commerce acceptance theory

Much explanatory research has been done towards technology acceptance. The Theory of Planned Behavior (TPB) and related works [1][2][3][4] provided dimensions such as attitudes towards behavior, subjective norms and perceived behavioral control to explain the reasoned human behavior. Attitudes towards behavior then stand for the individual’s evaluation of the performance from the outcome of the behavior. Subjective norm concerns the fact that the individual’s perception of the behavior is influenced by social normative pressures for example from family and friends. Perceived behavioral control stands for the ease of conducting the behavior. A person’s decision to perform certain behavior is affected by his/her own intention which relates to the mentioned dimensions. The TPB was widely discussed in information systems research to gain insight into e-commerce [11][13]. Pavlou et al [13] argued that both the intention to make some purchase and the intention of seeking information are important to understand the process of e-commerce adoption. They extended the TPB with extra components of self-efficacy and controllability that are:

- Individual judgments of a person’s capabilities to perform a behavior [4]
- Individual judgments about the availability of resources and opportunities to perform the behavior [5]

as well as other concrete elements involving technical (e.g. download delay) and non-technical details (product characteristics) of e-commerce. That research shows e-commerce adoption is not a monolithic but a multidimensional activity that involves the information seeking process [13]. Other research pointed out that users’ channel preferences are linked to relative advantages of the channels concerning issues such as trust, convenience and efficacy of information acquisition [7].

Predictive versus explanatory models

While most research on information systems acceptance concerns explanatory modeling, our paper concentrates on predictive modeling. Explanatory models are models that are ‘built for the purpose of testing causal hypotheses that specify how and why certain empirical phenomena occur’ [15, p.554]. Researchers then test causal hypotheses using association-type models, e.g. regression and structural models. Such modeling evaluates the goodness of fit of the model using criteria such as adjusted R². Predictive modeling (such as data mining) is ‘designed for predicting new/future observations or scenarios’ [15, p.555]. In predictive modeling, one uses a holdout sample where part of the sample is used to build the model and the other part is used to validate the predictive accuracy. These two types of models compensate for each other’s shortcomings since predictive models are built based on the distribution of the data (and possible relations are not limited to hypothesized relationships) but are weak in terms of explanatory power. Explanatory models contain causal associations between the response and the constructs, but overestimate the model fit since it builds and evaluates the model using the same sample (i.e., there is no hold-out). Explanatory models can tell predictive model builders what variables could be considered to make predictions. A literature review of MISQ and ISR articles showed that predictive modeling is scarce in mainstream IS research [15] and that sometimes explanatory modeling was used to reach a predictive goal, what is inappropriate given the fact that no holdout is used. Besides, ‘the best explanatory statistical model will almost always differ greatly from the best predictive model’ [15, p.555].

Much IS research [6] [17] concerns e-commerce adoption but that is typically exploratory research. In this paper we work on a parallel path, using predictive models in IS acceptance research so as to come to a higher predictive accuracy than what can be achieved with explanatory models.

Semi-supervised learning

In the field of predictive modeling research techniques are used such as machine learning and data mining. The full data sample is randomly split into training and test sets to demonstrate the predictive power. A training set is used to build a predictive model whereas a test set is used to measure the predictive performance. The goal is to predict the value of a response variable (‘label’), such as the binary outcome of whether a user is going to be an adopter/non-adopter. In practice there might be datasets with instances for which the response variable is fully known or only partially known. So-called supervised learning is applied to the scenario where all labels are known. Semi-supervised learning is the approach where the response variable is only known for part of the sample. Both labeled and unlabeled data are then used to build the predictive model [22]. The unknown label records can also be valuable for prediction in the sense that they share similarity in certain features with others that might have a known outcome. Despite the fact their true label is not known, these unlabeled samples can still contribute to prediction to some extent based on similarity among labeled and unlabeled data. For instance different people with similar interests in using certain online channels might be interested in shopping online. In practice, semi-supervised learning classification methods are preferred since less labeled data are needed. It has been used widely in engineering fields involving computer vision [16] and knowledge discovery on the web [20]. We use such approach in the hope to decently predict e-commerce adoption.

RESEARCH DESIGN

A survey has been conducted in 2012 at one European business school gathering information on channel preferences (1) to gather product information, (2) to find a supplier and (3) to make the purchase. Students and their parents were asked to reveal their perceived appropriateness of different media in the context of the procurement of different products. We refer to Table 1 for a list of the different products. The list includes a number of services as well (but for reasons of brevity we will talk about ‘products’ in this paper).
Table 1 Product item used in the survey

<table>
<thead>
<tr>
<th>Product type</th>
<th>Percentage of people that intend to buy the product online</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd hand car</td>
<td>0.2298</td>
</tr>
<tr>
<td>books</td>
<td>0.5134</td>
</tr>
<tr>
<td>pubs and cafeterias</td>
<td>0.2127</td>
</tr>
<tr>
<td>computers</td>
<td>0.5012</td>
</tr>
<tr>
<td>fitness centers</td>
<td>0.2323</td>
</tr>
<tr>
<td>camera</td>
<td>0.4328</td>
</tr>
<tr>
<td>hotels</td>
<td>0.6993</td>
</tr>
<tr>
<td>car rental</td>
<td>0.5770</td>
</tr>
<tr>
<td>copy-service</td>
<td>0.2494</td>
</tr>
<tr>
<td>family doctor</td>
<td>0.0954</td>
</tr>
<tr>
<td>air-conditioning</td>
<td>0.3399</td>
</tr>
<tr>
<td>clothing</td>
<td>0.4523</td>
</tr>
</tbody>
</table>

The online purchase of a service should then be interpreted as the online reservation of a service. The products that were included in this research are the same as in [19], so as to enable a comparison of the results.

An ordinal scale from 1 to 5 (most applicable to not applicable at all) was used to reveal the appropriateness of different media (see Table 2 for an overview of the different media).

Table 2 Online/offline channels used in the survey

<table>
<thead>
<tr>
<th>Search product information online</th>
<th>Search product information offline</th>
<th>Search supplier information online</th>
<th>Search supplier information offline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google and other search engines</td>
<td>Magazine and books, family and friends, from sellers</td>
<td>Google and other search engines, online yellow pages, online auction sites</td>
<td>Magazine and books, family and friends and other people, yellow pages, already having a fixed supplier</td>
</tr>
</tbody>
</table>

For reasons of clarity we here wish to say explicitly that students did not have to fill out the questions about where product information was searched for ‘products’ such as pubs and cafeterias, fitness centers, hotels, copy services and family doctors. Hence, no information on the channel choice to search product information could be used in the predictive model for these products.

We utilized data from 409 out of 414 respondents who filled out the survey. Data has been cleaned and preprocessed. We removed observations which had more than 10% missing values.

Predictions were made for the appropriateness of buying online for some person for a specific product. That is, all products were treated separately. For each product, we formally define a feature space of subject i’s channel preferences $\Phi_i = \{S_{i, on}, S_{i, off}, P_{i, on}, P_{i, off}\}$ where $S_{i, on}$, $S_{i, off}$, $P_{i, on}$, $P_{i, off}$ are channel preferences for searching supplier information online/offline and searching for product information online and offline respectively. The response variable – whether a respondent thinks it is appropriate to purchase online or not - is defined as $y = \{y_1, y_2, \ldots, y_l, y_{l+1}, \ldots, y_n\}$ where $\{y_1, y_2, \ldots, y_l\} = \text{subjects’ outcome (label) that is known}$, and $\{y_{l+1}, \ldots, y_n\} = \text{subjects’ outcome (label) that is unknown}$. $n$ is then the total number of respondents in the sample.

We obtain a similarity score between all respondents by using different distance measures. Affinity networks can then be constructed on the basis of the channel preferences. For instance we obtain an affinity network for the way supplier information is searched online:

$$ W_{ij}^{S_{i, on}} = dist(S_{i, on}, S_{j, on}) $$

(1)

The same holds for other types of affinity networks that are constructed from other features such as $S_{i, off}$, $P_{i, on}$ and $P_{i, off}$. Different distance measures can be used, such as Euclidean distance or Cosine similarity. Applying raw numerical values of the channel preferences to these measures might not preserve the ordinal nature of the data. Therefore, the scale measures from the survey have been converted into ranks before calculating the instance-based similarity. Specifically, if a person A rates online channel preferences for 5 different media as $[1 2 5 5]$ and person B gives a rating $[2 2 3 4 4]$, they will essentially get the same ranking on the channel preferences $[1.5 1.5 3 4.5 4.5]$. Ranks are averaged whenever there is a tie. We denote $\text{rank}(S_{i, on})$ as the rank of k th online medium to search supplier information for person i.

In practice, companies will generally not create surveys (as the one we created) to get the ordinal information we use. Rather one’s channel preference can be observed and binary data is available on the use of some channel (e.g., did the site visitor come...
from a Google search results page?) and in the best case a ranking can be made of the use of different media (e.g., the person came once to our site from the yellow pages but many times from Google). Hence we also converted the 1-5 ratings into binary ratings so that a medium that was perceived as appropriate (score 1 or 2) received a score of 1 and a medium that was not really perceived as appropriate (scores 3 to 5) received the score 0. For instance A’s preference of [1 1 2 5 5] then became [1 1 0 0 0]. We use Spearman distance [9] as our distance measure among all other choices. Using Spearman distance, we can, for example, create an affinity network based on similarity in the way supplier information is sought:

\[ w_{ij} = \sum_{k=1}^{n} (\text{rank}(s_{ik}^{on}) - \text{rank}(s_{jk}^{on}))^2 \]  

(2)

With the network in matrix W, a predictive model can be built by learning a function \( f \) which takes nodes in network W as input and predicts the label of the nodes as output. \( f(x_i) \) then is the predicted label for respondent \( i \) given \( x_i \), the respondent’s ranking of the appropriateness of different items. We denote all samples in the data with labeled samples \{\((x_1,y_1),(x_2,y_2),\ldots,(x_l,y_l)\)\} and \{\((x_{l+1},y_{l+1}),\ldots,(x_n,y_n)\)\} as unlabeled samples without \( y \) as the label. The \( x \) here is the channel preference such as \[1.5 1.5 3 4.5 4.5\] for person \( i \). A regularization framework can be built around labeled and unlabeled data to guide the design of the function \( f \).

\[
\min_{f, f(x)} \alpha \sum_{j=1}^{l} (y_j - f(x_j))^2 + \sum_{i,j=1}^{n} w_{ij} (f(i) - f(j))^2
\]  

(3)

There are two minimization objectives in such framework: the function \( f \) should provide an accurate estimate on labeled samples, and smoothness between labeled and unlabeled samples meaning the samples close in the network should have similar labels. These two objectives can be traded-off; thus balanced with parameter \( \alpha \) in (3).

Gaussian Random Field function (GRF) [21] provides a solution to the problem formulated above, by using a harmonic function that maps values from \( x \) to \( y \) in labeled data, and estimates the label of the unlabeled data with their neighbor data points in the network structure. More specifically, the labeled nodes are learned in the function as what they are; while for unlabeled nodes we intend to minimize the following function:

\[
E(f) = \frac{1}{2} \sum_{i,j} w_{ij} (f(i) - f(j))^2
\]  

(4)

It is harmonic as it is twice continuous differentiable and \( \Delta f = 0 \). The harmonic property provides the unlabeled nodes:

\[
f(j) = \frac{1}{d(i)} \sum_{i=j} W_{ij} f(i), \text{ for } j = l + 1, \ldots, l + u
\]  

(5)

This basically means the labels of unlabeled nodes are decided by the average of their neighbor. The degree of a node is denoted as \( d(i) \).

In this paper we intend to illustrate that semi-supervised learning performs better than supervised learning when using labeled and unlabeled data. We will therefore compare the results achieved with GRF, with the predictive performance of a logistic regression (see below). Using the affinity network and label of subjects we build a predictive model and cross validate the prediction performance. For instance, for a 30% holdout, 70% of the data is used to train the model and the remaining 30% is only used to test the prediction performance. We contrast the prediction result between supervised learning and semi-supervised learning methods with different percentages of holdout.

Just as is the case in practice, where there is a huge difference between the number of people browsing and those purchasing, there will be a lot of data entries about customers which only browse without knowing the outcome whether they are interested in e-commerce or not. Semi-supervised learning is considered to be a good choice with its ability to classify labeled and unlabeled data. Logistic regression is used as the supervised learning benchmark. It takes in feature \( \Psi \) as input and predicts the adoption by estimating parameters \( a \) and \( b \) using the maximum likelihood procedure [12].

\[
\ln \left( \frac{p(y = y_i \mid \Psi_i)}{1 - p(y = y_i \mid \Psi_i)} \right) = a + b\Psi
\]  

(6)

AUC (area under the ROC curve) is used as the criterion to evaluate predictive performance. AUC can be considered as the probability that a classifier in the predictive model will rank a randomly selected positive case (someone’s intent to purchase online) higher than a randomly selected negative case. [10]. We use AUC to measure the predictive accuracy because the e-commerce acceptance rate is low for some of the products (see Table 1). In such cases it is considered to be a better measure than accuracy for example [10]. All the tests have been repeated with 100 trials. We check the statistical significance using the Mann–Whitney U test [8] with significance level 0.95.
Tables 3 to 6 show the predictive performance of GRF and logistic regression with a 30% holdout (Tables 3 and 4) and 90% holdout (Tables 5 and 6) using the ranked data. Tables 7 and 8 show the results for GRF using binary data.

Each table shows the AUC (+ standard deviation) that is achieved for predicting someone will accept to buy a specific product online, given the media the person uses to search for supplier information online, offline or both; or given the media used for searching product information online, offline or both.

Tables 3 and 4 show interesting results. First, the AUC is systematically higher than 0.5, showing the data really has predictive power. With GRF, the AUC is typically even higher than 0.6 (when online media are used as input) and often even higher than 0.7. Comparing the AUC with the benchmark from [19], the results are promising. For example, the AUC that is achieved with the GRF and online supplier search information is systematically higher than the AUC reported in [19] (same holdout). Secondly, if we compare between online/offline channel usage information, having information on both Online and Offline channel usage is generally better than having information about online media usage only or offline media usage only. Furthermore, information about online channel preferences allows better predictions than offline channel preferences when using a 30% holdout. While largely irrelevant from a practical viewpoint, from a theoretical viewpoint it is interesting to note that there are still quite some cases where the AUC is larger than 60% when using information about offline channel preferences only. Thus, knowing the offline channel usage in early steps of the purchasing process can be helpful for predicting e-commerce adoption.

Zooming in on the GRF test results with 30% holdout, it is clear that having supplier search information is more predictive than product search information. Among the 7 product types, there are 5 cases where supplier search information provides better prediction than product search information with 1 case tied and 1 case the opposite. In the case of the Logistic regression, there are no systematically better results achieved when using supplier information than when using product information. Comparing the GRF results with the Logistic regression results, the GRF results are significantly better than those achieved with the Logistic regression.

If we compare the results within classification methods across holdout settings, increasing the holdout from 30% to 90% (table 3 versus 5, table 4 versus 6), it is obvious the predictive performance of logistic regression suffers significantly when the size of the training sample decreases. When only 10% of the data is available for training a model, the predictive results are far from satisfying as most of them are in the low 0.50s AUC. Meanwhile, GRF’s performance decreases as well but the AUC is still considerably higher than that of the Logistic regression.

In contrast to what was noted for the GRF tests with a 30% holdout, we note that the supplier search information on average is no longer more valuable than the product search information when a 90% holdout is used with GRF.

Finally, we are also interested to know if we still get good (or even better) results if we simplify the ordinal data (1-5, most applicable to not applicable at all) into the binary choice (1 and 2 => relevant, 3-5 => not relevant) made by respondents for choice the channels. The results of GRF with a 30% holdout and a 90% holdout are shown in Table 7 and Table 8 respectively. The results are very promising as the results are generally even better than when using the rank of the media preferences. This is both the case, for the test with a 30% holdout and a 90% holdout. This result is important since in practice, companies rarely have a ranking of one’s channel preferences. Our test results suggest that starting with very limited facts such as browsing history or other UGC (user generated contents) is sufficient to make relatively accurate predictions of e-commerce adoption.
<table>
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<th>Search for product information</th>
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Table 5 Result GRF with 90% holdout and ranked data

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Table 6 Result Logistic regression with 90% holdout and ranked data

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### Table 7 Result GRF with 30% holdout (binary)

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### Table 8 Result GRF with 90% holdout (binary)

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DISCUSSION

First, we contrast our results with those published in previous work [19]. The AUC that is achieved with the GRF function, using information about previous online behavior from the person, is higher than the AUC that was achieved in [19] using the social network information of people. Also, our approach does not need information on people’s social ties. Rather information can be used on the person’s browsing history. Just by investigating the use of Google and other search engines, online yellow pages and online auction sites such as e-bay, allows making good predictions of the e-commerce acceptance of a person. Such binary information can rather easily be gathered by companies (or bought from Internet ad serving firms such as DoubleClick). By making predictions about e-commerce acceptance, companies can make sure not to pay for publicity for online shops shown to people that are not open to buying that specific product online anyway.

Our research suggests that while there is a major emphasis nowadays on social influence (via online social networks for example) as a driver to increase e-commerce adoption (linked to the approach used in [19]), similarity between people based on personal channel preferences can be valuable in a different type of social network study as well, as shown here. Both, social influence and profile similarity, contribute to the observed correlation in networks. Neither of them should be ignored in e-commerce adoption research.

On first sight it seems surprising that using binary data generally gives better results than using ranked data. This fact could be caused by the fact that the ranking does not really matter so much in the head of the respondent. That is, whether some medium is deemed to be entirely inappropriate or only somewhat inappropriate to find a supplier does not really matter to the person, as the person will not use those channels anyway. In the end, some channels will be used and others will not be used, so that binary information very well reflects the relevant thoughts of the person. When creating rankings, people may be categorized as being dissimilar; while they actually show similar behavior in terms of the channel they are actually using (as measured by the binary variable).

One might say that it is unclear whether a person is looking for product information or a supplier when searching the Internet and that it thus could be hard to get the necessary data. Still, predictive performance is only slightly worse in case product search information is used with GRF with a 30% holdout. With binary data, no difference is noticed between using online supplier search information or online product search information so that it does not really matter (from an e-commerce acceptance prediction viewpoint) whether the person was actually searching for product information or a supplier.

Future research is needed to analyze the decision rules that are being generated during the training phase and that are used by the system when making predictions in the test phase. An analysis of those rules could give more insight into the reasoning and behavior of people.

The next step of our future research we will then investigate the difference between different products in more detail. Once we have analyzed the different rules, we can try to understand why the GRF function works better for one product and less good for another product. There is no simple explanation on first sight. For example, predictions for services are not systematically better or worse than predictions for products. While different rules are generated for different products, it is interesting from a theoretical viewpoint to find out why the GRF function performs differently for different products and to analyze whether the generated rules are very different for different products.

A limitation of our study is that we use a sample of students and their parents, so that we do not have a sample of the entire population. For example, the age category 25 to 40 is largely missed in our sample and future research could investigate the applicability of our approach in that part of the population. Still, we note it is appropriate to have used a student sample in our study, as students and their parents are really people who are consumers and who are really making decisions on buying offline or online. They are just not representative of the entire population but only of a (relevant) part of that population.

CONCLUSION

In this paper we use a semi-supervised learning model to predict e-commerce adoption of different products and services using information about the channels one deems appropriate to find product information or to find suppliers. Our results show that semi-supervised learning has advantages in terms of predictive performance compared to supervised learning, which demands a fully labeled dataset. The theoretical implication of our work is that both online and offline channel preferences are found to be predictive for e-commerce adoption. Using similarity in channel preferences between users, predictive models can utilize labeled and unlabeled data. The practical relevance of the work is that knowing users’ preferred channel for information retrieval can be helpful to estimate the probability the person is interested to buy a specific product online. Besides studying real relations in a social network [19], connecting similar people in an artificial network is valuable to predict e-commerce acceptance.


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REFERENCES


SOCIAL LEARNING IN MANAGEMENT EDUCATION

Lee Schlenker, EMLYON Business School, France, schlenker@em-lyon.com

ABSTRACT

In spite of the increasing amount of data available on student motivations, behavior, and aptitudes, Big Data has had little impact on the quality of higher education. Building upon the foundations of pedagogy, context and conversation, the author proposes a framework of how Big Data can be leveraged to improve the impact of learning technologies. The work concludes with an outline of the tenets of such "social learning" that underpin his current work around the AMATE™ platform for management education.

Keywords: Big Data, Mobility, Pedagogy, Learning Technologies, Management Education

INTRODUCTION

Nowhere are the opportunities and the challenges of Big Data more apparent than on the modern day university campus. The widespread introduction of course management systems has offered educational institutions increasingly larger data sets of personal, social network and contextual information. The development of interactive learning has produced increasing amounts of unstructured data through intelligent tutoring systems, simulations, and learning games. The recent introduction of mobile technologies has provided a viable platform for leveraging Big Data - cloud based, mobile applications are location sensitive, mobile data captures managerial and consumer behavior. The predictable result provides the epitome of "data deluge"; Locus estimates that the education sector has already accumulated 269 petabytes of structured and non-structured data.

Big Data is less a question of architectures and algorithms than an opportunity to redefine the meaning of learning. Big Data is commonly defined as large data sets that exceed the capacities of current software tools to adequately capture, curate, manage, and process the data. The potential impact of Big Data resides none-the-less is in its "relationality" in depicting individual motivations and group behavior. The value of this concept is thus its serendipity; patterns can emerge in "complex contexts" of massive quantities of data where best practices can't be ferreted out. Does the plethora of data actually improve the quality of pedagogy in higher education? On one hand, researchers are now examining a wide range of issues in the management sciences by using large-scale data sets to explore individual and organizational behavior, communication, and adoption patterns. On the other, in spite of the near universal student use of the latest information technologies has had little impact on educational experiences and services.

If Big Data is to help redefine the meaning of learning, we need to better gauge the challenges and potential advantages of Big Data for students, instructors and institutions. This "Reflection" paper explores the place of Big Data in improving the impact of learning technologies. We will begin with a quick review of research on e-learning to identify the key questions in leveraging big data in formal education. We will then turn our attention to how pedagogy can refocus on the value big data has to offer. We will conclude with the tenets of our vision of "social learning" that underpin the development of our AMATE™ platform as an interactive support for management education.

RESEARCH THEMES

If scholarly work on the use of learning technologies has not revolutionized the use of Big Data in teaching, it has contributed to our understanding of how IT can enhance educational processes. A quick review of research over the last two decades draws our attention to how learning technologies has been used in higher education, how IT has shaped teaching and learning, and how they reflect deeper "realities" of our social cultural systems. Studies of learning technologies have in general focused more on the technology and user scenarios than on the data itself. Learning technologies are designed to support learning through the creation, deployment and management of appropriate technological processes and resources. Bates and Poole propose a classification of e-learning supports from simple use of technology aids in the classroom, to a course web sites and content management systems to fully online education. Kadrir e suggests that mobile learning is an extension of e-Learning that takes place anytime, anywhere with the help of a mobile device. Does the value of learning technologies come from the support itself or from how these interfaces shape the meaning of data, information and knowledge? The major challenge here is understanding how information technologies influence what and how we learn. As many authors have argued, it is difficult to identify where learning starts and ends. Walker points out that mobile learning is essentially about learning perpetually and across contexts. Chan et al. suggest that the concept of seamless learning might be more appropriate to describe learning processes in which learners use information technology to navigate from context to another. Few studies since have focused on how IT has helped or hindered student's understanding of such context: navigating from simple views of the world based on cause-and-effect relationships to more to "complicated" visions in which
relationships can be deduced from prior experience onto more complex perspectives in which social interactions reflect patterns of collective behavior.

A second specific research theme, exemplified by Engestrom proposes that to different degrees information technologies have always shaped the contours of education. [12] Historically, textbooks, computers, and mobile applications have both supported and defined the limits and possibilities of class and the classroom. Today learning technologies incorporate software, hardware, and Internet applications like wiki's, blogs and social media. Information technologies have permitted personalized learning styles, learning designs, and blended learning. In this view, the present introduction of mobile phones in the classroom will inevitably influence learning objectives and outcomes. The impact of IT on education has not always been positive, as the debate concerning the relationship between "deep reading" and "deep thinking" has demonstrated. [13]

Early literature on e-learning suggested the possibilities of mass personalization in distinct social spaces mediated by technology. Norris & Soloway question the foundation of this "1:1" vision, pointing out that learners rely on a variety of technologies to support their learning styles. [14] In the last decade, the notion of "seamless learning" has gained in popularity; learning technologies are seen to function as interfaces between learners and their differing social environments. [15] Wong advocates revising the notion of a personal ‘learning hub’ independently of the technological interface: each learner's profile can be stored and developed on a cloud based, device-independent learning platform. [16]

A third research perspective has explored to what extent learning technologies have mirrored the broader foundations of dominant social cultural systems. Authors here argue that introduction of technologies in the classroom is far from neutral; information technologies have simply reinforced the traditional views of control, context and communication that learning represents. Sharples underlines the over-riding concern with control: traditional learning technologies are most often designed around a specific curriculum to reach the professor's teaching objectives. [17] Parsons et al. suggests that, far from decontextualizing education, learning technologies introduce context as a shell that reinforces the images of foundations of formal education. [18] In this view, communication remains channeled between that of the instructor (whether it a real life or virtual professor) and the students that are largely shielded from the contradictions and uncertainty of the real world. Other researchers have explored the dimensions of learning communities and the intertwining of individual and collaborative learning. [19] [20] Wong argues that early e-learning advocates tended to confuse the learners to the context in the formal learning (teacher- or expert-planned learning materials or activities), whereas new insight can be gained in exploring how information technology elucidates the students' formal and informal learning contexts in personalized learning experiences. [21] Yu suggests that the literature on learning technologies initially focused on transferring learning content in virtual environments, a second generation focused on pedagogical design, while the third generation explores the use of context-aware technology. [22]

THE IMPORTANCE OF PEDAGOGY, CONTEXT AND CONVERSATION

This discussion of learning, technology, and culture minimizes a number of questions that distort our understanding of the subject at hand. What is the link between learning technologies and pedagogy? Should pedagogy be contextualized or decontextualized? How does information technology capture context, and how will this shape pedagogy? Would pedagogy be more relevant in capturing student behaviors, motivations and experiences?

Pedagogy
What do we mean when we refer to the importance of pedagogy? Formal definitions of pedagogy evoke the science, art or profession of teaching. The fundamental objectives of pedagogy entail the development of the human being, or at least the acquisition of clearly identifiable knowledge, skills or competencies. Obtaining these objectives requires elucidating the learning processes within which professors, students, and the technologies interact. Does incorporating Big Data in education require simply changing the technologies, or exploring how technology shapes pedagogical context, processes and participants?

Park suggests that learning technologies have rarely been linked to established pedagogical theory. [23] Trans-actional distance theory, as exposed by Moore provides one potential theoretical foundation for mobile learning in proposing that virtual communication can be a higher form of self-action and inter-action. Jonassen claims that activity theory could provide a powerful framework for designing student-centered learning environments. [24] Naismith et al. suggest that e-learning can be explored through various paradigms including behavioralist, constructivist, situated and collaborative. [25] Kang and Gyorke underline the insight of cultural-historical activity theory (CHAT), which suggests that artifacts, including language, technology, and tools, mediate the social aspects of human activity. [26]

Context
University courses are most often modern day counterparts of the Aristotelian unities reflecting the harmony of time, place and action. If courses are building blocks of higher education, courses are built of classrooms, classes, professors and students. Class refers to a group of students who meet at a regularly scheduled time to study the same subject, and usually implies that they are taught together. A professor is literally a "person who professes": an expert in the arts or sciences, a teacher of high rank. In between the professors and students are a number of fine examples of technology: podiums, desks, pointers, and increasingly, information technology.

In spite of such attempts to decontextualize higher education into a universal set of tasks, activities and processes, all learning activity is bounded by both geographical and social constraints. Cole makes an important distinction between context as “that
which surrounds us” and context as “that which weaves together”. [27] Learning not only occurs in a context, it also creates context through continual interaction. This duality underlies the learning environment from the context that surrounds the student and the context arising out of the constructive interaction between student and technology. This vision situates the learner inside filtered "shield" in which the senses receive “meaningful” data. These contexts can be elucidated from the myriad of data within a student's reach in a number of ways: creating a supportive workspace, forming ad hoc social networks, or fostering shared understanding of a problem.

Conversation
When we introduce the notion of social learning, we suggest that learning has more to do with how we capture context than how we design technology. The challenge in higher education today is that our context is increasingly mobile, regardless of the technology at hand. The foundations of learning are continually shifting as we move from one location to another, deploy new resources, and enter new conversations. [28] Learning is not a neat transfer of information, but a complex and often-chaotic network of technology intermediated human relationships. The field of learning analytics is increasing focusing the attention of both faculty and administration on how social interactions reveal the experience, motivation and intelligences that influence learning opportunities. [29]

Education can be thought of as a directed, continual conversation. Directed in that education presupposes clearly defined learning outcomes for both the class and the students. Continual in that the learning experience neither starts, not stops, when the student enters the classroom. Pedagogy offers us the opportunity to elucidate and structure the language that anchors each student in the context in which they evolve. As such, both the professor and the classroom shape the structure of conversation. Big Data offers academia an opportunity to extend the conversation; it opens up new avenues to experience, interaction, and dialogue.

SOCIAL LEARNING

In a world that is increasingly complex, information technologies can provide virtual windows through which students can view the realities of both individual behavior and organizational dynamics. Learning technologies can be designed as platforms of social learning in enriching the interactions between students and their environments. The ability of mobile-based technologies to elucidate both geographical and social relationships can provide students and faculty with contextual GPSs to focus on the specificities of human interaction. In these conditions, Big Data can enhance the university experience in providing a bridge between the classroom and larger societal challenges.

A number of design principles can bring both substance and structure to “social learning”. Pedagogy should be consumable rather than exhaustive, keyed to students' study habits than to the standards of academic writing. Pedagogical content can be applied to real world situations: instructional design can incorporate workshop exercises, games, simulations that take advantage of the unique set of functions and features offered by Internet technologies today. Evaluation can be integrated into delivery, reflecting both a student's previous work and community input. These principles of social learning currently underpin our own efforts in developing the AMATE™ platform for management education. [1]

In suggesting that pedagogy should be consumable, we are suggesting that teaching should focus more on how students actually learn than on pedagogical models or best practices. Big data has provided us with real time, contextual evidence of how students study, communicate and work both in school and out. Graphics and video compete with the written word to inform and organize students' understanding of the world around them. In an academic environment in which "copying and pasting” class support, notes and assignments have become a characteristic of the digital age, the need to facilitate discover of meaningful content has become a critical objective of higher education. Structuring and restituting data through transmedia authorship can provide a key piece in the larger picture of pedagogy today.

In proposing that pedagogy be applicable, we are implying that instructional design can integrate interactive workshop exercises, games, simulations alongside the subject of study to help students apply the content to the realities of their own professional challenges. The interactivity of class support comes less from a reliance on video and music than in offering pedagogical materials designed to that capture student input and behavior. The principles of activity theory, illustrating educational principles with experience, actions and practice can also be implemented more easily in integrating social media and other Web 2.0 technologies. User generated input, not only from the students themselves, but also from peers and subject experts, becomes a core principle of higher education.

By integrating continuous evaluation into pedagogy itself, we are proposing that institutions and faculty can use the unique characteristics of Cloud-base architectures to help students better situate progress towards education goals. Student work, as well as instructor input, can be accessed anywhere, anytime and on any device. The ability to transmit and then store student input on the "Cloud" allows students to both compare their results over time and to benchmark their results with those of target communities. Institutions can study the aggregate data themselves to get a better handle on the objectives, behaviors and outcomes of students over time. The ability to recall the data on demand can also be leveraged in teacher/student interviews in class or from a distance.

In applying these principles of consumability, applicability, and accessibility, pedagogy becomes a truly social activity. Pedagogical platforms like AMATE™ integrate the micro-messaging services, social media, and video archives not only to facilitate discussion, but also to capture the context in which students reach out to their social and professional networks. On the individual level, students can draw on the experience, suggestions, and proposals of their colleagues through these "intuitive“ communication channels to enrich and extend class discussions into real world situations. On the level of the faculty.
teachers and administrators can use the resulting data sets drawn from actual student behavior to enhance their pedagogy materials. On the institutional level, higher education can glean invaluable insight on how student and faculty interactions shape the learning process through their own review of aggregate sets of such Big Data.

REFERENCES


HOW TO INTRODUCE ON-LINE AGRICULTURAL PRODUCTS NAVIGATION SYSTEM ON GOOGLE EARTH SUCCESS

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ABSTRACT

In the agriculture industry many brokers exploit the benefits between farmers and customers and decrease farmers’ income. As technology has developed, the internet has become the best advertising medium for many industries. In light of this, this study based on Google Earth, has designed an on-line Agricultural Products Navigation System operated by mobile devices which can easily exclude brokers, and build the bridge between farmers and customers in order to increase farmers income and customer benefits. Moreover, based on the IS success model of DeLone and McLean, by using qualitative methodology we expect this model will be able to provide system developers with the knowledge to improve the success of their systems.

Keywords: Electronic Commerce, Agricultural Products, IS Success Model

INTRODUCTION

The managerial tasks in agriculture are currently shifting to a new paradigm, requiring more attention to interaction with surroundings, namely environmental impact, terms of delivery, and documentation of quality and growing conditions (Sigrimis et al., 1999; Dalgaard et al., 2006). The increasing use of computers and the dramatic increase in the use of the Internet have improved and eased the task of handling and processing of internal information as well as acquisition of external information which may be produced from many sources and may be located over many sites (Sorensena et al., 2010). The potential of using these data will reach its full extent when suitable information systems are developed to achieve beneficial management practices (Fountas et al., 2006). For this reason, designing an information system should emphasize what farmers do and how they act (McCown, 2002). Although computer adoption on farms has been studied by many researchers (Amponsah, 1995; Ortmann et al., 1994; Huffman & Mercier, 1991), current studies do not present rigorous analyses of farm management information system (FMIS) success factors combined with geographic information systems and Google Earth. In addition, most farmers do not yet sell their agricultural products using the technology and concept of Internet marketing. Many benefits are therefore exploited by brokers in the market. Therefore, this study focuses on the actual needs of the farmers and customers, combining geographic information systems (GIS) (Bansal & Pal 2009), Google Earth (2012), Internet and databases in order to design an on-line Agricultural Products Navigation System, which provides a means of managing information between farmers and customers (Wu & Lin 2010). This not only helps the farmers to lower the prime cost and to improve efficiency in management, but also to provide a simple surfing platform for customers. The customers will be able to order and pick up the product easily through handheld devices (e.g., tablet computer, smart phones, PDA etc.) while choosing the freshest and most reasonable item at the nearest location. However, improving the system for successful use by farmers and customers is also a critical issue. In light of this, this study is based on the updated IS success model of Delone and McLean (2003) using a qualitative research method to explore how to improve the on-line Agricultural Products Navigation System and implement it successfully. In fact, Delone and Mclean (2004) found that the success of on-line book stores and electronics e-commerce need different kinds of characteristics in the system and use an approach between these two kinds of industries. In light of this, we can infer that the on-line Agricultural Products Navigation System needs different characteristics to achieve success. Therefore, in order to design a successful on-line Agricultural Products Navigation System which can operate by mobile devices, this study expects to resolve two research questions: (1) What kinds of characteristics should be included in this system? (2) How can farmers and customers use this system and what characteristics are required for success of the system?

The updated D&M IS Success Model and its six success dimensions as follows:

(1) **System quality**: in the Internet environment, measures the desired characteristics of an e-commerce system. Usability, availability, reliability, adaptability, and response time (e.g., download time) are examples of qualities that are valued by users of an e-commerce system.

(2) **Information quality**: captures the e-commerce content issue. Web content should be personalized, complete, relevant, easy to understand, and secure if we expect prospective buyers or suppliers to initiate transactions via the Internet and return to our site on a regular basis.

(3) **Service quality**: the overall support delivered by the service provider applies regardless of whether this support is delivered by the IS department, a new organizational unit, or outsourced to an Internet service provider (ISP). Its importance is most likely greater than previously since the users are now our customers and poor user support will translate into lost customers and lost sales. Therefore, assurance, empathy and responsiveness are critical elements in this dimension.

(4) **Usage**: measures everything from a visit to a Web site (number of site visits), to navigation within the site (navigation patterns), to information retrieval (nature of use), to execution of a transaction (number of transactions executed).
(5) **User satisfaction**: remains an important means of measuring our customers’ opinions of our e-commerce system and should cover the entire customer experience cycle from information retrieval through purchase, payment, receipt, and service. Therefore, repeat purchases, repeat visits and user surveys are critical elements in this dimension.

(6) **Net benefits**: are the most important success measures as they capture the balance of positive and negative impacts of the e-commerce on our customers, suppliers, employees, organizations, markets, industries, economies, and even our societies. Therefore, cost savings, expanded markets, incremental additional sales, reduced search costs and time savings are critical elements in this dimension.

Moreover, according to the study of Delone and Mclean (2004), they believe that different kinds of industries will have different characteristics to use and make the system a success. Therefore, the on-line Agricultural Products Navigation System should include some different kinds of characteristics to make it successful, especially that it can be operated by mobile devices. In light of this, based on the updated D&M IS success model (2003), this study proposes the following two propositions:

P1: In the on-line Agricultural Products Navigation System, information and service quality should include some characteristics which will improve the system success.

P2: To compare with other industries, the usage of the on-line Agricultural Products Navigation System will differ according to users (farmers and customers) to ensure the success of the system.

**RESEARCH METHOD**

In order to resolve the two questions of this study, this study presents a design for an on-line Agricultural Products Navigation System in the first stage, then adopts a qualitative research approach to interview the farmers and customers who have used the system in the second stage.

**First Stage: Design an On-line Agricultural Products Navigation System**

This study uses Dream Weaver, SQL Server 2005, Google Earth (2012) and Google Map API (2012) as the developing tools: This study uses Dream Weaver (2012), SQL Server 2005(2012), Google Earth (2012) and Google Map API (2012) as the developing tools: (1) **Dream Weaver**: Overall professional tool sets, used to set up and subordinate the Internet and the Internet application programs. It provides an integrated encoding environment and powerful standard WYSIWYG design platform; for the main program language used by the system, all program designers need to know how to design modularization, windows and Object-Oriented Programming to work in different divisions (Chiang 2006; Laboratory of Ming-Wei Shih 2008; Studio of Ruei Deh 2007; Tsai 2006). (2) **Microsoft SQL Server 2005** (2012): a well functioned database platform, using the integrated business intellectual (BI) tools to provide data management function for business. In addition, SQL Server 2005 database also provides a safer, more stable storage environment for relational and structural data, in which the team members may set and manage a more useful and efficient application for company. (3) **Google Earth** (2012): the visual tellurium software of Google Company sets all satellite photos, aviation photos and Earth information system on a 3D Earth Model. (4) **Google Map API** (2012): tools to produce, to view and edit 2D diagrams; it is simple and has various functions to work easily and efficiently (Chiang & Gong 2008).

The platform of each function is also designed according to the needs of users, so that the users encounter fewer problems while working with the system. The system constantly interacts with the farmers and potential customers during the analysis and designing process, receives suggestions from different sides, continuously edits and renews its functions, in order to achieve satisfaction for the users.

**Second Stage: Qualitative Research Approach**

There is an absence of extant literature on building an on-line Agricultural Products Navigation System used by farmers and customers, but organizational employees. Therefore, the next two questions are critical for this study: (1) What kinds of characteristics should be included in this system? (2) How will farmers and customers use this system and what characteristics are needed to achieve a successful system? In order to resolve the above two research questions, it is impossible to analyze the interactive relationship using the Cross-Section Positivism, since the user feedback of farmers and customers is a process (Petitgrew 1985). For this reason, the study adopted a case study approach to collect and analyze data (Paré 2004; Strauss & Corbin 1990). This paper adopts a multiple case study approach, collecting qualitative data from farmers and customers who have used the on-line Agricultural Products Navigation System, then analyzing data based on the Updated D&M IS Success Model (DeLone & McLean 2003) (Strauss and Corbin 1990; Yin 1994; Paré 2004). In light of this, this study was driven by Eisenhardt’s (1989) suggested eight steps of theory (model) testing (building), consisting of: get started, select the cases, craft the instruments and protocols, enter the field, analyze data, shape propositions, enfold the literature, and reach closure. Firstly, two farmers have used the on-line Agricultural Products Navigation System to sell their agricultural products. Case # 1 is a pineapple farmer, and Case # 2 is a mango farmer. All of them believe that their agricultural products sales will be increased through this system. Secondly, five customers have bought agricultural products with this system. They also believe that the success of this system will be different from other systems. In light of this, for collecting the qualitative data, the primary data sources were semi-structured interviews (Myers, 1997). The interview teams consisted of two of the four authors. Interview protocols were developed and refined several times. The interviews were taped, with agreement from participants. The semi-structured interviews lasted on average 2 hours. The taped interviews were transcribed verbatim into
text files. To understand the systems success factors, the following represent a sample of the questions that guided the interview process (follow-up questions in parentheses):

- What kinds of “system quality” will influence you have willing to use this system? Does it will affect your satisfaction for this system? Why or why not?
- What kinds of “information quality” will influence you have willing to use this system? Does it will affect your satisfaction for this system? Why or why not?
- What kinds of “service quality” will influence you have willing to use this system? Does it will affect your satisfaction for this system? Why or why not?
- Will you use this system in what way? Why or why not?
- Do you think the use (intention to use) and user satisfaction will impact each other? Why or why not?
- Do you think the use (intention to use), user satisfaction will perceived net benefit? Why or why not?
- Do you think the net benefits will feedback influence the use (intention to use) and user satisfaction? Why or why not?

We also observed users’ physical environments to be certain their use approach matches the interviewees’ description. Based on key constructs of the updated D&M IS success model (2003), we developed an initial list of coding categories. This list was refined after the first interviews, and refined again after interviews were completed to reflect both the information gained from the interviews and the additional information of published research (Strauss & Corbin, 1990; Paré, 2004). Once the research team agreed on the list of categories, each member separately coded the same interview file. We compared results and discussed differences until agreement was reached on the categories, meanings, and future coding procedures (Paré, 2004). One researcher then coded the interview files using the revised coding scheme, which provided not only structure but also flexibility for coding new or unexpected findings (Strauss & Corbin, 1990).

After these files were coded, further discussions were held until the coders achieved complete agreement on content categories and descriptors within the categories. Agreement was achieved through open discussion. Each case was then recoded.

**RESULTS**

**On-line Agricultural Products Navigation System**

![Figure 1: System Structure](http://mapshopping.wholeway-gis.com.tw:8080)

On-line Agricultural Products Navigation System (http://mapshopping.wholeway-gis.com.tw:8080) includes three management systems and eleven sub-systems (Figure 1). They are described as below:

1. **Google Earth management system:**
   - (A) display graphic system: combine all display information graphic systems in Google Earth;
   - (B) area selecting system: a system to combine cartographic data of Google Earth and display the information from different areas.

2. **Farmers management system:**
   - (A) farmers data processing system: to manage the information of the farmers;
   - (B) agricultural products data processing system: to manage the renewed and edited information of the agricultural products;
   - (C) Delivering processing system: to manage the delivery of the farmers;
   - (D) Transaction feedback processing system: to manage the customer’s feedback (e.g., after the customer has completed the payment).

3. **Membership management system:**
   - (A) Tradable agricultural products analysis system: to search for the analysis information of tradable agricultural products and areas;
   - (B) Membership data processing system: to manage the members’ information;
   - (C) Agricultural products order processing system: to deal with the orders of agricultural products;
   - (D) Transaction data processing system: according to the situation of member orders, it reports immediately the information of the trade;
   - (E) Payment processing system: to manage the payment information from members.

All the sub-systems mentioned above are written with Dream Weaver (2012), Microsoft SQL Server 2005 (2012) and Google Earth into the guiding forms as an online trading platform. It combines the function of item searching from Google Earth and builds an on-line Agricultural Products Navigation System on Google Earth. This not only provides the customers with a convenient and efficient online platform, avoids the previous complicated process, such as personal consultations for
agricultural product trade, but also avoids exploitation by brokers. Whether for clients or farmers, this system creates low-cost access for greatest benefit and efficiency.

The system provides several ways for searching: (1) **Single condition search**: according to the name of the agricultural products, areas, customers and search for the needed products individually. (2) **Multiple conditions search**: choose several areas and products; choose a combination of multiple areas and products at the same time for searching products (Figure 2).

After the customers have chosen their area and agricultural products and farmers according to their needs, they will confirm on the front page of the system, enter their member information, and order the products at the relative sub-system for members. The system has the advantage that it can be operated through handheld devices (e.g., tablet computer, smart phones, PDA etc.) in order to order the products online at anytime (Figure 3).

**Result of Qualitative Data**

1. **System quality**: the updated D&M IS success model (2003) suggests that the desired characteristics of an e-commerce system should be measured in the Internet environment. These are: usability, availability, reliability, adaptability, and response time (e.g., download time), which are examples of qualities that are valued by users of an e-commerce system. However, so that farmers can sell their agricultural products through the on-line Agricultural Products Navigation System in this study, it is necessary inter-exchange system data with the distributors’ system at the same time. For this reason, the $P_1$ cannot satisfy the data of this study, therefore, we extend $P_1$ and revise it to the following proposition:

   **New $P_{1-1}$**: **The system should provide an inter-exchange data function with the distributors’ system to improve the system quality.**

2. **Information quality**: the updated D&M IS success model (2003) suggests that for capturing the e-commerce content issue, web content should be personalized, complete, relevant, easy to understand, and secure if we expect prospective buyers or suppliers to initiate transactions via the Internet and return to our site on a regular basis.

3. **Service quality**: the updated D&M IS success model (2003) believes that the overall support delivered by the service provider, applies regardless of whether this support is delivered by the IS department, a new organizational unit, or outsourced to an Internet service provider (ISP). Its importance is most likely greater than previously since the users are now our customers and poor user support will translate into lost customers and lost sales. Therefore, assurance, empathy and responsiveness are critical elements in this dimension. But, due to the most of farmers who have adopt the on-line Agricultural Products Navigation System do not have the ability to resolve the system’s problems, therefore, 24 hours service of the system maintenance will be necessary. In light of this, $P_1$ was extended and revised to the following proposition:

   **New $P_{1-2}$**: **The system should provide 24 hours service to improve service quality.**

4. **Usage**: the updated D&M IS success model (2003) believes that everything from a visit to a Web site (number of site visits), to navigation within the site (navigation patterns), to information retrieval (nature of use), to execution of a transaction (number of transactions executed) should be measured.

5. **User satisfaction**: the updated D&M IS success model (2003) provides an important means of measuring our customers’ opinions of our e-commerce system and should cover the entire customer experience cycle from information retrieval through purchase, payment, receipt, and service. Therefore, repeat purchases, repeat visits and user surveys are critical elements in this dimension. However, users’ satisfaction will be produced after they have used (intention to use) the on-line Agricultural Products Navigation System. For this reason, this study extends $P_2$ and revises it to the following proposition: (3)

   **New $P_{2-1}$**: **Farmers will check users request frequencies, but customers will query all kinds of agricultural products which they need.**

   **New $P_{2-2}$**: **Use (Intention to use) the system will influence user satisfaction.**

6. **Net benefits**: the updated D&M IS success model (2003) believes it is most important to balance positive and negative impacts of e-commerce on customers, suppliers, employees, organizations, markets, industries, economies, and even our societies. Therefore, cost savings, expanded markets, incremental additional sales, reduced search costs and time savings are critical elements in this dimension.
In sum, as the “on-line Agricultural Products Navigation System” has characteristics which could differ from other information systems. For this reason, this study has extended the updated D&M IS success model (2003) with four modified new propositions.

RESEARCH CONTRIBUTIONS

Academic Contributions
Although the system has a number of advantages as described above, however, Google Earth could not access remote map data on the Android platform and this is the first contribution of this study. Therefore, we have resolved this by the following method: (1) transferring database data to the KML format, which can R/W by Google Earth on Android platform; (2) although a default is declared with UTF-8 code format in the file, it still needs to declare UTF-8 in the program, before saving data to KML to resolve the Chinese Mojibake problem; (3) addition of exhibit figure KML function and helping users to download KML to exhibit the agricultural products figures problem with Android platform; and (4) changing users’ connection to the outside IP address of server to capture and exhibit the figures on Android platform. In light of this, all the Android platform smart phone users can now perform the transaction of agricultural products through their smart phone at any time or place very easily.

This study found that the “on-line Agricultural Products Navigation System” indeed needs some system, information and service quality different from other industries’ systems; and users (farmers and customers) also have different kinds of use. Therefore, this study proposed **New_P1.1, New_P1.2, New_P2.4** and **New_P2.5** to revise and extend the perspective of Delone and Mclean (2004) for adapting it for the agricultural system.

Contributions for Practice
The system provides both farmers and customers a powerful dynamic map, which facilitates the trade of agricultural products. First of all, the farmers can easily use the system to manage their agricultural products and display them on the Internet in 3D platform. Secondly, the consumers can easily use computers or handheld devices (e.g., tablet computer, smart phones, PDA etc.) to search both the spatial and attribute information of the nearest farmers and products on this platform and order the agricultural products they want. After the consumers complete the purchase, they can view their orders online at anytime. The farmers can meanwhile obtain basic information about the consumers and their orders, manage and sell products accordingly in a more convenient and efficient way, sell products and create profits later on. Not only can farmers promote products without using any commercials, the users can also save their search time and consume agricultural products from the nearest distance and at the lowest-cost, but also the most convenient method, facilitating the pick-up procedure and saving the transport cost. It also reduces carbon footprint and accomplishes the purpose of energy saving and carbon reduction. It reduces the time and spatial problems of both sides during trading and avoids exploitation by brokers.

CONCLUSION
The system provides both farmers and customers a powerful dynamic map, which facilitates the trade in between and achieve the goals below: the first step is to upload the pictures on the Internet. Users can search the spatial information simply through computer’s browser or Android smart phones and enlarge or reduce the size of pictures. Then, when the users are surfing the website of the system, they can collect the relative information and the geographic location of the farmers. Not only the farmers can promote its products without using any commercials, the users can also save their search time and consume agricultural products from the nearest distance and at the lowest-cost, but also the most convenient method, facilitating the pick-up procedure and saving the transport cost. It also reduces carbon footprint and accomplishes the purpose of energy saving and carbon reduction. It reduces the time and spatial problems of both sides during trading and avoids exploitation by brokers.

REFERENCES


BUILDING EFFECTIVE ORGANIZATIONAL MANAGEMENT WITH BRICOLAGE AND IT GOVERNANCE ON TECHNOLOGY ACCEPTANCE MODEL

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ABSTRACT

According to the times of economic confusion, this leads most organizations to implement IT and advanced technologies to support their businesses by concerning them as the building blocks of organizational development and competitiveness to achieve competitive advantage. In this way, the roles of information systems (IS) and information technology (IT) are more focused attentively. On the other hand, the IT resource allocation is limited, which most organizations expect to save IT budgets with low IT investment. The point of this study is to focus on IT development with bricolage by using and renovating existing IT systems and applications, which turn out to become resourceful solutions. However, bricolage must be investigated closely by responsible people to ensure that they are aligned with business-IT strategies. In this case, the Technology Acceptance Model (TAM) is the main facilitator to measure the acceptance of bricolage. Pointedly, this paper examines how stakeholders and top management build a long-term vision in the use of bricolage, which is considered as IT development tools to deliver business value-added and meet IT budgets with its requirements by using TAM to examine the alignment between bricolage and IT governance and its domains.

Keywords:  Bricolage, IT Governance, Technology Acceptance Model (TAM), Organizational Strategy, Alignment

INTRODUCTION

In the digital age, there are advanced technologies, which are created and designed to meet the needs of business by agiling organizational activities rapidly. However, organizations also concern heavily on IT resource allocation during economic slump by merely focusing on IT investments, which could be over their IT budgets. To manage and save IT resources (budgets, people, and IT infrastructures), it is important to develop IT systems and applications, which are readily available and have possibility to transform to be new solutions. Notably, this is the concept of bricolage, which is created to build Information System Development (ISD) methodology to recognize the IT awareness, which follows business strategy and meets strategic development [1]. With the concept of bricolage, improvisational theorists adopted the bricolage concept [2] [3], coupled with IT developers [4]. Simultaneously, the integration between existing IT resources leads to emerge new artifacts and create new opportunities [5] to support the business and develop organizations further. However, the new artifacts from bricolage must be reviewed by responsible people, who concern them to be governed and must be aligned IT governance effectively.

Referring to the fact, there were several world famous corporate governance scandals in 2001. Then, Sarbanes-Oxley Act of 2002 was legislated by the United States Congress to strengthen the effectiveness of corporate governance by concentrating on the quality of internal control and financial statements [6]. Since then, governance topics have become a crucial aspect for organizations in this decade. Furthermore, the corporate governance has been examined with more interest in public due to regulatory change, legal deliveries, and renowned private-sector oversight organizations [7]. Subsequently, IT governance was emerged, which is an essential component of corporate governance and fits in every industry [8]. Based on the key to overcome business competitors through business survival, IT governance is the resourceful solution, which defines and indicates the value of IT clearly by facilitating organizations to achieve competitive advantage in worldwide businesses [9].

In order to build a long-term vision in the use of bricolage, stakeholders and top management must decentralize their responsibilities by sharing knowledge [10] and technologies. This means they must focus on organizational development by renovating existing tools to become new solutions to add value to the business and meet IT budgets and its requirements. Throughout this paper, there are two main questions, which are “How does bricolage align IT governance?” and “Which domains of IT governance are supported by bricolage?”. Based on these research questions, TAM is the research methodology to measure the acceptance of bricolage by examining, proposing and clarifying the alignment between bricolage and IT governance and its domains. In literature review, this paper presents the literatures of Bricolage, IT governance, and TAM. The conceptual model is shown in the next section, along with research methodology and discussion. Lastly, the conclusion of this paper is contributed in the end.

LITERATURE REVIEW

Bricolage

Levi-Strauss was anthropologist, who created bricolage concept [11], which is mainly adopted in dynamic processes within organizational contexts [12], especially immature organizations with limited resources [13] and entrepreneurial organizations [5]. Bricolage is considered as a creative process with restructuring of remaining objects and transform to new artifacts or
solutions [14] [15] by combining objects together and creating new innovations for new purposes and new opportunities [16]. Moreover, bricolage uses existing resources (familiar equipment and materials), which are available at that time to build new shapes or new structures by inventing and assembling them into new processes to solve the remaining problems [17]. At the same time, the processes and materials of bricolage are presented formally, which are based on the scientific and engineering theories that affect to humanistic value [18].

According to the business concept to achieve competitive advantage, IT plays important role to support stakeholders and top management [19] [20]. In this way, they choose to implement IT because they gained more understandings and acknowledged positive experiences, which IT can develop their businesses and they also can approach new business opportunities at the same time [1]. These lead to their attentions in bricolage concept during global recession due to cost savings and efficiency, which IT and software resources are considered as handy tools or materials in the organization. Consequently, creative concerns, pragmatic tools, and bricolage are supportive mechanisms [15] to achieve competitive advantage, overcome business competitors, and encounter numerous difficulties in the industry [21] [22]. This means bricolage mainly interacts with different business activities in organizational innovations and organizational change management to re-structure organizations [23], which mainly support organizations to save IT budgets, spend less IT investments, gain more profits and achieve business objectives by using existing objects and renovating them to make new supplies to support the business operations.

**IT Governance**

According to the organizational maturity assessment, there are five domains to develop an integrated framework: (1) strategy, (2) technology, (3) organization, (4) people, and (5) environment [24]. IT infrastructure, security, user’s concerns, awareness, skills, and regulations are the main influences, which affect the resistance and acceptance of users directly and indirectly by involving in these five domains [25]. In this decade, most large organizations consider IT governance as one of core business domains, which must be implemented in the organizations. This leads to investigate IT governance further by emphasizing on its domains, which contains: (1) strategic alignment, (2) value delivery, (3) risk management, (4) resource management, and (5) performance measurement [26].

With respect to IT governance, it is positioned in the relationship among and between business and IT management by brainstorming business ideas and activities, which involves IT awareness and IT perception to maintain different relationships and multiple IT skills of IT experts mutually in business and IT domains [27]. Consequently, it is important to understand IT governance by sharing business knowledge and IT skills to manage organizations perfectly. Based on IT governance responsibilities, there are different issues in IT governance agendas, which involve IT activities; for instance, organizational objectives, organizational opportunities and risks, core processes and major capabilities [28]. Beyond these developments, these factors are considered as the main components of IT governance processes, which are operated by organizational strategy to control and manage resources, in particular IT skills, IT performance and IT risk, productivity, performance measurement, Service Level Agreements, change management, and reporting [29].

In the contemporary business, most organizations aim to succeeded their projects and try to achieve competitive advantage and by implementing IT resources [27]. In this way, organizational strategy is a vital issue to build innovative projects [4] by cooperating with IT to align the business, which must always involve investment costs and return on investment. At this point, it is vital to manage IT resources. IT is a resource of information which supports and enhances organizational performance at any stage [30] [31] [32], develops organizational capabilities by considering as the main basis to sustain competitive advantage [33]. In brief, the resources can be realized as hard and soft assets [27] by dividing into two areas, which are hard resources (IT infrastructures) and soft resources (human resources, IT best practices, IT expertise, IT knowledge and skills, and IT experiences) [34] [35] including the shared capability and future development potential of an organization [33].

Meanwhile, there are three main components of resource based view of organization, which are IT resources (advanced technologies and applications), human resources (IT responsibilities and roles, IT management, IT trainings and knowledge, IT practices, IT skills and management), and business resources (strategic planning with IT planning and alignment, cost control, resource accessibility, IT licenses) including IT process re-engineering with cross functional training and inter-organizational relationships [36]. Therefore, IT resources concern to IT experts, IT skills and IT knowledge to escalate organizations in meeting competitive advantage [32]. This leads to deliver business value to obtain more profits, optimize effective operations and create better learning cultures [37]. Certainly, most organizations should draw high attention to the advantages of business - IT strategic alignment as they are resourceful approach and well-recognized solution to transform business and deliver better business value [38] [39]. This alignment leads to emerge innovations, which are considered as part of critical success factors by getting motivations from business and IT [40].

In addition, there are three factors to evaluate IT value, which are “profitability”, “effectiveness”, and “total value created” [33]. These three factors can sustain businesses to gain competitive advantage by increasing more profits, operating jobs effectively with low risk, and promoting higher organizational positions to become leaders in the industry from value creation. On the other hand, it is vital to consider these concerns (organizational size, growth forecast, key operational activities, industry types, financial services, and IT assistance), which influence IT value [41] [42]. Consequently, these effects focus on value delivery, which is one of the IT governance domains.

**Technology Acceptance Model (TAM)**

In the IT area, TAM is one of the most common adoption models, which identifies a method of technology acceptance from different variables (IT experiences, IT knowledge levels, and ages of IT users) and lead to concern the user beliefs and attitudes in the use of IT. In doing so, it concerns to the different usage behaviors; for example, ‘perceived usefulness’ and ‘perceived ease-of-use’, which indicate an individual’s attitude to the use of IT, behavioral intentions, and the actual usage of IT [43],

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together with knowledge of ‘institutional trust’, ‘perceived risk’, and ‘information integrity’ [44] [45] [46]. Obviously, TAM has been widely used [47] to support IT adoption in organizational environments efficiently with value-added results [48]. At this point, it supports to assume and define user behaviors and their IT usages [43] [49] [50]. In keeping with the advantages of TAM, it helps user decision makings to accept a new IT easily by highlighting (1) perceived usefulness (PU), which identifies user expectations in the use of IT to develop better work performance, and (2) perceived ease-of-use (PEOU), which uses IT measures to define the levels of belief [49]. Therefore, it is clear to understand that PU impacts to the purpose of user in IT adoption directly. On the other hand, PEOU influences IT adoption, which is free of effort in the actual use of IT and also meets the user purposes [51]. Consequently, PU and PEOU are vital factors of IT usage and IT experiences, which top management should provide IT skills and IT trainings to meet the user ages, experiences, and requirements. Moreover, IT measures assist to control IT usage in IT adoption and return on IT investments [52]. Thus, executive management people and IT experts should adopt IT measures to gain user acceptance of IT in a holistic view.

Conceptual Model
The point of this study is to focus on IT development with bricolage by using and renovating existing IT systems and applications, which turn out to become resourceful solutions. However, bricolage must be investigated closely by responsible people to ensure that they are aligned with business-IT strategies. In this case, the Technology Acceptance Model (TAM) is the main facilitator to measure the acceptance of bricolage. Pointedly, this paper examines how stakeholders and top management build a long-term vision in the use of bricolage, which is considered as IT development tools to deliver business value-added and meet IT budgets with its requirements by using TAM to examine the alignment between bricolage and IT governance and its domains including its domains (strategic alignment, resource management, and value delivery) as presented in figure 1 below.

According to figure 1, it illustrates the conceptual framework of bricolage and IT governance and its domains on TAM. Initially, it explains that responsible people should focus on organizational strategy by emphasizing the use of IT and bricolage, which combines the available IT resources to be renovated and adapted to support organizational functions. At this point, stakeholders and top management should draw attention to improve organizations by improvising all IT resources to save IT budgets on IT investments. Thus, it is the way to manage IT resources effectively by checking and using IT resources at hand and on-site.

However, it is compulsory for these improvised IT resources to be validated by TAM in organizational environments [53] to measure and examine the acceptance levels of users by ensuring and recognizing that users accept bricolage and new developments. Then, these improvised IT resources are considered as value-added IT resources. Finally, they can deliver more value to support business. In this development, it is considered as value delivery, which aligns IT governance and its domains. In this way, it is vital to maximize various strengths of TAM to explore the IT (bricolage) usage, which could be modified to suit the user acceptance [54].

TAM is a simple model, which can be integrated with other theories and adjusted or extended reasonably in various directions with different extensions [55] [50] [56] [57]. Over the decades, this is the reason why TAM has been widely published and adopted in IT adoption [58] [59] [60]. Furthermore, the research methodology is available in the next section.

RESEARCH METHODOLOGY
This paper raises the interest by using qualitative research method [61]. It will obtain an interpretive approach through a cross sectional survey of data collection methods by interview, personal observation, and quantitative surveys from participating organizations. Simultaneously, it also adopts the ‘how’ questions in current circumstances [61] [62] [63] [64], which delve IT governance by asking “How does bricolage align IT governance?” and “Which domains of IT governance are supported by bricolage?”. Further, in-depth approach is selected to examine organizational settings, which have complex human and IT
components [65]. Moreover, this paper seeks the ways on how responsible people build a long-term vision in the use of bricolage, which is considered as organizational development tools to deliver new IT value and meet organizational budgets and its requirements by using TAM to measure the acceptance of bricolage and also examine the alignment between bricolage and IT governance including its domains (strategic alignment, resource management, and value delivery).

Based on the literature review and conceptual model, they have discussed the nature of TAM in supporting and developing bricolage to measure the acceptance of bricolage and also examine the alignment between bricolage and IT governance including its domains. Basically, organizations attempt to overcome complex business processes and remaining problems by adopting effective IT resources to solve them and also adopt organization to achieve competitiveness and gain robust economic performance. However, they have limited IT budgets during economic slump, which lead this study to focus on the development through bricolage by using existing IT systems and applications. Then, they are developed and renovated, which turn out to become resourceful solutions.

At first, the executives must focus on the bricolage through IT governance. In doing so, they should focus on how to support organization and solve problems, which must be strategic alignment and also achieve competitive advantage. In this way, they have to consider the available IT resources and methods to invent or renovate them in achieving new solutions, which can create new opportunities or solve existing IT problems by considering organizational environments and business processes [66]. In this way, they are realized as valuable resources, which optimize growth and opportunities of organization to meet its competitive advantage. Certainly, it is important to provide IT knowledge and IT skills to support people. At the same time, the strategic alignment between IT and business emphasizes on top management support [20] and good communication [67] [68] to improve the potential of business in meeting organizational requirements in its environment. Due to this, they are the initial factors, which can be engaged in any project conclusively.

<table>
<thead>
<tr>
<th>Bricolage &amp; TAM:</th>
<th>Customized</th>
<th>Established</th>
<th>Consistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Governance Domain:</td>
<td>Strategic Alignment, Resource Management, and Value Delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>Build confidence &amp; strategic insight</td>
<td>Build business value to invent existing resources at hand</td>
<td>Build better relationship among stakeholders &amp; effective accountability of staff in the use of resources wisely</td>
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<tr>
<td>Factor:</td>
<td>• IT resources</td>
<td>• IT knowledge and IT skills</td>
<td>• IT measures</td>
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<td></td>
<td>• Top management support</td>
<td>• Good communication</td>
<td>• Effort in the use of IT</td>
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<tr>
<td>Result:</td>
<td>Higher productivity: organizational development and competitiveness</td>
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With regard to value delivery, it is indicated in the use of IT to create more value. However, executives should encourage and motivate people to use IT regularly by putting more effort [69] [70] [71]. Then, they will see positive results gradually in the long-run. Meanwhile, it leads to gain more attention from customers and achieve higher profits as well. To gain success, top management must realize the use of IT and decide to invent IT resources at hand, prior to investing more IT resources. Thus, it is a good technique to achieve the objectives of IT governance during global recession.

Meanwhile, top management should build stronger and closer relationships, which lead to have more cooperation [72] in the workplace to achieve effective IT governance implementation. Based on this paper, the integration between the TAM, bricolage, IT governance and its domains (strategic alignment, resource management, and value delivery) can provide higher productivity and maximize organizational strength, in particular organizational development, competitiveness and cost efficiency as shown above in table 1. This paper raises the interest by using qualitative research method [61]. It will obtain an interpretive approach through a cross sectional survey of data collection methods by interview in the following publications.

**CONCLUSION**

Significantly, this research focuses on the development through bricolage by using the existing IT resources. Then, they are renovated, which turn out to become resourceful solutions by using TAM to measure the acceptance of bricolage in complex environments and examine the alignment between bricolage and IT governance and its domains. With this development, the responsible people must pay high attention to analyze its alignment to meet organizational strategy and competitive advantage. Consequently, they must be patient and flexible to transform existing resources to new artifacts by understanding the bricolage concept. Moreover, TAM is very useful framework to validate the user acceptance appropriately. If the improvised IT resources are not validated or disqualified, they have to amend and test again to meet user acceptance. Finally, bricolage concept must align IT governance to support and strengthen relationships between business and IT and balance the use of resources to achieve resourceful development.
REFERENCES


ORGANISATIONAL MATURITY: CONFIGURATIVE AND OTHER ISOMORPHIC PRESSURES IN INSTITUTIONALISATION OF ERP SYSTEMS

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ABSTRACT

Each organisation is unique, because the way they are internally organised and the way they seek economic legitimacy is unique. Seeking economic legitimacy is the way an organisation competes within the industry. Therefore, in order to address the pressures exerted by competitive forces on the organisation, it has to develop and define certain competencies and maturities internally. At the same time, this competitive environment has a direct influence on economic incentives associated with the management of major technological platforms like ERP systems, since these technologies can influences the profitability and efficiency of the business extremely. As a consequence, organisations are required to create a dynamic internal environment. This dynamism is built around alignment of technology with business needs, achieving higher levels of technology maturity, conformance with the rules, norms and best practices of industry as well as external institutions, and using technology to support business sustainability, progress, and growth. The authors coin the term configurative isomorphic mechanism to address these forces. In fact, organisations desire to conform to their level of organisational information system maturity and internal capabilities to minimize these pressures. The authors believe that configurative pressure is indeed congruous with coercive, normative, and mimetic pressures and together can open up new research streams in institutional thinking of the role of technology in organisations.

Keywords: ERP systems, technology institutionalisation, configurative isomorphism, IS maturity, institutional theory.

INTRODUCTION

It is more than five decades that organisations have been using information technologies. During this time, a significant amount of research has been done to study why it is necessary for organisation to invest in these technologies. It is, however, surprising that some researchers like reference [5] believed that by increasing the availability of information technologies, they becomes ubiquitous and commodity. Therefore, from a strategic standpoint, they became invisible and no longer mattered and organisations should minimize their spending on these technologies. Nonetheless, contemporary literature do not consider information technologies as commodity and believe that information systems are more than technical installation of computers, software, and networks and believes that various sub systems need to work in concert with each other to take maximum advantage of technology and its capabilities in bringing profitability for the organisation ([1], [13], [15], [20], [37], [39])

The role of information technologies are evolving over time in organisations. As illustrated in figure 1, information systems were mainly treated as a technical change for organisations through early stages of their introduction to organisations. Nevertheless, later implementations of these technologies involved much larger part of the organisation than it did in the past and is become more a managerial change (who has what information about whom, when, and how often) and institutional "core" changes (what products and services are produced, under what conditions, and by whom). In the digital firm era, information systems are even more evolved and are influenced and/or influencing other institutional elements beyond the enterprise such as vendors, customers, and industry competitors ([1], [4], [16]).

Enterprise Resource Planning (ERP) systems are highly integrated and complex systems. These systems have become a core technology in many businesses since the past two decades; however, the implemented systems do not always bring about the planned results and still many ERP implementations fails to achieve the desired benefits. This is mainly because of the way these organisations have implemented ERP and the way this technology has been institutionalised within the organisations through interactions of various institutional elements such as people, technology, regulations, customers, and etc. ERP
institutionalisation, however, occurs when its usage becomes stable, routinized and embedded within the organisation’s work processes and its value chain ([18], [19], [31]). Information system researchers, however, tended to limit their attention to the effects of the institutional environment (i.e., coercive, normative and mimetic pressure) on structural conformity, so they fail to study the role of other institutional contexts which affect technology implementation and institutionalisation. This research aims to fill this gap by introducing configurative pressure as a new form of isomorphism which helps organisations to use technology to seek economic and structural legitimation. Seeking economic legitimacy is the way an organisation competes within the industry. Therefore, in order to address the pressures exerted by competitive forces on the organisation, it has to develop and define certain competencies and maturities internally, so as to address external challenges ([22]). Moreover, in order to explain how configurative pressure along with other institutional pressures influence various stages of ERP assimilation and institutionalisation, the authors present a case study of ERP adopting organisations in Australia. The rest of this article is structured as follows. The first section reviews literature on ERP assimilation and institutionalisation process followed by an in-depth overview of institutional isomorphic pressures derived from institutional theory. The next section introduces configurative pressure as a new form of isomorphic pressure, followed by describing proposed research methodology for doing this research. An illustrative case study of Australian ERP adopting organisation is then discussed to show how various isomorphic pressures shape understanding of, adoption, usage, adaptation and consequently institutionalisation of ERP. The final section summarizes learning from this research and highlights areas of future research.

**ERP ASSIMILATION AND INSTITUTIONALISATION**

ERP assimilation refers to the diffusion of ERP usage across organisational business processes and the routinization of activities within these processes. Once the organisation is making optimal advantage of ERP, its use will be taken for granted by the organisational stakeholders to contribute to the value of the organisation. This taken-for-grantedness to provide value in day to day operations results in institutionalisation of the ERP system ([14], [17], [19]). Reference [2] introduce a five stage ERP assimilation process called ERP life cycle starting from awareness for the need of ERP implementation to selection of appropriate package, preparation, implementation and final operation. Most of the researchers more or less agree to theses stages (see for example, [3], [9], [17], [38]). It is from this point onwards that researchers provide significant divergence in their views about institutionalisation of technology. For example, Reference [19] looks at ERP institutionalisation process by mainly focusing on post-implementation stage; Reference [31] studies the effect of institutional factors on decision to adopt ERP system at the organisational level; Reference [18] analyses institutionalisation as a process of transferring and stabilizing material artefacts and routines in the form of ERP systems. However, extant research does not provide a coherent insight into how and why ERP systems become institutionalised and what are the various organisational, technological, environmental, social, and cultural elements which make organisations more similar, giving rise to institutional isomorphism. The authors believe the main reason for this shortfall is because of the way researchers have treated ERP assimilation. This research concurs with reference [38] which suggests initiation, adoption, and routinization as the core elements of IT assimilation process that embody the pre-implementation, implementation, and post-implementation stages of ERP institutionalisation which offer a more comprehensive foundation. Reference [23] provides more detailed information about the characteristics and attributes of these three steps of ERP assimilation process. In the normal progression of events, firstly the technology is implemented, and then it is assimilated in the organisation. Once its usage becomes routinized and embedded within the organisation’s work processes and value chain activities, it leads to successful institutionalisation. Institutionalisation of technology, thus, is not a linear process, one that is independent of any organisational, cultural, technical, social, and environmental causes and effects that shape and reshape use of technology. In fact, ERP assimilation and institutionalisation can be summarized as an organisational effort to diffuse and appropriate technology within a user community. The user community has some aspirations attached to the use of technology, which characterize the values and interests of various social, cultural and organisational agents ([24]). Effectiveness of ERP implementation and assimilation, therefore, is a subjective term and depends on the maturity of the organisation as well as the alignment of technology with the context within which it is deployed. It, therefore, is not a one off endorsement of technology; in fact it is a continuing process of learning aimed at the evolving use of ERP systems. This means that value profile of ERP adoption cannot be realized with simple implementation and assimilation of technology, unless it is fully institutionalised within the organisation.

**INSTITUTIONAL THEORY AND INSTITUTIONAL ISOMORPHIC MECHANISMS**

Institutional theory has been applied to various dimensions of technology management paradigm (See for example, [10], [21], [25], [32]). Activities involved in development and use of technologies in general and ERP systems in particular are subject to the mutual interaction of social, cultural, organisational, technical, and other institutional factors. These factors could be from external sources such as competitors, suppliers, customers, and regulatory agencies as well as from forms, practices, and logics embedded within the organisational structure. Organisations respond to these forces by conforming to technology mandates, or by modifying their business practices to absorb technology within their technical as well as organisational infrastructure. In doing so, organisations address the opportunity of social approval and/or legitimacy within the industry as well as target market. ([27], [30], [39]). Institutional isomorphism is a process in which organisations aim to excel by aligning themselves with the environmental
conditions through their social rules, ideals, and practices. These institutional pressures push organisations to adopt shared notions and routines developed within the organisation as well as within the industry they operate in. In fact, the interpretation of intention to adopt technology and the prevailing context of the organisation is affected by its perception of these pressures. Coercive, normative, and mimetic are three isomorphic mechanisms, which influence organisations in gaining operational efficiency and similarity with peers ([7], [10], [25], [27]). These institutional isomorphic pressures are explained with more details in the rest of this section.

**Coercive Pressure**
It occurs by organisational desire to conform to laws, rules, and sanctions established by institutional actors or sources. This similarity results in the organisation gaining legitimacy and external validation that improves its access to resources ([7]). Negative sanctioning is the central component of coercive institutional pressure, as it includes rules, regulations, and laws that are used to constrain organisational actions. The coercive pressure is exerted on an organisation intending to adopt ERP by other organisations upon which it is dependent, for example, business partners, suppliers and customers ([21], [27]). As a result, the powerful constituent in this equation can exert pressure on the organisation (that is adopting technology) by raising requirements such as conforming to a particular technology standard ([40]). The dependant organisations will call attention to the asymmetry of power when they perceive coercive pressure and, thus, better understand the consequences of adopting or not adopting the technology. Generally, the dependent organisation tends to comply with the powerful organisation’s demands and is inclined to adopt and routinize technology usage into daily operations in order to maintain relationships with powerful partners. The motivating factors are to make transaction process more efficient, to secure the market status of the organisation and to continue accessing scarce resources provided by the powerful organisation ([15], [27]).

**Normative Pressure**
It mostly concerns the moral and pragmatic aspects of legitimacy by assessing whether the organisation plays its role correctly and in a desirable way. It can refer to the positive pursuit of valued ends, as well as negative deviations from goals and standards ([27]). The progressive use of IT in an organisation could be viewed as the result of normative influences, such as, ATM service which is a standard service offered by retail bank. The banks who do not offer this service are at the risk of damaging their legitimacy within the industry as well as with other institutions that they interact. Normative pressures evolve through organisation-supplier and organisation-customer inter-organisational channels as well as through other trading partners, and professional and industry institutions ([17]). For instance, the frequency of technology usage among an organisation’s suppliers and customers may make decision makers aware of the technology and contribute to the organisation’s inclination to adopt it. Furthermore, compliance with norms with respect to environmental concerns can lead to profitability, e.g., reducing organisational cost by conforming to an industrial standard resulting in reduction in wastage of efforts, time, and resources ([7], [15]).

**Mimetic Pressure**
It is a cause of organisational tendency to remain similar to its peers in order to get positive evaluation from the industrial environment. This mechanism results in reducing uncertainty, improving predictability, and benchmarking organisations which are performing at or near optimum level ([7], [27], [17], [30]). Organisations that are structurally equivalent and have similar economic network position, similar goals, and products are more likely to imitate each other. In fact, organisations mimic because they anticipate similar benefits. Therefore, when an organisation adopts technology, competitors from the same industry become aware of its advantages and consider adopting it ([27]). However, it is conceptually not clear whether organisations mimic other organisations to gain legitimacy in technical terms or for economic advantage ([29]). The results of reference [31]’s study reveal that institutional factors, such as mimicry of peers, compliance with industry norms, and coercion from powerful entities influence ERP adoption decisions.

**CONFIGURATIVE ISOMORPHIC PRESSURE**
Each organisation is unique, because the way they are internally organised and the way they seek economic legitimacy is unique. Seeking economic legitimacy is the way an organisation competes within the industry. Therefore, in order to address the pressures exerted by competitive forces on the organisation, it has to develop and define certain competencies and maturities internally, so as to address external challenges ([22]). Configurative pressure forces the organisations to use technology to seek economic and structural legitimisation. Internally, through configurative pressure, businesses enable business processes, establish communication flows, and maintain reporting relationships. Externally, through this pressure, businesses use technology to themselves within the competition, by leveraging the strategy translation, business intelligence, and decisions support properties of technology. However, the degree of structural and economic legitimisation of a business is affected by the maturity of its information systems. Literature suggests various factors that influence information systems maturity, such as, organisational and people skills, the senior management’s involvement in technology planning, the extent of technology diffusion within the organisation, coordination mechanisms, technology usage history, technology control mechanisms, degree of formalization, and technology performance evaluation criteria based on organisational goals ([6], [11], [17], [34], [37]). Nevertheless, through configurative pressure organisations aim to use technology definitively to create a structurally stable environment, such that each organisation unit takes technology for granted for maintaining the flow of business processes and communication relationships. For example, an ERP implementation aims to integrate the different

departments and functions of the organisation, and at the same time creates an information enabled integrated environment that helps the organisation to develop, sustain, and improve competencies and operational efficiencies which helps it to remain competitive. When an organisation aims to implement an ERP system, it desires to map business information requirements on to technology, so that not only the business automation needs are met, but at the same time the business processes and internal organisational designs become matured ([11], [12]). The stability of the internal structure and the flow of information contribute to the economic fitness/legitimacy of the organisation on an ongoing basis ([12], [22]).

IT mature organisations have better understanding of IS implementation, can collaborate effectively with ERP vendors and employees, and are more likely to succeed in ERP implementation. In fact, higher organisational maturity and favorable culture obtained through conformance to configurative mechanisms will make organisations more ready to handle complex technology ([11]). Conformance to configurative mechanism provides a more compatible environment for the development and usage processes associated with technology usage. As the organisational institutional structure becomes matured, more transparent information flow and more stable legal frameworks, institutional norms and government policies will be available. Therefore, more information about competitors’ technological development could be obtained which forces the organisation to adopt technology to avoid competitive decline ([33], [36]). Furthermore, IT business value resides more in the organisation’s skills to leverage IT than in the technology itself. Higher technology usage, thus, helps the organisation to develop unique capabilities from its core technological infrastructure ([22],[34], [35]). Conforming to configurative pressures, thus, requires organisations to understand business processes; and implicit and explicit rules, procedures, instructions, and communications that are to govern them ([37]).

RESEARCH METHODOLOGY

This research follows a qualitative exploratory approach with an explorative case study method. It is governed by the eight step framework proposed by reference [8]. These steps include getting started, selecting cases, crafting instruments and protocols, entering the field, analysing data, shaping hypotheses, enfolding literature, and reaching closure. This paper demonstrates the results of the within case analysis of an electricity distributor in Australia who have adopted ERP system. The within case analysis is central to the generation of insight because it helps researchers to cope early in the analysis process with the enormous volume of data. The overall idea of this analysis is to become intimately familiar with each case as a stand-alone entity. This process allows the unique patterns of each case to emerge before investigators push to generalize patterns across cases ([8]).

The data was collected through on-site interviews of ten participants in the case study organisation. These participants include solution architect, IT change manager, business analyst, domain architect, configuration analyst, and etc., which are engaging in various stages of ERP institutionalisation. Direct quotations from the case study interviews are used to complement the overall point of view being presented. Quotations from case study interviewees represent opinions, perceptions, and experiences of technology users and organisational stakeholders regarding particular factors or situations. These quotes, therefore, have the potential to assist readers in obtaining insights into the respondents’ understanding of the phenomena, as they provide the respondents’ true feelings and beliefs on certain issues. In addition, secondary sources of data have also been used in this research, which include review of ERP implementation documentation, observation of execution of workflow, and day to day routine usage of ERP system.

It is also noteworthy that, as per the research ethics requirements, confidentiality agreement signed with the participating case organisation and individual interviewees state that these entities must not be identified by their real names and/or actual position titles. Every feasible and plausible effort has been made to conceal the identities, thus the case is referred to as company A or case A, and interviewees are referred to by their job description rather than their actual designation, for example solution architect, IT manager, and business analyst.

ILLUSTRATIVE CASE STUDY

Company A is one of the state’s largest organisations in Australia, employing more than 2,000 people throughout metropolitan and regional areas. After deregulation in early 1990s, the state-owned utility corporation was broken down into different organisations between 1996 and 1998. Organisation A became an independent entity solely responsible for electricity distribution. In 1999, state government took the decision of privatising electricity industry in the state, thus, company A was sold to a commercial concern in Hong Kong. The main focus of company A is on the electricity networks (regulated and unregulated) serving commercial and residential customers in metropolitan state capital and regional and remote areas of the state. This organisation operates a distribution network that stretches across one of the states of Australia. This network comprises thousands of kilometres of power-line and hundreds of grid stations. This company is one of the five largest electricity distributors in the National Electricity Market (NEM), which operates as a competitive spot market in which prices are adjusted in real time to supply and demand conditions. Company A operates its electricity distribution business under licence granted by the state government. In year 2001, the council of Australia governments (COAG) established a ministerial council on energy (MCE) to drive energy reform, including the potential to harmonise regulatory arrangements. Following a review of energy market directions, COAG entered into the Australian energy market agreement (AEMA). The agreement established two new institutions to oversee Australia’s energy market. The Australian energy regulator (AER) was established as the national economic regulator and the body responsible for monitoring
and enforcing national energy legislation. The Australian energy market commission (AEMC) was established to undertake rule making and energy market development. Under the AEMA, AEMC is responsible for developing reliability service standards for organisation A. Regulation, however, primarily relates to the tariffs required to meet regulated service standards cost effectively. Company A, thus, concentrates its efforts on achieving regulated requirements for high levels of service, reliability, and safety. It also competes in the un-regulated energy market providing infrastructure construction and management services to industry and government. This organisation is proactive in renewing itself. To this effect, it continuously upgrades and updates its systems and processes to support its ageing infrastructures through smart technologies, capital investments, and strategic changes. Information technologies, therefore, are taking seriously at organisation A. Company A makes substantial investment in information technology area aimed at better productivity, resource planning, functional integration and operational efficiency. The rest of this section explains various institutional isomorphic pressures which are influencing ERP assimilation and institutionalisation in company A.

**Coercive Mechanism**

As mentioned earlier, Australian electricity market is quasi-deregulated market. The industry environment is deregulated, however, the prices and distribution is regulated by AER and AEMC. Once AEMC established reliability standards, AER is responsible for assessing the efficient level of expenditure required for company A to provide distribution services at the specified standards. In order to comply with these regulations, this organisation needs to have a technical solution which is capable of conforming to AEMA and AER standards and national legislative framework. The organisation was thus forced to adopt an ERP solution, because it not only enabled it to manage its operational requirements such as distribution at specified standards, but also helped with administrative requirements such as resources management. Implementing ERP system, therefore, helped the organisation to consolidate its market share. Company A faced strong pressure from AEMA and AER throughout the various stages of ERP assimilation, which is reflected by the response of IT change manager who noted that, We are under regulators, so the electricity industry regulators determine how electricity utilities must perform and what criteria they must meet. Nevertheless, every now and then, these regulations are changing. For example, fifteen years ago nobody had solar power; however, today our organisation has a large number of customers with solar power. Thus, the regulatory structure of our business and its relationships with partner are always changing, and we have to conform to new regulations.

IT Change Manager

The Effect of this coercive pressure extends beyond assimilation and has significant impact on post-implementation continuous improvements. For example, the senior business analyst, while describing the effect of change in industry regulations on ERP implementation, explained,

Mainly external forces for change are coming from regulations and legislative requirements than from other external institutions. For example, the electricity industry regulator comes to us and asks us to change some of the reporting requirements. In doing so, when different electricity and utility industry people are acknowledged by regulator about this new legal requirement, they will gather together to analyse how they are going to do this. Through these discussions, we may come with some new proposals for SAP provider/ vendors regarding upgrading and support packs.

Senior Business Analyst

The government regulates electricity distribution industry, and put financial pressures on company A. This pressure means that the organisation cannot exceed a certain amount of expenditure in five years term. Therefore, organisation’s expansion, enhancement, and maintenance costs related to ERP implementation are restricted. Furthermore, compliance with AER standards exerts pressure on company A’s pricing proposal which outlines tariff strategy in this organisation and indicates how tariff charging parameters are expected to vary. Standard control service tariffs and tariff classes that company A is subjected to are illustrated in figure 1. This requires centralised information processing from a number of different sources, which makes the choice of an ERP system a logical solution to the organisation’s predicament.

![Figure 1- Component of network tariffs (case A's annual pricing proposal 2013-2014)](image)

Company A is also required to conform to some technical requirements such as data and information format. These data sources include customers, suppliers, regulators, and a variety of third parties. Noncompliance with data standards and structures introduces a range of issues like lake of data quality, and interoperability. At the same time, company A itself exerts...
coercive pressure on other organisations in its external environment. For example, the domain architect posited that, other external parties in the environment of our organisation understand that we have an ERP system and we are not going to get rid of it, so they try to adjust themselves with our infrastructure and incorporate their data with our standard data processes. We rarely do changes to our core ERP technology and it is more the other way around.

Domain Architect

**Normative Mechanism**

Company A is concerned about the moral and pragmatic aspects of its legitimacy, and constantly assesses whether this organisation plays its role in a desirable way by looking at its internal and external information needs and norms. Company A takes this seriously and maintains close contact with vendors and ERP user community. For example, the SAP configuration manager expressed company A’s desire to conform to prevailing norms as:

> Our SAP team goes to various national and international conferences and web sessions to find out what is happening, where we should go in future, what other organisations are using, and how we can bring that on board here. At the same time, people executing business processes come to us and ask for customising ERP technology. We, however, accept those changes which help us to consolidate our organisational norms and to gain legitimacy in the view of our industry.

SAP Configuration Analyst

This organisation follows two types of norms, one relating to technology adoption and the other concerning technology use. Technology usage norms are also facilitated by vendors. For example, SAP has created industry verticals of specific industries which bring together users from the same industry. Company A participates in one such vertical where it collaborates with other players in the utility industry to improve its technology usage. For example, the IT manager explained that:

> Our organisation has developed the culture of being trend setter of ERP adoption with the industry. We are not afraid of trying latest features and capabilities of technology. We have a group of people whose job is to go to conferences and web sessions to follow the last updates in technology which helps us to be up-to-date. We try to integrate recent technologies such as mobile, social media, and tablets to our current SAP solution to have better acceptability and usability of the system among business managers and technology users. These developed norms aim to facilitate the usage of ERP system within our organisation as well as industry.

IT Manager

The users of technology in this organisation have developed norms which define the standard expectations or normal behaviour including what is right or wrong in a particular context. To this end, company A mostly seeks to conform to the national and state norms (formal and informal) established in its environment. In the words of domain architect, the predominant norms and culture of our organisation as well as country or state affect usage of technological innovations. For example, cloud-based solutions are not that much a norm among organisations in this state of Australia. We, therefore, do not have any aspects of ERP on cloud yet. However, this trend may be changed in the future. In fact, although we know moving to cloud may lead to more accessibility and cost savings, but we are not sure how it really would affect our business which aims to keep the lights on.

Domain Architect

One of the dominant norms in company A is customer intimacy. This encourages customers to voice their concerns and demands. For example, a recent demand within utility industry is to allow customers to control their energy usage. Company A has made changes in its technical infrastructure to involve customers in the process of energy usage monitoring, in order to comply with the new industry norms.

**Mimetic Mechanism**

Australian electricity industry was deregulated in early 1990s. However, it is not a fully deregulated environment because of the significant influence from regulatory agencies. Company A, therefore, is operating in an industry that is still going through the process of reorganisation. The use of major platform like an ERP system has not been formalised and institutionalised within the industry. It is for the same reason that this organisation does not face appropriate mimetic pressures. This view is reflected in the observation of the solution architect of company A, when he notes that:

> There are lots of external forces on our organisation to change, or modify the ERP system. However, these forces are not from our competitors or peers. In fact, one of the main external elements which affect our organisation via ERP implementation process is the reorganisation of electricity industry and the impact of regulatory agencies. For example, the government asks us to put more information in our reports as part of industry changes, and we have to change the system to be able to produce it.

Solution Architect

It is worth pointing out that company A is a monopoly and has tight coupling with its business partners, institutions and industry members. However, this organisation takes significant mimetic pressure from SAP implementation in other industries. For example, company A tries to set regular workshops with SAP consultants to find typical trends in other industries as well as utility industry around the world. This understanding helps organisation A to find out what other businesses are doing, why they use these modules and how new modules could help company A to achieve its goals and future directions. In summary, the organisational desire to know more about how others have implemented ERP system helps it to reduce uncertainties about its operating environment. While describing this, the configuration analyst suggests that:

> We have a committee between our organisation and its partners. For example, we work pretty close with one of our industry partners who own transmission stations. They sometimes come to us and explain an issue they had with ERP system, and ask us for advice. Sometimes we catch up with them and ask ‘what they are doing’. We, therefore, cannot stay away from the improvements each party is making to their systems. Even sometimes if one of the parties does not have the capability to deliver a system, other peers will help it to solve this issue. This helps in reducing organisational uncertainties about the effect of technology.
Configurative Mechanism

Configurative pressures force this organisation to use technology to support its business structure and follow of information that enable the entire business. Each organisation consists of various functions and together they contribute to the realisation of business value chain. Configurative pressure also forces company A to harness different functions of the organisation, appropriately utilise organisational resources, and integrate its business operations to seek economic legitimacy. This economic legitimacy helps the organisation be competitive and respond to the competitive, economic, regulative, and other social and cultural changes acting on it. Company A has responded to configurative pressure by deriving technology implementation, diffusion and assimilation strategy from business strategy. At the same time, it has established ex-ante performance evaluation criteria for choosing appropriate technology for the organisation based on the high level organisational goals defined in the business case. In doing so, this organisation aims to use technology to achieve higher level of maturity for the internal organisational structure. In theory, this maturity helps company A to enable stable internal environment and facilitate the organisation to be responsive to the outside change, thereby achieving continuous economic fitness on an ongoing basis. Moreover, alignment of ERP technology with the internal business structure, business processes, and business execution help this organisation to conform to its internal structure and external interactions and grow its internal sub systems in sync. Technology and organisational maturity at company A highlighted the following factors,

Technology Objectives

Having definitive and clear technology objectives result in more consistent direction to ERP implementation rather than just fulfilling individual and ad-hoc requests. Company A has a five-year rolling plan and strategy that matches what the business wants to achieve. In order to fulfil those business directions, the architecture team does strategic planning to determine business needs for the coming year and then assess and prioritize them. This results in a plan for upgrading modules or configuring SAP system. The IT change manager describes technology implementation objectives at company A as, The organisational goals and/or visions direct the pre-assessment process, and govern the implementation and post-implementation phases. The IS performance evaluation criteria, therefore, are strongly based on organisational goals and technology objectives. These criteria help us to ensure that technology is mapped properly onto business needs and information is at hand to reduce wastage of effort and money through effective resource utilisation.

Strategic Alignment

Company A tries to follow a top-down approach to ERP implementation, which helps it with clear definition of business information needs and the ability to address these needs with technology capabilities. However, the complexity of organisational structure at company A (which is becoming even more complex with passage of time) results in the lack of strategic alignment at some stages of ERP implementation and assimilation. In the words of IT manager, Alignment of business information needs with technology becomes more difficult, when the complexity of organisational structure increases. In fact, each department or division has its own managerial strategies, business rules, processes, and cultural and political considerations which make it difficult to strategically align information needs with technology capabilities.

Regular Evaluations & Upgrading of Technological Infrastructure

Company A believes that IT infrastructure needs to be re-evaluated every four to five years to ensure that it is up-to-date and aligned with the business needs. History and technology trend show that if company A leaves its IT infrastructure for too long without evaluating and upgrading, it becomes less reliable and does not operate properly. Besides, external vendors may not be able to support obsolete infrastructure by passing time. This organisation, thus, started a project eight years ago to re-architect ERP infrastructure in order to comply with configurative pressures exerted on it. This project aims at integrating the technological infrastructure of company A with its value chain to enhance organisational competitiveness.

User Competency

Company A operates on two extremes. There are some employees who are not technology savvy and nearing the end of their carrier and have less desire to learn new technologies. At the same time, they are fresh workforce who have been brought up with technology and consider technology as the integral part of their work. Those people who are not technology savvy have
the tendency of creating, implementing, and using ad-hoc solutions within technologies they are comfortable with. As a result, it not only adds to technology discrepancy in the organisation, but at the same time, information captured is not integrated and interoperable. This discrepancy manifest itself into much more profound issues due to lack of availability of right information in right format at a right time to make decision. As a result, there are some sections in the organisation which are technologically more mature than other sections. In the words of senior business analyst, the level of IT maturity among some business sections is insufficient which exert significant amount of pressure in routinization of ERP usage. Although we built an integrated IT infrastructure, most of our employees are not motivated enough to move to the new system.

Senior Business Analyst

Skills and Expertise of Project Team
Company A is conscious of configurative pressure and using technology for logical organisation and economic legitimacy of the organisation. However, it has not achieved these two objectives completely. This is because people engaged at ERP implementation project at company A had no experience of implementing a major technological platform like ERP before. At the same time, there were not aware of technology abilities, requirements, and how to align technology capabilities with business needs.

Identifying Exact Information Requirements
Company A will face difficulties in designing and implementing ERP technology, if it does not define the exact information requirements at the beginning of the project. This organisation goes through series of workshops for any technology procurement and/or change proposal. As mentioned earlier, these workshops aim to bring together all key stakeholders to discuss what the exact requirements are and how these requirements help this organisation to satisfy its goals. This helps in conforming to configurative mechanisms exerted on this organisation to be logically organised.

DISCUSSION AND CONCLUSIONS

Technology institutionalisation involves a full understanding of technological innovations so that it becomes ingrained into organisations work processes ([3], [19]). The assimilation and diffusion of information technology in organisations has been of great interest to researchers on information systems for about two decades. However, the assimilation of complex technologies is never easy, and a myriad of institutional, external, and internal forces blend together to influence how potential adopters make sense out of the technology and, accordingly, assimilate its use ([1], [4], [16], [26]). Traditionally, ERP systems were used mainly to handle organisation’s back-end processes and business transactions. However, today, organisations integrate both back-end and front-end (such as CRM, SCM) applications together to achieve more efficiency in functional and non-functional capabilities of the organisation ([28]). This makes ERP as a complex technology, which encounters more assimilation and institutionalisation challenges. In fact, ERP institutionalisation is a continuing process of learning aimed at the evolving use of ERP systems. This means that value profile of ERP adoption cannot be realized with simple implementation and assimilation of technology, unless it is fully institutionalised within the organisation. It, thus, becomes a continuous process aimed at organisational learning through alignment between the organisation’s strategy, its business needs, and the application of ERP system within the organisation, where the use of ERP system is shaped by the organisational context and actors and guided by the evolving value profile of the organisation ([23], [24]).

This paper concludes that the degree of structural and economic legitimization of a business is affected by the maturity of its information systems and the degree to which its technological infrastructure is mapped properly onto business needs and information is at hand to reduce wastage of effort and money through effective resource utilization. The organisational desire to conform to its internal organisational competencies and information systems maturity leads the authors to come with a new form of isomorphic pressures, i.e., configurative isomorphic pressure. This paper presents an illustrative case study of ERP adopting organisation in Australia to show how various isomorphic mechanisms affect ERP assimilation and institutionalisation process. The case organisation works as a private electricity distribution organisation to manage a significant piece of public infrastructure in one of the states of Australia. This paper reviewed the results of within case analysis of data gathered in this organisation including direct quotes form interviewees, internal document reviews, and observation of work place.

The case analysis reveals that ERP institutionalisation is influenced by the desire of case A to conform to coercive, normative and configurative isomorphism. This organisation needs to technically comply with certain coercive requirements, standards and codes of regulatory arrangements such as AER, AEMA and COAG. At the same time, company A seeks to gain technical legitimacy by following professionals in electricity distribution industry, and latest technological trends achieved through online web sessions and national and international conferences. Furthermore, as mentioned before, Australian electricity industry was deregulated in early 1990s. Company A, therefore, is operating in an industry that is still going through the process of re-organisation which resulted in company A not facing appropriate mimetic pressures. At the same time, the internal and external environment of company A is changing which influences its demand for new technological innovations. However, this organisation does not have a clear idea of exactly what technologies are going to be adopted and how the technology will be integrated with the core SAP solution or substitute it, and how the regulatory framework will adapt to and encourage changes. In these circumstances, configurative pressure forces company A to harness different functions of the organisation, appropriately utilise organisational resources, and integrate its business operations to seek economic legitimacy. Through the next step of this study, the authors will conduct another three to four case studies among Australian ERP adopting
organisations. The gathered data will further studied through within-case as well as cross-case analysis to find emerging relationships between variables.

REFERENCES


ONSCREEN ENGLISH FONT PERSONALITY: AN EXPLORATORY COMPARISON BETWEEN THAI AND ENGLISH NATIVE SPEAKERS

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ABSTRACT

Onscreen English fonts have critical roles in communication. Previous research has examined English native speakers’ perceived personality of a font. While the perception depends on a person’s background or culture, no publication has compared the perception across Thai and English native speakers. The present study attempts to fill this void. 402 samples of Thai and English native speakers returned their questionnaires that displayed one of the most accepted hand-writing font: Kristen. The analysis revealed that Thai native speakers perceived the highest extent of the Kristen font’s relaxed and feminine personality but at the comparable extent did the English native speakers perceive its active and exciting personality. The exploration into underlying dimensions showed a similar structure across the two native samples. In addition to extending theoretical insights into digital typography across two native speakers, practitioners could apply the findings to effectively apply the Kristen font to the onscreen message design.

Keywords: Onscreen English, Kristen Font, Personality, Thai, English

INTRODUCTION

An onscreen English font is a set of English types on a computer monitor with a certain design. Prior to the period of digital typography, a font is conceptually different from a typeface. In traditional typography, a font refers to a complete character set of a single size and style of a given typeface. For instance, the complete set of all characters for “an 11-point Helvetica” is a font and it is part of the Helvetica typeface (or Helvetica family). However, the technological revolution makes it more difficult to differentiate the font from the typeface. As a result, they could be used interchangeably [34]. Communication researchers consider a font as a communication channel [4, 11]. Gump [10] claims that various font appearances often constitute to different perceptions. Shaikh [27] labeled the perception as font personality and verified that it does have effect on the message it attempts to convey. It is thus necessary to discuss certain definitions of terms associated with the display of fonts.

Based on Figure 1, the baseline is an invisible line on which a letter sits. The ascender is the vertical extension above the body of a letter while the descender is that below the body. The x-height is thus the height of a lowercase letter excluding the ascender and the descender. The counter is an enclosed (or partially enclosed) space found in some letters such as a Q or a G and the bowl is the round part of a letter such as a C or an O. The stem is the main vertical stroke of a letter. While an O has no stem; an I has one stem. The cross stroke is the cross on a few letters such as that on a t or an e. The hairline is a contrasting thin stroke in some letters. For instances, the right stroke of a U is thinner than the left one. The serif refers to a short cross stroke at the top or bottom of a letter. This serif is often used to classify a typeface where the san serif means the absence of the serif. While the serif fonts are perceived as traditional, the san serif fonts are known as contemporary [10].

Figure 1: Names of font components [18]

Fonts receive remarkable research attention from two major areas: communication and marketing, besides the typical research initiatives in computer graphics as an effort to improve the fonts’ visual presentation. In communication, an individual could interact with others through a written message. Not only could the message convey meaning through its content, but it could also impress readers via its fonts. In Shaikh and colleagues’ [29] survey, subjects mostly perceived (1) the Times New Roman font as most appropriate for use in online business documents and (2) the Kristen font as most appropriate for use in children’s...
document. Shaikh and coworkers [31] chose three fonts based on their congruency to email use. The fonts were Calibri, Comic and Gigi. They discovered that the first two fonts were perceived as useful for composing email and the subjects’ perception towards the third one was significantly less useful that the first two fonts. Resumes should be prepared using the Corbel font since Shaikh and Fox [30] found that this font on a resume could enhance the company’s perception towards the candidate’s physical appearance. In Shaikh’s [28] work, subjects were asked to report their perception towards 40 onscreen fonts. Her findings ascertained the three groups of perception. First, the potency group reflects the font’s perceived strength or power. Second, the evaluative group indicates its perceived value or importance. Finally, the activity group implies the font’s perceived movement or action. From a rhetoric perspective, Brumberger [2] conducted five experiments to (1) verify if fonts have personalities and (2) examine the extent to which their perceived personalities resulted in one’s reading comprehension and reading speed. Her main findings were that the fonts did have personalities but only some of them would affect the reading comprehension or the speed. As such, authors and publishers must be attentive to the font selection. Li and Suan [19] attempted to correlate typefaces and personality modifiers. Despite no detail about the samples, most of serif and san serif typefaces are highly correlated to directness and script (or handwriting) typefaces are associated with cheerfulness. Based on their series of experiment, Amare and Manning [37] validated that those with non-US background noticed onscreen font personality in the same way as those with US background. Moreover, a handwriting font could evoke more emotional response than serif or san serif fonts. Amare and Manning’s [37] work was perhaps the first study examining font personality across subjects with different background. In a marketing field, Poffenberger and Franklin [25] did a survey on perception towards fonts in printed documents. According to their findings, typefaces could be classified based on reader’s perceived appropriateness. This should have serious implication to printed advertisement on a magazine. Nevertheless, such finding at the early years of typography research could denote the significant and serious investigation of perception towards fonts. Indeed, subsequent research has found that fonts could lead ones to develop either positive or negative perception towards the fonts used in a company logo [2, 27]. Brumberger [2] suggested that the varying perception towards a company could be attributable to the interplay between the font and the logo content. Examining a company logo on its website, Shaikh [27] contended that careless selection of onscreen fonts may seriously damage the company’s professionalism. She thus recommended that logo designers use the Calibri font since it was perceived most appropriate. Fonts have value in marketing. Various perceptions triggered by different fonts could lead to a large set of responses. Henderson and colleagues [12] examined if use of fonts could have significant impact on firm impression. They included 210 fonts based on suggestions from professional graphic designers. After a few rounds of surveys, they learned four dimensions of impression caused by these fonts. The dimensions are pleasing, engaging, reassuring and prominent. Also, the serif font could trigger the flourish feeling [12]. Spiekermann and Ginger [33] attempted to match specific fonts to product titles. Despite that their findings are limited to certain products and the fonts are not onscreen types, they did call for serious attention to examine fonts and its application to business. Considering fonts as a brand’s visual equity, Dole and Bottomley [5] investigated the extent to which the fonts could enhance a brand’s identity and its market share. They contended that customers often associated a product with fonts on the product’s packages. The products were selected as twice frequently when customers perceived congruence between the products and the fonts as compared to when they do not [5]. In their subsequent study [4], they could confirm that customer’s perception towards font appropriateness depends not only on the congruence between the font and the product packaging but also on the font itself. The major drawback of Dole and Bottomley’s [4, 5] findings is that the fonts in their studies were not the onscreen type. However, their effort confirms a serious need to examine one’s perception towards onscreen fonts.

OBJECTIVES

Based on the literature reviewed in the previous section, we could identify four major gaps, First, most of research on fonts has been mainly from the computer science community [8, 14, 32, 34]. This trend could have been predictable since the advance in computer graphics must be in pace with new display devices. There is, however, a relatively small volume of empirical work examining a human’s reaction to the fonts. Second, findings from user studies are still much inconclusive. The incomplete picture might be from the fact that some projects addressed either too small or too large sets of the fonts [4, 11, 13, 28]. The findings from such projects could have been more valid if the authors had rationalized the ground on which the fonts in their studies were selected. Indeed, a sizable volume of empirical research has addressed the fonts of serif and san serif families [6, 16]. What has been overlooked is thus the other set of fonts including those handwriting styles. Third, an examination of fonts from the viewer perspective should have taken into account the viewer’s demographics. This is because font personality could differ in perception among those with different backgrounds [1]. Based on the literature review, it seems that researchers have inadequate discussion on whether there is any discrepancy of the font personality among the subjects in their studies. The subjects in these studies were mostly American or European. Moreover, none of them has explored the difference of font personality as perceived by those of different ethnicity. Finally, most of previous examinations on fonts have clearly addressed the fonts on printed matters or as part of an image including a company logo [7, 11, 27]. Given the advance of digital display devices and a proliferation of electronic commerce, researchers should have extended the efforts to cover onscreen fonts. This current study attempts to fill this void by addressing the following objectives:
1. explore Thai native speaker’s perceived personality of an onscreen English font and underlying dimensions of their perceived personality,
2. explore English native speaker’s perceived personality of an onscreen English font and underlying dimensions of their perceived personality,
3. examine differences between Thai native and English native speaker’s perceived personality of an onscreen English font and underlying dimensions.

METHODOLOGY

Responses to the three objectives were from a survey in which online questionnaires were given to samples of different ethnicity. The following sections detailing methodology issues are (1) population and samples, (2) survey instrument and execution, (3) reliability and validity issues, and (4) data analysis framework.

Population and Samples

Members of our population are Thai native and English native speakers who have visited websites and presumably experienced onscreen English fonts. We carefully developed questionnaires to measure the sample’s perception towards an onscreen English font. The detail of this instrument will be in the next section. Given that the study is relevant to an online issue, we opted to (1) post a call for research participation on a number of web boards where both native speakers have frequent visits and (2) use an online channel to collect data. This could ensure the heterogeneity of the samples. Five weeks after we posted the call for participation, we were able to have 402 samples for this exploration.

Survey Instrument and Execution

Given thousands of onscreen English fonts currently available, it is nearly impossible to include all of them in one study. Our focus is thus on the script (or hand-writing) family which has not gained much research attention as compared to the serif or san serif families [6]. Among members in the handwriting family, we chose to explore the personality of the Kristen font. The selection was based on remarks in academic journals and trade magazines in which the Kristen font has been cited as one of the most accepted hand-writing fonts [38]. See Figure 2 for an example of the Kristen font. Note that we do not contend the Kristen font could represent all members in the hand-writing family. Given the exploratory nature of this study; however, this selection is still acceptable.

Once we had the font towards which we want to measure samples’ perception of its personality, we were ready to draft the questionnaire. Based on previous empirical work measuring an individual’s perception towards fonts, we employ semantics differential scales. Indeed, our 15 scales were adjusted from those bipolar adjective pairs used in Shaikh [27] and Li and Suen [19]. It could give us an opportunity to relate our finding to the other’s. See the appendix for one part of the questionnaire.

Reliability and Validity Issues
We strived to conduct the survey to validly and reliably achieve the study’s objectives. Such effort includes the followings.

A readable paragraph often conveys a meaning that may affect a reader’s perception towards the fonts used in the paragraph. For example, a paragraph describing a mother whose kids were killed in a war may sadden readers, even if it uses cheerful fonts. As a result, we employed an unreadable (or “nonsense” in Shaikh’s [27, p. 58] work) paragraph to minimize the contextual meaning. Moreover, the unreadable texts would be a fair treatment for the two types of speakers. Their assessment of font personality would be based on perceptive evaluation without a need to understand the contextual meaning.

Because we chose to examine the perceived personality of one font, the finding may be limited in scope. Yet, we were able to keep the questionnaire length relatively short thereby allowing a subject to better concentrate on survey items. Moreover, we opted for an online channel to collecting data. The sample’s concentration on a computer screen while responding to the questionnaires should thus be as minimum as possible in order to avoid the fatigue.

After we finished the online questionnaire’s first draft, we were engaged in two rounds of the pretest. First, we asked colleagues who are faculty members in Chulalongkorn Business School for feedback on it, particularly on its unreadability. Second, we pretested it on sixteen graduate students, two of whom are English natives and the rest are Thai. We made few adjustments based on their reaction. The pretests had therefore improved the instrument quality.

**Analysis Framework**

To respond to the study’s three objectives, we use descriptive statistics. In order to capture underlying meanings of the perception, we adopt the exploratory factor analysis (EFA) with the principal component rotation and the varimax rotation. Since this is perhaps one of the first few attempts to shed new light on Thai and English native speakers’ perceived personality of the Kristen font, the hypothesis testing should wait for more empirical knowledge to insinuate the proper hypothesis statement.

**RESULTS**

The five-week data collection yielded 402 usable data records for this exploration. In Table 1, 378 out of 402 samples shared which type of native speakers they are. 66% reported they are Thai natives, 16% are English natives and the rest are the others including Chinese or Spanish. According to Table 2, profiles of the Thai and the English native speakers are similar. As such, we described the combined profile as the whole picture. About 4 in 10 samples were male. 72% are between 21-30 years old. The majority (92%) earned at least college. A slight difference between the two profiles is that 7 in 10 of Thai samples worked in private sectors while the same proportion of English subjects were still students.

Prior to presenting descriptive statistics of the samples’ perceived font personality, we must report the Cronbach’s alpha to verify the reliability of our collected data. The 15 scales measuring perceptions towards Kristen font holds the alpha of 0.757. It is higher than 0.7, the threshold of which is considered acceptable [24]. It would confirm the acceptable reliability of our data.

Table 3 and Figure 2 present the samples’ scores indicating their perception of font personality. Considering Thai native speakers, the top two modifiers indicating their perceived personality of the Kristen font are feminine (5.03) and relaxed (4.66); and the bottom two are old (2.24) and sad (2.35). For the English-native speakers, the top two modifiers describing their perceived personality of this font are active (5.53) and exciting (5.42); and the bottom two are sad (1.83) and old (2.17).

**Table 1: Proportion of samples according to types of native speakers**

<table>
<thead>
<tr>
<th>Types of native speakers (378)</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thai</td>
<td>250</td>
<td>(66)</td>
</tr>
<tr>
<td>English</td>
<td>59</td>
<td>(16)</td>
</tr>
<tr>
<td>Others</td>
<td>69</td>
<td>(18)</td>
</tr>
</tbody>
</table>
Table 2: Sample’s demographics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All</th>
<th>Thai natives</th>
<th>English natives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Gender</td>
<td>364 (100)</td>
<td>222 (100)</td>
<td>59 (100)</td>
</tr>
<tr>
<td>Male</td>
<td>133 (36)</td>
<td>80 (36)</td>
<td>23 (39)</td>
</tr>
<tr>
<td>Female</td>
<td>231 (64)</td>
<td>142 (64)</td>
<td>36 (61)</td>
</tr>
<tr>
<td>Age</td>
<td>366 (100)</td>
<td>224 (100)</td>
<td>59 (100)</td>
</tr>
<tr>
<td>&lt;= 20 yrs</td>
<td>23 (6)</td>
<td>16 (7)</td>
<td>4 (7)</td>
</tr>
<tr>
<td>21-30</td>
<td>265 (72)</td>
<td>161 (72)</td>
<td>41 (70)</td>
</tr>
<tr>
<td>31-40</td>
<td>62 (17)</td>
<td>35 (16)</td>
<td>12 (20)</td>
</tr>
<tr>
<td>&gt;= 40 yrs</td>
<td>16 (5)</td>
<td>12 (5)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Highest education</td>
<td>362 (100)</td>
<td>221 (100)</td>
<td>58 (100)</td>
</tr>
<tr>
<td>Less than a college degree</td>
<td>30 (8)</td>
<td>22 (10)</td>
<td>4 (7)</td>
</tr>
<tr>
<td>College degree</td>
<td>180 (50)</td>
<td>133 (60)</td>
<td>13 (22)</td>
</tr>
<tr>
<td>Graduate level</td>
<td>152 (42)</td>
<td>66 (30)</td>
<td>41 (71)</td>
</tr>
<tr>
<td>Professions</td>
<td>364 (100)</td>
<td>224 (100)</td>
<td>58 (100)</td>
</tr>
<tr>
<td>Private sectors</td>
<td>199 (55)</td>
<td>149 (67)</td>
<td>13 (22)</td>
</tr>
<tr>
<td>Students</td>
<td>123 (34)</td>
<td>41 (18)</td>
<td>40 (69)</td>
</tr>
<tr>
<td>Government workers</td>
<td>22 (6)</td>
<td>14 (6)</td>
<td>5 (9)</td>
</tr>
<tr>
<td>Business owners</td>
<td>20 (5)</td>
<td>20 (9)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Table 3: Averages* on each adjective as perceived by samples towards the Kristin font

<table>
<thead>
<tr>
<th>Adjectives</th>
<th>Thai natives (N=250)</th>
<th>English natives (N=59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>4.36</td>
<td>5.53</td>
</tr>
<tr>
<td>Warm</td>
<td>4.03</td>
<td>4.12</td>
</tr>
<tr>
<td>Slow</td>
<td>3.16</td>
<td>2.88</td>
</tr>
<tr>
<td>Exciting</td>
<td>4.45</td>
<td>5.42</td>
</tr>
<tr>
<td>Old</td>
<td>2.24</td>
<td>2.17</td>
</tr>
<tr>
<td>Good</td>
<td>3.84</td>
<td>4.29</td>
</tr>
<tr>
<td>Beautiful</td>
<td>4.25</td>
<td>4.44</td>
</tr>
<tr>
<td>Sad</td>
<td>2.35</td>
<td>1.83</td>
</tr>
<tr>
<td>Relaxed</td>
<td>4.66</td>
<td>4.78</td>
</tr>
<tr>
<td>Expensive</td>
<td>3.16</td>
<td>3.76</td>
</tr>
<tr>
<td>Strong</td>
<td>2.94</td>
<td>3.54</td>
</tr>
<tr>
<td>Soft</td>
<td>4.43</td>
<td>4.36</td>
</tr>
<tr>
<td>Quiet</td>
<td>3.03</td>
<td>2.56</td>
</tr>
<tr>
<td>Delicate</td>
<td>3.83</td>
<td>3.71</td>
</tr>
<tr>
<td>Feminine</td>
<td>5.03</td>
<td>5.37</td>
</tr>
</tbody>
</table>

*1 is the least amount and 7 is the largest amount

Such interpretation regarding the samples’ perceived personality of the Kristen font was made solely on the two highest and two lowest scores of the 15 modifiers. While useful to some extent, it only presents fractions of small pictures of the font personality. Consequently, we performed exploratory factor analysis on these 15 adjectives, with respect to each of the two native speakers. We hope to explore broader dimensions that underlie the perceived font personality.

Tables 4 and 5 present results of factor analysis that embrace the factor pattern matrix in which loadings of the modifiers constituting the perceived font personality between the two native speakers are also included. Note that the structure of these underlying constructs of the perceived personality of the Kristen font are similar.

Regarding the Thai native speakers (see Table 4), Factor I accounted for 22.4% of the variance of all 15 modifying scales. Highest loadings of the five adjectives reflect the stodginess. Factor II accounted for 15.8% and its relevant modifiers convey the stimulating perception. Factor III constituted for 13.9% and the highest loadings indicate the lively dimension. Finally, Factor IV accounted for 12.7% and its relevant modifiers tap on the delicate dimension. Taken together, all four factors explain 64.8% of the total variance of all 15 modifiers.

Regarding the English native speakers (see Table 5), Factor I’s components reflecting the indulgence and accounted for 19.7%. Highest loadings on Factor II which accounted for 17.3% capture the lively dimension. The third factor accounted for 16.6%, reflecting the obsolete component. Factors IV and V have one modifier for each and capture 9.8% and 8.4% of the total variance. The final two factors denote the feminine and the relaxed dimensions, respectively. All five emerging factors explain 71.8% of the total variance.
Table 4: Factor analysis result for Thai-native speakers’ perceived personality of the Kristen font

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Factors</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
<tr>
<td><strong>Factor I: Stodgy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old</td>
<td>.76</td>
<td>-.05</td>
<td>-.26</td>
<td>-.01</td>
</tr>
<tr>
<td>Quiet</td>
<td>.75</td>
<td>.11</td>
<td>.18</td>
<td>-.08</td>
</tr>
<tr>
<td>Sad</td>
<td>.73</td>
<td>-.21</td>
<td>.26</td>
<td>-.16</td>
</tr>
<tr>
<td>Strong</td>
<td>.68</td>
<td>.30</td>
<td>.07</td>
<td>-.23</td>
</tr>
<tr>
<td>Expensive</td>
<td>.67</td>
<td>.22</td>
<td>-.20</td>
<td>.38</td>
</tr>
<tr>
<td><strong>Factor II: Stimulating</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excited</td>
<td>.07</td>
<td>.76</td>
<td>-.05</td>
<td>.24</td>
</tr>
<tr>
<td>Active</td>
<td>-.13</td>
<td>.73</td>
<td>.20</td>
<td>.11</td>
</tr>
<tr>
<td>Good</td>
<td>.35</td>
<td>.66</td>
<td>.33</td>
<td>-.10</td>
</tr>
<tr>
<td><strong>Factor III: Lively</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft</td>
<td>.09</td>
<td>.13</td>
<td>.80</td>
<td>.24</td>
</tr>
<tr>
<td>Warm</td>
<td>-.08</td>
<td>.22</td>
<td>.72</td>
<td>.16</td>
</tr>
<tr>
<td><strong>Factor IV: Delicate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxed</td>
<td>-.16</td>
<td>.01</td>
<td>.17</td>
<td>.84</td>
</tr>
<tr>
<td>Feminine</td>
<td>-.16</td>
<td>.36</td>
<td>.26</td>
<td>.72</td>
</tr>
</tbody>
</table>

Percent of variance explained: 22.4%, 15.8%, 13.9%, 12.7% = 64.8%

Kaiser-Meyer-Olkin (KMO) index = .782, Bartlett's test of Sphericity = 1,194.82 with df = 105, and p < .000.

We inspected the quality of these factor analysis results using Kaiser-Meyer-Olkin (KMO) index and Bartlett’s test of Sphericity. All results as reported in Tables 4 and 5 have the KMO statistics in the range of .602 to .782, the values of which Kaiser [17] considered acceptable. Also, the Bartlett's tests are all statistically significant, contending the parsimonious and proper underlying dimensions of the two native speakers’ perceived personality of the Kristen font.
### Table 5: Factor analysis result for English-native speakers’ perceived personality of the Kristen font

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor I:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indulgent</td>
<td>.85</td>
<td>-.16</td>
<td>-.17</td>
<td>-.27</td>
<td>.15</td>
</tr>
<tr>
<td>Beautiful</td>
<td>.83</td>
<td>-.05</td>
<td>-.03</td>
<td>-.05</td>
<td>.20</td>
</tr>
<tr>
<td>Good</td>
<td>.82</td>
<td>-.28</td>
<td>.20</td>
<td>.26</td>
<td>-.07</td>
</tr>
<tr>
<td>Expensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor II:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lively</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warm</td>
<td>-.18</td>
<td>.89</td>
<td>-.12</td>
<td>-.02</td>
<td>.03</td>
</tr>
<tr>
<td>Soft</td>
<td>-.13</td>
<td>.83</td>
<td>-.18</td>
<td>-.02</td>
<td>-.08</td>
</tr>
<tr>
<td><strong>Factor III:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obsolete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td>-.10</td>
<td>-.02</td>
<td>.80</td>
<td>-.05</td>
<td>.14</td>
</tr>
<tr>
<td>Quiet</td>
<td>.19</td>
<td>.19</td>
<td>.74</td>
<td>.03</td>
<td>.17</td>
</tr>
<tr>
<td>Old</td>
<td>.06</td>
<td>-.33</td>
<td>.68</td>
<td>.12</td>
<td>-.08</td>
</tr>
<tr>
<td><strong>Factor IV:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feminine</td>
<td>.10</td>
<td>-.02</td>
<td>.05</td>
<td>.84</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Factor V:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxed</td>
<td>-.08</td>
<td>.17</td>
<td>-.06</td>
<td>.05</td>
<td>-.92</td>
</tr>
</tbody>
</table>

Percent of variance explained: 19.7% 17.3% 16.6% 9.8% 8.4% = 71.8%

Kaiser-Meyer-Olkin (KMO) index = .610, Bartlett's statistics = 385.60 with df = 105, and p < .000.

### CONCLUSIONS AND IMPLICATIONS

#### Demographic Details of The Samples

Based on the total number of samples who are either Thai or English natives, their profiles are alike. 6 in 10 were women. About 70% were in between 21-30 years of age. The Thai native samples had mainly college degrees (60%) working in private sectors (51%); yet, the English native subjects have mostly (71%) graduate levels and 70% were students. A comparison of their profile between those participating in the present study and those in previous reports [22, 38] revealed a large sharing portion, confirming representativeness of our samples.

#### Thai native’s Perceived Personality of the Kristen Font and Underlying Dimensions of the Personality

We concentrated on the hand-writing font: Kristen. Data from 250 Thai native speakers suggested that they scored the Kristen font highest on the feminine and the relaxed modifiers but least on the old and the sad modifiers from the 15 one-to-seven-range modifiers (see Table 4 for more detail).

According to exploratory factor analysis results, 12 out of the 15 modifiers had highest loadings and were grouped into four underlying dimensions of the Thai native’s perceived personality of the Kristen font. On a macro level, the Thai natives view a message using this font as stodgy, stimulating, lively and delicate. Unable to locate previous work examining Thai native’s perceived font personality, we have no benchmark against which we could validate our findings and must urge for more research on similar topics.

#### English Native’s Perceived Personality of the Kristen Font and Underlying Dimensions of the Personality

59 English native speakers took part in the present study. Based on using descriptive statistics on the same 15 one-to-seven-range modifiers used with the Thai natives, the Kristen font delivers heavily the active and the exciting feelings but marginally the sad and the old perceptions. In addition to these four modifiers, we learned a large picture from performing exploratory factor analysis on the 15 items. Results in Table 5 lead to the conclusion in which the English native speakers view the Kristen font as having indulgent, lively, feminine and relaxed yet obsolete personality.

The finding in which the English native speakers noticed the active and exciting personality is in line with Li and Suen’s [19] work. Subjects in their study noticed the cheerful character of the Jokerman font (or a script font used in Li and Suen’s [19] study).

#### Juxtaposing the Thai Native’s and the English Native’s Perceived Personality of the Kristen Font

There exist both difference and similarity once we compared the Thai native’s and the English native’s perceived personality of the Kristen font.

There are two major difference issues. The first difference is related to the evaluation of 15 modifiers describing the font personality (see Table 3 for more detail). The two highest modifiers on which the Thai native speakers agree are “feminine” and “relaxed” modifiers. Yet, “active” and “exciting” are the two highest modifiers that the English native speakers agree to be the Kristen font personality.

The second difference is associated with the underlying dimensions underneath the 15 descriptive items. Using the same exploratory factor analysis, we discovered four aspects for the Thai native’s perception but five dimensions for the English native’s. While the feminine and the relaxed items loaded together with sizable loadings on a single dimension for the Thai...
natives, these two loaded separately on two orthogonal dimensions for the English natives. It is therefore reasonable to claim that the Thai natives view the Kristen font as having the delicate personality that is a result of the combination between the feminine and the relaxed characters. However, the English natives perceived both modifiers but one item conceptually independent from the other.

There are also two similarity issues. First, both native speakers rated least on the same two modifiers: old and sad. It implies that the two native speakers believe that the Kristen font would barely deliver the sad or the old personality. In other words, the two native speakers notice that the Kristen font has less sad and less old personality.

In the difference issue, we already discussed the feminine and the relaxed personalities. Should we dismiss these two items, the remaining three dimension behind the 15 descriptive items across the two native speakers are much comparable. The two groups have the lively dimension in common whereas the Thai native’s view of stodgy and stimulating aspects are much resemble to the English native’s view of obsolete and indulgence dimensions, respectively.

The claim on the difference and the similarity of the Kristen font personality must be exploratory. We could not locate previous work that had examined similar topics, although a few publications have addressed the English native speaker’s perceived font personality [19, 27]. We must therefore challenge other researchers to have similar research projects in order to shed a more complete picture on the cultural issues of the personality of the Kristen font.

Implications and The Study’s Limitations

The implication of this study is two-fold. First, it has extended theoretical insight into online typography across two groups of native speakers. Second, it has practical utility. The findings may suggest at least three recommendations for online practitioners.

First, given the different personalities of the Kristen font that the two native speakers have assessed, online content providers must be careful to display a message using the font. If one travelling website, of which the targets are English native speakers, wants to deliver the active and exciting feeling via the onscreen content; for instance, the designer may use the Kristen font to convey the personality. Nevertheless, he or she must be aware that the Thai native speakers could have seen the website as a relaxed and feminine tourist destination. Second, the two native speakers could have the lively feeling towards onscreen messages using the Kristen font. As a result, an electronic commerce website who wants to draw attention from both the Thai and the English native speakers may want to adopt the Kristen font to carry the lively personality. Finally, should content designers want to deliver the sad or old personality through their online messages, the Kristen font should not be of their choices since both native speakers barely notice the sad or old personality of the Kristen font.

Our contributions could have been more useful, if the study has not had two limitations. First, this study has examined the Thai and the English native speaker’s perceived personality of the Kristen font. As a result, our finding is substantial only in this context. We could offer no insight into other circumstance. This therefore calls for further examination in other critical environment. Second, we investigated perceptions of fonts in isolation of the other online contexts. Although useful to some extent, other researchers may want to examine the connection between perceptions towards fonts and the specific context within which the fonts may contribute to a satisfactory outcome. Such connection may be, for example, the congruence between specific fonts and certain types of online stores.

ACKNOWLEDGEMENT

We are thankful for financial support, in part, from “Chulalongkorn University Centenary Academic Development Project” through the Integrated Innovation Academic Center (IIAC).

REFERENCES


APPENDIX

Note that the following part of the study’s questionnaire was displayed using Courier New but the actual survey’s display was in the Kristen font.

3. Courier New


Please see the meaningless text above then kindly click in the space that best describe the perception toward this font.

<table>
<thead>
<tr>
<th>Agree the least</th>
<th>Agree the most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actie</td>
<td></td>
</tr>
<tr>
<td>Warm</td>
<td></td>
</tr>
<tr>
<td>Strong</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Soft</td>
<td></td>
</tr>
<tr>
<td>Slow</td>
<td></td>
</tr>
<tr>
<td>Beautiful</td>
<td></td>
</tr>
<tr>
<td>Quiet</td>
<td></td>
</tr>
<tr>
<td>Sad</td>
<td></td>
</tr>
<tr>
<td>Delicate</td>
<td></td>
</tr>
<tr>
<td>Exciting</td>
<td></td>
</tr>
</tbody>
</table>
USABILITY EVALUATION AND CORRESPONDENCE ANALYSIS OF SMARTPHONE OPERATING SYSTEMS

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Chao Chang Chiu, Yuan Ze University, Taiwan, 101chiu@gmail.com
Wen Lin Hsu, Yuan Ze University, Taiwan, wenlin1120@gmail.com

ABSTRACT

User-centered smartphone interface design is important so that consumers can easily learn about and begin to use newly purchased smartphones. This study first evaluates the effectiveness, efficiency, and user satisfaction of smartphone interfaces in Taiwan in terms of two representational operating systems: Android and iPhone OS. The usability evaluation includes observational experiments, user questionnaires, and the Wilcoxon sign-rank test. This study then conducts the correspondence analysis to summarize positive/ negative evaluations of usage and specification for smartphone OS. In observational experiments, a total of 48 participants with no previous smartphone experience on using smartphone with Android and iPhone OS are asked to perform five common phone tasks. All experiments are recorded and observed. Results and observations are discussed to attain a closer match between user needs and the performance of smartphone OS.

Keywords: Usability Evaluation, Correspondence Analysis, Smartphone, User Satisfaction

INTRODUCTION

Mobile phones are a ubiquitous part of everyday life in much of the developed world. The International Data Corporation (IDC) [2] says that “the growth of the worldwide converged mobile device market (commonly referred to as smartphones) more than doubled that of the overall mobile phone market” in the first quarter of 2010. According to the International Telecommunication Union (ITU), the number of cell phone subscriptions around the world will reach 5 billion in 2010 [3]. As consumers become more familiar with and comfortable using smartphones, the smartphone market continues to grow, and market competition continues to intensify.

Mobile phones have been and continue to be transformed into multiplex multimedia instruments. The functionality of smartphones has gradually approached that of handheld computers [11]. In addition to the basic calling and short message functions, smartphones also offer Internet access, personal information management, digital cameras, games, and multimedia [5]. As such, while mobile phones are now regarded as common consumer devices [8], smartphone users, especially inexperienced ones, often face difficulties with common smartphone functions pertaining to setting up, configuring and accessing data services [10]. Yamashita et al. [13] explored potential usability gaps confronted by consumers who switched from a familiar to an unfamiliar mobile phone interface. The results show that users with previous mobile phone experience often encounter problems when learning a new interface due to differences or complexities associated with the new system, including non-intuitive features. As such, the design of the smartphone user interface is vital—consumers must be able to easily understand, set up and use their new products.

According to ISO9241-11 [4], usability is defined as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” A usability evaluation is based on measures of users performing tasks with the products [6]. The current study evaluates the effectiveness, efficiency, and user satisfaction of smartphone interfaces on two representational operation systems: Android and iPhone OS. This study identified six groups of users based on gender, age, and information technology background—in total, 48 subjects who have never used smartphones are asked to solve specific smartphone tasks. After basic instructions were given, participants were asked to perform specific tasks; all experiments were recorded and observed. Once the tasks were completed, participants were asked to fill out a questionnaire regarding their satisfaction with the interface functions. Statistical results are reported and compared. This study then conducts the correspondence analysis to summarize positive/negative evaluations of usage and specification for smartphone OS. The correspondence analysis displays the evaluations in two-dimensional graphical form. Results and observations are discussed to attain a closer match between user needs and the performance of smartphone OS.

RELATED WORK

Many researchers have investigated cell phone menu designs. Lee et al. [9] clearly represented navigation paths on the Navigation Path Diagram, and discovered that supportiveness was negatively affected by difficult to understand text labels, icons, or menus. Surprisingly, Ziefle and Bay [14] mentioned that adding graphics to the display can improve problematic traditional menus in terms of meeting consumer demands. Today, most smartphones use legible icons rather than descriptions, which solves many of these types of problems.

Research on the usability of mobile devices exists; however, various mobile device features make it difficult to examine usability, such as mobile context, connectivity, small screen space, and restrictive data entry methods [12]. Therefore, many
researchers focus on simulation prototypes instead of actual mobile phones. Ziefle et al. [15] chose to investigate a software prototype of a palm-computing platform; participants worked with a mouse, which most of them were highly familiar with. The results were considered underestimated—using mobile phones in a real environment requires that users simultaneously manage complex demands including holding the phone, locating specific functions, and inputting data. This type of problem was also associated with the usability study by Huang et al. [1]; participants were asked to perform tasks on a paper prototype in the study, but admitted that they would likely perform poorly on real devices.

Keijzers et al. [7] conducted a usability benchmark study on three types of smartphones. All participants had to be familiar with computers and cell phones to negate differences in personal characteristics that could contribute to differences in usability. Measurement items included: the percentage of tasks solved as effectiveness; task completion time, the number of hierarchical levels in the menu used, and the number of detour steps as efficiency; and the questionnaire as satisfaction. The results showed significant differences in usability for the selected functions. However, all designed tasks were basic based on smartphone functions currently available. Therefore, our experiment focuses on available smartphone models and takes both newly evolving mobile technologies and basic functions into consideration in an attempt to shed light on the usability of smartphones. In this study, we measure and analyze participants’ navigational behaviors on two different phone interfaces: Android and iPhone OS. The results may assist mobile phone designers to create more intuitive, universal, and easy-to-use interfaces that can attract diverse users in terms of gender, age, and computer-related experience.

**EXPERIMENT**

**Participants**

To include users with various characteristics and backgrounds, this study identified eight groups of users based on gender, age, and the presence or lack of an information technology background—defined as having studied or worked in information technology related fields. Six people were invited to each group, for a total of 48 participants. In addition, to ensure that the experience would not influence the usability evaluation, only people who had never used a smartphone with Android and iPhone OS were invited to participate. Table 1 shows the characteristics of the grouped participants. To separate the participants into two groups based on age, this study defined that participants over 35 years old were classified as middle-aged, while those under 25 years old were classified as young adults.

<table>
<thead>
<tr>
<th>Middle age (&gt;35)</th>
<th>IT background</th>
<th>Non IT background</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>Group 1</td>
<td>Group 5</td>
</tr>
<tr>
<td>female</td>
<td>Group 2</td>
<td>Group 6</td>
</tr>
<tr>
<td>Young (&lt;25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>Group 3</td>
<td>Group 7</td>
</tr>
<tr>
<td>female</td>
<td>Group 4</td>
<td>Group 8</td>
</tr>
</tbody>
</table>

**Test Materials**

In this study, two popular smartphones were used: iPhone 3G for the Apple iOS (Phone-I) and HTC magic for the Android OS (Phone-II). Fig. 1 shows the Physical appearance for the two smartphones. Both employ an application grid main menu presentation, and both were configured for use with the same mobile network provider (Far EasTone) in Taiwan. In order to ensure fairness, all smartphones were reset to the initial factory settings. Moreover, once subjects completed the tests, all data was erased and units were reset to an identical start screen for the next participant.

**Experimental Tasks**

As smartphones have a very diverse range of functions, this study selected several typical tasks for the experiment:

Task 1. Call a number stored in the contacts list.
Task 2. Send a new e-mail message.
Task 3. Enter an appointment in the calendar.
Task 4. Search for the string “yzu” in Google, and link to the Yuan Ze University website.
Task 5. Download software from either the Apple Store or the Android Market.

**Procedure**
At the beginning of the experiment, participants were given a five-minute basic instruction on button functions, how to type, and the location of common applications on the desktop. Participants randomly began tasks on either smartphone; they were asked to perform the tasks in the predefined order and then fill-in the questionnaire after completing all tasks on both types of phone. The experiments were timed (a limit was set of 10 minutes for each task), recorded using video cameras, and observed. Participants were informed that they could withdraw from the study at any time if they felt frustrated or otherwise wished to stop.

**Measures**
Usability measures included effectiveness, efficiency, and user satisfaction regarding interface operations after actual use of various smartphone functions:
1. The percentage of tasks solved (effectiveness)
2. Task completion time (efficiency)
3. Number of detour steps required (efficiency)
4. Questionnaire survey (satisfaction).

In the questionnaire, participants were asked to rate their perceptions of each task on a scale of 1-5 regarding the five satisfaction items: a. ease-of-use, b. icon clarity, c. meet user needs, d. attractiveness, and e. overall satisfaction with the interface design.

**EXPERIMENT RESULTS**

**Effectiveness**
Table 2 shows the effectiveness results. Phone-I users showed relatively higher effectiveness in Task 3. Phone-II users showed relatively higher effectiveness in Task 1. For Task 1, after selecting an individual to call from the contact list, Phone-I units clearly indicated the dialing status with the “calling mobile phone” icon, while Phone-I units did not; as such, Phone-I users may not have known what icon to press to make the call. (In reality, they only needed to press on the number to make the call.) For Task 3, the Phone-I users were relatively more effective—no Phone-I user failed to complete the task. However, we found that many Phone-II users did not know how to save the new event in the calendar, or did not know they needed to find the save button; therefore, the success rate for the Phone-II in this task was the lowest in terms of all five tasks.

**Efficiency**
Table 3 shows the efficiency results. For Task 2 and Task 3, the time span required to complete the tasks was extraordinarily long as compared to other tasks. One reason may be connected to the long character strings participants needed to enter. For Task 2, participants were asked to type specific eight characters in the subject field, and specific two characters in the addressee field with no content in the message field before sending the mail. As required by Task 2, Task 3 asked participants to type specific characters in the subject line and set the time of the new event. Thus, the keyboard design significantly affected the time required to complete the task.

The Phone-I users had relatively lower efficiency for Task 5. We observed many participants could not determine how to begin the download when using the Phone-I; some were misled by the update icon and did not know how to return to the menu. The Wilcoxon Sign-Rank Test was used to compare the two smartphones in terms of efficiency. The Wilcoxon Sign-Rank Test showed significant differences for efficiency on Task 1 (Phone-II better than Phone-I, Z=-4.724, p<0.0001) and Task 5 (Phone-II better than Phone-I, Z=-4.313, p<0.0001). One possible explanation for this result is that Phone-II units often include words to clarify the function, so that participants were able to clearly proceed through each step.

**Satisfaction**
Table 4 shows the satisfaction results. The questionnaire results show that participants felt pleased when using both smartphones (all scores > 3 for all tasks). In detail, the Phone-II scored slightly higher than the Phone-I in terms of ease-of-use and icon clarity (Tasks 1, 2 and 3), perhaps because the interface design of the Phone-I is intuition-based, users need some time learn and get used to intuition-based operations or icons. However, in terms of meeting users’ needs (Tasks 1, 2, 4 and 5), attractiveness (all tasks), as well as preferences for the overall interface design (Tasks 1, 2, 4 and 5), the Phone-I scored slightly higher.

| Table 2. Effectiveness Results |
|---|---|---|---|---|---|
| | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 |
| | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II |
| Success Rate [%] | 91.67 | 100 | 93.75 | 95.83 | 100 | 89.58 | 97.92 | 100 | 95.83 | 100 |

| Table 3. Efficiency Results |
|---|---|---|---|---|---|
| | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 |
| | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II | Phone-I | Phone-II |
| Time [seconds] | 58.11 | 33.67 | 121.44 | 139.85 | 131.35 | 131.72 | 64.53 | 56.04 | 88.22 | 48.46 |

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Table 4. Satisfaction Results

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<thead>
<tr>
<th></th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
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<tr>
<td></td>
<td>Phone-I</td>
<td>Phone-II</td>
<td>Phone-I</td>
<td>Phone-II</td>
<td>Phone-I</td>
</tr>
<tr>
<td>Ease of use</td>
<td>3.67</td>
<td>3.92</td>
<td>3.92</td>
<td>3.4</td>
<td>3.5</td>
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<td>Icon-clarity</td>
<td>3.81</td>
<td>3.88</td>
<td>3.99</td>
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<tr>
<td>Meets needs</td>
<td>3.77</td>
<td>3.75</td>
<td>3.71</td>
<td>3.56</td>
<td>3.13</td>
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<tr>
<td>Attractiveness</td>
<td>3.85</td>
<td>3.48</td>
<td>3.88</td>
<td>3.5</td>
<td>3.63</td>
</tr>
<tr>
<td>Interface</td>
<td>3.71</td>
<td>3.52</td>
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<td>3.38</td>
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<tr>
<td>Average</td>
<td>3.76</td>
<td>3.71</td>
<td>3.82</td>
<td>3.69</td>
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CORRESPONDENCE ANALYSIS

This study then conducts the correspondence analysis to summarize positive/negative evaluations of usage and specification for smartphone OS. This study mainly compared the Apple iOS and the Android OS. In addition, this study also included the third smartphone OS, Symbian, for comparison purpose. This study collected Taiwan online user reviews regarding iOS, Android, and Symbian. There are 1718 reviews for both for iOS and Android. However, there are only 217 reviews for Symbian, because it is not as popular as iOS and Android in Taiwan.

The categorical data for usage evaluations include jailbreak, web access, games, applications, and performance. Fig. 2 shows the positive/negative evaluations of usage for smartphone OS. For Android, there are positive evaluations in jailbreak and performance. For iOS, there are positive evaluations in games and negative evaluations in applications. For Symbian, there are negative evaluations in games and web access.

The categorical data for specification evaluations include appearance, photograph, price, OS, specification, and battery endurance. Fig. 3 shows the positive/negative evaluations of specification for smartphone OS. For Android, there are positive evaluations in OS and specification. For iOS, there are positive evaluations in appearance. For Symbian, there are positive evaluations in photograph.
CONCLUSIONS

This study evaluates investigates the effectiveness, efficiency, and user satisfaction of two smartphone representational operation system interfaces, Android and Phone OS, across five task contexts. Observations based on the experiment results are listed below in the order that the tasks were successfully performed.

First, Phone-II employs clear textual descriptions to indicate the dialing icon in Task 1, while the Phone-I does not. Although the Phone-I may have an aesthetically pleasing interface design, it is more difficult for users to intuitively select the correct dialing icon, and some participants quit this task for this reason.

Second, all users required significant periods of time to complete Task 2 and 3. The two tasks were very similar, and were the only tasks that required users to enter character strings. It concerns the ratio of a smartphone's virtual or physical keyboard with text entry speed. Text input is an old problem for mobile devices because of the space constraint. This study suggested that a convenient keypad design is required with larger touch-keypad for users to input character strings easier.

Third, the save icon of Phone-II is at the bottom of the rolling screen in Task 3 — some users forgot to save or thought they had already saved before returning to the home screen. Therefore, they failed to complete the task.

Fourth, this study observed that the download button on the Phone-I is difficult to locate in Task 5, and when users attempted to select the toolbar on the bottom of the screen to update or chose another page, they often could not return to the previous page; in turn, some quit the task.

Finally, the positive evaluation results of correspondence analysis are summarized as the following. For Android, there are positive evaluations in OS, jailbreak and performance. For iOS, there are positive evaluations in appearance and games. In addition, there are positive evaluations in photograph for Symbian.

In terms of limitations, the small sample size of participants makes generalizations difficult. Also, there are many smartphone vendors, and new models are frequently released. Thus, the results and observations in this study may not apply far into the future. Further research with expanded participant sets is needed to ensure that the results are truly representational.
ACKNOWLEDGEMENTS

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REFERENCES

THE VALUE OF CONFLICT IN SOFTWARE PROJECT TEAM: A SOCIAL NETWORK PERSPECTIVE

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ABSTRACT
Conflict management is critical to project human resource and communication management. Conflict is inevitable in project and teamwork. Properly managed, a certain amount of conflicts is beneficial. However, the relationships between conflict management and team performance are inconsistent in previous studies. This study investigates the how project members' interpersonal relationships among internal members and external actors are related to the conflict solution satisfaction, and examines the effectiveness social interaction and satisfaction on the relationship between conflict management style and team performance. This study strives to make two contributions. First, this study adds to the sparse empirical evidence on the impact of social interaction ties on conflict management. Second, recent work on social interaction in organization has emphasized how social ties provide information and resource to a focal individual. We attempt to extend this concept at team level. In examining the relationship between social interaction ties and conflict solution satisfaction, and further affect the relationship among conflict management and team performance, this study provides a rationale for project managers to develop their conflict management skills.

Keywords: Software project management, Conflict management, social network, team performance.

INTRODUCTION
Most of previous studies about project conflict management investigate the relationship between conflict and team performance. Similarly, the researches of interaction ties in organization are focus on how interaction affects performance. To our knowledge, no existing empirical research addresses the question of how interaction shapes the behavior of conflicts and the effectiveness of varied interaction ties on conflict resolution. The increasing specialization and outsourcing are reasons to have a project team including members not only in organization but throughout inter-organization (such as customers and suppliers). Consequently, conflicts are increasing as a result of different goal of organization. In this case, to resolve conflicts by organization powers are limited. In addition ICT can help to improve the communication among project members and as such help to create social ties under virtualization and informal interaction, such as Facebook, Line. Consequently, how the social ties affect the conflict management is critical to practitioners and academia. Thus, the purposes of this study are to 1). Investigate different types of social ties existing within project team, and further enhance the effectiveness of informal communication on conflict management. 2). Define the satisfaction for conflict resolution and explore the strategy of conflict management. Furthermore, investigate the relationship among social ties, style of conflict management, and satisfaction for conflict resolution.

LITERATURE REVIEWS
Conflict Management in Software Development Environment
Conflict refers to any situation in which organization members have incompatible goals, interests, principles or feelings about team works. The potential conflict may emerge as a result of members coming from different social backgrounds and a diverse work experience and cognition within authority and hierarchical setting. Conflict management is a process which uses a properly management skills and rules of the organization to avoid, processing or accommodating conflict and, in turn, improves group outcomes, including effectiveness or performance in organizational setting[1-4]. Conflict management is one of nine knowledge areas of a project, and is one of the key skills that a project manager should have. 20%-30% of department leaders’ time spent in dealing with conflict and its consequence in general organization. However, a lot of conflicts exist due to the limitation of time, budget, resource with respect to a project as well as incompatible goals among project stakeholders, and project managers need more time and effort to resolve interpersonal conflicts. Conflict can be understood as a complex interaction between many factors, such as negative emotion and lack of communication. The members of software project usually suffer more psychological stress arises from risk and uncertainty of interdisciplinary technology integration or new technology. They also have a stronger need for growth and confident than the general population[5]. Therefore, authority or rule of management is not at all effective at dealing with conflict when both sides are “opinionated experts”. These conflicts frequently result in negative outcomes[6]. However, some studies recognized the importance of proper conflict management skills that lead to developing creative and effective project outcomes[7, 8]. Liu et al. (2008) pointed out that a collaboration conflict management style is positively associated with virtual team satisfaction. Schwalbe(2010) considered that managers not only to resolve conflicts, but sometimes to create conflicts those help in project enhancement and improvement. Schwalbe(2010) mentioned conflict might contribute to new ideas and creativity and avoid groupthink.
Previous researches about project management suggest five conflict management strategies: Accommodating, Avoiding, Collaborating, Compromising, and Competing[8, 9]. However, these strategies are just given as general recommendations and are not guaranteed to work for every project. It is worthy to go deep into conflict issues in term of project under instable conditions of software development with widening application areas. Study in software project settings have found that 'Problem-solving' style is positively correlated with 'Satisfactory Conflict Resolution' while 'Asserting' and 'Avoiding' styles are negatively whether conflict among IT staffs or IT users[6]. They also mentioned that 'Satisfactory Conflict Resolution' of IT staffs will affect IS quality while 'Satisfactory Conflict Resolution' of IT users will affect usage of IS. Chen&Tjosvold(2002)investigates how conflict management can contribute to team effectiveness by developing justice in term of three approach: cooperative, avoiding, and competitive[10]. Their research stated that "a cooperative approach to conflict leads to distributive, procedural, and interactive forms of justice which in turn promote team effectiveness." while avoiding approach and competitive approach were not as consistently related to justice as cooperative conflict. Chen&Tjosvold(2002)emphasized the indirect influence of a cooperative approach to conflict on team effectiveness through justice. Moreover, the study of Liu et al.(2008) argued that collaboration style of conflict management affect the team satisfaction instead of team performance.

Despite these studies use various terms to refer to styles or approaches of conflict management, connotation of these terms are similar. Problem-solving[6], cooperation conflict management[10], and collaboration style of conflict management[7] are refer to the coping strategy that manager actively seeks to interpersonal conflict management, or achieves the largest common denominator between both sides of conflict. However, the results of above studies regarding the relationship between conflict management strategy and team performance are inconsistent. Consequently, this study attempted to explore whether there are other variables that should have been included to explain the effectiveness of conflict management approach. In this respect, Liu et al.(2008) pointed out a significant relationship between interaction or organization structure and team performance. They found team members who work in a non-hierarchical situation are more likely engage in exchange of knowledge and create new idea or solution for team work. Besides, Tjosvold et al. (2005) demonstrated that teams with stronger team relations and better human relationships are better at managing conflict cooperatively[11]. Human relationships include such as friend-to-friend, parent-to-child, sibling-to-sibling, employer-to-employee, and many more. Social network researches regarding the influence of social interaction on team behavior in common workplace or group have been investigated for many years [12-16]. For example, Oh et al. (2004) found team benefits associated with informal relationships. Mehra et al.(2006) considered that friendship in the workplace allows employees to achieve greater work performance, and formal and informal leaders to coordinate and act efficiently in a group. In addition, Zhou et al.(2009)showed the size of the weak tie network increases creativity. Grosser et al.(2010) argued that the practice of gossip (informal communication) may be recognized as an effective means of workplace communication and could benefit to conflict resolution. Project is a temporary organization with a defined start and end date. Although but the concept of combining social network and conflict management in project organization is still lacking, the above studies form the basis for this study.

Social Network and Social Interaction Ties
A social network is comprised of a set of actors, which can include individuals, work groups, projects, events, objects or products [17]. Social interaction indicates a connection between two or more people or objects, including tangible things such as money, services and products or intangible things such as information, influence or social support[17-19] Some studies have defined social interaction as “ties” [20] or “interaction ties”. Regardless of the terminology used, all of these studies focus on capturing social network patterns which correspond to the meaning of social capital that can facilitate resource or information exchange [21, 22] and bring further value or benefits to social actors. Moreover, several researches noted that the strength of tie is key property of information exchange and emotional support among group members. Strong ties create transitivity. Two nodes linked by a strong tie will have mutual acquaintances and have similar or identical perspectives and access to the same information. On the contrary, weak ties are conduits across which an actor can access novel information. However, in-depth interviews and observation are required for determining whether a link in a social network is a strong tie or a weak tie. Thus, based on the study of Luo (2010), this study suggest three types of social interaction, including Emotion, Information, and Consultation Social Ties, which could influence group activity[33]. This classification be applied in practice in term of formal organization and project team.

RESEARCH MODEL AND METHOD
**Research Model**
This study aimed to investigate the effect of varied social interaction on conflict resolution. Drawing on the researches of Luo (2010) and Chiu et al. (2006), this study proposed a research model (showed in Figure 1) of satisfaction for conflict resolution with three types of social interaction. Table 1 list the questionnaire items used to measure each construct, together with construct definition.

| Table 1 Summary of the Survey Items used in this Study’s Analysis |
|---|---|---|
| **Definition** | **Items** |
| **Emotion Social Ties** | Formalizing based on stable social relationship, such as family and friendship, and may provide ways to relieve work pressure or express emotion. |
| Emotion Social Ties | I really care about keeping good interaction with my family members. |
| | I have close friend who could share my feelings, my happiness and sadness. |
| | I usually talk about unpleasant work experience with my family members or friend. |
| | I spend a lot of time interacting with my family members or friend. |
| **Information Social Ties** | A conduit for information exchange, including work-related message, notify or gossip. |
| Information Social Ties | I really care about keeping good interaction with my classmates. |
| | My classmates frequently share project information for me. |
| | I usually go lunch and have a chat with my classmates. |
| | My classmates frequently share gossip news for me. |
| **Consultation Social Ties** | A formal communication channel transmits information or knowledge about project and information technology. |
| Consultation Social Ties | I really care about keeping good interaction with IT expert. |
| | I have good friend who could share IT Knowledge. |
| | I frequently share my knowledge with classmates. |
| | I spend a lot of time interacting with IT expert. |
| **Satisfaction for conflict resolution** | The attitude of project members regarding how a clear and consistent opinion is developed with stakeholders in the process of conflict management. |
| Satisfaction for conflict resolution | The resolution of conflict and reducing of discrepancies about project always effectively achieved. |
| | I am satisfied with the trading and interactions I have experienced with actors in the auction website. |
| | I usually despair about the result of conflict resolution. (Reverse item) |
The sample data for the study was taken from students who are major information technology and having a graduation project in Taiwan. The graduation project is similar a small software project that students have to integrate their IT capacity and teamwork with collaboration to complete an IT system. Respondents were directed to complete a Questionnaire.

**DISCUSSION AND CONCLUSION**

The theoretical model and hypothesized relationships were tested collectively using AMOS 5.0. Goodness of fit was tested using six common model-fit measures: chi-square/degrees of freedom, goodness-of-fit index (GFI)[34], adjusted goodness-of-fit index, normed fit index (NFI)[35], root mean square error of approximation (RMSEA) [36] and comparative fit index (CFI)[37]. Taken together, the results of the model fit analysis suggest that the structural model acceptably fit the data (see Figure 1).

The results of this study show that the effect of three dimensions of social tie on satisfaction is different. Information and consultation social ties are significant predictors of satisfaction, while emotion social ties are insignificant. Moreover, the path coefficient between information social ties and satisfaction is 0.464 which is stronger than the path from consultation social ties to satisfaction. These results suggest that conflict resolution of software project rely on not only the exchange of technology, but also on informal communication. The relationship between emotional social ties and satisfaction is insignificant. A possible explanation is most of emotion social ties are linking project members to their family or friends instead of project stakeholder, and providing emotion output rather than practical solution for conflict.

To summary, this study suggests that creating technology and knowledge exchange network, as well as informal communication network, are critical to conflict resolution of project. For example, having a dinner party or outdoor activities far from project could be encourage the exchange of information and further enhance the effectiveness of informal communication on conflict resolution.

**REFERENCE**

Chiang


A MOBILE MUSEUM NAVIGATION SYSTEM DESIGNED FOR VISITORS’ USABILITY

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ABSTRACT

With the popularization of smartphone and the increasing use of mobile applications, the mobile navigation system has been widely used in museum. User satisfaction is correlated to information system usage and success. Thus it is essential that the mobile navigation system can meet the visitors’ need and create a good user experience. According to previous studies, we classify the design factors affecting visitors’ usability in museum mobile navigation system into seven main factors: connectivity, interface design, content design, user experience, marketing and promotion, exhibition space and cultural aspects. In this paper, a mobile guide system of the National Palace Museum which is designed and built on the basis of these seven factors is presented. Visitors can use the navigation system on their smartphones to read the timely information of the artifacts and the exhibitions ubiquitously, plan the desired tour routes, and share the unique experience via social media.

Keywords: Mobile Navigation System, Museum, Design Factor, User Satisfaction, Mobile Application

INTRODUCTION

The significant information need on museum Web sites includes information about recent exhibits, to search a museum collection, to find information on special events in the museum, to find direction, to find appropriate image, and to find information on research [1]. User satisfaction is correlated to information system usage and success [2]. Thus it is essential that the mobile navigation system can meet the visitors’ need and create a good user experience. The key factors for promoting visitors’ use of personal digital guide assistant in museum, includes connectivity, interface design, content design, marketing and promotion, user experience, exhibition space, and cultural aspects [3] [4]. Based on these design factors, we build a mobile navigation system.

For instances, the interface comprises graphical elements and maps; the content has the timely information of the exhibitions and the promotional activities; the system allows visitors to create their own customized souvenir photos and share it via social media to achieve marketing objectives of the museum; and as for the dimension of exhibition space, the route planning function allows visitors to plan personalized route according to the crowd in the exhibitions, and their favorite exhibitions and artifacts.

DEVELOPMENT

We build a mobile navigation application on android platform to implement the seven design factors in museum mobile navigation system. The system structure is depicted in Fig. 1.
CONCLUSION

In this paper, a mobile navigation system of the National Palace Museum which is designed and built on the basis of the above-mentioned design factors affecting visitors’ usability is presented. Combining with the convenience and the prevalence of mobile devices, our work makes the museum navigation system becomes ubiquitous, intuitive, interactive, and personalized. For the visitors, they can use the navigation system on their smartphones to read ubiquitously timely information about the artifacts and the exhibitions, plan the personalized tour routes, and share the unique experience via social media. For the museum, this system can serve as a promotion channel as well as a solution in escaping from the crowd.

REFERENCE

APP REVIEW ANALYTICS OF FREE GAMES LISTED ON GOOGLE PLAY

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ABSTRACT

Smartphones have become popular in recent years; in turn, the number of application developers and publishers has grown rapidly. To understand users’ app preferences, many platforms such as Google Play provide different mechanisms that allow users to rank apps. However, more detailed insights on user’s feelings, experiences, critiques, suggestions, or preferences are missing due to a lack of additional written comments. This research attempts to investigate the review analytics of Android games listed on Google Play using a proposed text analytic approach to extract all user reviews from game apps in Chinese. A total of 207,048 reviews of 4,268 free games from February to March 2013 are extracted and analyzed according to various metrics including game type and game attribute. The findings indicate there is high dependency between users’ gender and game type, males and females have differing opinions on game attributes. In particular, users of different game types prefer different game attributes. The results reveal product usage insights, as well as best practices for developers.

Keywords: Android smartphone, text analytic approach, game apps, Google Play.

INTRODUCTION

In addition to serving as communication devices, smartphones also act as a venue for entertainment or commerce. The smartphone application (app) market has become one of the most important consumer electronic resources. This market emerged rapidly and is highly competitive, due to the lower costs associated with developing apps as compared to developing traditional software. Google Play provides different types of information including the app descriptions, screenshots, user reviews, and star ratings information to help users select apps. Prior researches about user generated contents (UGC) in the web have shown that they are useful as a marketing tool and effective in increasing competitive advantage. To understand users’ app preferences, many platforms such as Google Play provide different mechanism that users can use to review downloaded apps. The most commonly mechanism is a ranking scale from 1 to 5. However, more detailed insights on user’s feelings, experiences, critiques, suggestions, or preferences are missing due to a lack of additional written comments.

According to the report from app store analytics firm Distimo, “the uptake in the types of quick downloads are most common with games, which are the most downloaded and revenue generating types of apps” [1]. Game reviews, especially those written by fans and nonprofessionals, are a relevant source of information that can help us understand how players describe games, gameplay, and so on [2]. It undoubtedly can influence potential users’ decision to purchase or download the game.

This research investigates Chinese app review analytics associated with Android smartphone games listed on Google Play using an opinion mining approach. Google Play provides different types of information including app descriptions, screenshots, user reviews, and star ratings to help users select apps. Opinion mining helps to identify the subjectivity, sentiment, appraisal or feeling of user expressed comments in unstructured texts on specific topics, or the overall context of a review, using certain analytic approaches [3]. In this paper, a heuristic n-phrase rule technique is proposed to automatically extract all user reviews crawled from game apps in Google Play. These texts are analyzed according to various metrics including game types (arcade & action, casual, brain & puzzle, cards & casino, sports, and racing) and game attributes (gameplay, aesthetics, musicality, stability, developer). The findings indicate there is high dependency between users’ gender and game type, males and females have differing opinions on game attributes. In particular, users of different game types prefer different game attributes. The findings offer insights into product usage as well as best practices for developers.

BACKGROUND

App Reviews

Reviews add value by providing feedback to both the developer and the user community. App user reviews are important because they communicate information that may influence product-purchasing decisions via polarized sentiment and user expressed opinion. User reviews can warn people about undesirable or privacy-invasive apps [4]. For developers, reviews represent user generated and crowd-sourced content regarding user preferences and app quality; they also facilitate developers in terms of design priorities and marketing strategies. UGC offers the opportunity to learn from successful apps that are similar to the one being designed and developed [14].

Typically, app users provide a numerical rating (often as stars) and a brief text comment. Hu et al. [9] demonstrated that product reviews have a J-shaped distribution with mostly 5-star ratings, some 1-star rating, and hardly any ratings in between. People tend to write reviews only when they are either extremely satisfied or dissatisfied.
Prior researchers have attempted to apply data mining techniques to deal with context dependent opinion words from app reviews. Ha & Wranger [7] examined a majority of reviews focused on the quality of apps available through Google Play and found that people often described an app using an adjective, wrote about its features/functionality, and clarified whether the app worked or not. The star ratings were generally positive and had a J-curve distribution. Huang & Ting [11] suggested that recipients’ ability to search for information, the relationship between the message receiver and communicator, and opinion leader’s viewpoints are the most important factors influencing the word-of-mouth marketing strategies for apps. Raison et al. [16] extracted user opinions posted at Gamespot by applying co-clustering to an adjective-context co-occurrence matrix. From the derived co-clusters, they discovered that game users tend to care about the overall look and feel of the game more than the concrete elements used in the game.

In the current paper, we employ a sentiment analysis approach to extract users’ sentiments associated with polarized ratings of game apps on Google Play.

Opinion Mining
Opinion mining is a useful mechanism to determine the subjectivity, sentiment, appraisal or feeling of an author expressed in texts on specific topics or the overall contextual polarity of a document [3]. The essential issues in opinion mining include identifying how sentiments are expressed and whether the expressions indicate positive or negative opinions toward the subject. Opinion mining effectively reduces the amount of manual effort required to identify, store, and analyze business intelligence. Opinion mining can be classified into two major tasks: information extraction and sentiment classification. Information extraction focuses on the extraction of opinions consisting of information about particular aspects of interest in a structured form from a set of unstructured text data. Sentiment classification aims to explore effective techniques for classifying an opinionated text as expressing a positive or negative opinion that is treated as a text classification problem [13]. Sentiment classification can be performed at three different levels of text granularity: document-, sentence- and feature/attribute-level. Document-level sentiment classification attempts to classify an entire document as either positive or negative according to the overall sentiment expressed in the text. Sentence-level sentiment classification attempts to classify the positive or negative polarity of each sentence. Feature-level sentiment classification is intended to identify opinions expressed about individual features or attributes. While document-level and sentence-level sentiment classification can determine the overall sentiment in a document or sentence, they are unable to indicate positive/negative meanings for specific object attributes; feature-level classification is more appropriate for this task. This study employs feature-level opinion mining to identify the specific product aspects users reviewed positively or negatively. Prior studies have shown that feature-level opinion mining has achieved valuable performance [12, 15]. Feature-level opinion mining consists of two primary subtasks: extracting information on various product attributes and associating each attribute with a corresponding opinion. For example, Hu and Liu [8] extracted nouns and noun phrases as features, such that nearby adjectives were extracted and considered as an opinion words. Turney [17] used two-word phrases that contained adjectives or adverbs in particular part-of-speech patterns from reviews. The opinion is determined by the semantic orientations of a group of words and/or phrases corresponding to the feature in the text.

THE PROPOSED METHODOLOGY

Users commonly seek quality information from online user reviews prior to downloading or purchasing an app, while many developers use online user reviews as an important resource for product development and marketing management. As illustrated in Figure 1, an opinion mining method is proposed to extract attribute-opinion pairs that reveal insights associated with user reviews for free downloadable Android games from Google Play. Content analysis accompanied by correspondence analysis (CA) is also utilized to summarize and visualize users’ reviews according to various metrics including game type and game attributes.
As shown in Figure 2, the app review mining process consists of four main steps: (1) data acquisition, (2) text preprocessing, (3) opinion extraction, and (4) analysis & visualization.

**Data acquisition and text preprocessing**

A web crawler program is developed to crawl UGC about free games across six game types listed on Google Play in Taiwan from February 1 to March 31, 2013; the game types include: arcade & action, casual, brain & puzzle, cards & casino, sports, and racing. This study focuses on free apps—Google Play only received permission to sell apps in Taiwan on February 27, 2013. The number of downloaded paid apps is obviously less than the number of downloaded free apps. The app and user information, including the name of the app and its developer, category, description, user account, gender, rating, comments, device, and post time are retrieved and stored in the initial repository.

Due to differences in contextual understanding between Chinese and English, existing text preprocessing techniques for English cannot be directly applied to Chinese sentiment classification. However, Academic Sinica developed a Chinese knowledge information processing (CKIP, http://ckip.iis.sinica.edu.tw/CKIP/index.htm) system used for word segmentation and part-of-speech tagging that is more applicable for processing Chinese reviews. Chinese terms or phrases often contains more than two part-of-speech tags; as such, full parsing is inappropriate during mining because it is difficult to achieve high accuracy [20]. This study proposes a Chinese noun phrase chunking module to identify commonly used noun phrases. Most noun phrases contain at least one noun. The other word or words may be nouns, verbs or adjectives. This module automates the process of collecting and comparing keyword suggestions from Google to build a noun phrase list. In addition, stop words that contain little or no content information, such as pronouns, prepositions, conjunctions, interjections, digital, and articles, need to be filtered out.

**Opinion extraction**

**Attribute-opinion pairs extraction**

In general, reviews for mobile apps are relatively short. Further, Vasa et al. [18] observed that users tend to leave significantly shorter reviews for games than for other categories. All sentences containing either attribute- or opinion-based information that expresses users’ positive or negative opinions about a game are collected and manually labelled within a training data set. All nouns, noun phrases, verbs, adjectives, and adverbs of degree are then filtered as candidate attributes.
For complex and multi-faceted objects such as game apps, single words are often insufficient to describe different app attributes. In addition, some reviews focus on praising or complaining about the company that developed the app [7]. Further, game reviews vary in terms of the attributes covered. This study focuses on the following five game attributes:

- **Gameplay**: the specific way that players interact with a game such as play, weapons, levels, tasks, ending, challenges.
- **Aesthetics**: the app’s overall look or interface such as style, picture quality, color scheme, resolution, appearance.
- **Musicality**: the quality of the sound effects, sounds, voices, tones, songs, music style.
- **Stability**: the stability of the game such as connection, server, reaction time.
- **Developer**: praise or complaints about the app developer.

The polarity of opinion words is measured based on the sentiment words set by HowNet and the National Taiwan University Sentiment Dictionary (NTUSD). Words not listed on HowNet or NTUSD are manually labeled. A minor complication regarding opinion word labeling is that attributes within a sentence can be stated explicitly or implicitly. For example, ‘stability’ is an implicit attribute corresponding to negative opinions including crashes, hang ups, break downs, blank screens, lag, and bugs that may not appear in the review, but are still implied. All the opinion words are contained in the opinion lexicon. Further, negation operators such as no, not, and never that reverse sentence meanings are adopted.

Each matched degree word has a predefined strength value that is used to compute the strength sentiment of phrase. The following is a list of Chinese degree words defined on HowNet: (1) 不 (insufficiently); (2) 般 (-ish); (3) 多 (more); (4) 很 (very); (5) 最 (most); (6) 超 (over) [10]. The list contains 228 degree words, and each matched degree word has a predefined strength value used to compute the strength sentiment of the word.

**Heuristic n-phrase rule**

We assume that an attribute-opinion pair contains an attribute and an opinion word that tend to be found close to each other. In addition, Chinese reviews commonly place the subject before the opinion word rather than after it. A heuristic n-phrase rule is proposed to identify the opinion polarity of an attribute in review sentences. An n-phrase is a contiguous slice of n words or phrases of a longer sentence. An n-phrase of size 2 is referred to as a bi-phrase; size 3 is a tri-phrase; size 4 is a four-phrase, and so on. The steps are as follows:

Step 1: Identify the attribute in a processed sentence—that is, whether it is on the predefined game attribute word list.

Step 2: Check the first phrase after the attribute to see whether it is in the opinion lexicon. If so, these two words “attribute” + “opinion polarity” are put together as an attribute-opinion pair. If the first phrase after the attribute is not in the opinion lexicon, check the first phrase prior to the attribute. If this matches, these two words are put together as an attribute-opinion pair.

Step 3: If the first phrase prior to the attribute is not in the opinion lexicon, check the second phrase after the attribute. If no, check the second phrase prior to the attribute. Continue this procedure until a qualified attribute-opinion pair is located, or until none can be found.

Step 4: If a negation operator precedes the opinion word by one or two words, the opinion polarity is reversed.

Step 5: If a degree word precedes the opinion word by one or two words, the strength sentiment of the phrase is computed based on the predefined level of strength of the degree word.

**Sentiment with Opinion Scoring**

The sentiment is computed based on the matched opinion words, degree words and negations. Let \( G \) denote a set of free Android games and \( R \) denote a set of user reviews of a game. To extract and evaluate the opinion for user reviews, the scoring function is defined as follows:

\[
OS_i = \sum_{j=1}^{n} \left( \omega \times \sum_{k=1}^{m} SO(w_k) \right)
\]

where

- \( OS_i \): opinion score of i-th game in \( G \)
- \( r_j \): j-th user review in \( R \)
- \( n \): the number of user reviews
- \( w_k \): k-th opinion word
- \( m \): the number of identified opinion words in the review
- \( SO(w_k) \): the polarity (+1 or -1) of an opinion word
- \( \omega \): the degree weights assigned to six category of degree words: (1) insufficiently: 0.83; (2) -ish: 1.67; (3) more: 2.50; (4) very: 3.33; (5) most: 4.17; (6) over: 5.00.

**Visualization**

User reviews of a game can be subdivided into specific attributes that can be graphically illustrated on coordinate axes known as a perceptual map. CA is a technique for representing categorical data on a low-dimensional map. It is one of the most commonly used visualization techniques to produce perceptual maps and has been successfully applied in different fields. CA can be used to identify a brand’s competitive strengths, as well as ideas to improve a brand’s competitive position [19]. In this study, CA is employed on a two-dimensional perceptual map to visually display the relationships between the game and the users’ opinions with respect to different attributes, where the distances on the map represent correspondence. Basically, CA takes the frequency of co-occurring features and converts them to distances, which are then plotted, revealing how things are related in terms of how close to or far from each other they are in a two- or three-dimensional visualization. CA
allows for a clear and graphic presentation of interdependence among a set of categorical variables. For visualization purposes and ease of interpretability, a large percentage of total variance is accounted for by CA’s first two principal axes. The distance on the map represents the closeness: a closer proximity means greater perceived similarity [5, 6].

THE EXPERIMENTS

Data Description
This study mined and analyzed 207,048 reviews of 4,268 game apps from 2,181 developer free games across the six game types (arcade & action, casual, brain & puzzle, cards & casino, sports, and racing) listed on Google Play from February 1 to March 31, 2013. Further, since Google Plus is integrated with Google Play, any reviews written by Google Plus members appear on their individual profile, which includes their name and gender, as well as other information. Through the integration to Google Plus, the users’ individual profiles are contained.

Table 1 shows the descriptive statistics of the data, which includes the numbers of reviews made by men (59.5%), women (32.3%), and those with no specified gender (8.2%). In addition, more than 75% of the reviews focused on either arcade & action or casual games. More specifically, males reviewed more arcade & action, sports, and racing games, while women reviewed more brain & puzzle and casual games, suggesting significantly different game type preferences between genders. Furthermore, the reviews were overwhelmingly positive: the number of positive reviews exceeded the negative ones by a factor of 2.8, particularly for the arcade & action and sports games.

Table 1. Descriptive Statistics of the Data

<table>
<thead>
<tr>
<th>Game Type</th>
<th>No. of Apps</th>
<th>No. of Developers</th>
<th>No. of Reviews</th>
<th>Gender</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Arcade &amp; Action</td>
<td>1,159</td>
<td>519</td>
<td>78,501</td>
<td>55,616</td>
<td>16,853</td>
</tr>
<tr>
<td>Casual</td>
<td>1,235</td>
<td>557</td>
<td>77,578</td>
<td>37,986</td>
<td>32,444</td>
</tr>
<tr>
<td>Brain &amp; Puzzle</td>
<td>852</td>
<td>472</td>
<td>28,432</td>
<td>13,472</td>
<td>12,715</td>
</tr>
<tr>
<td>Cards &amp; Casino</td>
<td>428</td>
<td>224</td>
<td>9,891</td>
<td>5,979</td>
<td>3,339</td>
</tr>
<tr>
<td>Sports</td>
<td>268</td>
<td>177</td>
<td>8,190</td>
<td>6,711</td>
<td>938</td>
</tr>
<tr>
<td>Racing</td>
<td>326</td>
<td>232</td>
<td>4,456</td>
<td>3,472</td>
<td>610</td>
</tr>
<tr>
<td>Total</td>
<td>4,268</td>
<td>2,181</td>
<td>207,048</td>
<td>123,236</td>
<td>66,899</td>
</tr>
</tbody>
</table>

* M/W: men/women ratio; P/N: positive/negative ratio.

J-Shaped Distribution of Users’ Reviews
As shown in Figure 3, the distribution of users’ reviews exhibited a J-shaped distribution with mostly 5-star ratings across all samples, followed by 1-star ratings. 80.0%, 81.7%, 81.5%, 83.7%, and 77.6% of the ratings, developers, reviews, reviews from male, and reviews from female are greater or equal to four stars that confirming review ratings of free Android game apps are overwhelmingly positive. However, the J-shaped distribution for female reviews was flatter than that for males. This suggests that males tend to write reviews when they are either extremely satisfied or extremely unsatisfied accompanied with the extremely star rating. In contrast, females are more prudent in terms of star ratings than are males. In addition, the polarized developer ratings (77.0% 5-star; 14.1% 1-star) demonstrate that users tended to express their sentiments using extreme ratings.
Figure 3. Distribution of Star Rating Reviews by Game, Developer, and Gender

Figure 4 presents the distribution of sentiments calculated using the opinion scoring technique across the ratings. A strong correlation of star ratings with positive reviews can be observed. Based on the distribution of sentiment polarity, 91.3% of the 5-star rating reviews had positive polarity, while 85.6% of the 1-star rating reviews exhibited negative polarity.

Figure 4. Distribution of Sentiments among the Ratings

Sentiment Mining for Game Attributes

Figure 5 shows the distribution of reviews among the game attributes based on gender and opinion polarity. Most reviews (67.5%) focus on gameplay discussion, while 17.6% focus on stability. Only 0.4% discuss musicality. Male positive reviews for game attributes nearly double those from females; however, male negative reviews exceed female negative reviews by 50%.

Figure 6 presents the distribution of sentiments among the game attributes. Based on the distribution of sentiment polarity, most of the reviews associated with gameplay, aesthetics and musicality have positive polarity; however, those associated with stability and the developer have negative polarity. More specifically, 84.7% of female stability reviews by women are negative, while the figure for men is 77.7%; 79.5% of female reviews regarding the developer are negative, as are 73.5% of male reviews.
In this study, a commercial software “XLSTAT” is used to conduct CA to better understand the relationships among the different game types, star ratings, and users’ sentiment polarities on game attributes within a two-dimensional perceptual map. Figure 7 shows the perceptual map for the six game types on the relative proximities of the five attributes with sentiment polarities (P: positive, N: negative) in corresponding space. The horizontal axis (Dimension 1) accounted for 63.80% of the total variance, and the vertical axis (Dimension 2) for 30.66%. As such, the associations between each attribute and user sentiment polarity are well explained by Dimensions 1 and 2 (94.46%). Further, as shown in Figure 7, three groups emerge: (a) arcade & action and sports games are mostly rated positively in terms of gameplay and musicality, (b) cards & casino games are rated positively in terms of stability, and (c) brain & puzzle, casual, and racing games are mostly rated negatively in terms of gameplay, aesthetics, musicality, and stability, but developer ratings show polarized sentiment.
Figure 8 depicts the perceptual map for the star ratings and game attributes. The first two principal components collectively explain 99.85% of the variance, with 98.80% accounted for by the first dimension and 1.05% accounted for by the second dimension. The 5-star ratings are mostly related to positive sentiment in terms of gameplay and musicality; the 3-star ratings are mostly related to negative sentiment in terms of gameplay, musicality, and aesthetics; and the 1- and 2-star ratings are mostly related to negative sentiment in terms of stability and the developer. These findings suggest that the gameplay and musicality of game apps are generally viewed positively by users; however, users are unlikely to tolerate game instability.

**Review Analytics for Popular Games**

Table 1 shows the top 5 games among men, women and all respondents based on sentiments calculated using the opinion scoring technique. These most popular games generally fall into the arcade & action and casual game types; however, the 9 Innings: 2013 pro baseball sport game is the highest rated game overall, which correlates with the fact that baseball is the national sport in Taiwan.

Table. 2 Top 5 Games among All Respondents, Males, and Females
### All

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Name</th>
<th>Game Type</th>
<th>Developer</th>
<th>Opinion Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 Innings: 2013 Pro Baseball</td>
<td>Sports</td>
<td>Com2uS</td>
<td>5,566</td>
</tr>
<tr>
<td>2</td>
<td>Chick Kitchen</td>
<td>Casual</td>
<td>iDT Digital</td>
<td>5,263</td>
</tr>
<tr>
<td>3</td>
<td>Cat War2</td>
<td>Arcade &amp; Action</td>
<td>WestRiver</td>
<td>4,983</td>
</tr>
<tr>
<td>4</td>
<td>Undead Slayer</td>
<td>Arcade &amp; Action</td>
<td>NHN</td>
<td>4,737</td>
</tr>
<tr>
<td>5</td>
<td>Mandora</td>
<td>Arcade &amp; Action</td>
<td>Rayark</td>
<td>4,390</td>
</tr>
</tbody>
</table>

### Males

<table>
<thead>
<tr>
<th>Name</th>
<th>Game Type</th>
<th>Developer</th>
<th>Opinion Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Innings: 2013 Pro Baseball</td>
<td>Sports</td>
<td>Com2uS</td>
<td>4,628</td>
</tr>
<tr>
<td>Undead Slayer</td>
<td>Arcade &amp; Action</td>
<td>NHN</td>
<td>4,150</td>
</tr>
<tr>
<td>Cat War2</td>
<td>Arcade &amp; Action</td>
<td>WestRiver</td>
<td>3,748</td>
</tr>
<tr>
<td>Little Commander – WWII Battle Cats</td>
<td>Casual</td>
<td>Cat Studio HK</td>
<td>3,337</td>
</tr>
</tbody>
</table>

### Females

<table>
<thead>
<tr>
<th>Name</th>
<th>Game Type</th>
<th>Developer</th>
<th>Opinion Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chick Kitchen</td>
<td>Casual</td>
<td>iDT Digital</td>
<td>3,554</td>
</tr>
<tr>
<td>Mandora</td>
<td>Arcade &amp; Action</td>
<td>Rayark</td>
<td>2,395</td>
</tr>
<tr>
<td>LINE Play</td>
<td>Casual</td>
<td>NAVER</td>
<td>1,758</td>
</tr>
<tr>
<td>Hotel Story</td>
<td>Casual</td>
<td>Happy Labs</td>
<td>1,470</td>
</tr>
<tr>
<td>Ovenbreak</td>
<td>Arcade &amp; Action</td>
<td>Com2uS</td>
<td>1,434</td>
</tr>
</tbody>
</table>

Figures 9-11 show the perceptual maps for the top five popular games among all respondents, men, and women, respectively, in terms of the relative proximities of the five attributes with sentiment polarities in the correspondence space. In Figure 9, the horizontal axis (Dimension 1) accounts for 86.67% of the total variance, and the vertical axis (Dimension 2) for only 6.82%; accordingly, user sentiment polarity seems to be explained by Dimensions 1 and 2 (95.49%). Further, Cat War 2, 9 Innings: 2013 Pro Baseball, and Undead Slayer are rated similarly by users: polarized sentiment in terms of gameplay and the developer, negative sentiment in terms of musicality and aesthetics, and positive sentiment in terms of stability. Mandora and Chick Kitchen show positive sentiment in terms of musicality and aesthetics, but negative sentiment in terms of stability.

In Figure 10, the first two principal components collectively explain 81.23% of the variance, with 51.39% accounted for by the first dimension, and 29.84% by the second dimension. 9 Innings: 2013 Pro Baseball, Undead Slayer, and Little Commander – WWII Battle are mostly rated positively in terms of gameplay and stability, negatively in terms of the developer, and show polarized results in terms of aesthetics and musicality.

Figure 11 shows that the first two principal components explain 93.14% of the variance, with 48.62% accounted for by the first dimension and 44.52% by the second dimension. The five games are located in four separate quadrants: Ovenbreak and Mandora show polarized sentiment in terms of gameplay and musicality; LINE Play is rated negatively in terms of gameplay but shows polarized sentiment in terms of stability and the developer; Chick Kitchen is rated positively in terms of aesthetics; but Hotel Story is rated negatively on aesthetics.
DISCUSSION

Game apps are facing intense competition due to a fast growing, emerging market, and developers need to be cognizant of how users perceive their products. The interpersonal influence arising from opinion exchange is an important factor influencing users’ selection decisions. Users seek quality information from online user reviews prior to purchasing a product. Developers need to put more focus on user perceptions of their games, including what their users want and expect from an app. It is essential that developers constantly monitor and assess online user reviews to identify how users rate the various game attributes.

UGC in Google Play contains substantive information about apps. In this study, the content of users’ reviews of free downloadable Android game apps is analyzed. Overall, most reviews focus on arcade & action and casual games game types, as well as two attributes: gameplay and stability. Males’ reviews outnumber those by females, particularly for arcade & action, sports, and racing games; the opposite is true for brain & puzzle and casual games. This shows that there are significantly different preferences in terms of game type across genders. Further, the reviews are overwhelmingly positive, particularly for arcade & action and sports games. Our results suggest a J-shaped distribution with mostly 5-star ratings for a series of data sets including games, developers, and reviews by males, females, and all respondents.

With the aid of CA, we can learn more about the relationship between game types and user sentiments regarding particular
game attributes, as well as the relationship between star ratings and user sentiments regarding game attributes. Arcade & action and sports games are mostly rated positively in terms of gameplay and musicality, while cards & casino games are rated positively in terms of stability. However, brain & puzzle, casual and racing games are mostly rated negatively in terms of gameplay, aesthetics, musicality, and stability. Further, 5-star ratings are most often given for gameplay and musicality, while 1- and 2-star ratings are most often given for stability and the developer. These findings suggest that the gameplay and musicality of game apps are generally recognized as positive by users; however, they are less likely to tolerate game instability. Finally, the top 5 popular games for males, females and all respondents are closely associated with users’ sentiments regarding game attributes. Our research findings offer critical information associated with users’ true experience, which can help developers provide immediate, complete, and accurate improvements to existing products and future designs.

CONCLUSIONS

This study develops an opinion mining approach related to feature-level sentiment classification that extracts online user reviews for free downloadable Android games listed on Google Play. A heuristic n-phrase rule is proposed to extract the attribute-opinion pairs to elicit user opinions about game apps. The combination of content analysis and CA helps to summarize and visualize users’ reviews according to different metrics including star ratings, game types (arcade & action, casual, brain & puzzle, cards & casino, sports, racing), and game attributes (gameplay, aesthetics, musicality, stability, developer). Using a sentiment analysis approach can effectively capture positive and negative opinions and distinguish between them. This study provides some insights on users’ published reviews, as well as greater clarity on what app attributes and opinions are important to users.

E-commerce is rapidly expanding, thereby facilitating online purchasing. Understanding the relationship between current offerings on the app market and user’s experiences and opinions can help developers to better understand their game image and what attributes influence users’ selection decisions. In this way, they can ensure the best possible end-user experience. Furthermore, developers should consider how best to exploit social recommendations and tactical sales promotions. They can encourage positive word-of-mouth from existing users as part of their marketing strategy, or provide more information-rich reviews to assist potential users. Developers should also continually track users’ opinions to stay cognizant of their weak attributes, such that they can improve in these areas. However, there are some inherent limitations in contents analytics such as free and short formats of text and the difficulty to generalize findings due to the minority users who will actually express their feeling in text. Thus, the research results can reflect partial users’ reviews, instead of for all. Additionally, the complicated Chinese grammar and linguistic structure may result in omission bias or wrong judgment for constructing the attribute–opinion pairs. Future researchers may wish to more fully investigate paid game apps as well as the diversified information sources about them, including game discussion forums. The attribute-opinion pair extraction technique can be improved by including more detailed information on attributes connected to game reviews.

ACKNOWLEDGEMENT

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REFERENCES


SOCIAL NETWORKING MANAGEMENT TO ENHANCE THAILAND DESTINATION IMAGE

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ABSTRACT

This preliminary research studies the dimension of social network site management. It is part of a bigger research project which aims to investigate the influence of social network site management on the creation of destination image of Thailand. As the power of social media in the tourism industry has become stronger, it is important to understand its influence on destination image creation. This part of research confirms three factors that can be considered main components of social site network management that are influential to tourists’ decision to use social network sites to find travelling tips/ other tourism information.

Keywords: Social Network, Social Network Management, Destination Image, Thailand, Tourism.

INTRODUCTION

This paper is part of a research project which aims to investigate the influence of social network site management on the creation of destination image, particularly that of Thailand. The impact and importance of social media on tourism industry has grown much larger than anyone could ignore. The power of social media in the tourism industry is epitomized by TripAdvisor and other online travel blogs. Blogging has become one of the most popular social media and networking tools [26]. Such sites allow customers to freely discuss their travel stories and recommendations as well as complain and tell stories of bad experiences to the world. Therefore, destination image of a specific place, defined as a set of beliefs, ideas, and impressions that people have of place or destination, could be affected by customers’ opinions on social media. As a result, Thai tourism enterprises as well as destination marketing organizations should pay attention to how to utilize social networking sites to create a positive destination image.

Tourism is considered one of the most important industries in terms of economy. In Thailand, the tourism industry both directly and indirectly contributes approximately 21.3% of the country’s GDP. This contribution varies from tourism employments and demands for other related supplies [29]. In 2011, domestic tourism is expected to generate almost 14,400 million USD, while expected revenue for inbound tourism is approximately 20,000 million USD (Ministry of tourism and sports, 2010). Therefore, an understanding of how to create a clear and positive destination image of Thai tourism will contribute to the development of Thai tourism industry and benefits the country’s economy. However, little work has been done on how web forums and blogs are used to measure and create a destination image [28]. This research, therefore, seeks to understand the relationship between social network site management and destination image.

This paper, however, concentrates only on understanding social network site management activities that tourists considers important or influential to their decision to use social network sites to find travelling tips/ other tourism information. The next section reviews the concept of destination image, the importance of social network sites to the tourism industry, and social network site management activities. Then, research methodology is explained, and an analysis result is discussed and concluded in the final section.

LITERATURE REVIEW

Destination Image

Destination image is defined as a set of beliefs, ideas, and impressions that people have of place or destination [14]. In other words, image is perception or impression of a product or place and cognitive as well as affective evaluation of a product or place [2]. Therefore, destination image can be measured by individual’s evaluation of cognitive image attributes (e.g. unreliable or reliable infrastructures, unpleasant or pleasant nature) and affective image attributes (e.g. boring or interesting, sleepy or arousing).

Destination image is found to be an important factor influencing the selection of vacation destinations [4]. Phelps [22] categorized destination images into primary and secondary, depending on the information sources used. Primary images are formed through internal information such as past experiences, while secondary images are influenced by information received from some external sources. This means that information from external sources, such as friends and internet, mainly affect the
image of destinations and in turn the selection of vacation destination [18]. Similarly, Baloglu and McCleary [4] state that image is formed by two major forces: stimulus factors and personal factors. The former stems from the external stimulus, physical object, and previous experience, while the latter is the characteristics (social and psychological) of the perceiver. Therefore, external stimulus, particularly information and opinion from reliable sources, seems to be important and influential on how individuals perceive an image of a particular destination.

**Social Network Sites and Tourism Industry**

Donath and Boyd [9] define social network sites as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. This research follows the definition by Donath and Boyd and also includes other web-based services which allow users to not only connect but share their ideas, opinions, experiences, and knowledge in any digital formats (text, photo, or video). The tourism industry has a close relationship with the new information and communication technologies, as the tourism industry involves extensive information-based products (reservations and tickets), all of which can be delivered in digital format. Besides, a good understanding of the mechanisms for spreading information online can facilitate tourism managers (whether of a destination marketing organization, a hotel, or any other tourism related companies) to market effectively own organization online [5].

In the Web 2.0 era, the boundary between information producers and users is blurred, and the usual concepts of authority and control are radically changed [19]. The use of web 2.0 tools, such as photo and video sharing, blogging and maps, before and during trips is becoming generalized [8]. An important feature of Web 2.0 applications is its capability to allow user generated contents. This can be highly influential in directing tourists’ choices, as the contents are primarily customers’ real experiences (direct or indirect) and opinions [27] [3].

Web 2.0 technologies, such as social media, also play an increasingly important role as information sources for travelers [30]. Tourism operators are facing new consumers, who can easily access information and easily share their views, comments and suggestions in an informal and collaborative way, increasing the value and influence power as determinants of choice for other consumers [3]. In recent years, we have seen more and more tourism organizations have utilized online social network sites to create and manage destination image. Experiences, opinions, and knowledge shared by travelers on online social networking sites appear to be influential on both cognitive and affective images of a particular destination [6] [16]. Govers et al. [12] also highlight that the creation of destination image has become more about two-way communication and experience sharing than just a one-way communication from product marketers to consumers. Therefore, all tourism businesses are facing the need to manage online social network sites in order to create a positive destination image.

**Social Network Sites Management**

An online social network is where a large group of people around the world can virtually get together. Its value depends primarily on the number of members and contents that those members generate. Therefore, it is important that an online social network provider creates and offers value that attracts existing as well as new members to join and share their experiences [7]. Similarly, organizations that utilize online social networks to communicate with their customers also need to properly manage the social networks to attract and retain their members [15].

Prior research on online social network management highlights that online social network sites are different from other websites. Social network site management need to focus on maintaining three components: interesting contents, users’ impressions, and good connection among users [9]. Therefore, the management of quality of content, responsiveness of interactivity, and aesthetic of multimedia design are key activities [21] [24] [25]. Most importantly, security of social network sites should be in the top priority for management.

Social Trust is another issue that social network site managers must pay attention. Trust in service integrity and appropriate privacy policy are found important and lead to users’ trust and willingness to share their contents/experiences in a social network site [10] [1]. Madu and Madu [17] also found that privacy policy increase users’ trust and positively relate to long-term relationship between users and providers.

Moreover, prior research found that online social network sites play an important role in knowledge sharing, which in turn benefits organizations [7] [23]. Therefore, social network knowledge management should be highlighted as another key activity. Particularly in the tourism industry, direct experiences shared by travelers are considered highly influential on other travelers’ decisions. Online social network sites which focus on tourism related products/services should apply knowledge management approaches to allow users to learn from and share to their network. Explicit knowledge can be easily stored and managed by information technologies [11], leading to good relationship among users. Besides, sharing tacit knowledge, be it technical or cognitive dimension, play an important role in developing human resource and organization as well as creating value and innovativeness to products/services [13].

**METHODOLOGY**

To examine the relationship between social network management and destination image creation, quantitative research, using questionnaire survey, is conducted with foreign tourists who traveled to Thailand. According to the department of tourism (tourism.go.th), there were 15,936,400 foreign tourists traveled to Thailand in 2010. Therefore, referring to random sample...
sizes shown in Table 1, we plan to collect data from at least 1,068 foreign tourists to achieve level of confidence of 95% and margin of error of ± 3%.

Table 1: Random Sample Sizes Required to Achieve Desired Levels of Confidence and Margin Error

<table>
<thead>
<tr>
<th>Margin of Error</th>
<th>Level of Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
</tr>
<tr>
<td>± 1%</td>
<td>1,140</td>
</tr>
<tr>
<td>± 2%</td>
<td>285</td>
</tr>
<tr>
<td>± 3%</td>
<td>127</td>
</tr>
<tr>
<td>± 4%</td>
<td>72</td>
</tr>
<tr>
<td>± 5%</td>
<td>46</td>
</tr>
<tr>
<td>± 50%</td>
<td>2</td>
</tr>
</tbody>
</table>


To sample 1,068 tourists, we use multistage sampling method. First, quota sampling is calculated as shown in Table 2. Second, convenience sampling is used to sample tourists in various tourist destinations in Thailand, for example Bangkok, Hua-hin and Pattaya.

Table 2: Quota sampling according to regions

<table>
<thead>
<tr>
<th>Regions</th>
<th>Population (N)</th>
<th>(%)</th>
<th>Calculated samples</th>
<th>Adjusted samples (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia</td>
<td>8,167,164</td>
<td>51.2%</td>
<td>546</td>
<td>546</td>
</tr>
<tr>
<td>Europe</td>
<td>4,442,375</td>
<td>27.9%</td>
<td>298</td>
<td>298</td>
</tr>
<tr>
<td>The Americas</td>
<td>844,644</td>
<td>5.3%</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>South Asia</td>
<td>995,321</td>
<td>6.2%</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Oceania</td>
<td>789,632</td>
<td>5.0%</td>
<td>53</td>
<td>60</td>
</tr>
<tr>
<td>Middle East</td>
<td>569,334</td>
<td>3.6%</td>
<td>38</td>
<td>60</td>
</tr>
<tr>
<td>Africa</td>
<td>127,930</td>
<td>0.8%</td>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>15,936,400</td>
<td>100.0%</td>
<td>1,068</td>
<td>1,151</td>
</tr>
</tbody>
</table>

* Note: when calculated samples are less than 60, the researchers adjust them to be 60 for statistical appropriateness

**DATA ANALYSIS AND DISCUSSION**

**Demographic Data**

1,261 tourists from 7 continents were surveyed. 50.2% were male and 49.8% were female. Details are shown in Table 3. Various social network sites were used for travel information search or planning. Facebook was used by most tourists, accounting for 29.83% of all tourists surveyed in this research. Online travel forums and travel-theme sites, such as TripAdvisor and LonelyPlanet were also popular among the tourists; 25.49% used online travel forums and 17.72% used travel-theme sites. Other social network sites mentioned by the tourists were personal blogs, twitter, and myspace.com. Interestingly, only 18.8% of the tourists rated the influence of contents/knowledge gained from social network sites on their travel-related decision making as low, while 62.8% rated it as medium and 18.4% rated it as high. This reconfirms prior research of the importance of online social network sites in influencing travelers’ selection of destination.

Table 3: Respondent Profile

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>633</td>
<td>50.2</td>
</tr>
<tr>
<td>Female</td>
<td>628</td>
<td>49.8</td>
</tr>
</tbody>
</table>
Characteristics and N, Percent

<table>
<thead>
<tr>
<th>Continent/Region</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia</td>
<td>562</td>
<td>44.6</td>
</tr>
<tr>
<td>Europe</td>
<td>336</td>
<td>26.6</td>
</tr>
<tr>
<td>Americas</td>
<td>102</td>
<td>8.0</td>
</tr>
<tr>
<td>South Asia</td>
<td>70</td>
<td>5.6</td>
</tr>
<tr>
<td>Oceania</td>
<td>64</td>
<td>5.1</td>
</tr>
<tr>
<td>Middle East</td>
<td>64</td>
<td>5.1</td>
</tr>
<tr>
<td>Africa</td>
<td>63</td>
<td>5.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>56</td>
<td>4.4</td>
</tr>
<tr>
<td>20 – 30</td>
<td>582</td>
<td>46.2</td>
</tr>
<tr>
<td>31 – 40</td>
<td>425</td>
<td>33.7</td>
</tr>
<tr>
<td>41 – 50</td>
<td>126</td>
<td>10.0</td>
</tr>
<tr>
<td>51 – 60</td>
<td>45</td>
<td>3.5</td>
</tr>
<tr>
<td>61 – 70</td>
<td>26</td>
<td>2.1</td>
</tr>
<tr>
<td>&gt; 70</td>
<td>1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Social Network Sites used for travel information search

<table>
<thead>
<tr>
<th>Site</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>776</td>
<td>29.83</td>
</tr>
<tr>
<td>Twitter</td>
<td>286</td>
<td>11.00</td>
</tr>
<tr>
<td>Personal Blogs</td>
<td>324</td>
<td>12.46</td>
</tr>
<tr>
<td>Online travel forums</td>
<td>663</td>
<td>25.49</td>
</tr>
<tr>
<td>Myspace.com</td>
<td>82</td>
<td>3.15</td>
</tr>
<tr>
<td>Travel-theme sites</td>
<td>461</td>
<td>17.72</td>
</tr>
<tr>
<td>PengYou</td>
<td>1</td>
<td>0.04</td>
</tr>
<tr>
<td>RenRen</td>
<td>8</td>
<td>0.31</td>
</tr>
</tbody>
</table>

The level of importance that information from social network sites influence your decision making to visit Thailand

<table>
<thead>
<tr>
<th>Importance Level</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>232</td>
<td>18.4</td>
</tr>
<tr>
<td>Medium</td>
<td>792</td>
<td>62.8</td>
</tr>
<tr>
<td>Low</td>
<td>237</td>
<td>18.8</td>
</tr>
</tbody>
</table>

Table 4: An exploratory factor analysis

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor Loading</th>
<th>Mean</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1: Trust in Social Network</td>
<td></td>
<td></td>
<td>.927</td>
</tr>
<tr>
<td>Honesty to provide accurate information</td>
<td>.689</td>
<td>5.07</td>
<td></td>
</tr>
<tr>
<td>Honesty to keep privacy</td>
<td>.715</td>
<td>4.87</td>
<td></td>
</tr>
<tr>
<td>Honesty to provide promised service</td>
<td>.759</td>
<td>4.92</td>
<td></td>
</tr>
<tr>
<td>Trustworthy of the social network sites</td>
<td>.763</td>
<td>4.95</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites that you used are trustworthy</td>
<td>.750</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Comments/ information from users of social network sites that you used are honest</td>
<td>.756</td>
<td>5.08</td>
<td></td>
</tr>
<tr>
<td>Factor2: Knowledge Management</td>
<td></td>
<td></td>
<td>.912</td>
</tr>
<tr>
<td>Attractive pictures/ videos</td>
<td>.588</td>
<td>5.07</td>
<td></td>
</tr>
<tr>
<td>Interaction with users</td>
<td>.739</td>
<td>4.71</td>
<td></td>
</tr>
<tr>
<td>Response to questions posted</td>
<td>.637</td>
<td>4.76</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites are willing to share tourism information/ traveling experience</td>
<td>.654</td>
<td>4.95</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites share traveling tips</td>
<td>.654</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites share pictures/ videos</td>
<td>.762</td>
<td>4.92</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites share traveling documents</td>
<td>.718</td>
<td>4.41</td>
<td></td>
</tr>
<tr>
<td>Users of social network sites share information about chaos</td>
<td>.534</td>
<td>4.28</td>
<td></td>
</tr>
<tr>
<td>Factor3: Site Management</td>
<td></td>
<td></td>
<td>.895</td>
</tr>
<tr>
<td>Easy to find information</td>
<td>.775</td>
<td>5.17</td>
<td></td>
</tr>
<tr>
<td>Reliable information</td>
<td>.813</td>
<td>5.17</td>
<td></td>
</tr>
<tr>
<td>Up-to-date information</td>
<td>.797</td>
<td>5.14</td>
<td></td>
</tr>
</tbody>
</table>

For Factor 1 (Trust in Social Network), the honesty of comments/information from other users in social network sites the most influential issue to them is ranked highest with mean score of 5.08 from 7. Ranked second is an item related to “honesty to provide accurate information” (mean = 5.07). “Users of social network sites that you used are trustworthy” and “Trustworthy
DISCUSSION AND CONCLUSION

This preliminary research shows that tourists do use social network sites to search for tourism information or plan their trips. Therefore, the management of social network sites should be an important task for tourism enterprise in order to create impression and in turn form a positive image of a particular destination. However, the relation of social network site management sites to destination image creation is not tested in this part of research. In this research, exploratory factory analysis is conducted to understand dimensions of social network site management.

Prior research on online social network management highlights that online social network sites are different from other websites and that social network site management need to focus on maintaining three components: interesting contents, users’ impressions, and good connection among users [9]. This part of research confirms three factors that can be considered main components of social site network management. The respondents were asked to rate the degree to which each item is important or influential to their decision to use social network sites to find travelling tips/ other tourism information. From the rating score, items concerned “easy-to-find information”, “reliable information”, and “up-to-date information” were rated highest, implying that social network site should be managed to provide these items. Other items which have a mean score higher than 5 (from 7) are “Comments/ information from users of social network sites that you used are honest”, “Attractive pictures/ videos”, “Honesty to provide accurate information”, “Users of social network sites that you used are trustworthy”, and “Users of social network sites share traveling tips”. This is consistent with [9] that interesting contents and good connection among users (including trust among them) are important.

In the next phase of our research, the relation of social network site management sites to destination image creation will be tested and further analysis will be conducted to understand dimensions of destination image and to see which items or dimensions of destination image that tourists consider important.

REFERENCES

International Conference on Information Technology and Travel & Tourism, January 26-28, 2011, Innsbruck, Austria.
[20] Ministry of tourism and sports, 2010, 
No. 2, pp. 179-188.
CULTURAL DIFFERENCES AND EMR EXPERIENCES: FROM THE USA TO THE UAE AND THE UK

Wen Shin Chen, Newcastle Business School, United Kingdom, wenshin.chen@northumbria.ac.uk

ABSTRACT

Electronic medical record (EMR) has gained increasing attention in the healthcare industry worldwide. Unfortunately, the adoption rate has been slower than what healthcare practitioners and IT professionals would expect. While various issues have recently been raised concerning hospitals’ and physicians’ EMR challenges, this research proposal specifically focuses on cultural differences in those healthcare organizations’ and practitioners’ EMR experiences. More specifically, a four-layer cultural framework is proposed and discussed. In addition to traditionally perceived national and organizational cultures, the framework further distinguishes institutional and group cultures that might also interact with other cultural elements and healthcare organizations’ EMR experiences. Six organizations situated in three culturally contrasting countries with comparative external environments, business purposes, managerial values, IT services, and organizational sizes are selected as potential study sites. An interpretive case study is further proposed to help investigate complex interactions involved in this research phenomenon. With a more comprehensive perspective on cultural effects and emerging nature of EMR systems, empirical research contribution, upon the project’s completion, is thus anticipated.

Keywords: electronic medical record, EMR, culture, case study, healthcare.

INTRODUCTION

Electronic medical record (EMR) is an emerging information system designed to maintain clinical information in electronic databases and in turn to reduce medical errors and improve healthcare quality [1]. Recent IT phenomenon such as Y2K and emerging healthcare institutional movements in the U.S. such as HIPAA (Health Insurance Portability and Accountability Act) and IOM (Institute of Medicine) reports over the years have increasingly urged, if not forced, healthcare organizations to adopt EMR [2]. Economically, with comprehensive clinical functionalities such as laboratory testing, problem diagnosis, allergy alerts, medication references [3], EMR are perceived to have great potential for reducing healthcare operations cost [4]. Some analysts specifically suggest that EMR implementation can save $84,000 USD for clinics over a five-year period [5]. An interoperable EMR network can save $81 billion USD annually for the healthcare industry [6]. Other benefits of EMR include efficiency improvement, particularly for smaller clinics [7], error prevention [8], and satisfaction enhancement for patients [9]. However, despite years of advocacy, EMR has not yet penetrated the healthcare institutions as information technology (IT) professionals or healthcare enthusiasts would long expect. More specifically, a survey reported in 2003 showed that only 5% of hospitals have adopted EMR [3]; another survey in 2009 further reported that only 9.1% of hospitals studied have adopted EMR and a comprehensive EMR was merely implemented in 1.5% of them [10]. These statistics implicitly hint that certain barriers and challenges must have been faced by healthcare organizations. Interestingly, the literature has long investigated obstacles commonly faced by physicians and hospitals in the EMR implementation process. For example, in the 1990s, there were major concerns about end users’ (i.e. physicians) readiness and acceptance of the technology. Computer experiences, computer anxiety, and perceived organizational support were suggested to influence how physicians accept this emerging technology [11]. Patients’ data privacy and confidentiality are also cited as two common concerns [4] [12]. Other studies further pointed out that while physicians and clinics have general concerns about high initial costs and uncertain payoffs, factors such as technology difficulties, complementary support, and physicians’ attitudes are underlying barriers that impede a more prevalent diffusion of EMR in the industry [1].

While these studies might help contribute to initial understanding of the EMR literature, what has not been understood is that how these factors play their roles in different healthcare systems. This research proposal thus seeks to investigate contextual differences in various healthcare organizations’ EMR decision making and implementation experiences. More specifically, a four-layer cultural framework is proposed and different layers of cultural interactions among one another and with EMR experiences are discussed. The proposed cultural framework intends to examine cultural effects at four different levels (i.e. national, institutional, organizational, and group), which could offer future studies a more comprehensive understanding of cultural effects in EMR experiences in particular and electronic business in general. Upon completion, this project thus has potential to provide valuable insights into consistency and/or disparities that might exist in various EMR systems and in turn help healthcare organizations better evaluate their EMR implementation processes.

CULTURAL IMPACTS

The IT and management literature have increasingly suggested that adopting the same business or IT model for organizations in different cultural systems is problematic because cultural elements could significantly shape organizational structure and business/IT practice which in turn might affect organizational performance and outcomes [13]. More specifically, at the
national level, cultural elements have been found to significantly affect information security policy making and practice [14], individual users’ behaviors on self-service technology usage [15], and an enterprise’s technology alliance formation [16]. At the organizational level, cultural factors have also been found to distinctively shape an organization’s adoption decisions of high-tech products in general [17] and ERP (Enterprise Resource Planning) in particular [18], significantly influence an organization’s knowledge management [19], and directly link to successful implementation of information systems [20]. Harper and Utley (2001) further reported that cultural attributes of autonomy, trust, teamwork, information sharing, and flexibility show high positive coefficients for successful IT implementation while rule orientation, compliance, carefulness, preciseness, and predictability demonstrate high negative correlations with IT implementation success. In contemporary globalized, networked business world where multiple cultural systems often co-exist, a better and more specific understanding of cultural differences in business practice and IT management will thus be imperative [15].

Culture is defined in sociology as collective behavior and shared values practiced and recognized by a group of actors [21]. These commonly sanctioned behavior and values guide actors’ interaction among one another [22] and in turn shape their collective identity in everyday life [23]. Without such normative guidance, actors would lose their senses of ‘who I am’ and ‘how should I behave’ [24]. In comparison with other groups or communities, these underlying social norms distinguish members in one group from those in another [25]. At the national level, these distinctive cultural elements are traditionally categorized and understood in four dimensions: uncertainty avoidance, power distance, masculinity, and individualism [26]. In other words, behaviors and shared values of members in one country can often be understood and analyzed by how members deal with power and uncertainty in life and the degree to which they act and interact with one another in muscular (vs. feminine) and/or individualistic (vs. collective) fashion [14]. At the organizational level, studies of cultural characteristics tend to focus more on how members perform their routines internally such as communication and collaboration with other organization members and how they respond to external environments such as industrial movement or technological changes [25] [27]. When members demonstrate enthusiastic behavior and agile response to environmental changes, an organization is often categorized as more prospective; when organization members, by contrast, tend to comply with rules and structures and focus mainly on existing market values and profits, an organization is mostly classified as bureaucratic and defensive [28]. Although these frameworks offer an overall guidance of cultural studies in business and/or IT practice, the complexity of cultural characteristics require our further understanding of institutional and group differences. Institutional theorists have long argued that organizations often act to gain social recognition as well as cultural and political fitness in their institutional fields [29]. It is likely that organizations situated in the same institutional landscape would act in a similar fashion which is commonly recognized within the institution and could be best understood only by institutional members themselves [30]. Members in certain institutional fields such as the healthcare sector that have distinctive regulations and professionalism would likely to demonstrate a greater tendency to share such cultural understanding and practice [31]. At the group level, organizations members’ behaviors in social interaction, group collaboration, power control, and interpersonal relations are often guided by their collective norms [25]. Even within the same organizations, different functional units or project groups might still demonstrate different cultural traits that distinguish themselves from other groups/units and in turn create misunderstanding among one another [32]. Typical tension between IT and user groups [33] and politics and user resistance in IT implementation [34] are some of those examples.

This research project thus proposes a four-layer culture framework to investigate cultural interactions with EMR experiences (Figure 1). National and institutional cultures are considered external effects while organizational and group cultures are internal characteristics that interact with an organization’s EMR experiences. The premise of the framework is that organizational experiences of EMR in particular and electronic business in general are shaped and reshaped by these cultural elements internally and externally. The process through which these cultural elements affect an organization’s EMR experience is essentially unknown and thus becomes the focal point of the proposed investigation. In addition, certain interactive effects might exist between different layers of cultures. For instance, group culture might be shaped and reshaped by each layer of organizational, institutional, and/or national cultures. Similarly, organizational culture might also interact with institutional and/or national cultures while institutional culture might be shaped and/or reshaped by national culture as well. These interactions and their effects on EMR experiences are summarized in Figure 1 below. Four layers of rectangles indicate different dimensions of cultural environments and suggest that smaller (inner) cultural elements are embedded within greater (outer) ones. Organizational and group cultures are highlighted because they are essential elements of an organization’s actions. The highlight also attempts to distinguish internal settings from external environments. Due to space constraints, the sizes or types of arrows, however, do not represent strengths of interactions but merely illustrate directions of those effects. Bidirectional arrows further imply interactive (instead of causal) effects among different cultural environments and with an organization’s EMR experiences, which largely focus on decisions and implementation.
METHODOLOGY

Case Study
The emerging nature of the research topic and the multifaceted complexity of cultural interactions and their relations with EMR experiences require an in-depth investigation of factors involved. At the current phase, my intention is thus to first conduct an interpretive case study of six healthcare organizations situated in three countries and different institutional landscapes. While interpretive research helps disentangle multifaceted issues involved and provide authentic insights for research phenomenon investigated [35], case study methodology is most suitable for investigation that is situated in well-defined boundaries [36] and attempts to analyze ‘why’ and ‘how’ questions [37].

Six organizations under consideration, all given pseudonyms in the proposal, are expected to represent four layers of cultural elements and potentially their interactive effects. The first two organizations, Alpha and Beta, are located in one of major metropolitan areas in the U.S. The third and fourth organizations, Gamma and Delta, are from one of major cities in the UAE while the fifth and sixth organizations, Zeta, and Eta, are situated in one of major urban areas in the UK. Although these organizations all reside and compete in the healthcare industry, their geographic areas, population density, demographics backdrop, and business environments provide contrasting institutional landscapes.

Study Sites
The first study site, Alpha, is a non-profit hospital with almost 900 beds. It has been voted on multiple occasions by Fortune as one of the “100 Best Companies to Work For” and by U.S. News & World Report as one of “America’s Best Hospitals.” Its large centralized IT department has enabled the hospital to gain various technology and innovation recognition over the years. The second study site, Beta, traditionally recognized as a community medical center with approximately 180 beds, merged with a large healthcare system in the U.S. and became a small branch of this for-profit hospital chain. Its IT department was recently outsourced to the headquarter’s IT partner and its IT services has subsequently become centralized.

With about 450 beds, the third study site, Gamma, is a local hospital of a large government healthcare agency in the UAE. Due to the headquarters’ centralized IT services and the nature of governmental sponsorship, Gamma’s internal culture can be categorized as centralized and bureaucratic. The fourth study site, Delta, by contrast, received direct sponsorship from military forces and housed nearly 370 beds. Although it has abundant resources for IT services, Delta’s internal characteristics is also largely shaped or constrained by its governmental and/or military nature.

The fifth organization, Zeta, is one of leading hospitals in the UK with approximately 800 beds. The hospital, largely funded by the government, has enjoyed its long tradition and reputation of healthcare innovation and academic partnerships since its establishment decades ago. The last organization, Eta, is a small branch of a large non-profit, private health charity in the UK. With 28 beds, Eta is specifically dedicated to certain healthcare services for a suburban community near one of major cities in the UK. As a relatively small healthcare center of a large healthcare systems, Eta’s IT services are predictably centralized by the corporate IT systems.

These organizations are selected because they could provide comparative insights for four-layer cultural interactions discussed previously. In addition to different national culture and institutional landscapes, these organizations also contrast one another in size (large vs. others), business purpose (profit vs. nonprofit), sponsorship (public vs. private), and IT services (independent vs. centralized). On the one hand, it inevitably increases difficulties in contrasting multiple factors embedded in the four-layer cultural framework. On the other, its potentials for providing analytical insight to various EMR scenarios are highly anticipated.
CONCLUDING REMARKS

Prior studies have examined cultural effects on various business practice and IT management. Most of them only focused on either the elements of national or organizational culture and thus failed to distinguish various properties of institutional and group cultures. Moreover, the existing empirical knowledge tends to assume one-directional effect, that is, cultural impacts on IT management. As Chen (2007) pointed out, IT implementation can also reshape cultural elements in recognizable and/or unexpected manners. In other words, cultural relations with IT projects are most likely to be interactive; as cultural elements affect IT project, the IT projects often reshape cultural norms in return. These interactive effects are depicted by the four-layer cultural framework discussed earlier. Although Figure 1 specifically proposes cultural interactions with an organization’s EMR experiences, the framework itself can also be applied to other IT projects situated in different cultural landscapes. Fruitful research venues can thus be expected.

REFERENCES

TRUST IN ONLINE MEDICAL TOURISM INFORMATION: HAVING COSMETIC SURGERY IN SOUTH KOREA

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ABSTRACT
Medical tourism continues to expand globally. Many consumers have to rely heavily on online information, given geographical distances and unfamiliarity of a different healthcare system. Yet the quality of information is mixed at best. Few studies have examined factors that can impact trust in healthcare websites, organizations and doctors. In light of the popularity in having a cosmetic surgery in South Korea, we conducted lab experiments using 80 business school students in Bangkok, Thailand. Given the uncertainty of information accuracy and credibility, medical tourists are strongly influenced by social influence, especially by those close to them. Social influence also affects their trust in cosmetic surgery hospitals, doctors, and websites. Furthermore, certain website features and self-efficacy of online searching influence the trust in hospitals, doctors, and websites.

Keywords: Medical tourism, online information search, online decision-making, self-perception theory, least likelihood model (ELM), trust in online information.

INTRODUCTION
A 2011 OECD report [23] notes the worldwide emergence of so-called medical tourism. It notes the main characteristic of medical tourism as “the movement of patients across borders in the pursuit of medical treatment and health” driven by significant cost savings. SRI International estimates the global market size of medical tourism to be $50 billion in 2010 [18]. Enjoying the competitive price advantage, the Asian countries such as India, the Philippines, South Korea, and Thailand are emerging as popular destinations of medical tourism [45]. Having a medical treatment in Asia can save up to 33% of the costs over having it in the United States [29]. The medical tourism industry in Asia is expected to reach $8.5 billion by 2013 [17]. Having the highest per-capita cosmetic procedures in the world in 2010, South Korea is one of the leading destinations for cosmetic surgery from overseas [11]. According to the International Society of Aesthetic Plastic Surgery (ISAPS), people in those Asian nations are also top consumers of cosmetic surgeries [21].

Aside from cost advantages, medical tourism poses some unique challenges for consumers. There are healthcare regulatory and legal concerns across borders [39]. There are not only geographical but also psychological distances between consumers and healthcare-provider locations [46]. Given these challenges, consumers reply on information available on the web. In general, more than 80% of Internet users are turning to online health information forums for answers to their questions before taking any concrete actions [16].

Although online health forums are proliferating, it is uncertain about whether they are an effective medium for consumers and healthcare service providers. First, the identity of forum posters is often not fully disclosed. Second, the description of patient experience may not be comprehensive and may be missing some critical information. Third, the reviews on doctors and hospitals may be biased. The posters are often those who are either highly satisfied or dissatisfied with their experiences.

Faced with the popularity of overseas cosmetic surgery and the uncertainty of online information, this paper poses the following research questions in the context of medical tourism. First, what factors influence trust in cosmetic surgery information (CSI) websites? Second, do these factors enhance trust in doctors and hospitals? Third, how do these factors affect the intension to have a cosmetic surgery overseas?

This study was conducted at a major business school in Thailand, because certain cosmetic surgeries are popular among the local youths. There are some recent studies [22], [45] that focused on medical tourism in Asia. However, few studies examined what factors impact the trust in website, hospitals, and doctors as well as the intension to have a cosmetic surgery overseas. In the following sections, the paper first reviews relevant theoretical background. It then discusses hypotheses, method, and results, followed by implications and conclusion.

THEORETICAL BACKGROUND

Online healthcare information
In the past decade, the popularity of search engines and portable devices has been fueling the use of online information searches. In 2005, about two-thirds of adults were already seeking online some types of healthcare information for themselves or their peers [20]. Although consumers rely on the web, some healthcare professionals are seriously concerned about the quality of online information [28]. The problem with the internet is not necessarily a lack of information but the [13], [35]. However, “half of those who have sought health information online in the United States reported these materials affected their decisions about treatment and care” (ibid., p. 499).
The supply side of healthcare information should not bear all the blame. For example, despite the abundance of information, there is little consistency in how consumers expect, seek, find and use online healthcare information [8]. In addition, many consumers do not read beyond the first page of search results [28]. They are also “seldom diligent” in checking and validating information they obtained online [26]. Indeed, online information may be advertisement, fraudulent, outdated, and/or sourced by unqualified parties. Metzger [26] thus suggest 25 guidelines to assess the credibility of online healthcare information.

Decision-making regarding cosmetic surgery overseas

Consumers not only browse healthcare information online, but they also use the web to make healthcare decisions. The Pew Research Center reports in its recent survey that 59% of U.S. adults explore the internet to gather health diagnostic information [32]. About 35% of U.S. adults used the web even to diagnose themselves, although 70% indicate they seek professional help for a serious health concern (ibid.). However, there are some cultural differences regarding online healthcare information searches and subsequent decision-making. For example, only 17% of the Japanese look for information on the web only after their doctor’s suggestion, while adults in the U.S. and Germany may seek online healthcare information frequently by themselves.

Given the variation of information quality, consumer expectations and cultural differences, how can we model consumers’ healthcare decision making? A few studies propose generic models relevant to healthcare information trust and judgment over the web. The first model [5] shows that consumers’ probability of taking advice online is influenced by source credibility, advice personalization, and advice predictability. The second model [6] is based on the observation that consumers generally visit many websites to scan information with some heuristics. They then evaluate the website and information systematically to integrate all the information and to start having long-term, trusting relationships with a select few websites. The third model [26] divides the online information use into three phases. In the exposure phase, consumers’ motivation and ability to evaluate the website play critical roles. Next, the evaluation phase consists of either no evaluation, heuristic/peripheral evaluation, or systematic thorough evaluation. If the evaluation is positive, consumers then enter into the judgment phase to critically assess the credibility of the website and whether to trust its information or not.

Trust what you see online

Trust in healthcare websites depends on several major factors. Numerous studies [1] [13] [31] note the importance of credibility. This is because the decision based on online information can lead to significant positive or negative health and financial implications. Judging whether information is credible or not, however, is the fundamental conundrum for consumers. The fact that they are not experts able to judge leads many healthcare experts to advise consumers to consult with them [41]. As an example, a study [19] had three experienced cosmetic surgeons assess the results of web searches using the term “breast augmentation.” Their evaluations found some websites offering limited but accurate procedural details. However, no websites were perfect. We have to wonder whether the average consumers can discern the accuracy and relevancy of website content as much as these three experts did.

Web site design and content significantly impact the trust level of a healthcare website [35] [36]. For example, consumers have favorable impressions of a website if its layout is clear with adequate navigational aids. Interactive features such as assessment tools also enhance website trust. Site contents such as informativeness, illustration use, content biases and language clarity are important as well for website trust. Comparisons of 57 medical facilitator websites show that site content structures and emphasis are different between Asia, Europe, Central and South America, and North America [7]. Such differences are not surprising because consumer needs, regulations, and healthcare infrastructures vary between nations. As a result, healthcare providers adjust website contents accordingly.

The above review points us to a few critical issues. First, there are quality variations of online healthcare information. Second, consumers use some triangulation to obtain the sense of what websites are more trust worthy than others. Third, it is basically up to consumers what information to trust and how to use it. For those considering a cosmetic surgery overseas, how is their trust in websites, hospitals, and doctors influenced when they seek information online? How is the intention to have a surgery impacted from online searching? The next section proposes a conceptual model and hypotheses to address these questions.

HYPOTHESES

Faced with the abundant online information, how do consumers trust relevant websites, hospitals, and doctors? The literature reviews reveal that it is up to consumers how to navigate the web and to find and screen credible information. In relation to web-enabled decision-making on having a cosmetic surgery overseas, we identify three key variables influencing the trust in websites, hospitals, and doctors. We also investigate how these three variables impact the intention to have a cosmetic surgery overseas. The websites we focus on offer cosmetic surgery information (CSI) by doctors, hospitals, and past/prospective patients sharing their experiences and opinions in web forums. We call such websites CSI websites for short. These CSI websites are typically set up and run by a third party, however they usually use some sponsorship from doctors and hospitals.
The first variable we focus on is self-belief in the ability to search and find the relevant information over the web. Self-Perception Theory [2] posits that consumers can form their attitudes, beliefs, and feelings by seeing their own behaviors. That is, consumers who engage in online searching tend to believe in their ability to search and identify relevant CSI online. For example, a study shows that the height and attractiveness of an avatar in an online game predicted the performance of players and influenced their subsequent face-to-face interactions [43]. This is akin to self-fulfilling prophecy [4]. Those who believe in their confidence in obtaining CSI online do find relevant CSI online and trust a CSI website that they find relevant and useful. This aspect is critical because no one usually supervises or directs consumers how to look for relevant information over the web. In most cases, it is entirely up to consumers to self-direct online information seeking. Therefore, we hypothesize:

**H1: Trust in CSI websites depends on consumes’ self-brief in their ability to obtain relevant information online.**

**Influence of one’s close peers**

The second variable influences not only information trust but also decision-making of consumers. The basic dilemma for these consumers is that they can search online as much as they want, but they do not have complete information and professional expertise to decide what information is credible and trustworthy [3] [33]. According to the elaboration likelihood model, consumers tend to go with the “peripheral route” of being persuaded to make a purchase decision when they cannot approach the decision rationally due to incomplete, inaccurate and/or non-trustworthy information. A recent study [30] notes that the power of the traditional word-of-mouth (WOM) is still more influential than that of electronic WOM (eWOM or opinions, reviews and rumors by other consumers online who are strangers to the consumer) or even expert opinions. The reason behind such reliance is that online information is frequently anonymous and is uncertain as to its credibility and source(s). Consumers, however, feel assured by face-to-face communication with someone they know (e.g., WOM).

**H2a: Trust in CSI websites depends on consumers’ expectation of their peer briefs on online information.**

**H2b: Trust in doctors and hospitals depends on consumers’ expectation of their peer briefs on online information.**

**H2c: The intention to have a surgery overseas depends on consumers’ expectation of their peer briefs on online information.**

**Website features**

As we saw in the literature review, website features impact consumer trust on websites of healthcare providers and facilitators. Metzger [26] suggests that consumers should pay attention to information source citations, contact information, professional site designs, sponsorship by reputable organizations, interactive features, and relevancy and comprehensiveness of information. Beyond healthcare websites, past studies have reported that site designs affect trust and loyalty for e-commerce [15] [34] and m-commerce [9]. Thus:

**H3a: Trust in CSI websites depends on the specific features of a CSI website.**

**H3b: Trust in doctors and hospitals depends on the specific features of a CSI website.**

**H3c: The intention to have a surgery overseas depends on the specific features of a CSI website.**

**METHOD**

To test the hypotheses, we used the two-step lab experiments (3 hours each) followed by a survey questionnaire. We used ordinary linear regressions to analyze the data.
Lab experiments

We had 80 participants. They were all students at a major business school in Bangkok, Thailand. Their ages range within 20 to 29 years old. According to the Thai ICT national statistic, the age range of our participants ranks second for the Internet usage in Thailand whereas the age range of 30-39 ranks first.

As we have seen earlier, the quality of websites and their information varies. In addition, which websites offer “quality information” may be subject to one’s background and expertise. Thus, we wanted reasonable control on the quality of websites and individual background to test the hypotheses. For this purpose, we had designed the two-step lab experiments to minimize the variance of individual knowledge and to have the survey participants select what the majority of them consider the websites with “quality information.” Therefore, in the first step, the researchers asked the participants to spend the entire 3 hours to browse, review and identify three CSI websites in Thailand. We gave the following guidelines to the participants: 1) information completeness, 2) clear explanation of the procedures used in plastic surgery in South Korea, 3) perceived trustworthy information on Korean doctors and hospitals, and 4) discussion threads with the most informative shared experiences from past patients. Once the participants had identified the CSI websites with the most informative discussion threads, we collected and ranked them by the frequency of the three choices.

After the three best CSI websites were identified, the researchers conducted the second lab experiment. In this session, we divided all participants into a group of three (one male and two females). Such a grouping was formed to familiarize the participants with different perspectives for the next tasks. Then, each group spent 3 hours to thoroughly read the three selected forum threads and discuss amongst its group members how the information was presented and how they would make informed decisions regarding whether to have a cosmetic surgery in South Korea.

Once these two sessions were completed, they were asked to take an online survey questionnaire. We took great care during the lab experiments not to prime the participants for the particular survey questions in the second step. For regression, we had 65 valid and complete responses.

Variable definitions

There are three dependent variables (DVs): Trust in Website, Trust in Hospital and Doctor, and Intention to Have Surgery. Website features we identified were the following 16 items: activity room, ask questions about their concerns, discussion forums, exchanging knowledge room, FAQs, information about hospital, information about doctor, information about Korean cosmetic surgery in general, information about Korean cosmetic surgery procedure, information about Thai cosmetic surgery in general, information about tour package, promotion from clinic, review pictures before and after, room to sell cosmetic and clothing, the hot issues, and top 10 members. Each item was measured with 5-point Likert scale on the frequency of use (from never to every time). The control variables used were: gender, time willing to spend for surgery, budget willing spend for surgery, interest in having surgery in South Korea, and frequency of social media use. As we see in the next section, the only significant control variable was the interest in having surgery in South Korea. Table 1 lists the multi-item variables we used for the survey questionnaire.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Items and scale</th>
<th>Cronbach α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust in Website</td>
<td>3 items, 7-point Likert scale</td>
<td>0.724</td>
</tr>
<tr>
<td>Trust in Hospital &amp; Doctor</td>
<td>6 items, 7-point Likert scale</td>
<td>0.824</td>
</tr>
<tr>
<td>Intention to Have Surgery</td>
<td>3 items, 7-point Likert scale</td>
<td>0.805</td>
</tr>
<tr>
<td>Self-Brief in Online Search</td>
<td>3 items, 5-point Likert scale</td>
<td>0.727</td>
</tr>
<tr>
<td>Social Influence</td>
<td>3 items, 5-point Likert scale</td>
<td>0.807</td>
</tr>
</tbody>
</table>

Table 1. Key Variable Constructs

RESULTS

The summary of regression results is given in Table 2. The results of the first regression (DV: Trust in Website) indicate the standardized coefficient for Self-Brief in Online Search is 0.501 with p = 0.000. The 16 Website Features was not significant and not entered into the regression. Social Influence had the standardized coefficient of 0.344. Thus, H1 has very strong support. H2a was not supported, but H3a was. The second regression (DV: Trust in Hospital and Doctor) shows a strong Social Influence (β = .501), supporting H3b. Also a strong factor was Before/After Pictures (β = -0.546). The negative sign of the standardized coefficient indicates that the survey respondents trusted less when seeing the before/after pictures than when not seeing them. The Activity Room use did not enhance trust in the hospital and doctor (β = -0.216) whereas the promotion from a clinic actually did. Then H2b was supported. Finally, the third regression (DV: Intention to Have Surgery) had the control variable, Interest in Having Surgery in South Korea, as the strongest factor. This is quite understandable because one would not want to have surgery unless he or she is interested in it. Controlling this factor, the regression gave support for H2c and H3c. The website feature specific to giving information about surgery in South Korea had a medium-level positive impact (β = 0.352). Social Influence was significant, but rather a weak factor (β = 0.195).

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variables</th>
<th>Beta</th>
<th>P-value</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust in Website</td>
<td>Self-Brief in Online Search</td>
<td>0.501</td>
<td>0.000</td>
<td>H1</td>
</tr>
<tr>
<td>Adj-R2 = .412</td>
<td>Website Feature</td>
<td>n.a.</td>
<td>n.a</td>
<td>H2a</td>
</tr>
</tbody>
</table>

References

(Venkatesh, Morris, Davis and Davis, 2003
Everard and Galletta, 2005
Sirdeshmukh, Singh and Sabol, 2002
Doney and Cannon, 1997;
Zaltman, 1993
McKnight, Choudhury and Kacmar, 2002; Moorman, Deshpande and Doney and Cannon, 1997;
Zaltman, 1993
McKnight, Choudhury and Kacmar, 2002; Moorman, Deshpande and

patients want better results, but that they do not necessarily want to know the reality of cosmetic surgery. For example, man y
factor. Furthermore, the specificity of CSI website features matters. One interesting finding of this study is that prospective
consumers are still relying on the recommendations of someone they trust or on WOM. That is, peer influence is a significant
reasonable and is generalizable to the healthcare consumers outside of Southeast Asia. Another important implication is that
online has a strong influence. Given the findings of the IT self-efficacy literature [20] [40] [44] we believe that this finding is

Concerning the trust in CSI websites, we find that the self-brief of consumers in the ability to obtain relevant information
in the Southeast Asia. Second, the results are based on what our survey participants consider credible and useful websites.
Third, some cautions are due on how to generalize the above implications.

There are several limitations of this study. First, the results reflect the perspective of those who are 20 to 29 years old and live
in the Southeast Asia. Second, the results are based on what our survey participants consider credible and useful websites.

Future studies should test our model in different geographic regions and other types of medial/elective treatments.

Table 2. Summary of Regression Results

<table>
<thead>
<tr>
<th>Term</th>
<th>Website Feature: Activity Room</th>
<th>Website Feature: Before/After Pictures</th>
<th>Website Feature: Promotion from Clinic</th>
<th>Social Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>F(2, 63) = 23.80, P = .000</td>
<td></td>
<td></td>
<td></td>
<td>0.344</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term</th>
<th>Website Feature: Information about surgery in South Korea</th>
<th>Social Influence</th>
<th>Interest in having surgery in S. Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adj-R2 = .361</td>
<td></td>
<td>0.353</td>
<td>0.599</td>
</tr>
<tr>
<td>F(3, 63) = 13.43, P = .000</td>
<td></td>
<td>0.099H2c</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Table 2. Summary of Regression Results

**IMPLICATIONS AND CONCLUSION**

There are several limitations of this study. First, the results reflect the perspective of those who are 20 to 29 years old and live
in the Southeast Asia. Second, the results are based on what our survey participants consider credible and useful websites.
Third, some cautions are due on how to generalize the above implications.

Concerning the trust in CSI websites, we find that the self-brief of consumers in the ability to obtain relevant information
online has a strong influence. Given the findings of the IT self-efficacy literature [20] [40] [44] we believe that this finding is
reasonable and is generalizable to the healthcare consumers outside of Southeast Asia. Another important implication is that
consumers are still relying on the recommendations of someone they trust or on WOM. That is, peer influence is a significant
factor. Furthermore, the specificity of CSI website features matters. One interesting finding of this study is that prospective
patients want better results, but that they do not necessarily want to know the reality of cosmetic surgery. For example, many
participants noted the details of information were important. Yet, they also expressed “discouragement” from seeing
after-surgery pictures and reading about the post-op pains.

Future studies should test our model in different geographic regions and other types of medial/elective treatments.

**REFERENCES**

sociology* (pp. 294-314). New York: Oxford University Press.
321-332.
Personalized user experiences in eCommerce*, 39-55.
discriminate between them, *Social science & medicine*, 59, 9, 1795-1806.
Management*, 43, 8, 950-963.
Marketing*, 61, 2, 35-51.
Towards quality management of medical information on the internet: evaluation, labelling, and filtering of
informationHallmarks for quality of informationQuality on the internetAssuring quality and relevance of internet


THE IMPACTS OF PRESENTATION MODES AND PRODUCT INVOLVEMENTS ON “LINE” SHORT MESSAGE SERVICE (SMS) ADVERTISING EFFECTIVENESS

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ABSTRACT

In today’s ubiquitous commerce (UC) era, short message service (SMS) advertisement has played an important role in the world of marketing. Convenience and economical reasons influence SMS usage frequency along with social involvement to influence attitudes towards SMS advertising. SMS advertising creates numerous opportunities for the marketers in promoting their products effectively. Adopting the competition for attention theory as the theoretical framework, we developed hypotheses to investigate the influences of presentation mode and involvement on SMS advertising performance (recall of advertising information). An experiment was conducted to examine the effects of three types of information presentation modes (text-only, image-text, and emoji-text) in the contexts of two product types (high- versus low-involvement products) in the “LINE” SMS environment. Specifically, in this current study, we allocate participants to six experimental environments (text-only for high-involvement products, text-only for low-involvement products, image-text for high-involvement products, image-text for low-involvement products, emoji-text for high-involvement products and emoji-text for low-involvement products) randomly to collected empirical data to examine the proposed hypotheses. The research findings are expected to provide instrumental guidelines for the practitioners to better achieve the goals of ads in the “LINE” SMS environment. Also, the empirical results may provide insights into the research of advertising interface design of SMS and integrating efforts from cognitive science and vision research to understand users’ involvement of SMS advertising processes.

Keywords: Line messenger, short message service (SMS), information presentation mode, competition for attention theory.

INTRODUCTION

Social media continues to grow recently. It is rapidly transforming the way that consumers and marketers communicate [1]. Particularly, Line, a text and voice message service, is emerging as the dominant social tools. Most of the users have integrated Line Messenger into their daily lives. Research has indicated that for teenagers, text-message communication has become the most popular way to communicate with others. It surpasses the way of face-to-face, e-mail, and voice call communication[2]. In the beginning of 2013, Line Messenger only has 100 million users, but in May, the users have exceeded 150 million[3]. The main function of Line Messenger is to provide a platform for people to communicate across geographical barriers. It also provides the function, called Line Official Account, for company to send the ad to users in order to promote their brand, products, and services. Prior studies propose that online ad design can affect the consumer's perception of the ad, such as information format and presentation mode. How to present the information better is a significant issue [4]. Despite the importance of the information format and presentation mode, there is a lack of research on the specific design features and the influences in a Line Messenger context.

The Line Messenger official account is unique medium different from other ad media in its presentation format, such as text size and limited image size. These different characteristics will create different consumers’ attention in advertising [5]. The effectiveness of text-only and image-text in other media has been investigated and research has widely supported advertising is image-dominant[6]. That is previous study found that image could generate better consumer’s attention and recall. However, because Line Messenger has unique features and research suggested that text-dominant advertising is also significant[7], it is suggested that the comparison of effectiveness of text-only and image-text should be further examined. In addition, although some study has been investigated emoji in the setting of human chats [8], less study focuses on emoji use in ad to understand its impact on ad effectiveness.

Presentation mode refers to how elements (text-only, image and emoji) are combined in the ad form. There are three presentation modes for Line Messaging, including text-only, image-text and emoji-text. Text-only refers to the advertising only text included, while image-text refers to the advertising including both text and image. Emoji refers to graphic representations, resembling facial expressions [2, 9]. Prior studies have examined the relative effectiveness of image-text versus text-only advertising, while the topic of which mode would be more effective for different product types in a Line Messenger context has not been explored. The product types in ad include high-involvement product ad and low-involvement product ad. In a low-involvement product context, consumers rarely involve with extensive information searches or comprehensive evaluations of the choice alternatives. In a high-involvement product context, consumers usually spend much time to search information of products in order to make the right decisions [10]. Furthermore, advertising appeal contains rational advertising appeal and emotional advertising appeal. Rational appeal can be conceptualized as thinking ad appeal, while emotional appeal can be conceptualized as feeling ad appeal [11]. Research
suggests that ad appeal can interact with product type and thereby influence ad effectiveness [12]. Thus, in order to prevent advertising appeal affecting our measures, only one type of ad appeal (rational appeal) is chosen in our study. Given that the availability of presentation modes in Line Messenger Official Account has three, an interesting question is created regarding the relative effectiveness of different presentation modes.

Specifically, our research question has two. Firstly, which presentation mode can create better consumers’ recall toward the ad in a Line Messenger context? Secondly, which involvement product (high- versus low-involvement) context can create better consumers’ recall toward the ad in a Line Messenger context? As a result, in this study, we use competition for attention theory and literature regarding product involvement as the theoretical framework to propose our research hypotheses. It is suggested that competition for attention theory can provide a useful foundation for comparing the effectiveness of text-only mode, image-text mode and emoji-text mode. The issue is particularly significant for Line Official Account advertiser because fail to capture consumers’ attention decrease the effectiveness of advertising and an appropriate advertising presentation mode may have positive influence on customer purchase decisions.

LITERATURE REVIEW

2.1 Competition for Attention Theory
The theory of competition for attention provides an important base for us to propose our hypotheses. That is, the theory provides significant information to better understand which presentation mode is more appropriate for Line-based advertising. Competition for attention theory is based on a foundation that the amount of attention and available information processing capabilities for people are limited [13, 14]. In the visual field, people selectively process information by responding to diverse stimuli. They respond to one stimuli and hold attention on the stimuli when the stimuli are different from others, moving, or relevant to their task [14].

It is suggested that the salience of objects, such as bigger size or outstanding color, can receive higher level of consumers’ attention[15]. The attention is competed. The reason is that when an object is the focus of attention(focal object), the other (non-focal object) will compete for attention with the focal object [14]. According to literature, for traditional media, the format of picture is considered as superior to other formats[16]. Thus, it is suggested that “a picture is worth a thousand words” [16, P.219]. That is, when a format includes both images and texts, images will attack higher level of attentions. Even if audiences watch texts first, images will compete for attention significantly.

2.2 Consumer’s Product Involvement
Consumer’s product involvement refers to a causal or motivating construct which influences consumer's purchase and communication behavior[17]. Product involvement is the perception of a consumer about importance of and interest in a product[10]. In a low-involvement product context, consumers rarely involve with extensive information searches or comprehensive evaluations of the choice alternatives. In a high-involvement product context, consumers usually spend much time to search information of products in order to make the right decisions[10]. The term of product involvement is different from that of product evaluation which refers to positive or negative responses to specific products[18].

Involvement with products has been hypothesized to cause better perception of attribute differences, perception of product importance, and commitment to brand choice[19]. Product involvement may be influenced by different kinds of consumers, but product characteristics play an important role affecting product involvement[10]. The typical examples of low-involvement product are consumable products, such as groceries, books, and music CDs. They are low-involvement products because the impact of making the wrong purchase decisions for the products is limited[10]. Typical examples of high-involvement products are durable products of which functionality is complex, price is high, and life is long, such as consumer electronics, appliances, and automobiles[10]. The wrong purchase decisions may cause financial effects and waste consumers' time to deal with poor products[10].

2.3 Presentation Modes on Line Messenger
In general, there are two types of presentation mode on commercial websites. They are text-only and image-text modes [6]. For Line official account, three types of presentation modes are usually used, including text-only, image-text, and emoji-text as shown in Figure 1. For text-only, only texts and punctuations are included in the advertising content. For image-text, texts, images, and punctuation are included. For emoji-text, texts, emojis, and punctuation are included. Different from the format of images in general websites or blog in which images can be arrayed according with wishes, the format of images in Line official account is fixed the upper left. Emojis are extensively used in electronic text-based conversations, such as instant message, Facebook, and Line.
2.4 Hypothesis Development

Image-text presentation mode refers to the content of advertising including image and text, while emoji-text refers to the content of advertising including emoji and text. Research shows that image plays an important role that attracts audiences’ attention[16]. In addition, because emoji could communicate writers’ emotions effectively[20] and it is picture-based[21], we suggest that emoji also plays an important role attracting audiences’ attention. According to Competition for Attention Theory, in the image-text and emoji-text presentation modes image and emoji will compete for attention significantly and influence the audiences’ attention on reading text[15]. It will affect audiences’ recall regarding the content of texts that provides major advertising information. Thus, we propose the following hypotheses:

H1a. Recall of advertising information will be higher in the text-only presentation mode than in the emoji-text presentation mode.

H1b. Recall of advertising information will be higher in the text-only presentation mode than in the image-text presentation mode.

H1c. Recall of advertising information will be higher in the emoji-text presentation mode than in the image-text presentation mode.

It is suggested that the level of consumers’ involvement would be higher when they perceive that there are higher level of financial risk[10]. This is because under the situation the consumers perceive better perception of product importance toward the objects[19] and spend more effort in order to decrease possible financial losses. It is reasonable to believe that the more important consumers perceive the product, the more concentrated consumers are toward the advertising. Since concentration is relevant to recall, we propose the following hypothesis:

H2. Recall of advertising information will be higher in the high-involvement product context than in the low-involvement product context.

RESEARCH DESIGN

3.1 Experiment Procedure

Each type of products includes six advertising tasks. That is, there are six high-involvement product advertisements as well as six low-involvement product advertisements. There are 6 questions for high-involvement product and 6 questions for low-involvement product. For high- or low-involvement product, there are 41 option-items for each of the 6 questions. Among the 41 option-items, the subject would actually browse the 22 items and 19 items are not seen in the contents of advertisements. Each subject was asked to give the answers regarding the advertising contents on the questionnaires. If they choose one correct option-item, they will get one point. This highest score for each of the questionnaire is 22. For example, if the subject can point out 15 correct option-items, he or she will get 15 points.

3.2 Subjects and Incentives

We employed a 2×3 between-subject full-factorial design. The two independent variables are product involvement (high versus low) and presentation modes (text-only versus image-text versus emoji-text). Participation in this study was voluntary. The subjects were randomly assigned to each of the three experimental conditions with different types of presentation modes.
(text-only versus image-text versus emoji-text). There were 192 questionnaires received after the experiment procedures. Two questionnaires were disregarded, since the two subjects didn’t fill in their demographic information. This results a 190 valid dataset. Table 1 shows the valid questionnaires received from the experiment of this study.

<table>
<thead>
<tr>
<th>Involvement</th>
<th>Text-only</th>
<th>Image-text</th>
<th>Emoji-text</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-involvement</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Low-involvement</td>
<td>32</td>
<td>30</td>
<td>32</td>
</tr>
</tbody>
</table>

There were two types of participation reward for participation in the experiment sessions. For the session of high-involvement product, we offered NTDS 200 participation reward to the subjects who gave the correct answers rate from 71%-100%, NTDS 100 for 35%-70%, and no reward for the subjects below 34% to increase their attentions in the experiment. The objective is to encourage the participants to seriously browse the contents of the advertising tasks, thereby to simulate the high involvement context. One the other hand, for the session of low-involvement product, we provide NTDS 100 to all participants if they have finish the experiment sessions.

**DATA ANALYSIS**

To summarize the experiment results and validate the proposed hypotheses of our study, we performed descriptive statistics analysis, two-way MANOVA analysis and t-tests, respectively. As for the results of the descriptive statistics analysis, Table 2 summarizes the values of mean and standard deviation for three types of presentation modes. Further, we also tested the proposed plausible hypotheses of this study.

<table>
<thead>
<tr>
<th>Presentation mode</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text-only</td>
<td>64</td>
<td>15.84</td>
<td>2.81</td>
</tr>
<tr>
<td>Image-text</td>
<td>62</td>
<td>15.63</td>
<td>2.89</td>
</tr>
<tr>
<td>Emoji-text</td>
<td>64</td>
<td>16.06</td>
<td>2.93</td>
</tr>
</tbody>
</table>

Prior to the two-way MANOVA analysis, a Levene-test (F = 0.611, Sig. = 0.691) showed that the observed covariance matrices for the dependent variables were equal across groups. This test result suggested that further MANOVA test was worth pursuing. The two-way MANOVA analysis indicated that there was no interaction between the presentation modes and types of product involvement for the recall of advertising information (F = 0.087, Sig. = 0.917). The two-way MANOVA result shown in Table 3 indicated that the recall performance of advertising information was significantly different among the types of product involvement (F = 10.46, Sig. = 0.001), but not significantly different for various presentation modes (F = 0.407, Sig. = 0.666).

<table>
<thead>
<tr>
<th>Effect</th>
<th>Sum of Mean Square</th>
<th>F statistics</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation Mode</td>
<td>3.232</td>
<td>.407</td>
<td>.666</td>
</tr>
<tr>
<td>Involvement Type</td>
<td>83.082</td>
<td>10.456</td>
<td>.001**</td>
</tr>
<tr>
<td>Involvement Type* Presentation Mode</td>
<td>.690</td>
<td>.087</td>
<td>.917</td>
</tr>
</tbody>
</table>

**p<0.01

Although the analysis result of two-way MANOVA didn’t signify significant differences among the three presentation modes (i.e. text-only, image-text, and emoji-text), we still decided to perform the t-tests to rigorously validate the proposed three major hypotheses regarding the effects of presentation modes on the recall of advertising information. As hypothesized in H1a, the recall of advertising information will be higher in the text-only presentation mode than in the emoji-text presentation mode. The descriptive analysis shown in Table 2, the recall of advertising information was higher in the emoji-text (mean = 16.06) presentation mode than in the text-only (mean = 15.84) presentation mode. Besides, out of our previous expectation, there is not significant difference between the two modes of text-only and emoji-text presentation for Line SMS advertising information. Thus, the results did not support the proposed hypothesis, H1a.

<table>
<thead>
<tr>
<th>Variable</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall</td>
<td>0.43</td>
<td>0.667n.s.</td>
</tr>
</tbody>
</table>

n.s.: non-significant, *p<0.05, **p<0.01, ***p<0.001

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H1b hypothesized that recall of advertising information will be higher in the text-only presentation mode than in the image-text presentation mode. As expected, recall of advertising information was higher in the text-only (mean = 15.84) presentation mode than in the image-text (mean = 15.63) presentation mode (see Table 2). However, the result of the t-test shown in Table 5, the difference between text-only and image-text presentation modes of Line SMS advertising information was not significant. Thus, the results did not support the proposed hypothesis, H1b.

<table>
<thead>
<tr>
<th>Table 5. t-test for comparing text-only and image-text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Recall</td>
</tr>
</tbody>
</table>

H1c hypothesized that recall of advertising information will be higher in the emoji-text presentation mode than in the image-text presentation mode. As expected, recall of advertising information was higher in the emoji-text (mean = 16.06) presentation mode than in the image-text (mean = 15.63) presentation mode (see Table 2). However, the t-test result shown in Table 6, there is no significant difference found between emoji-text and image-text presentation modes of Line SMS advertising information.

<table>
<thead>
<tr>
<th>Table 6. t-test for comparing emoji-text and image-text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Recall</td>
</tr>
</tbody>
</table>

Further, in order to substantiate the hypothesis, H2, we performed a t-test to check if the recall of advertising information will be higher in the high-involvement product context than in the low-involvement product context. Given that consumers may perceive better perception of product importance toward the objects and spend more effort in order to decrease possible financial losses; and so, the more consumers involve in the processes to procure the products, the more concentrations and attentions they may place on the advertising information regarding the ones they want. As the descriptive analysis results shown in Table 7, the values of mean and standard deviation for two types of product involvement show the initial evidence to support that the recall of advertising information will be higher in the high-involvement product context than in the low-involvement product context.

<table>
<thead>
<tr>
<th>Table 7. Mean and standard deviation for two types of product involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement</td>
</tr>
<tr>
<td>High-involvement</td>
</tr>
<tr>
<td>Low-involvement</td>
</tr>
</tbody>
</table>

As expected, the recall of advertising information was higher in high-involvement product context (mean = 16.50) than in low-involvement product context (mean = 15.18). As described in Table 8, the difference was significant (p = 0.001**). Thus, the result was support the hypothesis. This seems to indicate that consumers may spend more effort in order to decrease possible financial losses in purchasing high-involvement products than low-involvement products.

<table>
<thead>
<tr>
<th>Table 8. t-test for comparing high-involvement and low-involvement products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Recall</td>
</tr>
</tbody>
</table>

n.s.: non-significant, *p<0.05, **p<0.01, ***p<0.001

CONCLUSION

This study was motivated by the relatively little information known regarding the Line-based advertising. The result indicates that recall of advertising information was higher in the emoji-text presentation mode than in the text-only presentation mode, but the difference was not significant. In addition, recall of advertising information was higher in the text-only presentation mode than in the image-text presentation mode, but the difference was not significant. Furthermore, the recall of advertising information was higher in the emoji-text presentation mode than in the image-text presentation mode, but the difference was also not significant. Finally, recall of advertising information was higher in the high-involvement product context than in the low-involvement product context and the difference was significant. Accordingly, involvement is significant for the effectiveness of Line SMS advertising. Thus, in order for advertisers to design valid ads, it is important to create an involvement environment. Our research findings can provide instrumental guidelines for the practitioners to better achieve the goals of...
ads in the “LINE” SMS environment. Moreover, the empirical results may provide insights into the research of advertising interface design of SMS and integrating efforts from cognitive science and vision research to understand users’ involvement of SMS advertising processes.

**REFERENCE**


ABSTRACT

The growth and popularity of SNSs such as Facebook and Twitter have created a new world for users to conduct activities such as posting, viewing, sharing, replying and playing. One of the most important user participation behaviors is self-disclosure. This study attempts to investigate the relation between privacy risk and self-disclosure behavior in SNSs and to understand how the users selectively reveal personal information in an environment with high privacy risk. By integrating Communication Privacy Management Theory, Disclosure Decision Model and Social Capital Theory, we propose a SNS user self-disclosure model. In particular, we propose that perceived privacy risk (PPR) and perceived information control ability (PICA) are the two key antecedents of user self-disclosure. We further suggest that the three dimensions of social capital, namely, relational dimension, cognitive dimension, and structural dimension, influence PPR and PICA respectively. A survey was conducted and structural equation modeling (SEM) was employed for data analysis. Our hypotheses are generally supported. Research implications are discussed.

Keywords: Social Networking Sites (SNS), Accuracy of Self-disclosure, Perceived Information Control Ability (PICA), Perceived Privacy Risk (PPR), Social Capital.

INTRODUCTION

Social networking sites (SNS) is a cyber environment that allows the individual to construct his/her profile, sharing text, images, and photos, and to link other members of the site by applications and groups provided on the Internet[4][40]. The growth and popularity of SNSs such as Facebook and Twitter have created a new world for users to conduct activities such as posting, viewing, sharing, replying and playing[53]. Compared with traditional blogging, micro blogging is a more rapid and real-time communication mode, which requires less invested time and generated content, as a result it allows users to update more frequently and it encourages more personal topics[25].

People talk about themselves or their lives is usually considered as self-disclosure. Self-disclosure is a voluntary act that reveals personal information to others[52]. Different from information or knowledge sharing, self-disclosure is more related to revealing personal information and to the issue of privacy [1] and it is good input for building a reliable and trustworthy SNS e-business recommendation system. However, self-disclosure in SNS has its contradictions. On one hand, participants in SNSs expect to disclose more information in a more private level for the sake of self-discovery, gaining social capital, building social identity [11][53]. On the other hand, self-disclosure in SNS is faced with potential privacy threats, such as using the account information to reset users' social security number and reveal private information like birthday or hometown[18]. As we all know, SNSs remain their attractiveness only if people are willing to disclose themselves and communicate with each other. People received the self-disclosure motivation from a social level and then they reveal their information or thoughts in different ways. We want to discovery the process that how people handle the relationship between the desire to disclose and the privacy risk and this may give some advice to the SNSs operating company. Therefore, we attempt to investigate the relation between privacy risk and self-disclosure behavior in SNSs and to understand how the users selectively reveal personal information in an environment with high privacy risk. By integrating Communication Privacy Management Theory, Disclosure Decision Model and Social Capital Theory, we propose a SNS user self-disclosure model. In particular, we propose that perceived privacy risk (PPR) and perceived information control ability (PICA) are the two key antecedents of user self-disclosure. We further suggest that that the three dimensions of social capital, namely, relational dimension, cognitive dimension, and structural dimension, influence PPR and PICA respectively.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

Self-disclosure Behavior

The concept of self-disclosure is originally defined in psychology literature as the process that individuals in society transfer personal information and share ideas and emotions [26][27]. Since then, the concept and effect of self-disclosure are widely discussed by scholars. The concept of self-disclosure has been recognized by many prior literature as a multi-dimensional construct, comprising dimensions including (a) the amount of self-disclosure, (b) the intentionality of the person to self-disclose information, (c) the honesty or accuracy of the message being self-disclosed, (d) the depth or intimacy of the message being self-disclosed, and (e) the positiveness or valence of the message being self-disclosed [46][51][52].
Focusing on user behavior in micro blogging websites, we define self-disclosure in SNSs as the process that participants in a social networking site transfer personal information and share ideas and emotion. Compared with traditional blogging, micro blogging is a more rapid and real-time communication mode, which requires less invested time and generated content, as a result it allows users to update more frequently and it encourages more personal topics [25]. Self-disclosure behavior in SNSs shares many commonalities with general information and knowledge sharing behavior. Similarly, the intention of sharing in SNS could be viewed as a function of two decisive factors. In the individual level, participants concern about the benefits they can get from information sharing. In the social level, SNS users may perceive themselves as members in the organization and have participation intentions[2]. However, self-disclosure is different from general information and knowledge sharing in the degree of personal information and emotion exposure, and thus the privacy issue might be more sensitive [1].

Intention to share on SNSs
As one of the crucial activities in SNSs, knowledge or information sharing has been studied by many scholars. On the aspect of individual consideration, participants might care more about the benefits they derive from sharing information. At the same time, SNS users are likely to perceive themselves as members of a group and form participation intentions [2]. Bagozzi and Dholakia modeled participants’ intentions to participate together as a group as a function of individual and social determinants. Following their lead, many researchers, such as Dholakia, Bagozzi, and Pearo, have postulated some variables on these two determinants to develop participation theories in the context of virtual communities [11]. Individuals are not only concerned with how they can benefit from information sharing, but also consider group influence, which always generates common standards and pressures people to act. Therefore, when we study the behavior of self-disclosure in SNSs, both individual and social factors are worth investigating. In the individual part we use the privacy theories to conclude individual behavior and the social capital theory, which was so popular in SNS research, is used to explain the social factors.

Self-disclosure and Privacy Risk
The process of self-disclosure inevitably involves with privacy. Prior research indicates that users’ action would be affected by privacy or risk[15][32]. Petronio [39] proposes Communication Privacy Management Theory to explain how people manage their private information under the influence of individual and group. Privacy disclosure is a critical balance after people considering whether to reveal their privacy [7]. In other words, people will set up privacy boundary during the privacy information management process and disclose selectively. Omarzu (2000) propose Disclosure Decision Model to explain the cognitive process of self-disclosure decision. Self-disclosure is a strategic behavior in this model. After the disclosure purpose is settled, users will have subjective assessment of the utility and risk and decide the content, depth, breadth and duration of disclosure [37]. Both of two models consider self-disclosure as a rational decision-making process and have control and evaluation stages.

Both of the Communication Privacy Management Theory and Disclosure Decision Model view privacy risk as a countable factor users will take into account before self-disclosure, meanwhile both of theories include users’ perceived information control ability. Research shows that first-order measurement factor of users’ information privacy concerns are information collection, information control and consciousness [33]. While facing high level of privacy risk, people will tend to adopt stronger information control behavior [36].

Social Capital Theory
Social capital theory has been proposed to explain different prosaically behavior including community participation [50]. SNS provides different online interactive application such as friend lists, photo albums and search function, letting more and more people to establish and maintain their own social capitals in the social network [14][42]. There are three dimension of social capital, namely, structural dimension, relational dimension and cognitive dimension [9].

The structural dimension describes the pattern, density, connectivity and hierarchy of network [47]. The society and network relations decide who can be contact to and how did it achieve [47], these relations are formed when community members communicate with each other [49]. Burt [5] found individual who was in the center of network and has relation with more other members have the tendency to share continuously. In the internet environment, members have higher centrality will disclose more and reply helpfully [50].

The relational dimension is composed of norms [22][23][31], obligation [23][35], trust [9][23][24][35][41], and identification, which raise people’s awareness of collective goals [23][35]. In SNS, trust is defined as the match degree of behavior and own interest users think while others using their private information.[28]. Trust can reduce the perceived privacy risk and enhance the willingness to communicate and share [13][34].

The cognitive dimension means the resources which can promote the understanding between community members like shared goal, culture and ideas[9][24][55]. Tsai and Hoshal [48] found that shared vision is an important factor in cognitive dimension, it enhances group cohesion significantly and decides the group type. When the community shared vision was given, SNS users will be easy to find the common faith and disclose themselves.

RESEARCH MODEL AND HYPOTHESES
This study investigates the relation between privacy risk and self-disclosure behavior in SNSs and to understand how the users selectively reveal personal information in an environment with high privacy risk. Specifically, we propose that perceived
privacy risk (PPR) and perceived information control ability (PICA) are the two key antecedents of user self-disclosure. We further suggest that the three dimensions of social capital, namely, relational dimension, cognitive dimension, and structural dimension, influence PPR and PICA respectively. Our research model is presented in Figure 1.

![Figure 1 Research Model](image)

**Perceived Information Control Ability**

In our study, perceived information control ability is defined as the confidence level of SNS users for the relevance of the disclosed information flow and privacy boundary. Research indicates that control is an important factor affecting privacy concerns[33]. Perceived control has a significant negative effect on privacy concerns [54]. In other words, people who have higher level of information control ability will perceive less privacy risk [15]. SNS users who have better information control can handle the information flow better and manage their privacy boundary better, thus they will face less privacy risk. Hence we hypothesized that:

**H1**: SNS users’ perceived information control abilities are negatively associated with perceived privacy risks.

According to Communication Privacy Management Theory and Disclosure Decision Mode, the process of self-disclosure is dynamic and will change as the situation changes. Hence, information control ability may affect the accuracy of self-disclosure. The potential effect should be considered as speculative [43]. Most studies consider information control as a factor will affect the privacy risks but not self-disclosure. However, social network site has a more rapid and real-time communication mode and it may shorten the decision process. Hence we hypothesize that:

**H2**: SNS users’ perceived information control abilities are positively associated with the accuracy of self-disclosure.

**Perceived Privacy Risk**

Communication Privacy Management Theory has explained how people manage their private information under the influence of individual and group, people will set up the privacy boundary during disclosure process[7]. When the information risk is hard to predict accurately in SNS, people will take the perceived privacy risk as reference for privacy boundary. If users perceive high level of privacy risk in the SNS environment, they will modify the content, such as beautify or hide[32]. We therefore come up with the following hypothesis:

**H3**: SNS users’ perceived privacy risks are negatively associated with the accuracy of self-disclosure.

**Social Capital**

The factor affecting self-disclosure can be divided to individual factors and social factors and we use social capital theory to interpret the social factors.

In the structural dimension, we use centrality as the measurement. The people who have higher level of centrality will have better control ability to group structure, group attributes and group behavior [3][5][45]. Higher level of centrality means better master degree of privacy information audiences and better perceived information control ability. Hence we hypothesize that:

**H4**: The centralities of SNS users are positively associated with their perceived information control ability.

In relational dimension, we adopt trust as measurement. Many researches found trust has significant negative influence on perceived privacy risk[13][34]. In the environment of social network sites, the research object of trust can be divided into two kind[13], one is trust on the websites[15][38], another is trust on members [21]. Because of the trust on the website and on the friends, individuals worry less about their private information will be misused or reveal and the perceived privacy risks become lower. Hence we hypothesize that:

**H5a**: SNS users’ trust on websites is negatively associated with the perceived privacy risk.

**H5b**: SNS users’ trust on members is negatively associated with the perceived privacy risk.

In cognitive dimension, we use shared vision as measurement. Shared vision enhances group cohesion significantly and decides the group type [48]. In SNS, users’ subjective self-disclosure must associate with their values because of the originality. If individual has higher level of shared vision in the community, the disclosed content will be easier to accept by the audience.
and the potential risk will be lower. Hence we hypothesize that:

\[ H6: \text{SNS users’ shared visions are negatively associated with the perceived privacy risk.} \]

**METHODOLOGY**

We used questionnaires to test our hypothesis. To ensure the face validity we adopted mature scale to measure relevant variables. We adjusted each item for the SNS situation and integrate the contents refer to existing literatures. Table 1 shows the final scale of our questionnaire. A seven point Likert scale was used to measure each item. In the environment of internet, privacy concerns can be divided into abuse and finding[12]. Abuse refers to stolen or improper use of information and finding refers to information observation by improper audiences or information reveal. We choose the finding dimension as measurement because finding has widen range and suitable for the open platform in SNSs. For the measurement of centrality, we asked participants about their friends in SNSs but many participants didn’t answer or could only provide approximate numbers. To reduce the uncertainty, we developed a static evaluation scale based on the concept of social enhancement[45]. Social enhancement refers to the acceptance and approval values participants get from other members and users’ status enhancement after involvement [6]. Using the static evaluation of social enhancement process is similar with the concept of centrality. Both of the concepts are relevant with uses’ status in the community and the relations with others.

The main research object of this study was Chinese college students. We sent 175 questionnaires and received 174. We built strict rules to filter our filled questionnaires and eventually 157 questionnaires were valid. In 157 questionnaires, 155 of them have one or more SNS accounts and 93.5% of them have a SINA micro blogging account. As there were 25 items in the scale, our sample size is 6.2 times of the items number and it is a bit poor for a covariance-based structural equation model(CB-SEM). In a partial least squares structural equation model(PLS-SEM), the minimum sample size should be large as ten times the largest number of formative indicators or the largest number of structural paths directed at a particular latent construct[19]. Our model and sample size met the requirements and could be further analyzed. Hence, We will use SPSS 19.0, SmartPLS 2.0 to analyze the data.
DATA ANALYSIS AND DISCUSSION

Descriptive Statistics
We will use the 155 valid questionnaires which have SNS account for further analysis. There are 63 males and 92 females in the participants. 123 participants’ education degree is bachelor and 28 participants are master. The average age of the sample is 22.05, ranging from 18 years old to 28 years old. 90.97% participants have registered their SNSs account for more than 6 months. In SNS, only 35.48% people will use their real names but 56.8% people will upload personal real photos and 67.74% people will provide real contact information.

Reliability and Validity
Cronbachs Alpha is acceptable when it’s higher than 0.7[17] and it show model have good reliability . As the result in Table 2 we know all the α statistics are higher than 0.7 expect perceived information control ability(PICA).Other indicator of PICA have passed the test, so its scale and data are effective. The composite reliability statics of all variables have reached the threshold value of 0.7 [19]. All of the AVE statics are higher than 0.5 and the model have a good convergent validity[16].

Table 3 shows the cross loading of each item, the loading of each variable’s item is bigger than other cross loading. Meanwhile, in Table 4 we know the AVE square root of each variable is far higher than the correlation coefficient with other variables and it means the model has good discriminant validity[16].

In a word, the result of reliability and validity is acceptable and further analysis can be continued.

Table 1 Questionnaire items

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>Question</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Information Control Ability (PICA)</td>
<td>PICA1</td>
<td>I will provide accurate and private information only when the websites allows me to control it.</td>
<td>[15][30]</td>
</tr>
<tr>
<td></td>
<td>PICA2</td>
<td>It's very important for me to control my personal information I provided to the website.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PICA3</td>
<td>I will provide accurate and private information only when the website control policy is validated or supervised by trusted third party.</td>
<td></td>
</tr>
<tr>
<td>The Accuracy of Self-disclosure (AC)</td>
<td>AC1</td>
<td>My statements about my feelings, emotions, and experiences are always accurate self-perceptions.</td>
<td>[15][30]</td>
</tr>
<tr>
<td></td>
<td>AC2</td>
<td>I always feel completely sincere when I reveal my own feelings and experiences.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC3</td>
<td>I intimately disclose who I really am, openly and fully.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC4</td>
<td>I am always honest in my self-disclosures.</td>
<td></td>
</tr>
<tr>
<td>Perceived Privacy Risk (PPR)</td>
<td>PPR1</td>
<td>When I use SNSs I have the feeling of being watched.</td>
<td>[12][15][20]</td>
</tr>
<tr>
<td></td>
<td>PPR2</td>
<td>When I use SNSs I feel all my operations have been tracked or monitored.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPR3</td>
<td>I worry about others can find my following information in SNSs: My birthday and birth place; information of my close family members; home address, work place and phone number of the two; present and previous address and the phone number of the two; Personality traits and interests; Financial and social status.</td>
<td></td>
</tr>
<tr>
<td>Centrality (CE)</td>
<td>CE1</td>
<td>I left a deep impression to other when using SNSs.</td>
<td>[45][50]</td>
</tr>
<tr>
<td></td>
<td>CE2</td>
<td>I feel myself important when using SNSs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CE3</td>
<td>I feel surrounded by friends who care about me when using SNSs.</td>
<td></td>
</tr>
<tr>
<td>Trust on Websites (TW)</td>
<td>TW1</td>
<td>I think the SNSs platform is a trustworthy website for me.</td>
<td>[21][38][44]</td>
</tr>
<tr>
<td></td>
<td>TW2</td>
<td>I can believe that SNSs platform can protect my privacy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TW3</td>
<td>I can believe that SNSs platform will protect personal information from unauthorized use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TW4</td>
<td>It's credible that SNSs platform will keep its promise.</td>
<td></td>
</tr>
<tr>
<td>Trust on Members (TM)</td>
<td>TM1</td>
<td>Even there are opportunities, friends on SNSs won't exploit others.</td>
<td>[8][21][38]</td>
</tr>
<tr>
<td></td>
<td>TM2</td>
<td>My friends on SNSs will keep their promise to others.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM3</td>
<td>My friends on SNSs won’t do anything on purpose to destroy communications.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM4</td>
<td>The performance mode of my friends on SNSs is consistent.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TM5</td>
<td>My friends on SNSs are sincere during the interactions.</td>
<td></td>
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<tr>
<td>Shared Vision (SV)</td>
<td>SV1</td>
<td>My friends on SNSs have common goals and hobbies.</td>
<td>[8]</td>
</tr>
<tr>
<td></td>
<td>SV2</td>
<td>My friends on SNSs have similar views and interests.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SV3</td>
<td>My friends on SNSs have many similar places.</td>
<td></td>
</tr>
<tr>
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<td>Standard error</td>
<td>T-statistic</td>
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Table 3 Crossing loading

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<th>TW</th>
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<th>SV</th>
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<td>0.12</td>
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<td>-0.14</td>
<td>0.13</td>
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<td>0.34</td>
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<td>0.20</td>
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<td>0.15</td>
<td>0.34</td>
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<td>0.18</td>
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<td>0.24</td>
<td>0.15</td>
<td>0.41</td>
<td>0.99</td>
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<tr>
<td>SV3</td>
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<td>0.19</td>
<td>0.00</td>
<td>0.22</td>
<td>0.21</td>
<td>0.45</td>
<td>0.73</td>
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</table>

Table 4 Correlation coefficient and AVE square roots

<table>
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<tr>
<th></th>
<th>PICA</th>
<th>AC</th>
<th>PPR</th>
<th>CE</th>
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<tr>
<td>PICA</td>
<td>0.77</td>
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<tr>
<td>AC</td>
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<tr>
<td>CE</td>
<td>0.20</td>
<td>0.25**</td>
<td>-0.05</td>
<td>0.86</td>
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<td>0.28**</td>
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<td>0.25**</td>
<td>0.17**</td>
<td>0.44**</td>
<td>0.85</td>
</tr>
</tbody>
</table>

Note: 1. In the lower triangular region there are correlation coefficient between variables and in the diagonal there are the AVE square roots of variables. 2. ** indicates significant at the 0.01 level, * indicates significant at the 0.05 level.

Hypothesis Testing

Using SmartPLS 2.0, we set 155 as the sample size and 3000 as the repeat count in Bootstrap test. Finally we have the path analysis result in Table 5. Five of seven original hypotheses have been supported and one of them is reverse.

Table 5 The Result of Hypothesis Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Parameter Estimates</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>T Statistics</th>
<th>Conclusion</th>
</tr>
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<tbody>
<tr>
<td>H1</td>
<td>PICA -&gt; PPR</td>
<td>0.25</td>
<td>0.24</td>
<td>3.23</td>
<td>Support(Reverse)</td>
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<tr>
<td>H2</td>
<td>PICA -&gt; AC</td>
<td>0.18</td>
<td>0.19</td>
<td>2.03</td>
<td>Support</td>
</tr>
<tr>
<td>H3</td>
<td>PPR -&gt; AC</td>
<td>-0.20</td>
<td>-0.21</td>
<td>2.13</td>
<td>Support</td>
</tr>
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<td>H4</td>
<td>CE -&gt; PICA</td>
<td>0.20</td>
<td>0.22</td>
<td>2.40</td>
<td>Support</td>
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<tr>
<td>H5a</td>
<td>TW -&gt; PPR</td>
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<td>-0.41</td>
<td>4.67</td>
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<td>H5b</td>
<td>TM -&gt; PPR</td>
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<td>0.01</td>
<td>0.19</td>
<td>Not Support</td>
</tr>
<tr>
<td>H6</td>
<td>SV -&gt; PPR</td>
<td>0.08</td>
<td>0.07</td>
<td>0.59</td>
<td>Not Support</td>
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</table>

Note: T=1.65, p=0.1; T=1.96, p=0.05; T=2.58, p=0.01. [19]
Discussion

In Figure 2, the data in each path was showed in the format of "path parameter (T statics)". Five hypotheses are supported while one of them is reverse with the original hypothesis.

There is existing research shows that perceived control has negative influence on privacy concern[54]. Fogel and Nehmad also think people have stronger information control ability will perceive less privacy risk[15]. Different from their studies, our research result shows that perceived information control ability has positive influence on perceived privacy risk. In a 2009 research of Facebook, there are no significant relation between information control ability and self-disclosure[10]. Different from this research we found there are significant positive relations between perceived information control ability and the accuracy of self-disclosure. We focus on these two hypothesis different from former researches and think there may be four reason. Firstly, the rapid and real-time communication mode of micro blogging shortens the self-disclosure process. Secondly, as many privacy society events happened, users had more concerns of privacy risk and adopted more strict information release rule. Meanwhile we measurement the perceived information control ability but not real ability and this may reflect the awakening of people privacy concerns. Thirdly, SNSs platform provide more functions for users to control information, such as the audience choice function (appears in Facebook in 2010 and SINA micro blogging in 2012). Fourthly, users take some measures to strengthen information control, for example they can release different content in different kinds of SNSs. We think these two changing path is interesting and worth further study.

Former research indicates that people have higher level of centrality in the community will have stronger control ability of group structure, group attributes and group behavior[3][5][45]. Our research finds that the user’s centrality has positive influence on perceived information control ability and we clear the relationship between the two variables. Trust has significant negative influence on perceived privacy risk [13][34]. The result of our study shows the factors which have negative influence on perceived privacy risk is trust on websites but not trust on members or shared vision in the environment of SNSs. We think the reason may be that most participants’ SNSs accounts are in SINA micro blogging platform. The information people released in SINA micro blogging can be read by public and users may not know the true identity of the audience. So the effective trust is still stay at the website level but not member level, and the share vision platform haven’t been fully constructed yet.

CONCLUSIONS AND IMPLICATIONS

By integrating Communication Privacy Management Theory, Disclosure Decision Model and Social Capital Theory, we propose a SNS self-disclosure model by identifying perceived information control ability (PICA) and perceived privacy risk (PPR) as two key antecedents of self-disclosure in SNSs. Further, the three dimensions of social capital are identified to be the antecedents of PICA and PPR.

As there were already some articles investigate the self-disclosure behavior in SNS and mainly focused on the effect or performance of self-disclosure. For example, scholars found the interaction effect between self-disclosure and social connection will directly predict Facebook communication and indirectly predict relational closeness[29]. As self-disclosure plays an important part in SNSs, our research focused on the decision process of self-disclosure behavior. From theoretical perspective, this research investigates self-disclosure in SNSs by integrating three theories from different perspectives. Second, this research constructs a self-disclosure model by including both the individual and social factors. Third, we clarify the significant relationship between centrality and perceived information control ability. Last but not least, we found the factor effects perceived privacy risk is trust on websites but not trust on members or shared vision and this may relate to the characteristic of micro blogging.
From practical perspective, our research results may provide some suggestions to the development of SNSs. We discovered the audience choice function can enhance users’ information control ability. It’s an affirmation for the release of the audience choice function to the operating company(e.g. the group application in Facebook, audience choice function in SINA micro blogging, etc.). Meanwhile, our self-disclosure model gave some directions to promote the accuracy of self-disclosure in SNSs, such as the explicitness of perceived privacy risk. There could be some privacy risk analysis plug-in in SNSs. Finally, we found that, arguably, the trust of SNSs was stay at the platform level but not member level. Future research could be conducted to further verify this issue.

REFERENCES

THE EFFECTIVE USE OF CROWDSOURCING IN E-GOVERNANCE

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ABSTRACT

The rise of Web 2.0 paradigm has empowered the Internet users to share information and generate content on social networking and media sharing platforms such as wikis and blogs. The trend of harnessing the wisdom of public using Web 2.0 distributed networks through open calls is termed as ‘Crowdsourcing’. In addition to businesses, this powerful idea of using collective intelligence or the ‘wisdom of crowd’ applies to different situations, such as in governments and non-profit organizations which have started utilizing crowdsourcing as an essential problem-solving tool. In addition, the widespread and easy access to technologies such as the Internet, mobile phones and other communication devices has resulted in an exponential growth in the use of crowdsourcing for government policy advocacy, e-democracy and e-governance during the past decade. However, utilizing collective intelligence and efforts of public to find solutions to real life problems using web 2.0 tools does come with its share of associated challenges and limitations. This paper aims at identifying and examining the value-adding strategies which contribute to the success of crowdsourcing in e-governance. The qualitative case study analysis and emphatic design methodology are employed to evaluate the effectiveness of the identified strategic and functional components, by analyzing the characteristics of some of the notable cases of crowdsourcing in e-governance and the findings are tabulated and discussed. The paper concludes with the limitations and the implications for future research.

Keywords: Crowdsourcing, E-Governance, Strategic and Functional Components.

INTRODUCTION

The rise of Web 2.0 paradigm has empowered the Internet users to share information and generate content on social networking and media sharing platforms such as wikis and blogs. Web 2.0, as broadly defined by Weinberg and Pehlivan (2011), consists of computer network-based platforms on top of which social media tools and applications operate. Thus the capabilities of web 2.0 such as increased pervasiveness and empowered users are playing a major role in shaping up the new business scenario wherein businesses are typically built based on the wisdom harnessed from the crowd through open calls. This trend of harnessing the wisdom of public using Web 2.0 distributed networks through open calls was observed and which in turn led to the coining of the new term ‘Crowdsourcing’.

By simple definition, ‘Crowdsourcing’ represents “the act of a company or institution taking a function, once performed by employees, and outsourcing it to an undefined (and generally large) network of people in the form of an open call” (Howe, 2006). This can take up the form of peer-production in which the job is performed collaboratively or it can be undertaken by sole individuals. However, the most important requirement is to make use of the open call format and ensuring the existence of a large network of potential laborers (Howe, 2006). Thus, by outsourcing tasks, which were generally done by a limited group of people such as an organization’s employees or specialists, to the general public, the collective wisdom and efforts of the crowd can be utilized.

Though the term ‘Crowdsourcing’ was recently coined by Jeff Howe in the 2006 issue of Wired magazine, the concept is relatively old and has been in practice since the 1990s (Roth 2009). The power of crowd has been effectively utilized in the past to find creative and intuitive solutions for complicated problems. One such early example of crowdsourcing is the ‘Longitude Prize’; in which the British Government of 1714 announced a reward of £20,000 to the general public to come up with a solution to an issue related to navigation, known as the ‘Longitude Problem’.

According to the Economist Intelligence Unit (Economist, 2007), Web 2.0 was observed to have had significantly impacted a wide range of businesses and was predicted that Web 2.0 would be progressing further into the mainstream. In addition to businesses, this powerful idea of using collective intelligence or the ‘wisdom of crowd’ applies to different situations, such as in governments and non-profit organizations which have started utilizing crowdsourcing as an essential problem-solving tool (Brabham, 2009). As rightly pointed out by him, “The crowdsourcing model which is a successful, web-based, distributed problem solving and production model for business, is an appropriate model for enabling the citizen participation process in public planning projects” (Brabham, 2009).

Nowadays, crowdsourcing is being widely used for creating and enhancing collective knowledge and innovation, community building, civic engagement and crowd funding (Esposti, 2011). In addition, the widespread and easy access to technologies such as the Internet, mobile phones and other communication devices has resulted in an exponential growth in the use of crowdsourcing for government policy advocacy, e-democracy and e-governance during the past decade (Shirky, 2008).

In recent years, there has been an increase in the number of crowdsourcing initiatives in the e-governance sector as governments are also embracing and welcoming the idea of public participation and collaboration in governance. This is achieved with the help of tools such as social media networking platforms, blogs and discussion boards. For instance, Figure 1 shows the number of e-government initiatives undertaken by the US government till 2010 (Warner, 2011).
Although utilizing collective intelligence and efforts of public to find solutions to real life problems using web 2.0 tools is an emerging trend, it does come with its share of associated challenges and limitations. There are many crowdsourcing examples that failed to deliver accurate, reliable and good quality results. One such example is Wikipedia. The use of crowdsourcing in e-governance might also bring in new problems and challenges which may question its effectiveness and practicality. This paper aims at identifying and examining the value-adding strategies which are specific to the concept of crowdsourcing in e-governance.

The key objectives of this paper are as follows:

1. To understand the opportunities and the impact of crowdsourcing in e-governance.
2. To identify and analyze the factors, both at the strategic and functional levels, which contribute to the success of crowdsourcing technique in e-governance.
3. To evaluate the effectiveness of the identified strategic and functional components by analyzing the characteristics of some of the notable cases of crowdsourcing in e-governance.

The rest of the paper is organized as follows. Section 2 contains the literature review on the crowdsourcing concept including its essential components and opportunities, followed by which a theoretical framework ‘Crowdsourcing in E-Governance – Critical Factors Model’ is established which contains both the strategic and the functional web 2.0 components that had been identified. Section 3 proposes the methodology adopted in this paper for carrying out the qualitative research. Section 4 elaborates the background of the cases and analyzes them using the proposed theoretical framework. Section 5 contains the analysis report based on the emphatic design method adopted to carry out the empirical research. Section 6 includes the discussion and findings of the research. In conclusion, we provide the limitations of the study as well as implications for future research.

LITERATURE REVIEW

The concept of drawing intelligence from the crowd has been gaining increasing scholarly attention. Crowdsourcing, which has become a major phenomenon in recent years, is proving to be instrumental in promoting collaboration and innovation in business, research and government alike. Networking platforms provide the active web users with two-way communication capabilities which assist them in generating content and in contributing creative ideas in the form of fragmented input or in the form of feedback (Levy, 1997). Schenk & Guittard (2011) points out that there are three different players in crowdsourcing:

1. Individuals who form the crowd and are responsible for generating the content.
2. Organizations which benefit, directly or indirectly, from the crowd’s wisdom.
3. Crowd-sourcing enablers who serve as the intermediary platform, building a link between the crowd and the organizations.

Crowdsourcing, as already mentioned, has been setting a trend in businesses and governments alike. Open-source governance has empowered the otherwise ordinary citizens with ways to be involved in government policy-making activities. Theoretically, open-source governance is found to be more influential in affecting changes than what the periodic election does (“Open-source Governance”, 2013). Crowdsourcing is, therefore, increasingly being viewed as a core mechanism of the new systematic approaches to governance focusing on addressing the highly complex and dynamic challenges of poverty, armed conflict and other similar crises (Bott & Young, 2012).

However, it has to be admitted that there are cognitive limits to interactivity and unless the reasons are strong enough to directly touch the emotions of the people and thereby tap their creativity, it is quite improbable to grab their attention and make them stay involved for long enough to create an impact (Bott et al., 2012). But this is not so easily achievable as there are several issues worldwide, competing among themselves to draw people’s attention, and making them focus on a specific issue and motivating them to contribute is becoming more difficult. This is where rewards play their roles and as observed in an empirical investigation conducted by Zheng el al (2011), in general, people consider recognition as a more valuable and motivating factor to participate in crowdsourcing activities rather than monetary allowances. Also, the significance of crowdsourcing will continue to grow if it is coupled with the real-life interests and requirements of the users.

Figure 1: Number of US E-Government Crowdsourcing Initiatives
Thus, in this paper, we adopt a theoretical framework to analyze a set of case studies to understand the effectiveness of crowdsourcing in e-governance and the extent to which web 2.0 components enable the successful implementation of crowdsourcing technique for governance purposes. This framework includes the strategic (i.e., objectives or goals) and functional (i.e., web 2.0 features) components mainly drawn from the “Crowd-sourcing Critical Success Factors Model” of Sharma (2010) and the “Web 2.0 – 4 Factors Model” of Wirtz, Schilke and Ullrich (2010). A critical factor is defined as one which is considered as a significant driver of a system’s success (Ngwenyama, 1991). Based on the views of Heeks & Nicholson (2004), Carmel (2003), Farrell (2006) and Balasubramanyam & Balasubramanyam (1997), Sharma (2010) had proposed a set of critical strategic factors which have the potential to create a positive impact when considered in crowdsourcing initiatives in general, out of factors such as ‘Vision and Strategy’ and ‘Infrastructure and Interoperability’ are adopted in the theoretical framework. The other critical strategic factors adopted include ‘Citizen-centric approach’ and ‘Information Management’ (Fink, 2011), Financial Capita and Reward for Participation (Bott et al., 2012). On the other hand, Wirtz et al. (2010) had proposed the four fundamental Web 2.0 factors such as social networking, interaction orientation, customization and personalization and user-added value, which are considered vital for the successful implementation of crowd-sourcing initiatives. Thus a unified framework has been derived by combining the strategic factors drawn from various research papers and the web 2.0 functional components of Wirtz et al. (2010), to investigate the combination of factors which influence the success of crowdsourcing initiatives in e-governance.

![Figure 2. Crowdsourcing in E-Governance – Critical Factors Model.](image)

Source: Adapted from Crowdsourcing Critical Success Factor Model by Sharma (2010) and the Web 2.0 – 4 Factors Model by Wirtz, Schilke & Ullrich (2010).

The specific dimensions of the strategic and functional components of the theoretical framework illustrated in fig. 2, with respect to their relevance and importance in the success of crowdsourcing initiatives in e-governance, is explained as follows:

**Vision and Strategy:** Clarity in ‘Vision’ is vital and imperative to the success of crowdsourcing initiatives (Brabham, 2009). Government organizations need to develop a coherent and well-defined set of goals and objectives so that it is perceived by the crowd as a valuable and a well-intentioned initiative. In addition, it is important for the vision and strategy adopted to be harmonious with the dynamic nature of the digital environment in order to ensure success over a longer term.

**Citizen-centric Approach:** This is viewed as a core component of e-governance. Government organizations should take a citizen’s view of what e-governance will look like and adopt technology accordingly, to enhance government – citizen interaction (Fink, 2011).
Infrastructure and Inter-operability: Accessibility and reliability of communication technologies and infrastructure is a necessary prerequisite for ensuring maximum crowd participation, as almost all the crowdsourcing initiatives require robust and cheap internet access for effective communication (Donner, 2009).

**Reward for Participation:** Performance expectancy refers to the degree to which a person believes that using a particular system will help him in gaining faults, in terms of recognition as well as monetary benefits (Bott, 2012). However, as observed in an empirical investigation conducted by Zheng et al (2011), in general, people consider recognition as a more valuable and motivating factor to participate in crowdsourcing activities than monetary allowances.

**Financial Capital:** This refers to the overall monetary investment required to ensure crowdsourcing success in e-governance (Bott, 2012). However, if the crowdsourcing initiative is built on existing infrastructure and telecommunication technologies, it makes the initiative less capital intensive.

**Information Management:** This refers to the way in which acquired data and information from the crowd are processed and shared among the government entities in a timely and secure manner. This again is considered as a key facilitator of crowdsourcing success.

Further, the four web 2.0 functional components proposed by Wirtz, Schilke and Ullrich (2010) is explained with respect to their significance and specificity in e-governance related crowdsourcing initiatives.

**Social Networking** represents the functionality that promotes government-to-citizen and citizen-to-citizen relationships. This functionality further comprises of:
- Social Trust: refers to the level of confidence and security with which citizens can exchange data on the website. Seen as a valuable component which facilitates healthy interaction among peers or others.
- Social Identity: represents the online image of citizens which relates to the way in which they are projected among the other members of an online community platform.
- Virtual Word-of-Mouth: refers to the informal transfer of information among members of the online community by means of reviews, ratings, blogs and social sharing.
- Citizen Power: refers to the extent to which citizens are given the freedom to have a control over how to share and what to share thereby motivating increased citizen participation and more meaningful inputs.
- Interaction Orientation refers to the ability to manage and support the crowd participation to create value to the government by providing supportive interaction infrastructure capabilities. It further comprises of the following sub components:
  - Citizen Centricity: represents the act of placing the citizen at the heart of the governance activities and using them as the focal point of services.
  - Interaction Configuration: refers to how well the interaction interfaces are structured to ensure citizen centrity and citizen power.
  - Citizen Response: refers to the government’s ability to manage the responses provided by the citizens and provide feedbacks and solutions for further improvement based on the information acquired.
  - Cooperative Value Generation: relates to the way in which government manages to generate value using its citizens’ responses and its ability to integrate citizens into the governance-related activities.
  - The Customization / Personalization component refers to the capability of the Web 2.0 platform to support the users’ needs at the personal, group and social levels.
  - Personal Customization: relates to the extent to which the service platforms allow the citizens to alter the look and feel of their profile to suit their preferences, at the individual level.
  - Group Customization: refers to the extent to which customization at a group level is supported to facilitate the information dissemination to a specific user group thereby avoiding the information overloading from a broad user base.
  - Social Customization: refers to the ability of the government to provide specially customized services to different citizen groups.

And finally, the User-Added Value functional component refers to the value generated by tapping the intelligence of the crowd through meaningful crowd participation. This component can be further classified as:
- User-generated Content: encompasses the wide range of user input gathered from the profiles created by users which can serve as potential information resources.
- User-generated Creativity: refers to the generation of new ideas by the citizens which can turn out to be a highly valuable input for the governments to adapt in their governance activities.
- User-generated Innovation: It is closely in relation with the ‘user-generated creativity’ component and it refers to the actual step taken to involve the citizens in innovating the ways in which the government functions.
- User-generated Revenue: refers to the value generated by the users which has directly or indirectly been beneficial to the government in financial terms.

**METHODOLOGY**

A combination of qualitative and empirical method was used to study the effective use of crowdsourcing in e-governance. Combination of methods is necessary for improving the accuracy of results as suggested by Jick (1979). He suggests that, “according to basic geometry principles, greater accuracy can be achieved if measurements are available from multiple viewpoints; likewise the accuracy and reliability of results can also be approved for organizational researchers judgements if
different kinds of data collecting methods are applied on the same phenomenon” (Jick 1979).

As part of the qualitative study, the descriptive case study approach was adopted. According to Denzin (2005), “qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. Qualitative research involves the studied use and collection of a variety of empirical materials—case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts—that describe routine and problematic moments and meanings in individuals’ lives.” To further improve the understanding and accuracy of the results, multiple case studies were conducted, by selecting 5 different e-governance websites based on governance model. Researcher Robert K. Yin (1984) defines the case study research method as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.”

For empirical research, emphatic design approach was employed. Emphatic design is a process of collecting user’s views towards a product. This design was first proposed by Leonard & Rayport (1997) as a low cost and low risk solution to identify critical needs of customers. To carry out emphatic design test a team of end users and designers observe a product and then documents these observations.

As part of the emphatic design research method, we conducted a focus group experiment in 5 sessions with 7 graduate students in each session. Students were first briefed about the objective of study and important concepts and then they were asked to evaluate one of the five websites later they were asked to fill an online questionnaire. Section 5 discusses about the methodology of focus group experiment in detail.

The concepts and theories presented in this paper are extracted from scholarly papers. There was no attempt to validate the proposed hypothesis or generalize the data gathered from the Emphatic Design method or the case study analysis method. Emphasis was given on gaining a better understanding of strategic and functional components of crowdsourcing e-governance model, providing narratives and testing hypothesis through falsification method.

CASE DESCRIPTION AND ANALYSIS

This section provides a description of the 5 selected e-governance websites under analysis. Each of these websites is examined with the help of the proposed theoretical framework. All the 5 chosen websites have an innovative concept and are moderately successful.

4.1 SeeClickFix

SeeClickFix (www.seeclickfix.com) is an interactive e-governance website that allows the citizens to report any neighbourhood issue, which in turn is communicated to the local government for a quick resolution. According to the SeeClickFix co-founder, Jeff Blasius, SeeCLickFix is a "toolbox for social civic engagement." (Pleasants, 2010). This website which was founded in September 2008, has its base in New Haven, Connecticut and presently covers more than 25,000 towns and 8,000 neighbourhoods in United States as well as abroad. While the site is undergoing continual expansion, it has established its strongest networks in New Haven (“New Haven”, 2013) and Philadelphia (“Philadelphia”, 2013). Ben Berkowitz who is one of the founders of the site, stated that ”We hope to get citizens participating in government rather than just consuming it.” (Bradford, 2010).

The vision and strategy of SeeClickFix is citizen-centric, enabling the empowerment and engagement of citizens in reporting social issues via the internet. This also has a free mobile phone application associated with it. As in computer terminology, where distributed sensing is considered to be more powerful and efficient in recognizing patterns, several citizens being involved in reporting issues and getting them fixed is a more effective way of governance than relying solely on the government. This site also permits anonymity while reporting in order to encourage citizens to boldly report even in case of sensitive issues. In addition to that, SeeClickFix also recognizes the top contributors of the site by appreciating them online in a public platform. Thus the strategic factors of SeeCLickFix, aimed at facilitating crowd participation are summarized in the table below (table 1).

<table>
<thead>
<tr>
<th>Vision &amp; Strategy</th>
<th>Offers empowerment and engagement of citizens in reporting public issues; user-friendly platform; enables collaboration while reporting public issues; made available in both web and mobile platforms; governments and elected officials publicly propose solutions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen-Centric Approach</td>
<td>Enables citizens to effectively report neighbourhood issues and get them resolved by the government officials in-charge; allows users to decide the extent to which their identity should be exposed.</td>
</tr>
<tr>
<td>Infrastructure &amp; Interoperability</td>
<td>Virtual network established to look into the social issues primarily in the cities of US, as well as abroad; facilitates reporting of issues via web and mobile platforms, thus providing users with flexibility.</td>
</tr>
</tbody>
</table>
Reward for Participation

- Top users are recognized based on their level of efforts to improve their city.

Financial Capital

- Less capital intensive; however funds may be required for building efficient interfaces to further enhance information management.

Information Management

- Issues reported are publicly broadcasted which in turn are directed to authorities in-charge to propose solutions.

Table 1. Strategic Components of SeeClickFix.

The relevant web 2.0 characteristics of SeeClickFix which align with its strategic factors are summarized in table 2. SeeClickFix incorporates the social networking functionality which empowers the users to maintain their social identity and to communicate effectively with the government as well as among their peers. However, the ‘social trust’ component is questionable to an extent because of the anonymity of reporting which is allowed. Interaction process is configured in ways to facilitate interaction among citizens as well as with the concerned authorities. Issues reported by users are considered as major value adds. However, the content generated from users’ profile is not being effectively mined and utilized for any customization purpose.

Table 2. Functional Components of SeeClickFix.

4.2 FixMyStreet

FixMyStreet ([www.fixmystreet.com](http://www.fixmystreet.com)), developed by ‘mySociety’ in collaboration with the Young Foundation, enables citizens of England, Scotland and Wales to report problems with streets and roads in their locality to the local council or the related government authorities. In 2008, a FixMyStreet mobile app was developed to enable iPhone users to report issues using their phones. Since then, similar apps had been developed and launched for nokia and android phones as well. Also the success of FixMyStreet has inspired the launch of similar sites in other countries.

The vision and strategy of FixMyStreet includes providing an intuitive user interface which enables the citizens to easily report issues and get it resolved. The site is map-based, in which the citizens are expected to locate the problem on the area map displayed. The details of the problem, which are then entered on the provided space, are sent to the respective council for processing. FixMyStreet adopts a citizen-centric approach in which the citizen empowerment and engagement are considered as the prime factors for achieving its objective. It has a well-established virtual infrastructure and it is supported on web as well as mobile platforms. Motivation is provided in the form of quick resolution of the issues reported which gives the citizens a sense of satisfaction and achievement. Public appreciation is however not implemented. Further, the site welcomes contributions from developers who help in leveraging the functionalities of the site. The table 3 below summarizes the strategic measures adopted by ‘FixMyStreet’.
**Vision & Strategy**
To enable citizens to locate, view and discuss on the local problems in UK, provides interactive maps to locate issues in a particular area, interface to engage citizens in reporting details of the issue, interface to direct the issues to the respective council.

**Citizen-Centric Approach**
Offers citizen empowerment and provides constant updates to citizens on the status of the reported issue.

**Infrastructure & Interoperability**
Well established virtual infrastructure. Site availability is high. New android and iPhone apps are going to be launched soon.

**Reward for Participation**
Motivation is provided in the form of quick resolution of the issues reported. Public appreciation is however not carried out.

**Financial Capital**
More capital investment ensures better participation from the crowd and better interfacing capabilities.

**Information Management**
Quick resolution of issues reported. Also, developers' contribution to the improvement of the site is well utilized to leverage the functioning of the site operation.

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Table 3. Strategic Components of FixMyStreet.

The web 2.0 characteristics which are in alignment with its strategic components are summarized in table 4. The social networking component complements the vision of this site by creating a platform for discussion among the citizens as well as with the government authorities. It also provides the users with the freedom to decide on the level of exposure of their identity. However, social trust is not supported in the case of anonymous users. Further, the interface configured facilitates discussion among citizens. Also the concerned authorities provide feedbacks and solutions to the reported issues via the interface. The site's interaction infrastructure ensures transparency of the whole reporting and resolution process by broadcasting the updates on the site. With respect to the user-added value, issues reported by users are definite value-adds; however, the users’ profile data are not being effectively mined and utilized for any customization purpose.

**Social Networking**
Allows users to decide on the level of exposure of their identity. Social trust is not supported in the case of anonymous users.

**Interaction Orientation**
The interface configured facilitates discussion among citizens. Also the concerned authorities provide feedbacks and solutions to the issues reported via the interface. The site's interaction infrastructure ensures transparency of the whole reporting and resolution process by broadcasting the updates on the site.

**Personalization/Customization**
Customization is not supported.

**User-Added Value**
Issues reported by users are value adds; however, the content generated from users’ profile is not being effectively utilized for any customization purpose.

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Table 4. Functional Components of FixMyStreet.

4.3 BlueServo
BlueServo is a free service that allows real time surveillance of Texas-Mexico border through the website [www.blueservo.com](http://www.blueservo.com). This surveillance program was designed to empower and allow citizens to participate proactively in fighting border crime. The innovative idea, of crowdsourcing border patrolling to citizens via website, was first proposed by Texas Governor Rick Perry and endorsed by Texas Border Sheriffs' Coalition in 2006. In 2007 Texas State Government launched the program with
an initial setup of 200 web cameras installed along the Texas-Mexico border.
BlueServo allows online monitoring of border via network feed of live streaming video to users. Users can register free for an account and can monitor the live feed from border cameras 24/7. Users can also report if they detect suspicious activity. These reports are later investigated by local county sheriffs. The vision of the BlueServo is to allow citizens to participate in border patrolling. The idea of participating in fighting border crimes is a motivating factor for citizens but since this web site lacks social identity and social profile features therefore there is no public recognition to motivate its users. Physical infrastructure for BlueServo consists of 200 web cameras installed at border and virtual infrastructure is web service that allows worldwide users to access the live video stream from border. Although the site is available 24/7 but the streaming is slow. The program is quite capital intensive and investment is required for physical infrastructure. Table 5 summarizes the strategic components for BlueServo.

<table>
<thead>
<tr>
<th>Vision &amp; Strategy</th>
<th>To empower and allow citizens to participate proactively in fighting border crime through free online service. 24/7 live video feed with a simple and easy to use interface. Installation of cameras at border</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen-Centric Approach</td>
<td>Citizen is engaged in border watching.</td>
</tr>
<tr>
<td>Infrastructure &amp; Interoperability</td>
<td>Virtual infrastructure enables worldwide users to monitor Texas-Mexico border. Physical infrastructure includes installation of web cameras installation. Site availability is high but live streaming is slow. No supported on mobile devices.</td>
</tr>
<tr>
<td>Reward for Participation</td>
<td>No public recognition. Users are notified about the investigation through email.</td>
</tr>
<tr>
<td>Financial Capital</td>
<td>Quite capital intensive. Crowd participation can be enhanced by investing on physical and virtual infrastructure.</td>
</tr>
<tr>
<td>Information Management</td>
<td>Reported issues are directed to local authorities for investigation.</td>
</tr>
</tbody>
</table>

Table 5. Strategic Components of BlueServo.

Since BlueServo does not allow users to create and maintain an online profile therefore no social identity is established and no social trust is available between users. There is also no interaction between users through which they can comment or verify reports of other users. No personalization or customization features are provided. Table 6 summarizes the functional components for BlueServo.

<table>
<thead>
<tr>
<th>Social Networking</th>
<th>Social identity is not established. Social trust is not supported because there is no interaction between citizens. Citizens cannot comment on other reported issues. Low citizen power because it lacks two way communications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction orientation</td>
<td>Lacks a discussion board thereby limiting interaction b/w citizens. The site lack two way communication facility however the feedback is provided via email.</td>
</tr>
<tr>
<td>Customization/ personalization</td>
<td>No personal or group customization provided.</td>
</tr>
<tr>
<td>User-added value</td>
<td>User’s profiles are created through registration process. User contributions are high in terms of reported issues.</td>
</tr>
</tbody>
</table>

Table 6. Functional Components of BlueServo.

4.4 State of the Union Speech Response
State of the Union Speech Response page ([www.whitehouse.gov/sotu-response](http://www.whitehouse.gov/sotu-response)) on White House official website allows citizens to read, comment and share U.S. President Barack Obama’s, speech to a joint session of the United States Congress. The vision behind this service is to engage citizens in policy making by listening to their opinions about the current policies. This is achieved with an easy to use web page which allows users to comment on the speech by clicking the segment of speech they want to comment about and entering name email address and zip code. The idea is centred on citizens to make them participate in policy making. Virtual infrastructure for this service is a simple web service with very limited functionalities with a large amount of data collection. The idea of participation in policy making is a motivation factor for citizen although no public recognition is present since the website does not allows users profile. It is less capital intensive as existing infrastructure is used. Table 7 summarizes the strategic components for this service.
Engaging citizens in policy making. Provides an easy to use platform to collected citizen opinion about any part of President’s speech; synthesizing the information gathered to make changes in policies.

Empower citizens to project their views on any issues addressed in the speech.

Virtual infrastructure supports limited amount of functionality and large amount of data collection.

Involvement in influencing government’s policy making.

Less capital intensive and functionality incorporated in existing infrastructure funds to ensure that the news reaches everyone will impact crowd participation.

Registered opinions are filtered and processed.

Social ID is not established. However, citizens are empowered to share their posts on other social networking platform, such as facebook. Two way communications is not provided.

Acknowledgement on successful receipt of citizen response is provided. No features such as discussion board to facilitate interaction b/w citizens.

No personal or group customization provided.

User generated content helps in innovating the way in which government functions.

Vision behind this service is to allow citizens to report and track small problems related to local transport system which is achieved with the help of web and mobile service. This service is also integrated with social networking platforms such as Facebook and Twitter and is less capital intensive as many of the features such as virtual word of mouth are also achieved through integration with social media platforms. The information about the local transport system has been collected through various local transport databases such as the National Public Transport Access Nodes (NaPTAN), the National Public Transport Gazetteer (NPTG) and the National Public Transport Data Repository (NPTDR). Reports collected from users are forwarded to local authorities and users are notified about the progress online. Table 9 summarizes strategic components for FixMyTransport.

Table 7. Strategic Components of State of the Union Response.

Table 8. Functional Components of State of the Union Response.

4.5 FixMyTransport

FixMyTransport (www.fixmytransport.com) is a free web service that allows citizens to report common problems about public transport system such as poor facilities, overcrowding, late buses or trains, fare and ticket problems, etc. and helps them bring it to the notice of local public transport authorities.

FixMyTransport is designed by mySociety which is a project of UK Citizen Online Democracy (UKCOD) which is a registered charity organisation in England and Wales. Currently this service is only available for UK.

Vision behind this service is to allow citizens to report and track small problems related to local transport system which is achieved with the help of web and mobile service. This service is also integrated with social networking platforms such as Facebook and Twitter and is less capital intensive as many of the features such as virtual word of mouth are also achieved through integration with social media platforms. The information about the local transport system has been collected through various local transport databases such as the National Public Transport Access Nodes (NaPTAN), the National Public Transport Gazetteer (NPTG) and the National Public Transport Data Repository (NPTDR). Reports collected from users are forwarded to local authorities and users are notified about the progress online. Table 9 summarizes strategic components for FixMyTransport.

### Vision & Strategy
To allow citizens to report transport issues which are brought to notice of public and authorities for resolution.

### Citizen-Centric Approach
Allows citizens to report and track local transport issues.

### Infrastructure & Interoperability
Service is available for web and all mobile platforms and also integrated with social networking platforms such as Facebook and Twitter.

### Reward for Participation
No specific measures are to citizens’ participation. However, the reported issue being noticed and resolved by the government officials can serve as a motivational factor.

### Financial Capital
Less capital intensive as many of the features such as virtual word of mouth are achieved from integration with currently available social networking platforms. Capital is also collected from crowd funding.

### Information Management
Information about the transport systems is collected through several public transport databases. Reported issues are forwarded to local authorities and tracked. Users are also provided with feedback about their problems.

<table>
<thead>
<tr>
<th>Vision &amp; Strategy</th>
<th>To allow citizens to report transport issues which are brought to notice of public and authorities for resolution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizen-Centric Approach</td>
<td>Allows citizens to report and track local transport issues.</td>
</tr>
<tr>
<td>Infrastructure &amp; Interoperability</td>
<td>Service is available for web and all mobile platforms and also integrated with social networking platforms such as Facebook and Twitter.</td>
</tr>
<tr>
<td>Reward for Participation</td>
<td>No specific measures are to citizens’ participation. However, the reported issue being noticed and resolved by the government officials can serve as a motivational factor.</td>
</tr>
<tr>
<td>Financial Capital</td>
<td>Less capital intensive as many of the features such as virtual word of mouth are achieved from integration with currently available social networking platforms. Capital is also collected from crowd funding.</td>
</tr>
<tr>
<td>Information Management</td>
<td>Information about the transport systems is collected through several public transport databases. Reported issues are forwarded to local authorities and tracked. Users are also provided with feedback about their problems.</td>
</tr>
</tbody>
</table>

Table 9. Strategic Components of FixMyTransport.

The users are allowed to register for free and can also use their existing Facebook account to be used for identification. Virtual word of mouth is achieved through presence on social media platforms such as Facebook, Twitter and BlogSpot. Feature for interaction and collaboration between users are provided. Users can report a problem, track their problem and also rate and comment on problems reported by other users. Integration with Facebook also helps in enhancing social trust level. Rating and commenting on problems reported by others is also possible which enhances the interaction between users. No personal or group level customization or personalization features are provided. Table 10 summarizes the functional components for FixMyTransport.

<table>
<thead>
<tr>
<th>Social Networking</th>
<th>Users are allowed to establish social ID with profile creation. Users are also allowed to use their existing Facebook ID. Virtual word of mouth is enabled through social platforms such as Facebook, Twitter and BlogSpot. Since the platform is integrated with social platforms, it enhances social trust.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction orientation</td>
<td>Features are provided for interaction between users to allow users to view, rate and comment about issues reported by other users.</td>
</tr>
<tr>
<td>Customization/ personalization</td>
<td>No personal or group customization provided.</td>
</tr>
<tr>
<td>User-added value</td>
<td>User reported problems and rate and comment about other reports add value. User – generated revenue in the form of crowd funding.</td>
</tr>
</tbody>
</table>

Table 10. Functional Components of FixMyTransport.

**CASE RESEARCH METHOD**

For emphatic design we started with conducting a focus group experiment to assess the influence of strategic and functional components of crowdsourcing framework discussed earlier on the success of five e-governance website based on crowdsourcing model. These were: BlueServo, FixMyStreet, FixMyTransport, SeeClickFix and White House Response. Each of these websites crowd source a specific governance related task to citizens.
The focus group was carried out in five sessions (both online as well as in lab). Each session comprised of seven participants who were graduate students of NTU, most of them from an IT background. In each session the students were first given a brief introduction on the important concepts for about 10 minutes. Later they were assigned with one of the five cases/websites for evaluation. They were given about 10 minutes to explore and evaluate the functionalities of the website such as login, fault reporting, and so on. In order to save time they were given with a pre-registered user name and password.

After the evaluation, the students were asked to fill an online questionnaire. This questionnaire consisted of about 39 questions including demographic questions. The intent of the questionnaire was to collect the data about the strategic and functional components of the crowdsourcing framework based on the evaluation by 35 students of 5 websites. The questionnaire was uploaded on SOGOSurvey online tool. A copy of the complete questionnaire is can be accessed online from www.sogosurvey.com/survey.aspx?k=SxWXUXsRsPsP&lang=0&data=. The questions involve rating the influence of each of the sub category of the web 2.0 functional components and the strategic components of the crowdsourcing framework on the success of crowdsourcing in the evaluated e-governance website. Sample questions are shown in Figure 3(a) and Figure 3(b).

Students were allowed to give comments about the strengths and weaknesses of the evaluated website with respect to the crowdsourcing and e-governance features, and in general about the idea of involving citizen in e-governance through crowdsourcing. The questionnaire and comments part was completed in about 15 minutes.

**Figure 3(a): Assessment Scores for sub-categories of Web2.0 functional components.**

**Figure 3(b): Assessment Scores for sub-categories of strategic components.**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatly</td>
<td>The functionality to a great extent determines the success of crowd sourcing for that website</td>
<td>5</td>
</tr>
<tr>
<td>Fairly</td>
<td>The functionality to a considerable extent determines the success of crowd sourcing for that website</td>
<td>4</td>
</tr>
<tr>
<td>Moderately</td>
<td>The functionality to a lesser extent determines the success of crowd sourcing for that website</td>
<td>3</td>
</tr>
<tr>
<td>Slightly</td>
<td>The functionality to a very little extent determines the success of crowd sourcing for that website</td>
<td>2</td>
</tr>
<tr>
<td>Not at all</td>
<td>The functionality does not determine the success of crowd sourcing for that website</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 11: Normalization of Functionality Assessment Scores.**

Table 11 shows numeric score assignments for the levels given in questionnaire. In order to measure the agreement between the 35 responses Fleiss Kappa coefficient was calculated. Usually Cohen Kappa method is used to find the degree of agreement between responses but Cohen Kappa model assumes that raters are same for fix number of items and since in our case each item was rated by 7 different sets of raters therefore Fleiss Kappa model is more applicable which allows different items rated by different raters (Fleiss, 1971, p.378).

**Fleiss’ Kappa = Degree of agreement achieved**

**Degree of agreement attainable**

Fleiss Kappa indicates the level of agreement between raters from -1 to 1. Where -1 indicates complete disagreement below chance, 0 indicates agreement equal to chance and 1 indicates complete agreement above chance.

<table>
<thead>
<tr>
<th>Vision &amp; Strategy</th>
<th>BlueServo</th>
<th>FixMyStreet</th>
<th>FixMyTransport</th>
<th>SeeClick Fix</th>
<th>SOTU Response</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.32 (0.88, 0.05)</td>
<td>3.68 (0.77, 0.04)</td>
<td>3.79 (0.91, 0.03)</td>
<td>3.46 (0.9, 0.03)</td>
<td>3.43 (0.97, 0.05)</td>
<td>3.54 (0.88, 0.04)</td>
</tr>
<tr>
<td>Citizen-Centric Approach</td>
<td>3.39 (1.02, 0.03)</td>
<td>3.57 (0.87, 0.06)</td>
<td>3.18 (0.97, 0.04)</td>
<td>3.64 (1.06, 0.04)</td>
<td>3.46 (0.93, 0.04)</td>
<td>3.45 (0.97, 0.04)</td>
</tr>
</tbody>
</table>
Table 12: Assessment Scores for Strategic Components.

Table 12 summarizes the mean assessment results with their standard deviation and Fleiss Kappa coefficient in brackets for the web 2.0 functional components. Since all the Fleiss Kappa values are positive it is inferred that the agreement between raters was above chance. Also the assessment scores are uniformly high for the strategic and functional components. Table 3 shows the scores for strategic components.

Table 13: Assessment Scores for Web 2.0 Functional Components.

It is apparent from the results in Table 13 that there is a clear consensus within the focus group responses about the influence of functional components on the success of the e-governance based on the crowdsourcing model. Vision and strategy for all the 5 cases was clear and focused on citizens participation in respective area. Various level of investment was done on infrastructure from low investment in case of State of the Union Response to medium investment in SeeClickFix, FixMyTransport and FixMyStreet. Infrastructure for BlueServo was most capital intensive project. Among the web 2.0 functional components, ‘Personalization/Customization’ seems to have the minimal score and this is in line with the findings of the qualitative case analysis where it was observed that none of the 5 cases provided any significant customization features for this purpose. Interaction orientation and social networking features seem to have a great importance in crowdsourcing model because it allows collaboration between users. These features were not present in State of the Union Response other websites provided these features with various levels. Figure 3(a) and Figure 3(b) shows kiviat graphs of assessment scores for comparative analysis. Figure 3(c) shows mean values for strategic and functional component scores.
Figure 3(a): Kiviat Graph of Strategic Components for Comparative Analysis.

Figure 3(b): Kiviat Graph of Web 2.0 Functional Components for Comparative Analysis.
Figure 3(c): Mean of Strategic and Web 2.0 Functional Component Scores.

DISCUSSION AND FINDINGS

On comparing the impact of the strategic components on the five e-governance websites, based on the results obtained from the emphatic design method and the observations documented during the case study analysis, it is observed that all the five cases have a clear and precise vision and strategy in terms of involving the citizens in governance-related activities and encouraging maximum crowd participation to achieve the same. Also, the results reveal that the citizen-centric approach, infrastructure and the information management capabilities of these sites had been above average, showing that the acquired information has been efficiently processed and managed to obtain optimum results in minimum time. For instance, the transfer of issues reported to the concerned government councils and the feedbacks and resolutions provided them, denotes the presence of an efficient infrastructure and an information management system.

On the other hand, it is observed that the ‘financial capital’ has a relatively lesser impact on the successful functioning of these sites, which is quite contrary to the established hypotheses. Further, regarding the ‘reward for participation’ strategic factor, it is observed that the different sites offer different levels of motivation and there is no way of generalization which can be arrived at. For instance, SeeClickFix website publicly recognizes the top contributors to the society whereas in the case of the White house website, being involved in government policy-making itself is a motivation to the users to contribute frequently. Further moving on to the comparison of the web 2.0 functional components of the five websites under analysis, it observed that the social networking component is quite well supported in almost all the cases, thereby highlighting its importance and relevance in encouraging citizen participation in e-governance environment. However its sub component ‘social trust’ is not presented in all the sites at all times because of the anonymity offered while reporting the issues. However, this is attributed to the inherent nature of the e-governance sites, where sensitive issues might be discussed unlike the other e-commerce websites in which disclosing the identity would hardly have any negative impact on the user.

Also it is noticeable that, all the five cases offer a certain level of interaction orientation although its implementation is customized to suit the needs and motives of each of these sites. For example, sites such as SeeClickFix, FixMyStreet and FixMyTransport have interaction process configured in ways to facilitate interaction among citizens as well as with the concerned authorities. Whereas websites such as Whitehouse and BlueServo does not support interaction among the citizens. However, they facilitate interaction between the citizens and the government authorities to an extent.

Another concept which is observed to contradict the earlier established hypotheses is the ‘Personalization/Customization’ component. Unlike in e-commerce websites, it is observed from the results of the analysis that this component has the least impact in influencing maximum crowd participation in the sites evaluated. It is quite clearly noticeable that this component is given the least importance in the sites evaluated.

It is further observed that all the five websites focus on encouraging maximum crowd participation and thereby generate and capture the user-added value. The user-generated innovation was utilized by the government to make significant changes to the ways in which government functioned, for instance, in the case of White house website, the opinions of the public registered through the site, had an impact on the government’s policy-making agenda. However, the user-generated content through user profile creation is not being effectively mined or utilized for any customization purpose.

CONCLUSION

Thus in this paper, we have identified and analyzed the critical factors, both at the strategic and the functional levels, which have the potential to positively impact the success of crowdsourcing initiatives in e-governance. These factors are presented in the form of a theoretical framework. Further the effectiveness of the proposed theoretical framework is evaluated by analyzing the characteristics of some of the notable cases of crowdsourcing in e-governance, using the case study analysis method and the emphatic design method and the discussion and findings are documented. In addition, it has been observed that there is an alignment required between the strategic and functional web 2.0 components in order to ensure the success of crowdsourcing initiatives in e-governance. This research study had a few limitations. The emphatic design method conducted had limitations in terms of the number of respondents. A total of only 35 responses were collected to study the five cases. This limitation attributes to the time and financial constraints. Thus as an implication for future research in this path, the accuracy and robustness of the results obtained can be improved by conducting a similar study with a larger sampling size.

Also, all the respondents were students of NTU with most of them having an IT background and advanced internet knowledge and experience with web2.0 functionalities. However, their level of understanding of the concepts varies based on their grasping power in the given time. Nevertheless, given their level of education, we assume that they were able to articulate to the concepts to which they were introduced to through the hand-outs and their dialogues with us during the evaluation.

REFERENCES
WKWSCI Institutional Review Board Approval - Critical Inquiry
Nithiyah d/o Muthukrishnan [NITHIYAH@ntu.edu.sg] on behalf of MSc (IS) Programme
[MSc_IS@ntu.edu.sg]
Sent: Friday, March 22, 2013 10:06 AM
To: Ravi S. Sharma (hr) [rsharma@email.ntu.edu.sg]
Cc: Na Jin Cheon (Assoc Prof); MSc (IS) Programme; #JAYAKUMAR SOMITA#; #HUSSAIN SHAFIQ PYARAI#

Project ID & IRB No.: RSS-07 (Semester 2 AY2012-2013)

Dear A/P Ravi Sharma,

WKWSCI Institutional Review Board Approval
Project Title: The Effective Use of Crowdsourcing in e-Governance

I refer to your application for ethics approval with respect to the above project.

The school board has deliberated on your application and noted from your application that your research involves administering survey/interview on subjects.

You have also confirmed that informed consent will be obtained from the participants and you have guaranteed the confidentiality of your participants’ biodata obtained from them.

The board is therefore satisfied with the bioethical considerations for the project and approves the ethics application under Exempt Review.

Regards
Nithiyah on behalf of
Assoc Prof Na Jin Cheon
School-IRB Committee Member for Critical Inquiry
Wec Kim Wee School of Communication & Information

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APPLYING CUSTOMER KNOWLEDGE MANAGEMENT TO ALIGNMENT AND INTEGRATION OF STRATEGY MAPS

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ABSTRACT

Customer knowledge refers to understanding customers’ needs, wants and aims. It is essential for an organization to align its processes, products and services to build customer relationships. Managers need to understand how the acquisition and use of customer-related knowledge create value for the organization. Customer knowledge management (CKM) is a strategy that focuses on the task of gathering information including finding effective ways to extract data from customers as well as to locate and absorb information from other sources. This paper builds an information retrieval (IR) and information extraction (IE) system to analyze customer knowledge from the Web. The system is designed to assist organizations in conducting the alignment and integration of strategy objects in strategy maps.

Keywords: Customer Knowledge Management, Information Retrieval, Information Extraction, Strategy Maps

INTRODUCTION

Gaining corporate advantage depends on how quickly the organizations can acquire business knowledge and fulfill customer requirements in the rapidly changing market [1]. Organizations have long recognized knowledge management (KM) as an important business strategy [2]. How to apply customer knowledge effectively to improve business strategy in order to enhance corporate advantage is an important challenge. Traditionally, customer behavior analysis means understanding and distinguishing customers from a variety of different perspectives with a goal to develop products and services. The purpose is to manage the relationship between enterprises and customers to achieve higher customer satisfaction, loyalty and profit contribution [3]. With a global competition, rules of the market change forcing enterprises to adapt swiftly. Exploration and management of the remaining knowledge in customers’ mind can help enhance the predicting, responding and value-creating abilities of an enterprise to strengthen its competitive advantages in a dynamic environment [4].

Knowledge is considered as a key factor in global competition and viewed as a foundation of potential competitive advantage for an economic entity to identify or develop core competences [5]. Analysis of knowledge for customers can satisfy customers’ needs for information about products, market, and other relevant issues. Exploring knowledge about customers can capture customer’s background, motivations, expectations, and preferences for products or services. Comprehending knowledge from customers can help understand the patterns of customers’ needs and/or experience of product and/or service consumption [6]. Customer knowledge can be a critical source of competitive advantage. The issue of customer knowledge management (CKM) is widely discussed by many researchers. CKM is a dynamic combination and application of customer’s experiences, demands, and insights in customer’s contacts with a company [7]. The processes of CKM, which include acquisition, analysis and integration of customer knowledge, can help an organization to record, analyze, share and create customer information [8]. Through these processes, enterprises transform data into customer information and integrate the information throughout the business model to develop customer knowledge competence [9]. CKM provides information related to customers and their experiences to help organizations effectively develop strategic planning to improve competitive advantage.

Traditionally, operational and management control systems in most companies are built around financial measures and targets, which bear little relation to the progress of a company in achieving long-term strategic objectives. Thus, the emphasis most companies place on short-term financial measures leaves a gap between the development of a strategy and its implementation [10]. A strategy map is a diagram that describes how an organization creates value by aligning strategic objectives in explicit cause-and-effect relationships in the four balanced scorecard perspectives (financial, customer, internal processes, learning and growth) [11]. Financial perspective includes two important financial strategies, i.e., expansion of product markets as well as increased productivity. Customer perspective concerns satisfaction of customer requirements and customer expectations. Internal processes perspective refers to transforming intangible assets into customer and financial outcomes through operational management in order to achieve value-creating processes. Learning and growth perspective signifies that the foundation of strategy rests on aligning and integrating intangible assets and activities to achieve value creation. Customer knowledge can effectively provide reference and basis for strategy planning around the four perspectives. Customer knowledge includes the following domains: conversational knowledge, observational knowledge and predictive knowledge. Observational knowledge is the most difficult to gather and acquire from customers. Web mining is the application of data mining techniques to discover patterns from the Web. Observational knowledge can be gathered and acquired with the mining, extraction and integration of useful information and knowledge from web content. This paper integrates information retrieval (IR) and information extraction (IE) to discover customer knowledge from the Web. Customers can provide their experience, creative ideas, and satisfaction or dissatisfaction with the products or services. Having customer feedback,
system can effectively analyze, explore and comprehend customer knowledge to assist organizations with conducting the alignment and integration of strategy objects in strategy maps.

The remainder of this paper is organized as follows. In section 2, some related literature is reviewed. Next, we describe how to apply CKM to identify strategic objectives in Section 3. Finally, the concluding remarks are made in Section 4.

LITERATURE REVIEW

CKM can be regarded as a comprehensive concept which integrates customer relationship management (CRM) and knowledge management (KM) [12]. It emphasizes “knowledge from customers” and can be viewed as an extension and development of CRM. CKM uses knowledge gathered through the interactions with customers required for the organization [13]. CKM is mainly used to increase revenue, reduce potential risks and avoid the production of products that do not match customers' needs. It helps to enhance mutual understanding between the company and its customers. CRM emphasizes sustainable long-term relationship with the customers and cultivates customer loyalty what reflects a customer-oriented strategy. CRM involves the processing of customer knowledge to pursue the goals of relationship marketing. Knowledge flows in customer relationship management processes can be classified into three categories including knowledge for customers, knowledge about customers and knowledge from customers [14]. KM emphasizes effective capturing, sharing and diffusion of customer knowledge in the organization. Knowledge asset is an important element for an enterprise in creating value. It includes customer’s regarding products, market and suppliers [15]. Through the interactions with customers and by accumulating knowledge, the company can sustainably grow. CKM goals include achieving new product development, establishing or improving customer loyalty, and developing marketing strategies.

Data mining was proposed recently as a useful approach in the domains of data engineering and knowledge discovery [16]. Over the last decade, it has been successfully introduced into the research of Web data management [17] [18]. Web mining is the extraction of interesting and useful knowledge and implicit information from the activities related to the Web [19]. The term “web mining” originally denoted the use of data mining techniques to automatically discover Web documents and services, extract information from the Web resources, and uncover general patterns on the Web [20]. Over the several years, web mining research has been extended to cover the use of data mining to discover resources, patterns, and knowledge from the Web and Web-related data. We use information retrieval (IR) and information extraction (IE) to extract content from the web. Information retrieval (IR) is an activity of obtaining and collecting information resources relevant to information need. Information extraction (IE) is a task of automatically extracting structured information from unstructured and semi-structured machine-readable documents. When extracting web content with web mining, there are four typical steps: 1) collecting, i.e., fetching content from the Web; 2) parsing, i.e., extracting usable data from formatted data; 3) analyzing, i.e., tokenizing, rating, classifying, clustering, filtering, and sorting information; and 4) producing, i.e., turning the results of analysis into something useful.

Strategy map is a component that represents cause-effect relationships among strategic objectives and summarized depictions of the main parts of a business system that link to drive firm's sustainable competitive advantage [21]. The concept of strategy mapping was originally developed by Kaplan and Norton as part of the balanced scorecard system, a means of assessing how successful a company is in terms of delivering on stated goals. The balanced scorecard of strategy map has four perspectives: learning and growth, financial, customer and internal processes. Strategy map presents how a number of indicators integrate in successful a company is in terms of delivering on stated goals. The effect of the strategy map will reflect on enhancing the turnover and shareholders' value.

METHODOLOGY

Business model describes how an organization captures, creates, and delivers value. The process of business model construction is part of a business strategy [23]. A business provides the kinds of products or services based on the propositions of customer, technology and operation. Among them, the proposition of customer is the most difficult to comprehend. How to understand customer requirements, meet customer expectations and manage customer complaints is a challenge in strategy planning. If businesses wish to know the customer, they need not only to quantify the customer-related information but more importantly to comprehend customer knowledge by organizing and analyzing it. Integrating customer, knowledge and management becomes a practical action to execute. CKM can be classified into four categories [24]:

- Management of knowledge for customers: this is knowledge that company provides to satisfy customers’ knowledge needs. Examples include knowledge on products, markets and suppliers.
- Management of knowledge about customers: this is accumulated knowledge to understand customers’ motivations and address them in a personalized way. This includes customers’ profiles, connections, requirements, expectations, and their purchasing behavior.
- Management of knowledge from customers: this is knowledge that customers own with regard to products,
services, suppliers and markets. Through interactions with customers, this knowledge can be gathered to sustain continuous improvement.

- Management of knowledge co-creating with customers: knowledge management seeks to facilitate interactions between customers and the company for the development of new knowledge.

Figure 33. Conceptual model of CKM [7][24][25].

CKM activities should focus primarily on knowing what the customer wants. There are three domains of knowledge related to customers [26] and each domain is defined on the psychological basis associated with the customer. These domains are:

- Conversational knowledge (understanding what customers’ needs via interactions between customers and employees, employees and suppliers, and so forth);
- Observational knowledge (knowledge acquired through observing how customers use products and services);
- Predictive knowledge (knowledge based on analytic models designed to predict likely outcomes).

Observational knowledge is the most difficult to gather and acquire from customers. How to observe and obtain the customers’ usage of products and services is a critical point. Tacit knowledge acquisition is a very difficult task which requires a large number of customers with direct and indirect connections taking the forms of observation or experience exchange. With the rise of Web 2.0, web content services move towards the emphasis on "interactive sharing" and "user experience". By effectively observing, capturing, organizing and analyzing web content, we will be able to have a better understanding of the tacit customer knowledge.

Because of increasing sophistication and changing customers’ preferences, we should apply a dynamic customer-centric approach to observe, capture, organize and analyze customer knowledge. Social media refers to the means of social interactions among people using online services. People can create and share information and ideas in virtual communities and networks through highly accessible and scalable web-based publishing techniques [27]. Social media can support multi-way communication between organizations and their customers with relatively lower costs and higher levels of efficiency than traditional communication channels [28]. Many researchers emphasize the importance of social media in bringing the customer’s aspect into the CKM. Social media support CKM framework which integrates social media services to facilitate the CKM strategies. The framework is shown in Table 1 [29].

Table 24. CKM framework supported by social media [29]

<table>
<thead>
<tr>
<th>Social media services</th>
<th>Management of knowledge for customers</th>
<th>Management of knowledge from customers</th>
<th>Management of knowledge about customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-blogging services (MBS)</td>
<td>Serve as an avenue for organizations to supply knowledge for customers about their products, markets, offers and also provide customer service</td>
<td>Allow organizations to draw knowledge from customers by actively seeking out customer-driven innovation in their design and production</td>
<td>Keep organizations knowledgeable about their customers and better manage the potential areas of concerns among them</td>
</tr>
<tr>
<td>Social networking services (SNS)</td>
<td>Help organizations provide knowledge for customers by keeping them abreast of changes in their products and services</td>
<td>Enable organizations to gain knowledge from customers by comprehending how they react to changes</td>
<td>Facilitate accumulation of a body of shared knowledge about customers, which in turn help promote customer loyalty</td>
</tr>
<tr>
<td>Location-aware mobile services</td>
<td>Permit organizations to provide knowledge for customers about offers</td>
<td>Allow the checked in customers to leave tips and comments, which can</td>
<td>Separate customers and help organizations acquire knowledge</td>
</tr>
</tbody>
</table>

In order to gather tacit customer knowledge, we use web mining to automatically discover and extract information from the Web documents and services. Web mining generally consists of web usage mining, web structure mining and web content mining as depicted in Figure 1.

- Web structure mining is the process of using graph theory to analyze the node and connection structure of a website and discover useful knowledge from hyperlinks which represent the structure of the web.
- Web content mining is the mining, extraction and integration of useful data, information and knowledge from web content. Furthermore, we can mine forum postings and customer reviews to discover opinions from customers.
- Web usage mining is the process of extracting useful information from server logs and discovering user access patterns from web usage logs.

We apply web content mining to gather and extract customer’s experience of using products and services. When extracting web content information using web content mining, there are four typical steps:

- Collecting – fetching content from the Web.
- Parsing – extracting usable data from formatted data.
- Analyzing – tokenizing, rating, classifying, clustering, filtering, and sorting information.
- Producing – turning the results of analysis into something useful.

Organizations plan strategy to define direction and make decisions on allocating their resources according to vision and mission. In order to determine the organization’s future direction, it is necessary to understand its current position and possible avenues through which to pursue particular courses of action. Strategy map is a diagram that is used to document the primary strategic goals pursued by an organization or management team. It also provides a visual framework for integrating the organization’s objectives. Strategy map portrays the cause-and-effect relationships that link specific capabilities in human, information and organization capital with process excellence, and process excellence with the desired outcomes in the customer and financial perspectives. Organizations pursue these strategic goals to improve competitive advantages in a dynamic environment. The process of developing a strategy map is depicted in Fig. 3.

- Definition of vision and mission. Company establishes organizational identity (vision) and where it wants to go (mission).
- Identification of strategic themes. Strategic themes provide vertical links through the four dimensions seeing the strategy as a parallel and complimentary theme.
- Definition of general objectives. General objectives are generated from the company’s vision and mission. A method to select the most important objectives is presented later.
- Internal and external analysis. Strategic internal and external analyses are carried out through SWOT analysis.
- Generation of specific objectives. Specific objectives are derived from a modified SWOT matrix. The consistency between the specific strategic objectives with the organizational strategy on the one side and the general objectives derived from the vision and mission on the other side should be revised.

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- Generation of the strategy map. Strategy map is generated by establishing the cause–effect relationship between general and specific objectives.

![Diagram of strategy map generation](image)

Figure 35. The process of strategy map generation [31].

Strategy mapping encourages managers to look beyond traditional financial measures by applying four different perspectives. The four performance perspectives are:
- Financial: What do investors expect and what should be followed to reach the strategic goals of the financial perspective?
- Customer: Which strategy goals are to be set with regard to meeting customer needs in order to attain financial goals?
- Internal processes: Which strategic goals are to be set for internal processes in order to fulfill the expectations of customers and investors?
- Learning and growth: Which strategic goals are to be pursued to develop key potentials in order to provide an excellent basis for outstanding results in the other perspectives?

We apply CKM to identify strategic objectives in order to align and integrate strategy maps. We use web mining to automatically discover and extract information from social media. Through the process of collection, parsing, analysis and production, customer knowledge can be extracted and organized. The process is depicted in Figure 4.

![Diagram of CKM processes](image)

Figure 36. The processes of CKM.
CONCLUSION

The thrust of CKM is to capture, organize, share, transfer and control customer knowledge for organizational benefits. It can help organizations address the specific needs of their customers and make them more effective in enhancing customer satisfaction [32]. Researchers have indicated that CKM can shorten the duration of service calls and improve the quality of the provided service, enhance knowledge transfer to the customer resulting in higher customer satisfaction, higher loyalty and higher revenue, and facilitate more efficient content creation resulting in lower costs [33][34][35]. CKM applies the acquisition and use of customer-related knowledge through direct and indirect interactions with the customers to create value for the organization.

Strategic objectives are derived from the organization’s vision and strategy and then classified into the four perspectives which include financial, customer, internal processes, and learning and growth. This paper builds a web mining system to analyze customer knowledge from the Web for identifying strategic objectives as part of the design of strategy maps.

REFERENCES

BYOD APPROACH TO BLENDED LEARNING IN DEVELOPING NATIONS

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ABSTRACT

Businesses are adopting Bring Your Own Device (BYOD) policies in their organisations to allow employees to bring personal mobile devices to work. This approach can be adopted in education to address the educational divide between developing and developed nations. A BYOD approach to education could entail the use of cheap tablets to deliver educational content but would require an appropriate blended learning approach for learning to be effective. Consequently, the objective of this paper is to investigate the effectiveness of different blended learning approaches with tablets as an instructional medium. A conceptual model for blended learning was constructed from learning theories in the literature. Subsequently, experiments were conducted to investigate the impact of media richness, collaborative work and performance feedback on learner performance, engagement and satisfaction. The results have implications on educators who plan to design tablet-based blended learning arrangements.

Keywords: Education divide, blended learning, BYOD, learning theories, tablet device.

INTRODUCTION

There exists an educational divide between developing and developed countries which governments and non-governmental organizations have sought to address through the use of new technologies [1, 2]. In particular, the rural poor still lack easy access to education and skilled teachers despite the fact that the majority of applications deployed in these areas are created for education [3]. At the same time, the proliferation of cheaper mobile devices [4] has prompted organisations to adopt a Bring Your Own Device (BYOD) IT policy. Companies are allowing their employees to use their personal mobile devices to access work information [5] to raise productivity, lower IT costs and improve staff morale [6]. It has also been pointed out that the BYOD trend in business could be mirrored by a Bring Your Own Tablet trend in education as more students utilise cheap tablets for their school work [7].

The BYOD approach of using cheap tablets for education has the potential to close the educational divide in developing nations. For example, the use of cheap wireless and battery powered tablets could address the lack of wired technologies and power that plagues developing nations [3]. Moreover, by providing access to educational content online or offline on the tablets, the lack of teachers and poor accessibility to classrooms mentioned earlier can be mitigated.

However, tablets alone are insufficient to bridge the educational divide. For learning to be effective, new pedagogical models need to be designed [8]. Blended learning is a suitable pedagogical model that leverages on the use of technology to vary the amount of face-to-face (F2F) instruction with technological-mediated learning [9]. This makes it an ideal candidate for use in developing nations where the provision of F2F instruction is challenging. This is particularly since tablets are becoming cheaper and more widely available. With the availability of hardware, the challenge is to identify an appropriate blended learning approach that would successfully integrate tablets into the learning curriculum. With this in mind, the objective of this paper is to investigate the effectiveness of different blended learning approaches with tablets as the instructional medium.

To accomplish this we examined the different approaches to blended learning in the literature. We then formulated our conceptual model using the theories identified. Thereafter, a series of experiments were conducted to understand the factors that influence student performance, engagement and satisfaction when tablets are used in learning.

LITERATURE REVIEW

ICT Projects for Education in Developing Nations

The effectiveness of the BYOD approach to using laptops as an instructional medium in developing nations is mixed. While some studies have cited its effectiveness in improving academic performance [10, 11], others have disagreed with this approach [8, 11]. Referring to the OLPC initiative, Tedre, et al. [8] pointed out that for one–to-one computing to be effective in improving mass education, the ICT programs will need to look beyond technical innovation than just the provision of cheap ICT equipment [12]. To be effective, the social, organisational and physical infrastructures will need to be available to integrate one-to-one computing technologies into the curriculum [13]. This highlights the need to focus on the formulation of appropriate tablet-based learning pedagogy. To do so, we examined the field of blended learning in the following sections.

Theories in Blended Learning

Blended learning is defined as a pedagogical method that uses a combination of conventional face-to-face (F2F) instruction
with technological-based learning to enhance learning effectiveness, accessibility and cost effectiveness [9, 14]. Graham [9] highlights that blending can be introduced at various levels by instructors to improve learning effectiveness or by administrators wanting to reduce cost. Several theories underpin blended learning approaches. These theories include the Media Richness Theory, the Constructivist Theory (also known as Constructivism) [15] and the Behaviourist Theory (also known as Behaviourism) [16].

Media Richness Theory (MRT) is the most frequently cited theory to explain how communication medium impacts the performance of tasks [17]. MRT classifies communication media within a spectrum of rich and lean media with face-to-face being the richest and numeric documents the leanest. Communications media that allow for feedback, have multiple communication cues, allow for expression of natural language and can be directed at individuals, are the richest. Rich media is suitable for scenarios which are uncertain and equivocal while lean media is applicable for settings which are routine [18].

Evidence that support the effects of media richness on learner performance in blended learning is mixed. While some researchers [19, 20] support MRT’s proposition that better learner scores are associated with richer medium, other researchers have found little or only partial impact [17, 21]. In particular, Erik Timmerman & Kruepke [22] found that moderately rich audio media resulted in better scores than media rich videos. Moreover, lean textual content was associated with better scores than rich text with graphics [22]. This was also the case for impact of media richness on learner’s engagement and satisfaction. Another theory often applied in blended learning is constructivist theory. Constructivism is an instructional philosophy that presumes that learners are active processors of information who construct meaning by interacting with the surroundings including other people [23]. As part of the constructivist paradigm, blended learning arrangements may include opportunities for collaborative learning among fellow students. Blends implementing collaborative work will require students to work on group-based assignments to help them construct their own meanings as they interact among students and instructors [16].

Behaviourist theory is another theory that is applied in blended learning. The behaviourist paradigm presumes that learners are passive recipients of instruction. Unlike constructivism, students require feedback on their performance as soon as possible [16]. The emphasis is on repetitive activities rather than the formation of cognitive formation of mental models when learning [24]. Thus, the behaviourist approach would provide timely feedback on learner performance to help them gauge their learning progress.

Blended Learning Approaches

The typical approaches of blended learning include a mix of traditional and technology-mediated formats. Traditional formats include classroom instruction and paper-based books. Technology-mediated formats include interactive online learning, email discussions, self-paced content, online forums, collaboration software and online tests [14]. Higher institutions and K-12 schools have adopted a combination of different mixes to achieve their learning objectives [25].

Djenic, Kneta, & Mitic [26] formulated a blended learning approach for two programming courses in VISER, Serbia. The effectiveness of the blend was compared to F2F instruction. In traditional F2F instruction lessons were taught by instructors in classrooms with the use of paper textbooks and practices in computer laboratories. In their blend, approximately 50% of the sessions were held over the Internet through the use of online instructional content, books, exercises and discussions. The other 50% consisted of compulsory first and last meetings, colloquiaums as well as the final examinations. Their evaluation of students’ results and feedback found that this blend was able to give satisfactory results in tests, have a higher percentage of students participating in exams and a lower drop-out rate. The latter was because the blended mode was able to cater to the individual needs and learning dynamics of the students.

Hoic-Bozic, Mornar, & Boticki [16] applied blended learning to a university course. Their blend was a combination of F2F learning with independent learning of online material, online discussions as well as problem-based learning (PBL) through a group project. The group and instructor communication was done via emails, online forums and some F2F meetings. In this blend only the first introductory lecture, project presentation and final examinations are F2F. The other course requirements are done entirely online. Their blend takes a constructivist view of learning where students contextualise concepts in a practical situation when they participate in their group projects.

More extensively, Twigg [27] identified five different blends in thirty US universities as part of an instruction redesign project. They are the Supplemental Model, Replacement Model, Buffet Model, Emporium Model and the Fully Online Model. The Supplemental model is a blend which contains traditional lectures but with the provision of online materials and as well as online activities such as quizzes. The Replacement Model involves replacing F2F class time with activities that can be done online in a computer lab or at home. The Buffet Model is a blend where students are given the choice between online or F2F options for lectures, laboratories and projects that suit their individual needs. In the Emporium Model, a learning resource centre replaces a classroom with materials placed online and on-demand personal assistance. Lastly, the Fully Online Model is a blend which eliminates F2F class meetings altogether. Only in rare instances are there an option for F2F help.

3-C Model for Blended Learning

Having surveyed the different theories and approaches in blended learning, the challenge remains on how an appropriate blend can be formulated. The 3-C didactical model is a useful framework for this purpose [14]. The model specifies three didactical components - content, communication and construction that need to be considered when formulating a blend. Different weights are placed on each component depending on the learning objectives. The amount of time students spend on different components can vary and not all components are necessary.

The content component is the part of a learning arrangement that presents the learning information to the student. This component is essential when there is a need to transmit facts or rules that the user needs to recall. In designing this component,
the mode of delivery of the information and the choice of synchronous or asynchronous distribution will need to be considered. The communication component refers to the interpersonal exchanges among students and between student and teacher. This component is essential when the knowledge is complex, depth of understanding is desired, there is a need for students to articulate their personal views and mutual feedback within a discussion is important. Communication can be one-to-one, one-to-many, F2F or virtual. The construction component assists individual learners or groups to work on learning tasks of different complexity. These tasks may include individual assignments or projects to group projects such as problem-based learning. This component is essential when practice, application of concepts and self-discovery is needed.

Evaluation of Different Blends
To measure the effectiveness of different blends, we look to Drysdale, Graham, Spring, & Halverson [25] who summarised the factors used by different researchers to assess the effectiveness of blended learning programs. Factors useful for our study include the performance outcome, level of satisfaction and the level of engagement. We summarise the evaluation metrics in Table 1. The most common factor was the performance scores. This was typically measured through the examination scores of the learners in a blended approach compared to traditional F2F courses. The scores and passing rates were compared to make a quantitative assessment. While these may measure the retention rate of the content learnt, the time taken to learn in different blends can also serve as an indicator of pedagogical effectiveness [16].

Another factor was the student satisfaction of blended programs. Survey responses were used to identify user satisfaction. Factors that affected satisfaction include the degree that the learner feels that learning needs are met, the perceived efficacy of learning, the quality of interactions and the whether the format was appropriate [28].

Finally, the level of engagement measures the learners’ motivation and effort when participating in the learning activity. This can be measured by looking at the amount of time spent in online discussions and other learning activities [29].

<table>
<thead>
<tr>
<th>Evaluation Metrics</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance outcome</td>
<td>Test scores</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Questionnaires</td>
</tr>
<tr>
<td>Engagement</td>
<td>Time spent on online/classroom discussions</td>
</tr>
<tr>
<td></td>
<td>Time spent on learning materials</td>
</tr>
</tbody>
</table>

**CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES**

To formulate the conceptual framework for experimental design, we analysed the different blended learning arrangements in literature using the 3C Didactical Model by Kerres & Witt [14] to identify similarities between the different approaches which can be adopted for our tablet learning approach.

Analysis of Blended Learning Approaches
Through the analysis (See Table 2), we make the following observations about the different blended learning approaches:

1) The replacement of classroom presentation of content with lesser media rich content was assumed to not impede learning performance.
2) Blends typically applied constructivist learning pedagogies in the form of collaborative learning to the communication and constructive components.
3) Blends also applied the behaviourist approach to learning by providing timely performance support in the form of online assignments. This gave learners timely feedback on their learning progress.
4)"
collaborative learning through discussion forum and PBL in group projects.
- **Behaviourism:** Give learning feedback via online tests and use of adaptive hypermedia.
- **Cognitivism:** Allow individuals to choose own project topic and provide map of lessons in online modules

<table>
<thead>
<tr>
<th>Supplement [27]</th>
<th>- <strong>Active learning approach:</strong> Have interactive technology to supplement classroom meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Classroom lecture -CD ROM</td>
</tr>
<tr>
<td></td>
<td>-Group session in class with response posted online</td>
</tr>
<tr>
<td></td>
<td>-Online exercises -Online quizzes</td>
</tr>
<tr>
<td></td>
<td>-Better academic results -Lower drop out rate</td>
</tr>
</tbody>
</table>

- **Behaviourism:**
  - Only intro topics in classroom
- **Cognitivism:**
  - Active learning approach: Have interactive technology to supplement classroom meetings
  - Reduced classroom lecture
  - Online lesson (interactive module)
  - Classroom discussion
  - Discussion board
  - Online exercises with immediate feedback
  - Online quiz

<table>
<thead>
<tr>
<th>Replacement Model [27]</th>
<th>- <strong>Active learning approach:</strong> Online activities are better replacements for the classroom whether they are done in groups or individually.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Classroom lectures -Recorded lectures -Text-based material -Videos -Online resources</td>
</tr>
<tr>
<td></td>
<td>Classroom discussions</td>
</tr>
<tr>
<td></td>
<td>Lab sessions</td>
</tr>
<tr>
<td></td>
<td>Better academic results</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buffet Model [27]</th>
<th>- <strong>Cognitivist approach:</strong> Assortment of interchangeable paths that match their individual learning styles, abilities, and tastes at each stage of the course.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Classroom lectures -Recorded lectures -Text-based material -Videos -Online resources</td>
</tr>
<tr>
<td></td>
<td>Classroom discussions</td>
</tr>
<tr>
<td></td>
<td>Lab sessions</td>
</tr>
<tr>
<td></td>
<td>Better academic results</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emporium Model [27]</th>
<th>- <strong>Active learning approach:</strong> Direct students to resources instead of teaching. -Student's choice of suitable materials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Online lectures -Online interactive textbook</td>
</tr>
<tr>
<td></td>
<td>-On-demand assistance -Group session for problems</td>
</tr>
<tr>
<td></td>
<td>-Online exercises -Online quizzes</td>
</tr>
<tr>
<td></td>
<td>Lower costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fully Online [27]</th>
<th>- <strong>Active learning approach:</strong> Unsupervised learning based on learning schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Online course content</td>
</tr>
<tr>
<td></td>
<td>Discussion forum</td>
</tr>
<tr>
<td></td>
<td>Online assignments</td>
</tr>
<tr>
<td></td>
<td>Raise number of students handled by one instructor</td>
</tr>
</tbody>
</table>

**RESEARCH METHODOLOGY**

**Conceptual Framework**

Based on the above analysis and literature review, we formulate the following conceptual framework for accessing tablet-based blended learning arrangements (See Figure 1). In this framework, the learning theories form the basis for designing the different blends. Each blend is made up of the components as specified in the 3-C Model. Finally, the effectiveness of each blend is measured with respect to the metrics in the learning quality.
Our framework proposes that media richness theory, constructivist theory and behaviourist theory have implications on learning quality. To elaborate, MRT proposes that the media richness of the content presented on the tablet will have an impact on the three indicators of learning quality. Similarly, one implication of subscribing to constructivism in blended learning would be an emphasis on collaborative work to improve learning quality because it facilitates active learning. Examples of implementing collaborative work would be the discussion forums or chat rooms. Finally, the implication of behaviourism would be the emphasis on providing timely performance feedback to enhance learning quality. This may involve the administering of online assignments with given answers for learners to apply what they have learnt and to assess their learning progress.

Research Hypotheses
Based on the conceptual framework, we raised three research questions about the impact of media richness, collaborative work and performance feedback on the effectiveness of tablet learning.

Media Richness
We first investigate the validity of the often cited MRT. Here we planned to investigate if media richness will impact the learning quality on the tablets. Based on MRT, we would expect that increasing the media richness of the learning content would result in better learning quality. Thus, the following research question (RQ) is asked:

RQ1: Does the media richness of content impact learning quality?
H₀: Media richness of content does not impact learning quality
H₁a: Media richness of content has a positive effect on performance.
H₁b: Media richness of content has a positive effect on engagement
H₁c: Media richness of content has a positive effect on learner satisfaction

Collaborative Learning
Constructivism presumes that the introduction of collaborative learning would positively impact learning quality on tablets. Consequently, we asked the following research question:

RQ2: Does collaborative learning impact learning quality?
H₀: Collaborative learning has no impact on learning quality
H₂a: Collaborative learning has a positive effect on performance.
H₂b: Collaborative learning has a positive effect on engagement
H₂c: Collaborative learning has a positive effect on learner satisfaction

Performance Feedback
Finally, we investigate the impact of the behaviourist’s assertion that performance feedback can positively impact the learning quality. We pose the corresponding research question as:

RQ3: Does performance feedback impact learning quality?
H₀: Performance feedback has no impact on learning quality
H₃a: Performance feedback has a positive effect on performance.
H₃b: Performance feedback has a positive effect on engagement
H₃c: Performance feedback has a positive effect on learner satisfaction

EXPERIMENTAL RESULTS

Experimental Conditions
We recruited 30 volunteers from the Masters of Science in Information Systems programme at Nanyang Technological University to participate in these experiments. This group was chosen because of their reasonable proficiency with IT equipment and to eliminate the need for extensive training on how to use the tablets. Groups of 5 students from the volunteer pool were randomly selected to perform each experiment to ensure that variations in learning ability would be spread out against the different groups.

To investigate the hypotheses, we designed 6 learning experiments using the 3C Model framework (See Table 5). They consist of 5 different blended learning approaches (B1 – B5) and a control group C0. With exception to C0, participants were given a maximum of 11 minutes to consume the content that was administered via a tablet. Thereafter they were given a maximum of 10 minutes to complete an online assignment on the tablet that consists of 4 open ended questions about the content. With exception to B5, answers where provided immediately once they submitted their own responses.

### Table 27. Experimental blends and their corresponding Content and Communication/Construction components.

<table>
<thead>
<tr>
<th>ID</th>
<th>Blend Description</th>
<th>Content</th>
<th>Communication</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Learning content presented in hypertext. Individual assignment with answers provided after response is submitted for participant to review.</td>
<td>Hypertext</td>
<td>None</td>
<td>Online Individual Assignment (4 Open-ended Questions with answers)</td>
</tr>
<tr>
<td>B2</td>
<td>Learning content in audio format with textual transcript. Individual assignment with answers provided after response is submitted for participant to review.</td>
<td>Audio &amp; Hypertext</td>
<td>None</td>
<td>Online Individual Assignment (4 Open-ended Questions with answers)</td>
</tr>
<tr>
<td>B3</td>
<td>Learning content in video format. Individual assignment with answers provided after response is submitted for participant to review.</td>
<td>Videos</td>
<td>None</td>
<td>Online Individual Assignment (4 Open-ended Questions with answers)</td>
</tr>
<tr>
<td>B4</td>
<td>Learning content in hypertext format. Group assignment via online discussions. Assignment answers are provided after response is submitted for participant to review.</td>
<td>Hypertext</td>
<td>Online Group Assignment (4 Open-ended Questions with answers)</td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>Learning content in hypertext format. Individual assignment without answers after response submitted.</td>
<td>Hypertext</td>
<td>None</td>
<td>Online Individual Assignment (4 Open-ended Questions with no answers)</td>
</tr>
</tbody>
</table>

The subject of Gamification was chosen for the content since it was a topic that is relatively new and participants were less likely to have prior knowledge. A YouTube video about this subject was adapted and transcribed into hypertext and converted into audio-only format to vary the media richness for B1, B2 and B3 [30, 31]. Steps were also taken to ensure that the experimental conditions were consistent. Participants were instructed not to interact with each other except for B4 where the interactions in the group online assignment were encouraged through the use of Google Chat. To ensure external reliability, Apple iPad2 tablets were used for all activities in B1-B5 and C0 to eliminate differing tablet performances during the experiment.

### Experimental Procedure

In each experiment, the participant will first consume the content component as presented in their respective blends for up to a maximum of 11 minutes, since that is the length of the video component. Participants are allowed to stop the consumption at their own preference, at any time before or at the end of 11 minutes. The participant’s time spent on consuming the content will then be recorded as the “content engagement time”. This will be followed by a 4-question, open-ended online assignment based on the content learnt earlier. This was completed by the participant individually in the experiment blends B1, B2, B3 and B5. For the experiment testing of the blend B4, participants will complete the online assignment as a group through a facilitated online chat discussion using Google Chat. Upon each individual submission of the completed assignment, the answers were provided to the participants for their own review of their performance. The exception was B5 in which participants were not given any performance feedback. Participants were allowed to stop doing any part of the assignment or review at their own preference, at any time before or at the end of a maximum of 10 minutes. The participant’s time spent on this portion of the experiment will then be recorded as the “assignment engagement time”.

As mentioned, the times recorded for “content engagement” and “assignment engagement” is summed up and the “engagement percentile” metric is then obtained by taking the sum as a percentage of 21 minutes. After completing the assignments, participants were tasked to complete the quiz of 10 questions within ten minutes to test how well they have learnt the content. The number of correct answers is recorded as the “performance result” of the participant of that blend. The survey questions were then administered after the quiz without time limit.

To analyse the data collected, we planned to compare the mean performance, engagement and satisfaction scores across the appropriate experimental groups in Table 6. To investigate hypotheses H1a – H1c about media richness, we examine the effects of varying media richness of content by comparing the results of B1, B2 and B3. To examine the impact of collaborative work for hypotheses H2a – H2c, we looked at the impact of individual and group assignments on learning quality in B1 and B4.
respectively. Finally, to test hypotheses H3a – H3c about the impact of performance support, we examined the difference between B1 and B5 where assignment answers were provided in B1 and absent in B5.

### Table 28. Research Question and Blend Comparisons.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Blends to be compared</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ1: Does the media richness of content impact learning quality?</td>
<td>B1, B2, B3</td>
</tr>
<tr>
<td>RQ2: Does collaborative learning impact learning quality?</td>
<td>B1, B4</td>
</tr>
<tr>
<td>RQ3: Does performance feedback impact learning quality?</td>
<td>B1, B5</td>
</tr>
</tbody>
</table>

### EXPERIMENTAL RESULTS

The data collected from the experiments were collected and the summarised means scores is displayed in Table 7.

### Table 29. Mean values for performance, engagement percentile and satisfaction score of different blends.

<table>
<thead>
<tr>
<th>Blends</th>
<th>C0</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Performance (p-value of T-test with mean of C0)</td>
<td>2.0 (0.006)</td>
<td>5.6 (0.002)</td>
<td>6.6 (&lt;0.000)</td>
<td>7.2 (&lt;0.000)</td>
<td>8.0 (&lt;0.000)</td>
<td>5.2 (0.006)</td>
</tr>
<tr>
<td>Mean Engagement Percentile</td>
<td>-</td>
<td>86.76</td>
<td>93.08</td>
<td>83.83</td>
<td>79.13</td>
<td>81.56</td>
</tr>
<tr>
<td>Mean Satisfaction Score</td>
<td>-</td>
<td>22.2</td>
<td>23.2</td>
<td>25.2</td>
<td>22.2</td>
<td>23.4</td>
</tr>
</tbody>
</table>

#### Mean Performance
Participants from the control group C0 scored an average of 2 out of a possible 10, while those in B1, B2, B3, B4 and B5 scored an average of 5.6, 6.6, 7.2, 8.0 and 5.2 respectively. In an independent t-test between the means of C0 and each of the blends B1-B5, the p-values are all significant (α=0.05). The mean values for performance, engagement percentile and satisfaction score for each blend are summarised in Table 6, as well as in Figures 3, 4 and 5 respectively.

We observed a linear increase in performance from B1 to B2 to B3, as the media richness of the content increases in each blend. When comparing between B1 and B4 to test the effect of collaborative learning, B4 has posted a higher mean content proficiency score of 8.0 than B1’s score of 5.6, and is the only comparison between blends that is statistically significant (p-value=0.035, α=0.05). To assess the effect of performance feedback, we compare performance scores for B1 and B5 and find that the mean content proficiency score of B5 (5.2) is lower than that of B1 (5.6).

#### Mean Engagement Percentile
In testing for the effect of media richness of content on learner engagement, we observed that participants who were given content of moderate media richness in B2 (93.08) had a higher mean engagement percentile than participants given the leanest media in B1 (86.78). Participants given the most media rich content in B3 had the lowest mean engagement percentile (83.83) compared to B1 and B2.

To test the effect of collaborative learning on engagement we compare results of B1 and B4. Here we observed that participants who were given group assignments in B4 had a lower mean engagement percentile (79.13) than participants in B1. To test the effect of performance feedback we compared B1 and B5 and we observed that the participants in B5 had a lower mean engagement percentile (81.56) than those in B1.

#### Mean Satisfaction Score
We observed a slight linear increase in the mean satisfaction scores of B1 (22.2), B2 (23.2) and B3 (25.2) as the media richness varies from hypertext (B1) to audio and text (B2), and then to video (B3). When comparing the blends B1 and B4 to test the effect of collaborative learning, participants who were given the group assignment in B4 (22.2) had the same mean satisfaction score as those in B1 who were given individual assignments. Finally, we compared B5 and B1 to test the impact of performance feedback and the results revealed that participants in B5 (23.4) had a slightly higher mean satisfaction score than those in B1.

We summarise the results of the hypotheses that were tested and show whether the experiments supported them in Table 8.
Table 30. Summary of hypotheses that were supported or not supported by the experimental results.

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does media richness of content have any impact on learning quality?</td>
<td>H1a: Media richness of content has a positive effect on performance.</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>H1b: Media richness of content has a positive effect on engagement.</td>
<td>Not supported</td>
</tr>
<tr>
<td></td>
<td>H1c: Media richness of content has a positive effect on learner satisfaction.</td>
<td>Supported</td>
</tr>
<tr>
<td>Does collaborative learning have any impact on learning quality?</td>
<td>H2a: Collaborative learning has a positive effect on performance.</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>H2b: Collaborative learning has a positive effect on engagement.</td>
<td>Not supported</td>
</tr>
<tr>
<td></td>
<td>H2c: Collaborative learning has a positive effect on learner satisfaction.</td>
<td>Not supported</td>
</tr>
<tr>
<td>Does performance feedback impact learning quality?</td>
<td>H3a: Performance feedback has a positive effect on performance.</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>H3b: Performance feedback has a positive effect on engagement.</td>
<td>Supported</td>
</tr>
<tr>
<td></td>
<td>H3c: Performance feedback has a positive effect on learner satisfaction.</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

**ANALYSIS AND DISCUSSION**

**Effect of Media Richness on Tablet Learning Quality**

The linear increase in the performance results as media richness varies from hypertext (B1) to audio and text (B2) and finally to video (B3) provides support for our hypothesis H1a that media richness has a positive effect on the learner performance. This trend was also observed in the mean satisfaction scores of the participants in B1, B2 and B3 respectively, although only slightly. Thus, it also provides support for our hypothesis H1c that media richness of content has a positive effect on learner satisfaction.

However, the trend was not repeated entirely in the mean engagement percentiles of B1, B2 and B3. There was an increase in the mean engagement percentile from B1 to B2, but not from B2 to B3. Therefore, it only partially supports the hypothesis H1b that the media richness of content has a positive effect on learner engagement. This illustrates how learner performance is not directly related to his level of engagement in the content during the learning process.

**Effect of Collaborative Learning on Tablet Learning Quality**

Our hypothesis H2a is supported by the great increase in the learning performance of B4 participants in contrast to that by B1 participants. The earlier observation that learner performance is not directly related to engagement is also repeated here, as B4 posted a lower mean engagement percentile than B1. The mean satisfaction scores are the same for both B1 and B4. Collectively, these results seem to suggest that the positive effects of collaborative learning on the quality of learning are fairly limited. In particular, the positive effects pertain only to the learner’s performance.

There are a few possible reasons why the B4 participants do not feel more engaged or more satisfaction than those in B1. Firstly, there might have been dissatisfaction with the chat module in the experimental tablet learning system. Secondly, some participants who are not particularly vocal in a group setting might have experienced less personal engagement. An examination of the details of the recorded chat history of the discussion for the online assignment revealed that there were mainly two participants who were dominant.

Given the above observations, it should be noted that in designing learning blends where there is a collaborative learning element, educators may want to consider integrating complementary elements in the blend that could assist learners to be more engaged, and/or derive greater satisfaction from the learning process.

**Effect of Performance Feedback on Tablet Learning Quality**

There are increases in both the learner performance and the engagement of participants of B1 when compared to those of B5, in which performance feedback is absent. This supports our hypotheses H3a and H3b that performance feedback has a positive effect on learner performance and engagement respectively. However, since the mean satisfaction score observed in B5 compared to B1 is only slightly greater, the difference is considered as insignificant. Thus, H3c is unsupported.

What was unexpected in the results is the slightly higher mean engagement percentile and mean satisfaction score observed in B5, as compared to B4, which had performance feedback. This may shed further light on how performance feedback may not be the sole factor in determining the level of learner engagement and satisfaction. It also shows how the combination of collaborative work with performance feedback in a learning blend can have a negative effect on learner engagement and satisfaction. This relationship was first observed when we compared B1 with B4, and is observed again when we compare B4 with B5.

**Further Discussion**

Among the survey comments received, we noted that some participants in the blend B2 and B5 reflected similar sentiments about the presentation of the content. Two participants in blend B2 and a participant in blend B5 felt that the inclusion of...
images and videos would have been useful to the learning experience. The summary of the comments provided by these participants is shown in Table 9 below. We postulate that these participants may be more visual learners and raised these comments because of the lack of visual tools such as images and/or video in the learning content of their respective blends. Another possible reason is that as seasoned learners in a graduate program, they are generally more informed of the types of tools available that can aid learning. As such, their expectations of more visual-oriented learning tools might have contributed to their survey comments.

<table>
<thead>
<tr>
<th>Experiment Participant</th>
<th>Comment given in response to “Do you have any feedback on how this system can be improved?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant A from B2</td>
<td>“Incorporate images/videos”</td>
</tr>
<tr>
<td>Participant B from B2</td>
<td>“Adding some picture or mind map”</td>
</tr>
<tr>
<td>Participant C from B5</td>
<td>“Pictures may be helpful for readers to understand the content of the report”</td>
</tr>
</tbody>
</table>

### CONCLUSION

#### Limitations

One limitation of the experiments was the small sample size of 30 graduate students. While the results were consistent with some of the learning theories, a larger sample size may further augment the validity of our results [32]. Another limitation is the short amount of time participants are expected to learn the content. While this may allow us to observe the immediate impact of the different treatments, the authors are aware that a typical educational curriculum has more content and take place over longer durations which could produce different results. Finally, our study comprises IT savvy students who are comfortable and proficient with tablets. With only a small minority of learners in developing nations having access to computers [1], the lack of IT skills may result in differences in learning quality when conducted in developing nations.

#### Future work

Apart from repeating the experiment with a larger sample size within a developing nation context, the authors also note that the usability of the learning interface on the tablet can also impact learning quality. Hence, future research should include investigations on how usability factors and design guidelines that have been proposed for tablet-based mobile learning [33, 34] can impact the learning quality. Further research on tablet-based blends could also investigate: the relationship between other types of learning content and learning quality; the differences in the resultant learning quality between students of high and low achieving students when using a tablet-based learning system; and the implementation costs of adopting the BYOD approach in education [35].

#### Concluding Remarks

In our investigation of the effectiveness of different blended learning approaches using tablets, we defined learning quality in terms of learner performance, engagement and satisfaction. The results of the experiments provided support for the impact of media richness theory, constructivist theory and behaviourist theory on performance outcome only. More specifically, the amount of media richness, collaborative work and performance feedback had a positive relationship with learner performance scores. In addition, only performance feedback had a positive effect on learner engagement. In terms of learner satisfaction, only the impact of media richness was supported while collaborative work and performance feedback had negligible effect. We also discovered that collaborative work when combined with performance feedback resulted in lower learner engagement and satisfaction. An implication of these results on the BYOD approach for developing nations is that curriculum planners and educators should consider focusing more on how best to provide learning content that is media rich to maximise learning quality. As tablets become cheaper and Internet video streaming become more ubiquitous, the BYOD approach proposed in this study has the potential to further narrow the educational divide between developed and developing nations [36].

### REFERENCES


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CLOUD SERVICES ADOPTION: AN EXPLORATORY INVESTIGATION

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ABSTRACT

Cloud computing enables customers to rent IT when needed. From technology's point of view, the advent of cloud computing finally makes the long-held idea of computing as a utility to be realized. However, from business’ perspective, the acceptance of cloud computing depends not only on the technology availability, but more on the business readiness. A systematic approach to evaluate the business value of adopting cloud services for potential users is needed. Following Diffusion of innovation theory, and by interviewing five companies, we identified three important factors and one moderating variable that may influence firms’ intention of adopting cloud services. We then collected data from 200 firms to examine the validity of the proposed model. Our findings indicate that perceived benefits and business concerns are the primary two factors when a firm evaluates its cloud adoption. Nevertheless, environment pressure from trading partners becomes the main driver to their final adoption.

Keywords: IT services; Service adoption; Innovation adoption; Cloud computing

INTRODUCTION

Cloud computing is a new technology concept that delivers IT services as computing utilities. It evolves from distributed computing, grid computing, virtualization technology, and more recently, service oriented architecture (SOA). Cloud computing business model is one that customers can rent IT infrastructure, platform, and software services in the cloud when needed. Cloud clients do not need to purchase too many IT infrastructures (hardware, software, IT employees etc.) in order to run their business. Instead, they can deploy their business applications, store data, and run analysis on the cloud via the Internet connection on a pay-per-use basis [1]. Thus, cloud services reduce information technology overhead for end-users, provide on-demand services with great flexibility, and most importantly, lower total costs of ownership [3].

With the alluring benefits, more and more companies are considering or have embraced cloud services as part of their IT solutions. However, as the visions and hype of cloud computing are popularly discussed, many technical and business concerns of cloud computing gradually emerge. For example, service outage, IT security concern, data leak, vendor lock-in, performance unpredictability, data transfer bottlenecks, and many others [1]. Is cloud computing a profitable business model or just a new technology concept?

The answer of the above question depends on how CIOs and IT managers make a tradeoff between the various benefits and concerns of cloud computing when they decide on their IT solutions. Moreover, a firm’s characteristics such as size, IT capability, and core businesses may also moderate the impacts of the benefits and concerns of cloud computing. Adopting cloud or not is a complicated decision, and currently, there is no systematic framework to assist the IT people to make the decision. Therefore, this study attempts to provide a more organized and integrated framework to simultaneously evaluate the benefits, concerns, environment and firm’s own IT resources as a moderator of adopting cloud computing for potential users.

As cloud computing is still in its early age, our exploratory based study proposes a framework by interviewing five cloud using companies or potential users in Taiwan, and validate the framework by collecting 200 firms. To have a solid guide to conduct the research, we use Diffusion of innovation (DOI) theory as the research foundation.

LITERATURE REVIEW

Rogers’ Diffusion of innovation (DOI) theory is the most used theory when investigating IT innovation adoption [13]. This study also applies DOI’s point of view as our research foundation. DOI theory is concerned with the way that a new technological idea, artifact or technique, progresses from creation to use. It purports to describe the patterns of adoption, explain the mechanism of diffusion, and assist in predicting whether and how a new invention will be successful. Rogers’ diffusion of innovation theory posits that Innovation Characteristics will affect innovation adoption. Factors within the Innovation Characteristics category are the “perceived attributes of the innovation” that either encourage (e.g., relative advantage) or inhibit (e.g. complexity) innovation use. Rogers indicated that five attributes of an innovation (relative advantage, compatibility, complexity, trialability, and observability) can explain 49 to 87% of the variance in rate of adoption.

Although Rogers’ diffusion of innovation theory appears to be most applicable to investigate innovation use, researchers still keep searching other contexts influencing organizational innovativeness and combine them with Rogers’ diffusion of innovation theory to provide richer and potentially more explanatory models. A new and important component – Environmental context – is added into the framework by Tornatazky and Fleisher (1990) [14]. The Environment context is the arena in which a firm conducts its business – its industry, competitors, and dealings with government. The environment presents both constraints and opportunities for technological innovation. For example, external pressures from customer or competitors in the environment plays a very important role in innovation adoption [5].


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The DOI theory has been applied to examine various technology adoption issues in order to distinguish adopters from non-adopters. Zhu et al. (2006) [16] empirically examined some DOI factors (i.e., technology readiness, technology integration, firm size, global scope, managerial obstacles, competition intensity, and regulatory environment) that have strong influence on three different stages of e-Business assimilation at the firm level. Kuan and Chau (2001) [9] reported that perceived direct benefits, perceived financial cost, perceived technical competence, and perceived industry and governmental pressure have significant influence on EDI adoption in small businesses. Pan and Jang (2008) [11] applied the DOI theory to examine the relationship and influence of ERP adoption with the results indicating that technology readiness, size, perceived barriers, and production and operations improvements are important determinants. Venkatesh and Bala (2012) [15] proposed that DOI factors influence IT-enabled inter-organizational business process standards (IBPS) and found that two factors—expected benefits and relational trust—had direct effects on IBPS adoption.

Reviewing past studies that empirically tested DOI theory, we found that perceived benefits offer by an IT innovation is the most common factor that was found to influence a firm’s decision to adopt innovations [6]. Therefore, we include perceived benefits of cloud computing as the first factor into our model. In contrast to the benefits of using cloud, several factors that may inhibit firms to adopt cloud services are also identified and are combined as the second factor called business concern in our study. These inhibitors are proposed by many IT experts who believe them to play a big role in the acceptance of cloud services [6]. Lastly, as previous research in DOI suggests that small firms’ decision on rather to adopt a new IT is primarily based on their business partners’ requests [2, 7, 8], we include Environment factor which comprises of external pressure from business partners and some general environment issues as a third factor in our framework. In summary, three categories of factors are used in forming our research framework including: (1) Perceived Benefits, (2) Business Concerns, and (3) Environment. In the following, we applied these factors into cloud computing context and explain them in detail.

Perceived Benefits of Cloud Services: Reviewing literature, we found there are four dimensions of perceived benefits of cloud services [1, 10, 12].

- Costs Decrease: Costs are claimed to be greatly reduced as fixed costs (hardware, software, etc.) are converted to operational expenditures (rent) when using cloud services. The pay-as-you-go manner in cloud computing significantly lowers IT infrastructure costs, barriers to entry, and fewer IT skills are required for implementation.

- Flexibility and Scalability: IT departments do not need to purchase additional hardware and software when they anticipate an increasing user load if using cloud computing. A cloud service user firm can add and reduce its IT capacity as its business transaction volume fluctuates. During peak times or holiday seasons, cloud services can provide additional computing power quickly and easily to process increasing customers’ visits. The flexibility and scalability are what firms always wish to have.

- Easy Implementation/Upgrade/Maintain: Without the need to purchase hardware/software, to implement, to maintain or to upgrade any in-house IT systems, a company using cloud computing can receive its IT services within the least possible wait time. The firms don’t need to hire too many IT professionals to operate IT systems either.

- Mobility: Employees can access information wherever they are, rather than having to remain at their desks.

Business Concerns of Cloud Computing: Many IT scholars and practitioners have attempted to identify the potential concerns of using cloud services [1, 10, 12]. These can be grouped into the following five groups:

- Service Availability/Outage Risks: Firms worry most about whether cloud services will have non-failure availability, just as individuals concern about the reliability of general utility services (electricity, water, gas, etc.). These utility services are accessed so frequently that they need to be available to the consumers at any time. Large companies especially, will be reluctant to migrate to cloud computing if their business continuity can not be assured.

- Vendor Lock-In/Data confidentiality: Concerns about the difficulties of extracting data from one cloud provider to another, or from cloud computing back to firms own IT systems is preventing many firms from adopting cloud services. Firms care about the interoperability among platforms as they don’t want to see data lock-in problem. Firms want to assure that the standardization and compatibility could enable them deploy data and analysis across multiple cloud providers. Furthermore, firms always have security concerns of putting their sensitive corporate data in the cloud. The concern of data confidentiality could limit cloud computing’s desirability.

- Data Transfer Bottlenecks: Since firms have to send a lot of data back and forth between the clouds and their own companies, data traffic bottlenecks would be an important issue. Data backup and data archive are common data-intensive activities that firms do in their daily businesses. While companies can save money on equipment and software with cloud computing, they could incur higher network bandwidth charges from their service providers. Checking Amazon’s cloud computing price scheme, we found network bandwidth charges indeed is a big concern.

- Unpredictable Functionality: Firms can customize their in-house IT systems to fit their business processes and needs. However, since cloud computing is a utility service, it may not provide the same level of customization. Cloud providers generally don’t design platforms to support specific companies’ IT and business practices. The concern of losing control of the system functionality and performance may inhibit firm’s willingness to adoption of cloud computing service.
Hsu

- Incident management/Service Level Agreement: Many firms indicate that they would worry tremendously if incidents happen when using cloud computing. They would feel extremely nervous if their cloud vendors cannot provide them with efficient communication channels to report the incidents. They also feel anxious if they don’t know how much recovery time is needed to solve the incidents. In service industry, it’s hard to measure service quality, service performance, or service providers’ capability in solving incidents, and the same difficulty exists in delivering IT services from cloud computing.

Environment:
There are two dimensions in Environment construct.
- Environment Pressure: Environment pressure refers to (1) competitive pressure from rivals and (2) business partners’ pressure from focal firm’s suppliers or customers. Among them, imposed pressure from business partners is expected to be one of the most critical factors for IT adoption by small firms [6]. Once a firm’s important business partners (customers and supplier) have adopt cloud computing, it usually will request the focal firm to adopt to integrate their IT solutions. Also, when most of the rivals of the focal firm have adopt cloud computing, the peer pressure will also have some influence on the focal firm.
- Environment Readiness: First, economic climate downturn will boost cloud computing’s appeal, particularly to small companies with limited resource for IT investment. Cloud computing is a solution for small and midsize companies to outsource their IT completely. Second, from previous experience, government promotion or subsidy is another factor that influences the adoption of innovations. Third, the infrastructure including regulation completeness and IT quality are also important factors affect a firm’s willingness of adopting cloud services. In short, when firms feel more environment readied (economically, subsidy wise, regulation wise, infrastructure wise etc.), they would be more likely to adopt cloud services.

RESEARCH MODEL AND PROPOSITIONS

The abovementioned three categories of factors in the literature are formed into a framework to simultaneously evaluate a firm’s intention of adopting cloud computing (Figure 1). The related propositions are listed in the following.

![Fig 1. Research Model](image)

Proposition 1: Firms perceive more cloud benefits are more likely to adopt cloud services.
Proposition 2: Firms with more business concerns are less likely to adopt cloud services.
Proposition 3: Firms feel more environment pressure and readiness are more likely to adopt cloud services.

METHODOLOGY

To rigorously test the proposed research model and propositions mentioned above, we investigated five companies using both qualitative (in-depth interview) and quantitative (questionnaire) research methods to understand what are the firms’ intentions in adopting cloud services. Since cloud computing is still in its early stage, an exploratory study using both qualitative and quantitative research methods would be especially appreciated because such research methods can provide different aspects of information to uncover the cloud block box.

The five companies that we investigated are start-ups at the Center of Innovative Incubator in two universities in Taiwan. The objective of these incubators is to assist and facilitate the business success of Small and Medium Enterprises (SMEs) with university resources (such as IT facility and other infrastructure). The reason we chose the five star-ups instead of other large firms as our subjects is because we believe cloud computing is more likely to be adopted by small and medium firms with very limited IT resources first. Cloud computing provides SMEs with very low cost and affordable IT services. Besides, SMEs usually have less concern for using cloud computing as their businesses are still young and less complex comparing to large firms. Therefore, the five start-ups are very good candidates to investigate.

During our investigation, top managers (CEO, CIO, etc.) from the five chosen firms were invited to fill in a questionnaire and then face-to-face structured interviews were conducted at their available time. The face-to-face interviews clarified some crucial points the respondents expressed in the questionnaires. Afterwards, telephone or email confirmation with these top managers are sent to ensure that the responses are accurate.

managers was executed if necessary. All interviews were recorded with a voice recorder, and were transferred to transcripts before further discussion. The company profiles of the five start-up companies are listed in Table 1.

### Table I. Company Profiles of the Five Start-ups

<table>
<thead>
<tr>
<th>Firm</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>ICT*</td>
<td>ICT</td>
<td>ICT</td>
<td>ICT</td>
<td>ICT</td>
</tr>
<tr>
<td>Company type</td>
<td>.COM</td>
<td>.COM (S/W)</td>
<td>H/W</td>
<td>.COM</td>
<td>.COM</td>
</tr>
<tr>
<td>Interviewee</td>
<td>CEO</td>
<td>CIO</td>
<td>CEO</td>
<td>Founder</td>
<td>CEO &amp; CIO</td>
</tr>
<tr>
<td>Service or Product</td>
<td>e-Pass &amp; e-Ticket</td>
<td>Mobile communication service (Push email)</td>
<td>Network storage devices</td>
<td>Online game community management</td>
<td>Online marketing with facebook platform</td>
</tr>
<tr>
<td>Company years</td>
<td>0.5</td>
<td>10</td>
<td>2.5</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Total Employees</td>
<td>6</td>
<td>20</td>
<td>3</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>IT employees</td>
<td>6</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Revenue (NTS)</td>
<td>&lt;5M</td>
<td>5-10M</td>
<td>10-30M</td>
<td>&lt;5M</td>
<td>&lt;5M</td>
</tr>
<tr>
<td>Capital Source</td>
<td>Microsoft</td>
<td>Acer</td>
<td>NA</td>
<td>Founders and Gov.</td>
<td>NA</td>
</tr>
<tr>
<td>Customers</td>
<td>enterprises</td>
<td>mobile phone users</td>
<td>System houses</td>
<td>Online game players</td>
<td>enterprises</td>
</tr>
<tr>
<td>Current Cloud Adopter</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*Note: ICT: Information and Communication Technologies industry, S/W: Software company, H/W: Hardware company

Two out of the five companies that we interviewed are cloud users now. The other three companies are non-adopters. However, the three non-adopters indicated that they would be potential cloud adopters under some circumstances. We will use our proposed framework to explain the different cloud adoption level in the following.

### Proposed framework using five case studies

#### Categories of Cloud adopters

The relative importance of perceived benefits, business concerns, and environment in a firm influences different levels of cloud adoption for the firm. Thus, using our proposed research model (Figure 1), we combined the anticipated effects (High, Low) of each factor to formulate a framework serving as cloud adoption typology for businesses (see Table 2). Using the typology, we classified the five firms from our sampling pool into the accordant positions in Figure 2. In the following, we describe and illustrate each cloud adoption type from Table 2 as it applies to the case study firms (firm A, B, C, D, E).

### Table II. Framework of Cloud Adoption

<table>
<thead>
<tr>
<th>Firm</th>
<th>Perceived Benefits</th>
<th>Business Concerns</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopter (Motivated)</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Adopter (Initiated)</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Limited Adopter</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Follower</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Speculator</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>
Adopters (motivated adopters and initiated adopters)
Adopters are firms that perceive high benefits and low business concerns to cloud adoption regardless to external environment. The firms in this category have recognized the relative advantages of cloud services, and their business models are adequate for adopting cloud services with lesser concerns. Top managers of adopters are experienced and able to make comparisons between a variety of cloud solutions offered by the cloud service vendors. Moreover, the adopter category can be divided into two sub-groups – motivated adopters and initiated adopters, according to the level of the third factor (i.e. Environment). Firm A and Firm B in the left upper corner in Figure 3 are cloud adopters, both perceived high benefits and are hold less concerns when using cloud service. Though Firm A who perceived higher environment pressure (located outside the circle) is a motivated adopter, while Firm B who perceived less environment pressure (located inside the circle) is an initiated adopter. Firm A is a motivated adopter who is highly motivated by its trading partner with financial support. A large amount of capital from Microsoft was poured into the company when firm A was launched in January of 2010 without any income. Firm A, an e-Pass and e-Ticket service provider, is a so called dot-com company. The company offers a unique and proprietary cloud services to customers by delivering a two dimension bar code to a customer's mobile phone which acts as a certificate instead of a paper-form ticket when customer purchases a ticket on the Internet for sport games or shows. The only thing that the customer needs to do when s/he arrives at a show or a game is to show the barcode in his/her mobile device to the ticket collector. Firm A provides all of its services on a cloud platform. Firm A’s CEO (the interviewee) told us they perceived high benefits of using cloud services and their business model is suitable for cloud services with limited concerns. Firm A has six employees with strong IT expertise to date. Microsoft, as firm A’s big trading partner, provided firm A a cloud operating system –Azure—and charged firm A very little fee. Firm A felt high trading partners pressure (environment pressure) as well as trading partners’ support. Therefore it is categorized as a motivated cloud adopter.
Firm B, on the contrary, is categorized as initiated adopters with less capital support from its trading partners than firm A. The company, a mobile phone service provider, offers a proprietary push-mail service to its mobile phone users. Push-mail represents an application delivering email contents to a user's mobile phones. This service is particularly beneficial to business people who travel across nations and are often away from their offices. To develop such an application, IT talents are highly required. However, Firm B only has three IT employees. From CIO’s perspective, he tends to delegate the firm's IT talents to core R&D and business instead of management of information systems. Following such thought, firm B adopted an unlimited email solution from ICDSoff (cloud services providers) and abandoned it’s own proprietary email system; it adopted Google document for project management and customer service; Skype for conference meeting, and lastly, Amazon EC2 (cloud services) for their data center. Firm B’s decision in adopting cloud solutions is not forced or supported by its business partner, but because it perceives high benefits and has limited concerns for using cloud services. We then categorized it as a cloud initiated adopter.

Limited Adopters
Limited adopters are organizations that are aware of potential benefits of cloud services, but they have much concern in adopting cloud services at the same time. They would adopt cloud services for their non-core business operations in the beginning. By limited adoption, these firms could evaluate their willingness to adopt cloud services in order to get some benefits from cloud services and at the same time, reduce the concerns on their vital business. Firm C in our sample, though it’s not a cloud adopter yet, is likely to become a limited cloud adopter soon. Firm C is a high-tech manufacturing firm run by three people with limited funds, and its level of IT sophistication is very low. Firm C has lots of confidential business data such as material data that needs high IT security. Even though the owner recognized several benefits that cloud services can contribute to his organization (such as cost savings and flexibility), he indicated that data...
security and data lock-in problem restrain his firm to adopt cloud services. Despite these concerns, the owner expressed a strong willingness to adopt cloud services on their non-core business operations (such as E-mail and office suite). The owner argued that only when public key encryption are available and the related confidentiality issues are highly secured by cloud vendors, he would consider the adoption of cloud services for most of his business operations.

**Follower**

Followers are small firms that just started their business and have not had enough business volume (transactions). Because of the small business volume, they usually do not have large IT needs, and therefore, they perceive low benefits of using cloud services while they have low business concerns as well. Firm D in our sample is one example of followers who was launched a year ago. It was established by five members and its business model is to provide an online platform for online game players to manage their own communities. Online game companies are also its potential customers who can gain market information to form their marketing strategy from Firm D’s database analysis. At present stage, Firm D is still in its early phase on products/services development and testing. It has not reached to full scale operation yet. Firm D is in need of project development tools, project management, video conference and business communication solutions. However, due to its limited financial resources, Firm D could only afford free cloud services such as Google sites, Wiki, and second life that make their team members communicate and manage projects with ease. For their full scale operation in the near future, the interviewee explained that they had high interests in using cloud services and would check out the current cloud service providers’ solutions along with their customers’ requests.

**Speculators**

Speculators are small firms that are not fully aware of the potential benefits of cloud services and have lots of concerns for adopting cloud services. They will not adopt cloud services immediately. However, they would pay much attention to the latest news of cloud services, and keep an eye on their competitors’ pace of using cloud services. The firms in this category are speculating other firms’ decisions. Firm E, a dot-com company, is a speculator that does not recognize the full benefits of adopting cloud services because of its competent IT capability and powerful data center in house. Currently, the data center is able to fulfill the needs of the firm, so it reduces the perceived benefits from cloud services and increases concerns about security. However, the CIO and CEO of Firm E kept mentioning that they would consider adopting cloud services to save costs when they need more people to maintain the data center as its business grow, or when concerns decrease. But most importantly, if their competitors are using cloud, or their customers are requesting cloud, they will adopt cloud soon. The firms in this category are speculating other firms’ decision and are waiting for cloud to mature.

**Effect of the explanatory factors**

**Perceived Benefits**

In general, cost-saving, scalability/flexibility, and fast deployment, are the main advantages that the five firms all agreed to. One of the reasons could be they are all SMEs struggling for survival, and sufficient cash flow (or cost-saving) is critical to decision-making when an IT investment is evaluated. For example, firm B (an initiated adopter) expressed the concern of huge maintenance costs with traditional IT solution as they encountered IT problems that happened far away from their headquarter. Additionally, firm D (a Follower) stated that cost is their first priority to put into consideration when evaluating cloud solutions. Firm B, D, and E all favor cloud version SMEs IT package, which includes the most common IT functions to support business operation, if it is available. In terms of scalability and fast deployment, four out of the five companies from our sampling pool indicated the significance of time-to-market concept to a SME’s competitive advantage, and cloud services can meet the needs much better than traditional IT solutions.

**Business Concerns**

Generally speaking, we found that cloud service availability, data confidentiality, and incident management are major concerns that the five companies strongly expressed in this study. An unexpected service interruption would lead to chaos of business operations in a company. Such loss is rather difficult to evaluate, and thus cloud service providers’ capability of incident management and disaster recovery is highly considered by cloud potential users. In addition, data confidentiality and vendor lock-in are vital to a company in light of customer data, core business operation data, competitive technology, and commercial secrets. Data confidentiality is the top concern to firm C (a limited adopter), and the company admitted that they will adopt cloud solutions for their core businesses only if data encryption technology is well applied. All these firms would consider accept to in-house data back-up in conjunction to data back-up on cloud.

**Environment Factors**

Our findings indicate that environment readiness (regulation, infrastructure, government subsidy, economy etc.) are less significant comparing to external environment pressure (from trading partners or from competitors). Also, the majority of our respondents expressed that although perceived benefits and business concerns are important variables when evaluating cloud adoption, external pressure is the strongest explanatory factor that influences their final decision. Specifically, we found that external pressure becomes so critical in influencing the limited adopters’ and followers’ decision of cloud adoption. For
example, firm D, a follower who sees low perceived benefits and concerns, mentioned that it will change its decision-making of IT investment if it receives financial support from trading partners or from government.

**Moderating Factor**
In our more careful observation from the interviews and questionnaires, we found that except the three main explanatory factors in our model, there might exist one important moderator that is very likely to moderate the relationships between the main factors and the final adoption decision (dependent variable). The possible moderator is “IT resources”. IT resources in this research refer to IT capable employees [4] (Figure 3). For the moderating effect of IT resources, we found that part of reasons that firm E chooses to be a speculator instead of an adopter is due to its strong IT resources (ten IT-capable employees), who are capable to manage their in-house data center efficiently and effectively than cloud service providers are. Therefore, the benefits of using cloud services are not strong enough for Firm E, even though they clearly understand the benefits of cloud services. The strong IT resources moderate the relationship between perceived benefits and their intention for adopting cloud [4].

![Figure 3 Proposed Moderating Effects](image)

**EMPIRICAL RESULTS AND FRAMEWORK VALIDATION**
To validate the proposed framework, this study had surveyed enterprises by telephone. Our target firms are public Taiwanese companies, and we reached 200 efficient samples. Respondents must be CIO or IT-related employees from those enterprises which had considered cloud computing solution among their organizations. Besides, 65% samples are from small and medium businesses (SMBs) which have less than 200 employees within their companies and were viewed as the target customers of cloud services. In the 200 sample, most of enterprises (64%) had IT outsourcing experience. It is good for us to understand will history of enterprises affect their decision. In addition, there are 40% enterprises have less than 2 employees in IT department, which means that almost half of our sample has a small IT department or lack of IT employees. 31.5% enterprises have IT budgets under New Taiwanese dollars (NT) 1 million. Thus, we know that about 1/3 of our sample are those enterprises which lack of IT human and financial resources. Furthermore, Constructs and measurement items used in this research are adapted from previously validated measures, or are developed on the basis of literature review.

This study then used SmartPLS version 2.0 to analyze the proposed model. The results including path coefficients and significance level of each variable are shown below (Table III).

<table>
<thead>
<tr>
<th>Table III: Empirical Results</th>
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</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>Perceived Benefits</td>
</tr>
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<td>Perceived Concerns</td>
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<tr>
<td>IT Resources</td>
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<tr>
<td>Environment</td>
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<tr>
<td>IT Resources*Benefits</td>
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<tr>
<td>IT Resources*Concerns</td>
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<td>R2</td>
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</table>

We found that perceived benefits positively influence cloud adoption (path coefficient = 0.121, p < 0.10) while Business concerns negatively influence cloud adoption (path coefficient = -0.153, p < 0.10). Furthermore, we found that a firm currently chosen to be a speculator instead of an adopter is due to its strong IT resources (ten IT-capable employees), who are capable to manage their in-house data center efficiently and effectively than cloud service providers are. Therefore, the benefits of using cloud services are not strong enough for Firm E, even though they clearly understand the benefits of cloud services. The strong IT resources moderate the relationship between perceived benefits and their intention for adopting cloud [4].
with more IT resources will have higher intention to adopt cloud computing (path coefficient = 0.114, p < 0.10). Some IT experts and cloud vendors think firms that need cloud computing the most are those enterprises with limited IT budget, lack of IT staff and technological ability to maintain systems. However, our finding is contradictory to the statement. A possible explanation is that these firms have more resources and knowledge to try and experiment the efficacy of a new service, such as cloud computing. Therefore, they have higher intention to adopt cloud at early stage.

We further tested a moderating effect in our model. We found IT resources do strengthen the relationship between cloud benefits and adoption intention. Firms with more IT resources will feel more benefits of using cloud, and therefore, have even higher intention to adopt cloud.

However, our data show that Environment is not a significant factor influencing firms’ cloud adoption decision. A possible explanation of this result is that the current cloud users of cloud service are technology innovators or early adopters, which have higher willingness to take risks, are daring to attempt new things, leading crowd, rather than being affected by the rest of majority [13]. Therefore, they are not affected by others (i.e. the Environment) too much. However, we know that cloud service is still in its early stage, and its users have not reach “critical mass” yet. Whether at the later stage of cloud’s life cycle will environment becomes a significant factor influencing other type of customers (early majority, late majority, or laggards) is still worth investigation.

**CONCLUSION**

The exploratory study proposes a framework that weaves three important explanatory factors and one moderator of cloud adoption and categorizes cloud adopters into a typology. Our empirical investigation suggests that perceived benefits and business concerns are important factors that can explain the different level of cloud adoption. IT resources plays a moderating role in cloud adoption. External pressure from business partners, though is not significant in our empirical analysis, may play a critical role to the final decision a firm makes to switch from non-adopter to adopter based on our case interviews.

Our study provides some managerial insights for practitioners (cloud vendors, potential users, and government policy makers) to facilitate the adoption of cloud service. First, a low cost SMEs package with basic and required cloud service is preferred. Such package would benefits hundreds of thousands of start-up companies and SMEs, and consequently facilitates the adoption of cloud service. Second, a prompt incident management and disaster recovery is critical to adoption of cloud service. The majority respondents expressed their concerns on the service quality as they suffered cloud service crash. This concern conveys a signal to cloud service providers that a premium customer service is desperately needed to facilitate cloud adoption. Third, an effective and sustainable government policy for innovated SMEs would change their IT decision-making from traditional IT solutions to cloud service. Government subsidy, regulation completeness, and better infrastructure are what government could do to assist the development of cloud industry.

**REFERENCES**


THE ROLE OF “SERVICE RETURN”: AN EXPLORATORY STUDY ON CLOUD COMPUTING FOR LOGISTICS

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ABSTRACT

Cloud computing offers the possibility to compose application landscapes with services from different cloud service providers. These application landscapes tend to change over time in their service composition, mainly based on the fact that requirements to the application landscape are changing, too. Therefore, the question arises, what happens if some services of the application landscape have to be transferred from one service provider to another. In this scenario, the particular service has to be returned to a service provider and has to be replaced by a service from another service provider. This return and replace-scenario involve multiple aspects on the system level, the data level, and the business process level. Current industrial practice show, that there are no satisfying solutions for this scenario. This paper investigates the return aspects of IT services in the case of cloud-based logistics application. By following the SCOR model, every section of the supply chain management process is explored. Based on this, recommendations for further investigations and practical applications are given.

Keywords: Cloud Computing, Logistics, Service Management, Exploratory Study

INTRODUCTION

The paradigm of cloud computing offers the chance to build business applications, which are composed of several components, some of the coming from “the cloud” [1]. For example, there might be a CRM (customer Relationship Management) application which comes from application provider A. This CRM application might be extended by a logistics module coming from application provider B and an address verification application coming from application provider C (see figure 1). Practitioners and scientists agree that the orchestration of application modules is a promising method to obtain highly dynamic, purpose-oriented business applications [2].

But concerning the entire life cycle of a product, which also is effective for business application, the questions arise, how to deal with a composite, cloud-based business application at the end of the product lifecycle. A typical product lifecycle consists...
of five distinct phases: plan, source, make, deliver and return [3]. In general, “return” means that the product will be returned either to the producer of the product due to some service agreements or legal restrictions or to some kind of clearing instance. This meaning of “return” holds true and is easy to understand when we are dealing with tangible goods. Looking to IT services, the picture of “return” is still foggy and needs to be discussed to clarify what is the meaning of “return” in case of cloud-based business applications and their components.

The overall question is: what does “service return” in the context of cloud-based solutions mean on an organizational and technical level? How can a return process be modeled according to the requirements of cloud computing for agile, on-demand business applications? This question has to be investigated. Aim of this work is to explore relevant issues for the return process in cloud-based, composed business applications to understand the full product life-cycle and to guide research and practice in relevant aspects which have to be considered in business application development. The paper is structured as follows: Section 2 provides an overview on the research background highlighting the term Cloud Computing with a focus on cloud computing for logistics, followed by a paragraph explaining the research approach and the aim of the paper. Section 3 provides a view on the market for cloud solutions for logistics. It presents examples from the market on successful transition of enterprises towards a cloud-based architecture to their logistics systems showing that cloud computing has more aspects than the technical aspect. Section 4 describe how does the Supply Chain Operations Reference (SCOR) model been used in this work. The main focus of the paper is to highlight the problems which face companies when they decide to move from cloud provider to another, and this step belong to the last process of the SCOR five processes, the return process. The paper closes with a short conclusion and a research outlook.

RESEARCH BACKGROUND

Cloud Computing

In many industries, cloud computing practice has attracted much attention [4] and is an issue that is usually placed much attention from IT managers in companies’ needs. The term “Cloud Computing” goes back to a collaboration announcement between Google and IBM [5]. Before this time, several other technologies were discussed in the market which may be handles as predecessors of the term Cloud Computing like “Grid Computing” [6], “Computer in the Cloud” [7] or “Dreaming in the Cloud” [8]. An actual definition of “Cloud Computing” is given by Buyya: “A Cloud is a type of parallel and distributed system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified resource(s) based on service-level agreements established through negotiation between the service provider and customers.” [9]. Mell & Grance from the National Institution of Standards and Technology (NIST) defined Cloud computing as “a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” [10]. Breaking down these rather complex definitions, Cloud Computing can be described as the delivering of infrastructure, platform and software in a service model based on a pay-per-use model provided to the customer [11]. In the market, this differentiation is denoted as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

Infrastructure as a Service (IaaS) is characteristic of the flexible and adaptive use of IT resources. One example is the use of virtual servers or storage (Remote Storage) from the cloud, which can be provided dynamically through virtualization. The cloud software infrastructure layer provides resources to other higher-level layers [12]. An additional level of abstraction is Platform as a Service (PaaS). Instead of a virtual infrastructure, software platforms will be provided if required. Thereby integrated runtime and development environments are provided as a service. A known representative is the Google App Engine [13]. At the application level services are offered (SaaS). Users can access the hosted cloud services. SaaS will be defined as a method for deployment of software applications available in the Internet as a service. A typical scenario is the access via Internet browser. In the narrow sense of the term "Service" functionality can also be accessed via a "web service" interface. Thus, the integration of external services into own applications is possible [14]. The layer provides a nice alternative to the use of local applications. Examples of this are typical office applications such as Word, which are installed as desktop applications on a remote computer.

In one of its last studies, IBM claims that the use of cloud computing will be more than double until 2014 [15]. Another recent study by Sterling Commerce, a software provider from Duesseldorf, Germany, showed that 87% of senior IT managers in Germany plan the move to cloud-based information systems in the B2B sector [16]. Main driver according to the survey is the reason of cost pressure: most companies promise a cost reduction through the use of cloud-based IT-structures due to a usage-based billing for services. Other aspects are also better use of their own IT staff, a reduction of manual processes and improve transparency of processes. Emphasis in the consideration of cloud-based systems lies in the areas of security and trust [17].

Cloud Computing for Logistics

Jonsson & Mattsson defined logistics as "the planning, organization, and control of all activities in the material flow, from raw material until final consumption and reverse flows of the manufactured product, with the aim of satisfying the customer’s and other interest party's needs and wishes i.e., to provide a good customer service, low cost, low tied-up capital and small..."
environmental consequences" [18]. In logistics, there exist highly branched communication structures between the different market participants. From this arises obviously the question whether cloud architectures are appropriate to optimize these communication structures. A survey by the Fraunhofer Innovation Cluster Cloud computing in logistics actually about 64% of all surveyed companies can imagine using logistics software that is not installed locally in the house, but on servers which are available on the Internet [19]. Therefore, willingness to engage such technologies constructively seems to be present. Larger companies (250 employees or 50 million € sales per year) have already been predominantly in the outsourcing experience of data and processes, whereas in small and medium enterprises this is rather less the case. In summary, it can be seen, therefore, that to depict the willingness to realize logistical processes and their corresponding data in a cloud architecture typically exist already in by large companies, but small and medium-sized enterprises rather not. This may have its origin, that large companies are able to build up effective information system structures and to operate them accordingly, small and medium-sized companies typically have neither the financial nor human resources to realize this. Exactly to these aspects, solutions based on a cloud architecture that offers both financial benefits as well by providing services, independence of their IT knowledge achieved. It is expected that this will just be increased by the impact of the financial crisis on the logistics market to expand solutions based on SaaS (Software as a Service) or Cloud architecture for small and medium-sized enterprises [20].

A study by IDC shows that the expected growth of cloud technology in logistics. Small and medium enterprises will significantly benefit from this technology, especially as regards the cash flow. IDC expects an increase of 19% by 2012 for the market of SaaS applications for Supply Chain Management [21].

Research Approach

Aim of the paper is to provide a new insight into the intersection between supply chain management and cloud computing. Therefore, we have chosen to develop an exploratory conduction of the study. Exploratory studies are suitable for investigating contemporary phenomenon within its real-life context [22]. For structuring purposes, we have taken the most popular reference model in supply chain management – SCOR – as outline for the study. Data for the study came on one hand from a comprehensive literature review and on the other hand from the study of market information and expert opinion. All the gathered information was classified into the five key processes of the SCOR model. From this classification, recommendations were drawn.

A VIEW ON THE MARKET FOR CLOUD SOLUTIONS FOR LOGISTICS

There are already several examples existing on the market that describe the successful transition of enterprises towards a cloud-based architecture to their logistics systems. A current example is the decision of the Mexican brewer Grupo Modelo Group to adjust its export logistics to a cloud-based system [23]. Grupo Modelo sells 13 brands in 160 countries, including the highly successful beer Corona Extra and making it the leading Mexican beer manufacturer. The cloud-based logistics system allows for Grupo Modelo an optimized adaptation of products to demand a new level of transparency and control of all logistics processes. Other examples from the field of logistics service companies are the COSCO Logistics and FedEx. Together with CloudX (solution provider), FedEx introduced the cloud computing within the company (private cloud) in 2011. FedEx has moved to hybrid cloud (Salesforce.com) to get more advantages of this transition. This step enables FedEx to focus on its customer relationship management and obtain a single interface for many of its sales processes [24]. In the case of the giant Chines COSCO Logistics, the transition start at 2009 with the aim to provide a SaaS service to their customers, subsidiaries and distributors allowing them to use the same system [25].

As already confirmed in the Fraunhofer survey, these examples show that large companies with a high innovation ratio are already heavily involved with the new opportunities and demonstrate first use of the potentials and improvements in practice. In a concise market view, three directions may be distinguished. One direction is the appropriate industry software provider to make their existing solution available in a cloud architecture on the market. They make use of the corresponding advantages of minimizing risk and often better affordability for the customer. On closer examination, it must be said but often that the manufacturers usually offer a SaaS model and use less of the specific benefits of a cloud architecture. One example is the British company OmPrompt (www.omprompt.com), one of the optimized logistics processes EDI solution in a SaaS architecture offering, thus enabling a complex integration of business partners, without requiring that a company invest in their own EDI infrastructure. The second direction is the solution providers of platforms that are already being used to process the appropriate logistical operations. Here, one can see that taking place gradually increasing the supply portfolio. For example, the German company Transporeon (www.transporeon.com) provides a logistics platform that offers the elements of transport assignment, time slot management and tracking. In addition, a reporting and various additional functions are integrated. This platform has been extended by a special solution to the Book of charging slots. The U.S. company GT Nexus offers at international level to a platform that is complemented by a network of market participants and can be used not only for the processing of processes, but also to establish new business. A third variant on the way to the cloud-based solution provider service that can be seen is getting the demand for such services from their own customers. These service providers are usually distinguished by their business content and use new technologies to market them accordingly into solutions. Example is Cargoclix (www.cargoclix.com), a provider of an
electronic marketplace for transport and logistics. Besides the core business for the award of short- and long-term transport contracts, has now taken on the marketplace the opportunity to book time slots for loading and unloading of trucks. Due to the architecture of the solution offered in the form of a seamless market place, this was possible by using existing business content. Especially the last example shows that cloud computing is not just a technical aspect. The technology allows for existing operators to expand its range, and the reorientation of existing business models. The result is first, a variety of providers for certain issues, which usually leads to customers to lower prices for the services. Second, to develop new pricing models, as the costs of cloud offerings have to be passed on to market participants. This leads to a shift of costs, the classification is still observed to date. Overall, it can be stated that the offer is growing cloud-based solutions for supply chain still on, but it offers because of the market situation in the logistics a high potential.

A STRUCTURED ASSESSMENT

The growing market acceptance and the first successful demonstration projects show that cloud architectures have a growing influence on the design of supply chains. Now companies are raising the question of how to approach this issue. For this purpose, the five main processes of the SCOR model in the context of cloud computing are considered separately. In order to achieve a holistic view on the opportunities of cloud computing, we decided to take a more high-level framework for supply chain management processes. The framework chosen for such a holistic approach is the SCOR model (Supply Chain Operations Reference-model) [26]. This model was designed by the Supply Chain Council as a reference model for describing business processes in the Supply Chain [3]. It draws on both corporate as well as enterprise-wide business processes described. SCOR has established itself as a model on the market, especially shown by the fact that more than 1000 companies worldwide have joined the Supply Chain Council. The active development of the model currently in Version 10.0 highlights the efforts to establish the SCOR model as a standard in a growing market. It is not only appropriate to look at complex supply chains, but it also offers the opportunity to improve basic requirements, which contributes significantly to the acceptance of the model.

The SCOR model includes five key supply chain operations Plan, Source, Make, Deliver and Return and is organized into four levels of observation. The following investigation examines all activities in these five operations area whether they have an impact on the return process of a cloud-based IT service or not. Table 1 gives an overview of all activities, which are relevant for the return investigation. These activities have been identified in the SCOR model by expert discussion on practical implementations of SCOR within companies.

Table 1: Return relevant SCOR activities

<table>
<thead>
<tr>
<th>Supply Chain Operation Area</th>
<th>SCOR id</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>sP5.1</td>
<td>Identify, Prioritize, and Aggregate Return Requirements</td>
</tr>
<tr>
<td></td>
<td>sP5.2</td>
<td>Identify, Assess, and Aggregate Return Resources</td>
</tr>
<tr>
<td></td>
<td>sP5.3</td>
<td>Balance Return Resources with Return Requirements</td>
</tr>
<tr>
<td></td>
<td>sP5.4</td>
<td>Establish and Communicate Return Plans</td>
</tr>
<tr>
<td>Source</td>
<td>sS3.1</td>
<td>Identify Sources of Supply</td>
</tr>
<tr>
<td></td>
<td>sS3.2</td>
<td>Select Final Supplier(s) and Negotiate</td>
</tr>
<tr>
<td>Make</td>
<td>sM3.8</td>
<td>Waste Disposal</td>
</tr>
<tr>
<td></td>
<td>sD3.9</td>
<td>Pick Product</td>
</tr>
<tr>
<td></td>
<td>sD3.10</td>
<td>Pack Product</td>
</tr>
<tr>
<td></td>
<td>sD3.11</td>
<td>Load Product and Generate Shipping Docs</td>
</tr>
<tr>
<td></td>
<td>sD3.14</td>
<td>Install Product</td>
</tr>
<tr>
<td>Return</td>
<td>sSR3.1</td>
<td>Identify Excess Product Condition</td>
</tr>
<tr>
<td></td>
<td>sSR3.2</td>
<td>Disposition Excess Product</td>
</tr>
<tr>
<td></td>
<td>sSR3.3</td>
<td>Request Excess Product Return Authorization</td>
</tr>
<tr>
<td></td>
<td>sSR3.4</td>
<td>Schedule Excess Product Shipment</td>
</tr>
<tr>
<td></td>
<td>sSR3.5</td>
<td>Return Excess Product</td>
</tr>
</tbody>
</table>

Main Process: Plan

The process design of the process Plan includes the planning and management processes. In this case, a consultation between the existing resources and future needs is done, and plans for the entire supply chain and procurement processes for exporting, manufacturing and delivery are created. It is management of the business rules, evaluating the performance and various other aspects of the supply chain such as logistics management and risk management. Finally, an alignment of the plans of the supply chain has to be made to the financial plans of the company [3]. There are four activities in the SCOR model, which have an impact on the future return of the IT service: Identify, Prioritize, and Aggregate Return Requirements (sP5.1), Identify,


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Assess, and Aggregate Return Resources (sP5.2), Balance Return Resources with Return Requirements (sP5.3) and Establish and Communicate Return Plans (sP5.4)

Overall, it is necessary to synchronize the data and information flow in a cloud-based application infrastructure with the flow of material and services in the real world. To achieve this, there has to be a mapping between elements of the internet data and information flow and the elements in the material flow. For this mapping, standards like the EPCglobal framework architecture may be used [27]. Another possibility is to use ID@URI, which describes a mapping between Internet addresses and unique product identifier to enrich the products which additional information retrieved from other sources in the Internet.

The example of the Grupo Modelo, FedEx, and COSCO Logistics, showed that cloud-based architecture can achieve significant positive effects. Just mentioned for example the optimized adaptation of products to meet the demand of the customers was achieved through closer communication between business partners. Plus, for FedEx they claim that stack smaller databases together helped to achieve economies of scale in addition to the advantage of the standardization to provide better service at a lower cost. Despite the successful examples in the planning, it is still lagging behind in terms of appropriate cloud-based solutions. It is observed that the sub-processes are modeled in company-specific implementation, which is more of a hindrance for the use of cloud-based solutions. Therefore, existing examples on the market are very much tailored to the needs of each project. It is expected that further efforts in the standardization process must take place in this area to establish an appropriate range of solutions.

Main Process: Source

The process Source includes the acquisition, receipt and inspection of incoming material. In addition, it includes the procurement processes and the identification and selection of appropriate suppliers. The management of business rules, supplier performance and the processing of specific aspects such as supplier contracts and risk management complete the purchasing process. There are three different sourcing strategies implemented in SCOR. Regarding cloud-based IT services, the most similar sourcing strategy is Engineer-to-Order. In this sourcing strategy, two activities can be identified to have an impact on the future return of the IT service: Identify Sources of Supply (sS3.1) and Select Final Supplier(s) and Negotiate (sS3.2). Therefore, selecting suppliers who have recycling and return plans, would be much appropriate. An interesting aspect in the context of cloud architectures is the identification and selection of suppliers [28]. In a growing global markets given the task to identify competent business partners, gets an ever-growing importance. Traditional search mechanisms such as an Internet search using appropriate search engines and a catalog-based search in relevant supplier catalogs comes very quickly to the limit of their possibilities. Especially when it comes to building long-term business relationships play next to the question of whether the supplier can provide an appropriate material, other factors play a role. These other factors such as reliability and general business practices can often only be established beyond pure search engines. Often, here are recommendations or personal contacts relevant. Recent studies have shown that the proportion of partnerships that have a personal contact as a background take a significant proportion of all business collaborations [29].

One way to transfer such personal contacts is to provide a digital level like digital social networks. Examples such as XING, Facebook show how such digital networks are used to generate recommendations and to support new business development. The positive effect of digital social networks in the identification of possible business partnerships continue in subsequent phases of the selection and qualification. It is observed that these compounds are equipped with an increased trust in it [30], which influences the negotiations for the conclusion of cooperation and development in the course of a business relationship significantly positive. Thus, the integration of a component for digital social networking based on a cloud architecture makes a compelling contribution to optimize the supplier identification.

4.3. Main Process: Make

The process Make includes processes such as production planning, production design, assembly, quality control and packing. Even in these areas there already exist software solutions, available on a cloud basis and thereby allowing a cloud-based production planning. On a closer examination of tenders, it can be seen, however, that all offers are substantially SaaS solutions that offer an Internet-based access to a production planning system based on an ERP system. A true cloud solution is not yet apparent. In the Engineer-to-Order strategy, there is only one activity relevant: sM3.8: Waste Disposal.

The manufacturing processes have in common is that they can be highly individualized. Almost every manufacturing company has its own manufacturing processes that often make the value of the company through their individuality. Cloud solutions are living in standards: in the data formats, the information formats used in the processes. Standardized processes with the standard interfaces for integration. It is expected that the production area still needs some development in order to exploit the potential of cloud architectures. A promising way seems to be the establishment of cloud-based process management infrastructures which are suitable for a flexible composition of functional components [31]. These platforms are able to provide basic information and process infrastructure which may be delivered from a cloud provider. Based on this platform it would be suitable to define components for the functionality for supply chain management processes which will be provided from different suppliers.

4.4. Main Process: Deliver


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The delivery processes include order processing and warehouse and transportation management. There are four activities in the SCOR model, which have an impact on the future return of the IT service: Pick Product (sD3.9), Pack Product (sD3.10), Load Product and Generate Shipping Docs (sD3.11) and Install Product (sD3.14).

In these areas, currently the widest field of existing services can be recognized. In the area of order processing, there are corresponding CRM systems available on cloud-based systems or in a SaaS architecture. Order processing has the advantage to be more homogeneous in the processes in many areas so that a variety of vendors can adopt them. A distributed control structure of employees with tasks in the order management favors the development of cloud-based systems. But also in transport management there is already a large number of solutions that can be included as part of a cloud-based overall architecture.

An outstanding example is the logistic tracking, which is now offered by virtually every logistics company for its business customers, but also for private clients. Here, there are small components that can be used to offer its customers the appropriate information service. An example is the UPS provided widget that evidence (widget.ups.com). This widget is a software component for the desktop of a computer. In this component, UPS displays relevant data to the particular user information about their deliveries available. It is expected that such components make a large contribution in the future motivated through the standardization of processes and information to realize significant potential for cloud-based solutions in the delivery processes.

4.5. Main Process: Return

The return processes include the return and the withdrawal of all in the course of the supply chain resulting undesirable or not or no longer needed goods. The areas of the withdrawal process are currently largely not directly related to cloud-based solutions supported. Support refers indirectly to the offer to the CRM solutions and an offer to the logistics solutions instead. These sub-processes are integrated to optimize the return about a product or the award of an RMA number. Dedicated solutions for the return area are currently not identified yet on the market. Nevertheless, it is expected to be created solely on the basis of existing legislative provisions here relevant offers, which can then be re-integrated under a cloud architecture into an existing offer. In FedEx example, the company took into consideration some crucial questions in the early stage like, understand how much data transformation the vendor is capable of performing, identify system limitations, understand what technology will be used in the cloud, but we could not investigate if they have mentioned the return process in the Service Level Agreement. There are five activities in the SCOR model, which have relevance for the return process: Identify Excess Product Condition (sSR3.1), Disposition Excess Product (sSR3.2), Request Excess Product Return Authorization (sSR3.3), Schedule Excess Product Shipment (sSR3.4) and Return Excess Product (sSR3.5).

This is particular relevant in the case of a partial return of a cloud-based business application. To illustrate this on the previous example: assume, that the company wants to change the logistics module in the business application and move from application provider B to application provider D (see figure 2).

By looking at this scenario, several issues arise. From a first look, the straight forward solution would be to migrate data from provider B to provider D and exchange the application. But actually, cloud providers are not well prepared to extract data in a way that the data can be used seamlessly by another application [12]. In practice, the scenario of data migration might work for master data, but for transactional data, there are a lot of problems. But this means that data migration from one application provider to another leads to a reduction of information in the new application. Maybe this restriction is also part of the business model of some cloud providers, the question is how to deal with this issues when having agile business applications in mind. Another issue is the transition of application states from one application provider to another. Business applications are highly stateful [32] and concerning the time aspect of transition from one provider to another, the states of the business processes have to be considered to ensure proper condition in the target system.

Another issue to mention is the correct data deletion by the “old” provider. Relevant in the discussion of this question is the strict observation of relevant regulation as well as the time factor in the transition again. It is necessary to ensure correct deletion at the correct time to ensure the proper function of the whole application.

SUMMARY AND OUTLOOK

The aim of this paper was the structured exploration of service return in the case of cloud-based business applications. For this, the case of logistics applications have been investigated. For a structuring element, SCOR was selected to provide a holistic view on the supply chain. From this investigation, observations and recommendations have been developed for further investigation and industrial practice.

This explorative study can be seen as a first step to put some light into the emerging topic of return issues in cloud-based solutions. To achieve real agility in business application, these issues have to be investigated more in depth. Therefore, as a next step, a broad market study would be reasonable to investigate the return processes in leading cloud-based solutions. This would help to gain more insight into the market mechanism behind service return. As a second step, the development of a conceptual framework for return in IT service provisioning would help to understand more of the theoretical insights. This would help to develop new methods for enhancing return processes in the IT service industry.
REFERENCES

PRODUCT INFORMATION AND ONLINE REVIEW: WHAT IS MORE IMPORTANT TO CONSUMER’S TRUSTING BELIEF AND PURCHASE INTENTION?

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ABSTRACT

In an e-commerce website, product information is usually presented to visitors in forms of text and pictures. Quality of product information is proven to be one of the important factors affecting visitor’s decision to convert to consumer. However, in this new era of social network and word of mouth referral, online reviews of products have become more and more important to consumer’s decision to shop online.

This study investigated and compared the importance of product information and online review toward consumer’s trusting belief in web vendor and purchase intention from web vendor. For product information, factors of our interest were (1) perceived quality of product information, and (2) perceived quality of product pictures. For online review, factors of our interest included (1) perceived quality of online reviews, (2) perceived overall direction of opinion from online reviews, and (3) number of online reviews read.

The data were collected in computer laboratory from 400 undergraduate and graduate students from Chulalongkorn Business School, Chulalongkorn University, Thailand. The participants were 68% female. 80% of them were between 18-25 years old. Four hotels in Thailand, with a total of more than 4,000 online reviews, were selected for the study. Hotel information and online reviews were from two online hotel reservation services, agoda.co.th and booking.com. So, there were 8 different conditions in our study (4 hotels x 2 hotel reservation service websites). One hotel reservation service (agoda.co.th or booking.com) and one of the four hotels were assigned to each volunteer participant. When the participants came to the computer laboratory, they were asked to connect to agoda.co.th or booking.com as assigned. Then, they were asked to search for a specific hotel preselected for them on agoda.co.th or booking.com. After finding the hotel, they were asked to gather hotel information (by reading the text description of the hotel and looking at hotel pictures). Then, they filled in the first questionnaire to evaluate their perceived quality of hotel information and quality of hotel pictures. Also, their trusting belief toward that specific hotel and their intention to reserve a room of that hotel were measured.

Next, participants were asked to read online reviews of that specific hotel (on agoda.co.th or booking.com) until they were satisfied with the information supplied by online reviews. Then, in the second questionnaire, they were asked to evaluate quality of online reviews, perceived overall direction of opinion from online reviews (how positive or negative), and wrote down the number of online reviews they have read. Finally, their trusting belief toward that specific hotel and their intention to reserve a room of that hotel were measured again, this time after reading the hotel online reviews. Steps of data collection for this study are shown in Figure 1.
The statistical analysis was conducted on the collected data. Pearson Correlations were calculated for each pair of variables as presented in Figure 2. For hotel information, perceived quality of hotel information had a little higher impact than perceived quality of hotel pictures to consumer’s trusting belief toward a specific hotel, while perceived quality of hotel pictures were a little more important than perceived quality of hotel information to consumer’s intention to reserve a room (purchase intention). For online review, perceived overall direction of opinion from online reviews was the most important factor toward both consumer’s trusting belief and purchase intention.

Figure 1: Steps of the data collection for the study.

The result of data analysis, at 0.05 level of confidence, indicated that participants’ intention to reserve a room (purchase intention) was significantly correlated with the following:

- Perceived quality of hotel information: 0.417**
- Perceived quality of hotel pictures: 0.403**
- Perceived overall direction of opinion from online reviews: 0.634**
- Number of online reviews read: 0.064

** Correlation is significant at the 0.01 level (2-tailed).

Figure 2: Hypothesis Testing Results.
intention) after reading online reviews was significantly higher than intention to reserve a room before reading online reviews about the hotel. Moreover, participants’ trusting belief toward a specific hotel after reading about hotel online reviews were higher than trusting belief toward the hotel after reading about the hotel and looking at hotel pictures, however, not significantly higher at 0.05 level of confidence.

*Keywords:* Product information, online reviews, trusting beliefs, purchase intention.
OPEN DATA, OPEN INNOVATION, OPEN INNOVATION ECOSYSTEM

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ABSTRACT

The open data movement has gained prominence over the last decade among governments, corporations as well as across the scientific and citizenry communities. In particular, the public sector has been among the most ardent in embracing the open data movement. Many government agencies around the world have embarked on open data initiatives in the belief of its transformative potential in enhancing citizen engagement, accountability, transparency, public service delivery and public value creation [1, 2, 3]. For example, in Europe, the EU Public Service Information directive was issued in 2003, and served as a common legislative framework for EU nations to make government agencies data available publicly for re-use [2]. In 2011, the European Commission further expanded the adoption of the open data movement with the launch of the Open Data Strategy for Europe. In the US, the Open Government Directive was issued in 2009 by the Obama Administration [1, 4]. This was followed by the issue of the Digital Government Strategy in 2012, which included the aim to unlock the power of the government data to spur innovation and improve the quality of services for Americans. In Singapore, the government also launched a data.gov.sg portal in 2011 to serve as a first-stop portal where publicly accessible government data can be found [3].

In open government data initiatives, government agencies made their data available for public consumption in machine-readable format such that corporations and individuals can access, re-use and re-distribute these data for various purposes [2]. Examples of such datasets include meteorological data, macro-economical statistics, geographical data, community or municipality-based event calendars, and road traffic information [3]. Corporations and individuals are encouraged by government agencies to participate in public value co-creation by developing new insights or e-services through using the open data. The approaches to achieve such public value co-creation includes “meshing up” distributed government data from different government agencies and private corporations, discovering interesting patterns through data analytics, developing value-added e-services, providing feedback to enhance the quality of published government data and even promoting their value-added data products or e-services to other parties [5, 6]. Essentially, the underlying premise for the success of open government data initiatives lies in the presence of value co-creation through the participation of corporations and individuals in using the open data. It calls for government agencies to embrace open innovation in order to reap the envisioned fruition of open government data initiatives.

Open innovation acknowledges that organizational innovation does not always occur within the organization [7]. Instead, innovations are widely distributed and organizations need to supplement their internal innovation processes by transforming previously closed boundaries into semi-permeable ones that enable interaction with external sources of innovation in pursuit of new products, market advantage, and other opportunities. For example, corporations may partner with research institutions possessing complementary resources to co-create and innovate on a better product. In order for organizations to be innovative and productive, it is essential to recruit the participation of parties outside of the traditional organizational boundary. Hence, the success of open government data initiatives is predicated upon open innovation.

Interestingly, recent research development in open data as well as open innovation coalesced upon the concept of ecosystem [3, 10, 11, 12]. The ecological concept is widely adopted in contemporary business strategy research for organizations whose success depends highly on interdependencies with other organizations well outside the traditional value chains that contribute directly to product or service creation [13, 14]. This stream of literature focuses on the need for businesses to be supported by a healthy, diversified ecosystem of actors, playing specialized roles in the value development and delivery process [15].

Research in open data indicates that value co-creation in open government data initiatives is supported by a complex ecosystem of interconnected and interdependent actors as well as information resources [3, 10]. These actors include government agencies that own the data, various data intermediaries involved in co-creating information products and e-services based on the data, and the consumer of the resultant information products and e-services. The information resources include databases, portals, electronic-exchanges and e-marketplaces where the open data and the resultant information products and e-services may be discovered and utilized. At the same time, research in open innovation also identified that open innovation takes place within an open innovation ecosystem [11, 12]. Organization pursuing open innovation needs to work with other actors in the ecosystem by opening up their innovation processes to other actors and using external resources to enhance its own innovative capacity. Such an ecosystem is termed to be an open innovation ecosystem.

This paper examines the open innovation ecosystem in open government data initiatives to identify the key types of actors, resources as well as typical mechanism and strategies that these actors employed is engaging one another. In so doing, it posits a conceptual framework of the open innovation ecosystem in open government data initiatives.


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The research methods include formal content analysis and thematic analysis on various print and online media (e.g., newspaper articles) on the open data initiative by the various government agencies. The content analysis method was adopted for two reasons. Firstly, research on open government data initiatives is still emerging and a more exploratory research approach is justifiable. Secondly, the scale and magnitude of the ecosystem and the nebulous understanding of it also justified the adoption of the content analysis method. Specifically, without knowing the various actors and resources, it is difficult for field work to be conducted. Moreover, given the scale and magnitude of the ecosystem, it is also challenging to adopt other exploratory research methods, such as case study.

In sum, this research aims at expanding the existing open data literature by identifying the major actors in the open innovation ecosystem of open data initiative. Its primary theoretical contribution is the conceptual framework of the open innovation ecosystem in open government data initiatives. The managerial implications for policy makers, corporations and individuals is primarily the appreciation of the dynamics and among the various actors in the eco-systems and strategies that can be adopted to facilitate and generate desired participation and collaboration for value co-creation in open data initiatives.

**Keywords:** e-government, open data, open innovation, open innovation ecosystem.

**REFERENCES**


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