A Study of Consumer Value-added Services in Mobile Commerce—Focusing on Domestic Cellular Phone Companies in Taiwan,China

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ABSTRACT
Mobile commerce, or e-commerce over mobile devices, has become a major topic of interest for the IS research community and a key priority for many business organizations as it is becoming increasingly evident that PC-based e-commerce has not lived up to the expectations and achieved true mass adoption. However, mobile commerce includes a large range of various services, especially with regard to numerous value-added services. Before we discuss the customers' level of demand for extra services, it is essential to understand and study the existing added services available in the market. This awareness can also assist further research. Balasubramanian et al describes eight different areas of mobile commerce value-added services. Clarke suggests four value propositions for m-commerce to define value added services characteristics. Both Balasubramanian et al and Clarke's models are commonly-used tools to test the characteristics of value-added services. Moreover, this research mainly focuses on Taiwan's current mobile commerce value-added services, while separating them into categories and characteristics. We surveyed the three largest cell phone service providers in Taiwan: Chunghwa Telecom, Taiwan Cellular Corp, TransAsia Telecommunications. We collected and sorted these providers' value-added services using the eight categories of Balasubramanian et al. and Clarke's four Value propositions for m-commerce to examine each value added service's characteristics. The purpose is to better understand the characteristics and current situations of service providers in Taiwan, as well as what areas need improvement. We also provide companies with a clear view of their deficiencies; moreover, cell phone service providers can have an accurate goal for developing future services. Moreover, we provide sufficient suggestions, thereby giving providers a clear direction for further promotions and marketing.

Categories and Subject Descriptors
K4.4 [**Electronic Commerce**]: Distributed commercial transactions.

General Terms
Management, Documentation, Design, Theory.

Keywords
Mobile Commerce; end-user adoption; Value added Service; Wireless

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1. INTRODUCTION

1.1 Research Background
The improvement of wireless technology involved a new era for electronic commerce. This includes using cell phones connected to the Internet or Inter-Network. Mobile commerce (m-commerce) is a new type of e-commerce that conducts business transactions via mobile devices (Abuelyaman, Wen 2004). Due to its inherent characteristics such as ubiquity, personalization, flexibility and dissemination, m-commerce promises businesses unprecedented market potential, great productivity and high profitability. Yet, the move to create a wireless version of the internet means a new set of problems. One of the problems is slow transmission speed (Abuelyaman, Wen 2004). We expect this new e-commerce to provide more business in wireless or mobile network. Currently, more than 800 million cell phones and other mobile devices are in use worldwide, and out of those, more than 140 million users are in US alone (www.wow-com.com). The worldwide numbers are projected to rise to 1 billion soon, thereby exceeding the combined total of all computing devices several fold. (Varshney 2002; Vetter 2002). We see that the cell phone industry is comprised of two major components: Consumer Services for individuals and Business Services for industrial users. Regarding Business Services, we can gain important data in real time to assist decision makers, exert great influence on communications between businesses and their customers, and transform the way we live our lives (Siau 2003; Shen 2003); regarding Consumer Services, users previously needed to be in a certain location to access the Internet. Now, wireless Internet access allows for increased mobility in our work and our daily lives. Moreover, our work environment will not be limited to a certain space, and information will be able to travel at much faster speeds than in the past. The environment of today's worker is evolving from one of centralization and control to one of mobility and performance (McIntosh and Baron 2005）. These tendencies show that Business Services will provide greater mobile e-commerce. Individual telecommunication will develop into a individual mobile era.

1.2 Research Motivation
The increased number of cell phone users has allowed for a growing variety of value-added services. In the past, telephones allowed for basic, voice-based phone calls. Now, with numerous individual value-added products, all cellular service providers are attempting to enter this growing value-added service market. However, a comparison of the slow adoption of WAP services in Europe with the successful adoption of comparable I-mode services in Japan and technologically

simple SMS-based services in Scandinavia, suggests that aggregate and technology-based models are insufficient to explain the mobile commerce adoption process (Pedersen et al 2002) . Similar to other emerging industries, mobile business is characterized by a continuously changing and complex environment, which creates important uncertainties at the levels of technology, demand and strategy (Porter, 1980). These uncertainties have affected virtually all value-added product and service offerings. Nevertheless, different groups will have varying opinions of the usefulness of certain value-added services. One group may have a high opinion of a specific value-added service feature, whereas another group may completely reject this value-added offering. This phenomenon occurs due to varying expectations of value-added services' demand.

Balasubramanian et al (2002) developed a model to categorize mobile business value-added services into eight areas. Clarke (2001) defines the characteristics of value-added products via four value propositions for m-commerce. These two models allow us to clearly determine the attributes of each value-added service. Moreover, we can understand the differences among existing attributes. This will refine our understanding of the whole value-added process. Moreover, continuing research will increase our understanding of consumer behavior. M-commerce in Taiwan of China developed later than in other major areas--such as America, Japan, and Europe. Now, mobile phone users in Taiwan regularly use cell phone communication, but with relatively few value-added services; nevertheless, promotion and acceptance of other value-added services has been somewhat disappointing.

1.3 Purpose of Research

The purpose of this research is to take an in-depth look at the value-added services and categories offered in Taiwan. We applied the theories of Balasubramanian et al (2002) and Clarke (2001) in order to determine the benefits of each value-added attribute. Further, we expect that this research will allow us to better understand the current value-added services' characteristics in Taiwan. We hope this research will give the cell phone service providers a reference source for developing future value-added services.

We collected and analyzed data on value-added services from the official websites of Taiwan's three largest mobile telecommunication providers: Chunghwa Telecom, Taiwan Cellular Corp, and TransAsia Telecommunications. This allowed us to understand the attributes of Taiwan's value-added service attributes. Moreover, we can easily compare and contrast the value-added service attributes. The purposes of this research are two-fold:

(1) To find out which value-added products have the highest and lowest rates of demand, as well as the attributes of those products.

(2) We can use marketing research and surveys to better understand which service products are in greater demand among cell phone users in Taiwan.

2. REVIEW OF THE LITERATURE

2.1 Definitions of the M-Commerce

Even though m-commerce is a new phenomenon, there are already many different definitions for the main terms related to this research area in the literature (Stanoevska-Slabeva, 2003). See Table 1 for definitions of terms found in the related literature.

Table 1. Definitions of the M-Commerce in previous literature

Definitions of the M-Commerce	Literature
Mobile commerce, a subset of e-commerce, conducted through mobile devices using wireless telecommunications network is poised to change the market place globally.	Kini and Thanarithiporn 2004
A commonly adopted definition, by Durlacher, defines mobile commerce as "any transaction with a monetary value that is conducted via mobile telecommunication network". Similar to e-commerce, the focus is on the exchange of products and services, but without the constraint of a stationary user using wired infrastructure.	Camponovo and Pigneur 2003
Advances in wireless technology and mobile devices give rise to a new kind of e-commerce - mobile commerce. Mobile commerce transactions are conducted via mobile devices using wireless telecommunication networks and other wired e-commerce technologies. Mobile commerce (also increasingly known as m-commerce or mobile e-commerce) enables wireless information exchanges and business transactions. Mobile commerce means different things to different people. To customers, it represents convenience, whilst merchants associate it with a huge earning potential; and service providers view it as a large unexplored market.	Siau and Shen 2003
E-commerce is considered to be the buying and selling of information, products, and services via computer networks. A primary distinction between m-commerce and e-commerce lies in the differences between transactions and access. M-commerce provides good support and promotion for e-commerce transactions to roaming users, even if it's not always fully functional for every shopping need.	Stafford 2003
Giovanni Camponovo and Yves Pigneur prefer to adopt a broader view of mobile business, which includes "all activities related to a (potential) commercial transaction through communications networks that interface with mobile devices"	Tarasewich 2002

Research studies regarding e-commerce are also relevant to mobile commerce. However, as a word of caution, some differences in definitions and terminology may arise when we look at e-commerce from different angles. Mobile commerce operates within three main roles: mobile telephone providers, system service providers, as well as end users. Mobile commerce means different things to different people. To customers, it represents convenience, whilst merchants associate it with a huge earning potential; and service providers view it as a large unexplored market. (Siau and Shen 2003) Therefore, it is apparent that different people have different views about this concept.

2.2 Discussion of applied mobile commerce value-added services

Considering the huge potential of mobile business services, no one actually knows how to exploit the new possibilities brought by technology to create valuable services that the customers are willing to purchase (Camponovo and Pigneur 2003) . As a consequence, participants must attempt a variety of strategic

approaches and constantly reposition themselves in order to find the most favourable competitive position in the industry (Camponovo and Pigneur 2003) . Certainly, many experts have engaged in value-added services research--such as Clarke (2001)--who exploited four value propositions of m-commerce to define the relationships between value-added services and customers. Also, Balasubramanian et al (2002) categorized value-added services into eight areas. Now, we will discuss the related previous research.

1. Four value propositions of m-commerce

Clarke (2001) hoped to create a sufficient mobile commerce strategy through research of value propositions. This can provide managers with a reference for developing a good marketing strategy in this newly wireless environment. Value propositions define the relationship between supplier offerings and consumer purchases by identifying how the supplier fulfills the customer's needs across different consumer roles（Band，2000；Porter，1998）These are the key points for our discussion of value propositions. The mobility afforded wireless devices shapes m-commerce into a disparate entity from conventional e-commerce. Consequently, value propositions are likely to be new, different and novel for mobile e-commerce. That is, by accessing the Internet through mobile devices, users will be able to realize additional value allowances for any specified period of time, which fixed-line users will not be able to achieve. Information may now truly become available anytime, anyplace and on any wireless device. As such, value propositions of e-commerce will be forced to change to reflect the underlying dimensions of value-for-time for users （Clarke 2001）. Clarke (2001) defines value propositions for Mobile-commerce into four levels:（1）「Ubiquity」（2）「Personalization」（3）「Localization」（4）「Convenience」. Please see Figure 1 for further details:

An concise explanation of each of the four value propositions for m-commerce

(1) Ubiquity：Mobile devices offer users the ability to receive information and perform transactions from virtually any location on a real-time basis.

(2) Personalization：Mobile devices are typically used by a sole individual, making them ideal for individual-based target marketing. Mobile offers the opportunity to personalize messages to various segments, based upon time and location, by altering both sight and sound.

(3) Localization：Location-specific information leverages the key value proposition of m-commerce over traditional e-commerce by supplying information relevant to the current geographic position of the user. M-commerce providers will be able to both push and access information relevant to the users specific location.

(4) Convenience：The agility and accessibility provided from wireless devices will further allow m-commerce to differentiate its abilities from e-commerce. People will no longer be constrained by time or place in accessing e-commerce activities. Rather, m-commerce could be accessed in a manner which may eliminate some of the labor of life's activities.

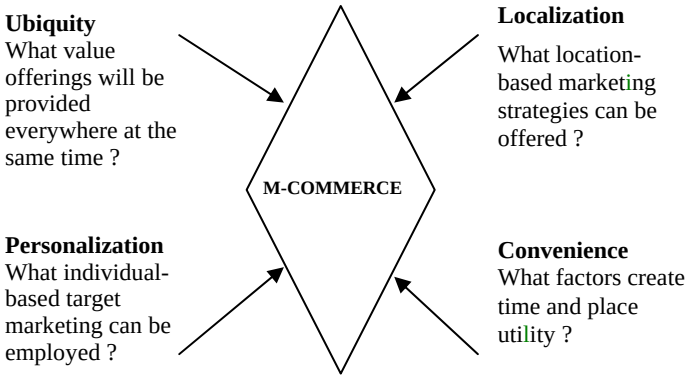

Figure 1. Value Propositions of Mobile Data source : Clarke (2001)

2. Eight categories of mobile commerce value-added services

Balasubramanian et al (2002) proposed the M-commerce value-added service classification method. In the taxonomy being proposed, m-commerce applications are categorized along three dimensions: (1) the extent to which the application is location sensitive, (2) the extent to which the application is time critical, and (3) the extent to which the application is controlled by the information receiver (or, alternatively, the user) or by the provider (or, alternatively, the network). Three essential classification factors （location sensitive, time critical, information controlled）are divided into eight major classifications ($2\times2\times2=8$). Now, we concisely elaborate on these eight big classifications. (Please also see Table Five).

Category I Applications : Category I applications frequently relate to the provision of information that is both timely and related to the immediate environment of a receiver. A range of devices and platforms are beginning to incorporate mobile technologies that are location sensitive, time critical, and recipient controlled.

Category II Applications : Category II applications differ from Category I applications in that they are typically initiated and controlled by the product or service provider.

Category III Applications : Category III applications typically relate to the on-demand provision of information regarding the physical environment of the information recipient.

Category IV Applications : Category IV applications are similar to the fleet management applications described in Category I, except that they are not time critical..

Category V Applications : Category V applications typically relate to the acquisition of time-critical information that is tied to a remote transaction or event.

Category VI Applications : Category VI activities are similar to those in Category V, except that the initiative for communication now rests with an information provider rather than a receiver.

Category VII Applications : Category VII applications typically relate to receiver-initiated acquisition of information that is held in a repository or database.

Category VIII Applications : Category VIII applications typically relate to modification and configuration of software for remotely located mobile units.

From a research or theoretical perspective, the taxonomy can serve as a platform to guide the further conceptualization of issues and frameworks related to m-commerce. From a managerial perspective, the taxonomy can serve as a tool to systematically probe existing and potential business operations for opportunities related to m-commerce (Balasubramanian et al. 2002).

Table 2. A Taxonomy of M-Commerce Applications

LOCATION	TIME	CONTORLLED	CATEGORY
SENSITIVE	CRITICAL	RECEIVER	Ⅰ
		PROVIDER	Ⅱ
	NON-CRITICAL	RECEIVER	Ⅲ
		PROVIDER	Ⅳ
INSENSITIVE	CRITICAL	RECEIVER	Ⅴ
		PROVIDER	Ⅵ
	NON-CRITICAL	RECEIVER	Ⅶ
		PROVIDER	Ⅷ

3. RESEARCH DESIGN

3.1 Research Process

This research focuses on individual cases of current domestic cell phone value-added services offered in Taiwan, China. First, we collected data from Taiwan's three largest telecommunication providers: Chunghwa Telecom, Taiwan Cellular Corp, TransAsia Telecommunications in order to arrange all of the value-added services into the proper class of Balasubramanian et al (2002) eight categories model, while Clarke's (2001) four value proposition for m-commerce is also utilized to define each service's characteristics. It was expected that this detailed analysis and comparison would let us understand which value-added services in Taiwan are included in the eight categories of Balasubramanian et al (2002). The results should generate considerations for further reference to business and education in developing mobile commerce.

3.2 Collect Secondary data

The collection and sorting of data is critical work which must be completed before analysis of the data. Due to the limitations of research time and samples, we collected only the most significant information to represent the current situation. The data sample collection and sorting methods are described below:

(1) Data collection time range: The data collection for value-added services in Taiwan deadline was March 1, 2005. The market for mobile commerce value-added services is highly-competitive. Also, the value-added service offerings often quickly become obsolete, along with variations in the products being promoted. Certainly, some changes may have occurred after the data was collected, along with changes in the value-added services being offered. The consumers' willingness to accept the products may be varied, but such uncertainties are not included in our data.

(2) Data collection samples: There are numerous mobile telecommunication providers in Taiwan. Each provider offers value-added services which also vary. This research focused on three main providers data: Chunghwa Telecom, Taiwan Cellular Corp, TransAsia Telecommunications. The data was collected and aggregated from the official websites of these three telecoms. These three companies were chosen because they are the three largest providers of mobile phone services in Taiwan. During the data collection period, the providers did not necessarily have complete data available in their official websites. It is also possible that some information was listed after our data had been collected; therefore, certain pieces of information are not included in our research.

(3) Data classification: We referred to the official websites Chunghwa Telecom, Taiwan Cellular Corp, TransAsia Telecommunications; we separated those value-added services offerings into various categories. The categories and the results follow :

(A) There are a total of fifteen classes of value-added services. Each class and the total service items are: Travel (3 item), Food (2 item) , Friend (22 item) , News and Weather (9 item) , Amusement (38 item) , Chart bell download (29 item) , Game (37 item) , Transportation（8 item）, Finance (23 item), Safety (7 item) , Email (2 item) , Divine (8 item) , Life Server (34 item) , Short Message (16 item) , Other (8 item) . Please see the following graph - Figure 2 for details.

(B) Each value-added service class includes several different types. A total of 40 value-added service types are presented here. Each value-added type also included several value-added items. There are totally 246 value-added service items in these 40 value-added service types.

The names of these 40 value-added service types are LBS-POI（Pleasure seeker）, Navigating Taiwan, Leisure amusements, LBS-POI（Seeking good food）, Making friends and chatting, Making friends and gossiping, emome Handset net, Mobile friend finder, Mobile life→news and weather, Life information, catch music, Mobile video and music, Mobile life→Popular map storage, Mobile life→life amusements, Voice added value service, Mobile draws a portrait, Amusements express, Java happy city, Video and music chart bell, Chart bell download, Mobile life→Computer game, Mobile JAVA, Interaction game, Computer game, Mobile life → Investment and manages finances, Banking manage finances, Manages finances expert, Manages finances area, Mobile video and music uGoLive, email, Mobile office, Mobile Constellation fortune-telling, Constellation fortune-telling, Information service, LBS-POI（SHOPPING INFORMATION）, LBS-POI（LIFE INFORMATION）, SM service, catch, Shopping.

4. DATA CLASSIFICATION AND AGGREGATION

4.1 Classification Rules

The guidelines used to classify the collected data are: The main category is Class, which included fifteen value-added services based on total collected data. Under each Class, there are 40 different Types. Each value-added service item belonged to its own Class and Type. Next, we applied each Type into Balasubramanian et al.'s (2002) model to identify the specific category. The same method was used to apply each Type into Clarke's (2001) four value propositions for m-commerce model to define the proposition. The classification results can

obviously be related to Balasubramanian et al (2002) and Clarke (2001). The results are included in the following graphs.

4.2 Classification and Aggregation Results

Table 3 shows the overall totals for value-added services in each Class. It shows each value-added service (such as how many types of service offerings, which providers provide those services, which services belong to propositions for Clarke model) and applies the data into Balasubramanian et al's (2002) model.

Table 4 also refers to Balasubramanian et al's (2002) model. We organized the above 246 value-added service items (in these 40 value-added service types) into the eight categories of Balasubramanian et al (2002). The first category included 13 items. The second category included 2 items. The third category included 4 items. The fourth category included 38 items. The fifth category included 6 items. The sixth category included 182 items. The seventh category included one item. The eighth category does not include any items. Table 4 also shows the data under each category with Class, Items, Total Items, and also related to which Clarke's propositions.

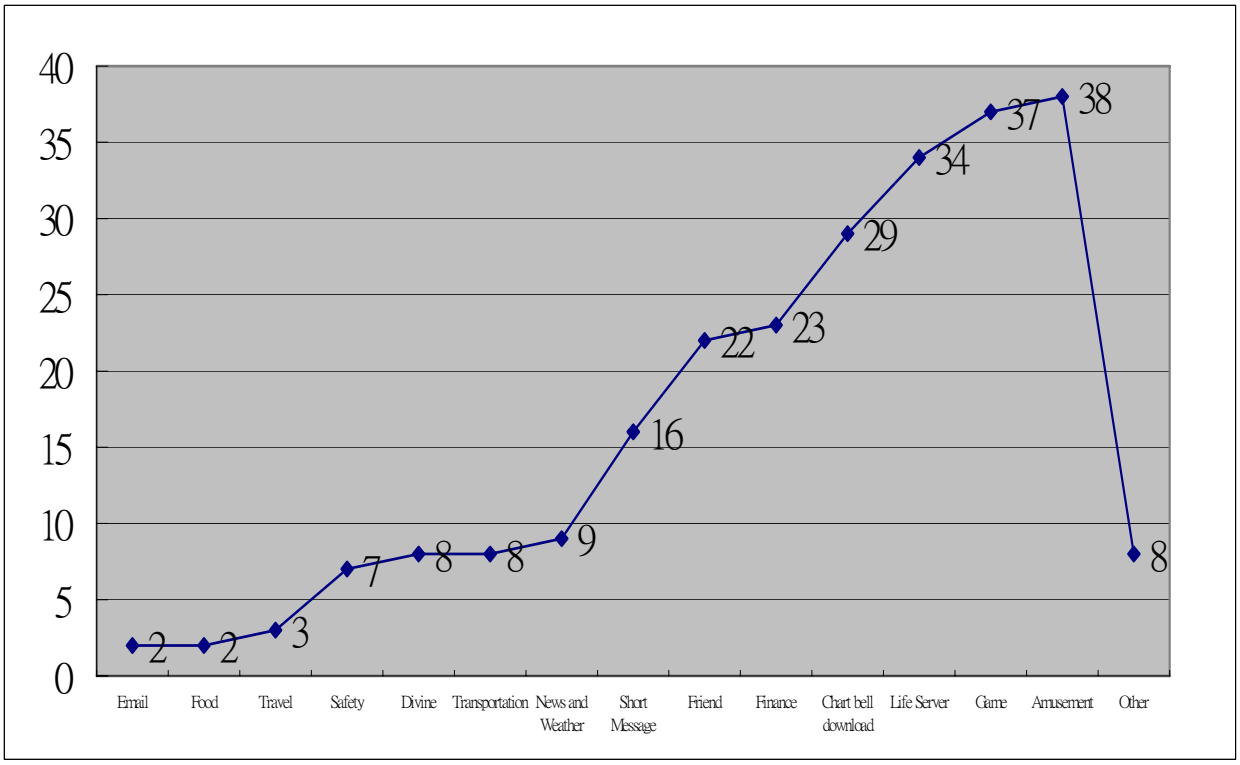

Figure2. Class and quantities of value-added service

Table 3. Value -added service classification in mobile commerce

Service class	Total items of service	Cellular Phone Companies in Taiwan	Clarke's Value propositions	Balasubramanian et al's eight categories
Amusement	**38**	Chunghwa Telecom ／ Taiwan Cellular Corp ／ TransAsia Telecommunications	C／U、C／U／P、L／C／U	Ⅴ、Ⅶ
Game	**37**	Chunghwa Telecom ／ TransAsia Telecommunications ／ Taiwan Cellular Corp	C／U	Ⅶ
Life Server	**34**	Chunghwa Telecom ／ Taiwan Cellular Corp／ TransAsia Telecommunications	C／U、L／C／U、C／U／P、L／C／U／P	Ⅰ、Ⅲ、Ⅴ、Ⅵ、Ⅶ、Ⅷ
Chart bell download	**29**	Chunghwa Telecom ／ Taiwan Cellular Corp ／ TransAsia Telecommunications	C／U／P	Ⅶ
Finance	**23**	Chunghwa Telecom ／ Taiwan Cellular Corp ／ TransAsia Telecommunications	C／U、C／U／P	Ⅴ、Ⅵ、Ⅶ
Friend	**22**	Chunghwa Telecom ／ Taiwan Cellular Corp ／ TransAsia Telecommunications	C／U／P、C／U、L／C／U／P	Ⅶ
Short Message	**16**	Chunghwa Telecom ／ Taiwan Cellular Corp ／ TransAsia Telecommunications	C／U、C／U／P	Ⅵ、Ⅶ
News and	**9**	Chunghwa Telecom ／ Taiwan Cellular Corp	C／U、L／C／U	Ⅱ、Ⅴ

Weather				
Transportation	**8**	Chunghwa Telecom ／Taiwan Cellular Corp	L／C／U、L／C／U／P	Ⅰ、Ⅴ、Ⅶ
Divine	**8**	Chunghwa Telecom ／Taiwan Cellular Corp ／TransAsia Telecommunications	C／U	Ⅶ
Safety	**7**	Chunghwa Telecom ／Taiwan Cellular Corp ／TransAsia Telecommunications	C／U、L／C／U／P	Ⅰ、Ⅱ、Ⅴ、Ⅶ
Travel	**3**	Chunghwa Telecom ／Taiwan Cellular Corp	L／C／U	Ⅰ、Ⅲ、Ⅶ
Food	**2**	Chunghwa Telecom ／Taiwan Cellular Corp	L／C／U	Ⅰ
Email	**2**	Taiwan Cellular Corp ／TransAsia Telecommunications	C／U	Ⅶ
Other	**8**	Chunghwa Telecom ／Taiwan Cellular Corp ／TransAsia Telecommunications	C／U	Ⅶ

Remark: U:Ubiquity, P: Personalization, L: Localization, C: Convenience

Table 4. Value -added service classification based on Balasubramanian et al's eight categories

Balasubramanian et al's eight categories	**Service class**	**Valued-added service name**	**Total items of service**	**Clarke's Value propositions**
Ⅰ	1.Travel, 2.Food, 8.Transportation, 10.Safety, 13.Life Server	Fun Seeker Amusement thumb race, 828 Mobile Gourment, Gourmet seeker eat good foods, 168 Transportation information, 168 Taiwan big motorcade, Federal highway state of roads, Call in taxi, Protects you, Women and children hot line, Market Seeker Shopping wisdom king, Expenditure service, Mobile yellow page	**13**	L／C／U、L／C／U／P
Ⅱ	4.News and Weather, 10.Safety	373 weather of information, Far-end monitoring	**2**	L／C／U、L／C／U／P
Ⅲ	1.Travel, 13.Life Server, 3.Friend	Travel Taiwan work, Fashion life, seeks good friend, Municipal government convenient service	**4**	L／C／U、L／C／U／P
Balasubramanian et al's eight categories	**Service class**	**Valued-added service name**	**Total items of service**	**Clarke's Value propositions**
Ⅳ	NONE	NONE	**NONE**	NONE
Ⅴ	4.News and Weather, 5.Amusement, 8.Transportation, 9.Finance, 10.Safety, 13.Life Server	ETTV news, WNI cool weather observatory, e first news, Lotto map, Lotto wealth, Win the money for Lotto, 850 information of news observatory, News, Catch News, Multimedia broadcast area→portrait Information post, Transportation traveling→Public transports inquiry, Transportation traveling, Stock Inquiry, Immediate stock price, Stock market information, International stock marketE generation finance, 888 Financial hot line, 887 Sound finance hot line, TCC Stock king, Taiwan stock market mobile, 588 Finance Motion payment, Mobile ticket business, Sound ticket business, Mobile ticket business, Short message ticket business, 855 Riding save service, 527 Mobile assure the safety, 536 Looks up the announcement service, 818 Checks lottery results, Mobile secretary, Mobile secretary, Customer service, Immediate video and music, Video and music downloading, 536 Make an appointment looks up the announcement	**38**	C／U、L／C／U、C／U／P
Ⅵ	9.Finance, 13.Life Server, 14.Short Message	889 Shows to the price, Investment and manages finances, Your good friend, Short message immediately information, 8086 short message service	**6**	C／U／P、C／U

Ⅶ	1.Travel、3.Friend、5.Amusement、6.Chart bell download、7.Game、8.Transportation、9.Finance、10.Safety、11.Email、12.Divine、13.Life Server、14.Short Message、15.Other	Transportation traveling→Approaches nature, 856 Makes the friend password, 858 SM secret room, Good friend QQ, Yahoo! mobile Immediate communication, 850 Miss you, 856 Chat e Chat, community make friend, 520 Mobile make the friend, OKone photo make the friend, EZFirend, Covers the cotton-wadded quilt purely to chat, the love tries clothes room, 1069 Comrade makes the friend, way irony of fate, the subject plays the partner area, ePost finally, ePost mailbox, ePost Makes the friend, ePostBBS, 8288 Mobile party, Makes the friend private paradise, Music Center, Catch Talk, Catch Event, music hall, Adult hall, Movie hall, Cartoon hall, Amusements hall, pepper new paradise, Fun e fun, Game cool, Cartoon modelling energy hall, Color fun e fun, Cartoon Popular city, In addition kind of chart bell hall, Left bank art center, 866 Mobile music, YOYO666 Handset amusements net, 866 Joyful SONG, Hank Kara OK, Video and music downloading, Use the wireless technology to sing, Mobile showing hall, YOYO666 Handset amusements net, Shopping new paradise, Cartoon and cartoon general mobilization, Java hand book, emome PDA, MeloRing, Super MeloRing, YoYo Ring, Oricon Popular song announcement, Western sound bell, Japanese sound bell, Disnep mobile, Japanese Animation field, N-Melody Town, Game Cool, Sanrio fun e fun, K-taiFun, Cartoon happy town, 830 Pays expenses downloading, 830 The chart bell collects entire,HAHA ZONE, 800 My Ring, 801 Joy sound, Colored chart downloading, Chord bell sound downloading, Original bell sound downloading, 811, 801 Whistling bell, 810 cool Chart bell download, Personalization Chart bell download, Popular bell sound download, Chart bell download,	**182**	L／C／U、C／U／P、C／U、L／C／U／P
Balasubramanian et al's eight categories	**Service class**	**Valued-added service name**	**Total items of service**	**Clarke's Value propositions**
Ⅶ (contuine)	1.Travel, 3.Friend, 5.Amusement, 6.Chart bell download, 7.Game, 8.Transportation, 9.Finance, 10.Safety, 11.Email, 12.Divine, 13.Life Server, 14.Short Message, 15.Other	Approaches the body-GP Competition, Approaches the body →Mah-jong hall, TIC game battlefield, Relaxz game, Game →Warring States age, GEMMYPLANET, JavaAmusement park, Thumb cool Club, SAN mobile club, Disnep mobile, Hit5 Game king, FUN2U Download amusement park, JOYMASTER, Airborne game city, iGame Mobile game, , XCome heaven, Cool start, Amogi, Star Ring game empire, Sky mobile Paradise, Relaxed game universe, Hee ha Java island, 8 elements, GAZILA amusement network, Moja Theme park, Game Supervisor, 880 Computer game, Java Game paradise, Short message game paradise, Computer game hall, Computer game download, Java Game, Computer game hall, Transportation traveling→Map inquiry service, Transportation traveling→Parking lot information, Bank service, Mobile bank, Mobile bank, Mobile bank, Bill credit inquiry, Mrs. Zhang, Life hot line, email, e-mail Young postman, Angel warning,	**182**	L／C／U、C／U／P、C／U、L／C／U／P
Ⅷ	13.Life Server	Industry telephone short message	**1**	C／U

The following chart (Figure 3) represents the three providers' value-added services data. The chart shows the numbers of the services applied and offers a comparison based on the model of Balasubramanian et al (2002).

5. DATA ANALYSIS AND COMPARISON

From the above classification result, we evaluated the current value-added services situation in Taiwan.

(1) We divided the value-added services into two segments: "Living" and "Entertainment." There are nine classes such as: Life Server (34 item), Finance (23 item), Short Message (16item), News and Weather (9 item) , Transportation (8 item), Safety (7 item), Email (2 item), Food(2 item) , Travel (3 item) are under Living segment. It included total 104 value-added services. There are five classes such as: Amusement (38 item) , Game (37 item), Chart bell download (29 item), Friend (22 item), Divine (8 item) are under Entertainment segment. It included total 134 value-added services. The Entertainment segment total of 134 is over half the combined number of 246. This results show that the value-added service tendency is still driven by entertainment. The Advertising is directly related to product promotion, but currently has no data aviable for study. Providers usually volunteer provided the advertising information to customers-receivers. When providers do not

actively provide the information to receivers, the promotion products may be less well-receivedby the target customers. This problem should be researched further. Finally, there are twenty-three items under the Finance class. Stock transition and inquiry are the main activities, indicating that financial activities are represented in value-added services.

(2) Only two data items appear in Email service, but Short Message service has sixteen items. Even though these two services are quite similar, there is a major difference in the data collection. This is affected by mobile commerce's two main limitations: small screens and low-resolution displays. Mobile handsets are also limited in computational power, and memory space. Short Messages require less memory space compared to Email's greater requirement of larger display screen. Therefore, Short Messages have more usage than Email.

(3) Applying Balasubramanian et al's (2002) model, Category IV is not available in Taiwan. On the other hand, Category VIII in this category contains only one piece of information. Both IV and VIII have the same characteristics that the providers control over providing the information. Since Category II included only two data items, and Category VI included six items, these were considered very limited amounts. The similar characteristics of Category II and Category VI indicate that the sources of such information are the service providers themselves. Moreover, this shows that Taiwan cell phone providers are not providing sufficient information about available value-added services when these organizations are the main information controllers. This concept also corresponds to the previously mentioned first point about advertising being controlled by providers. Conducting a survey to investigate the demand for this service might help us to understand mobile commerce development in the future.

(4) From Balasubramanian et al's (2002) model, the total of Category I, II, III, and IV for the SENSITIVE factor included only 19 data items. Therefore, providers in Taiwan currently are not providing sufficient value-added services in SENSITIVE area.

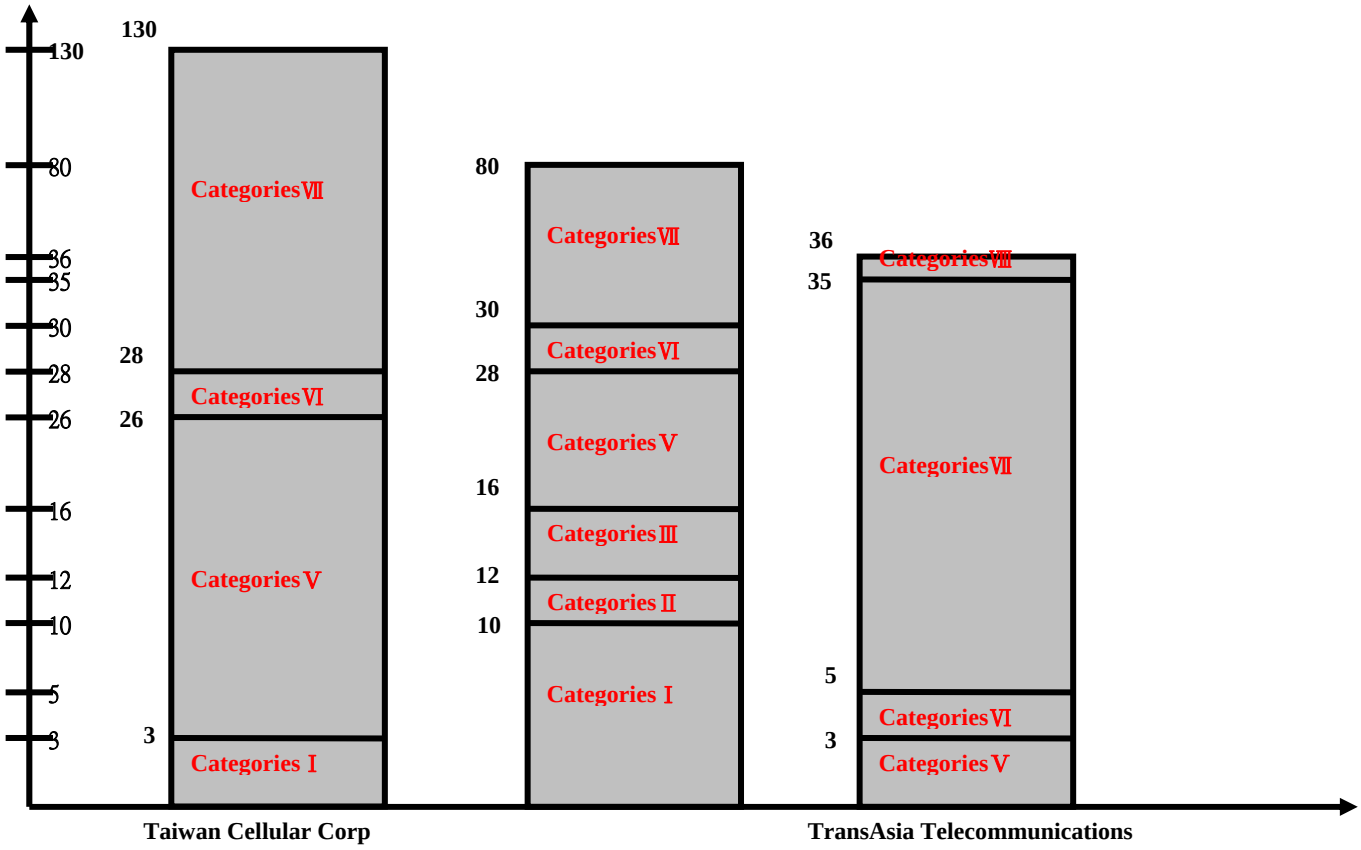

Figure3. Numbers of the value-added services provided by celluar phone company in Taiwan

(5) The largest count number belongs to VII category of total one hundred eighty-two. Earlier results showed that Amusement included thirty-eight items. Among these thirty-eight items, thirty-six belong to category VII. Thirty-seven of the Game items and twenty-nine of Chart Bell Download are also included in category VII. The above data analysis confirmed that Taiwan users still focus on insensitive, non-critical and receivers are the main controller's Entertainment service. In category VII, Amusement, Game and Chart Bell Downland dominate most count with 102. This explains the reason category VII is still influenced by Entertainment services.

(6) From Clarke's four value proposition for m-commerce theory to compare with our data, Convenience／Ubiquity dominated the total count with 142. The second highest amount is Convenience／Ubiquity／Personalization with

71 entries. Next, Localization／Convenience／Ubiquity／Personalization have 10 and Localization／Convenience／Ubiquity contain 23. In Convenience／Ubiquity, there are 114 belonged to VII category and 26 of 114 are under Amusement, while 37 of 114 are listed under Games, and 8 of 114 are under Divine. After a thorough study, not only the main value-added services are using popularly in Entertainment under category VII, but they also illustrate Conveience／Ubiquity characteristics. There are many value-added services with this kind of Entertainment characteristic. However, it remains to be seen whether customers will widely accept and use these offerings. Systematic surveys will provide us with evidence of what customers really desire.

(7) Referring to Clarke's four value proposition, Convenience／Ubiquity／Personalization included seventy-one items, and Localization ／ Convenience ／ Ubiquity ／ Personalization included ten items. Only Convenience／Ubiquity ／ Personalization and Localization ／ Convenience／Ubiquity／Personalization integrated the aspect of Personalization characteristic. However, eighty-one items did not comprise even one-third of the total two hundred and forty-six collected items. This confirms that providers in Taiwan do not offer adequate Personalization value-added services.

(8) The providers in Taiwan have not provided Advertising value-added service. The least three value-added services are Travel, Food, and Email and they belong to I, III, and VII Balasubramanian's Eight categories. These three services do not count to II, IV, V, VI, and VIII categories because no data exists for category IV and only one data item was placed in category VIII. Conducting a survey would allow us to recognize whether the customers desire II, IV, V, VI, and VIII categories' Travel, Food, Email and Advertising. This further research can assist the providers to develop new value-added services to improve the e-commerce future markets.

6. CONCLUSION AND DISCUSSION

6.1 Conclusion and Suggestions

Following is a discussion of the research, along with several relevant suggestions for cellular phone companies.

(1) Under Balasubramanian model, Time class is separated into Current and Non-Current. For Current, there are Urgent and Non-Urgent. For example, if we are ordering an airline ticket right now and want to be on the plane right now, this will be Urgent. If we ordered the ticket but the airline will leave next week, we classify this as Non-Urgent. Balasubramanian only defined Location without identifying where the customers actually were. This category should be classified into two separate parts: Current Location and Non-Current Location. For example, if the user is seeking restaurants for their surrounding areas, this would be considered Current Location. If the user is looking for restaurants for later usage, this is also related to Location but the usage is for future, Non-Current Location use. If Balasubramanian were to describe the Time and Location using more detailed segments, it would allow for the identification of value-added services with clearer characteristics.

(2) From the research classification method, we demonstrated which value-added services are available or unavailable in the local Taiwan market. The research utilized the Eight-categories of Balasubramanian et al. (2002) and Clarke's (2001) Four value propositions for m-commerce models to explore each value-added service's characteristics. This allows us to better understand the current mobile phone value-added services situation in Taiwan.

6.2 Future Research Directions

Suggestions for the future development of research:

(1) Through Balasubramanian model, we can further segment the TIME CRITICAL factor based on Urgent/Non-Urgent, and we can segment the LOCATION SENSITIVE into Current Location/Non-Current Location. Such a detailed segmentation would allow us to better understand each value-added service's characteristics.

(2) Divide the customers into five elements: age, sex, education, occupation, and income. Researchers can conduct a survey to study each class and type of service that customers prefer and accept.

(3) Furthermore, the survey can include five more elements such as pricing, ease of operation, demand requirements, security, and services presently unknown among target customers. This will allow us to more fully understand the customers' concerns even before they choose to use the services.

(4) We can also investigate each group's Internet usage level as a reference to predict the potential usage rate of mobile commerce. While these customers may have used the Internet in the past, they may have gotten cheated. If they have such negative experiences with the Internet, this experience would likely affect their habits to use mobile phone value-added services.

7. REFERENCES

[1] Abuelyaman, E. and Wen, H. J. An efficient wireless transmission method for m-commerce. *International Journal of Mobile Communications*, Vol. 2, No. 4, 2004, 405-417.

[2] Anckar, B. and D'Incau, D. Value creation in mobile commerce:Findings from a consumer survey. *Journal of Information Technology Theory and Application*, Vol. 4, No. 1, 2002, 43-64.

[3] Balasubramanian, S., Peterson, R. A. and Jarvenpaa, S. L. Exploring the Implications of M-Commerce for Markets and Marketing. *Academy of Marketing Science*, Vol. 30, No. 4, 2002, 348-362.

[4] Camponovo, G. and Pigneur, Y. Business Model Analysis Applied To Mobile Business. *5th International Conference on Enterprise Information Systems (ICEIS)*, April, Angers, 2003, 173-183.

[5] Clarke, I. III. Emerging Value Propositions For M-Commerce. *Journal of Business Strategies*, Vol. 18, No. 2, 2001, 133-148.

[6] Kini, R. B. and Thanarithiporn, S. Mobile commerce and electronic commerce in Thailand: a value space analysis. *International Journal of Mobile Communications*, Vol. 2, No. 1, 2004, 22-37.

[7] McIntosh, J. C. and Baron, J. P. Mobile commerce's impact on today's workforce: issues, impacts and implications. *International Journal of Mobile Communications*, Vol. 3, No. 2, 2005, 99-113.

[8] Pedersen, P. E., Methlie, L. and Thorbjomsen, H. Understanding mobile commerce end-user adoption: a triangulation perspective and suggestions for an exploratory service evaluation framework. *Proceedings of the 35th Hawaii International Conference on System Sciences*, HICSS-35, Hawaii, US, (Jan. 2002), 7-10.

[9] Siau, K. and Shen, Z. Mobile communications and mobile services. *Int. J. Mobile Communications*, Vol. 1, Nos. 1/2, 2003, 3-14.

[10] Stanoevska-Slabeva, K. Towards a Reference Model for M-Commerce Applications. *European Council of International Schools (ECIS)*, (June. 2003), 1-13.

[11] Tsalgatidou, A. and Pitoura, E. Business models and transactions in mobile electronic commerce: requirements and properties. *Computer Networks*, Vol. 37, 2001, 221-236..

[12] Varshney, U. and Vetter, R. Mobile Commerce : Framework, Application and Networking Support. Mobile Networks and Applications, Vol. 7, No. 3, (Jun. 2002), 185-198

[13] Taiwan Cellular Corp http://www.tcc.net.tw/main/ ; http://www.tcc.net.tw/vas/

[14] Chunghwa Telecom http://www.cht.com.tw/PersonalCat.php?CatID=737

[15] TransAsia Telecommunications http://www.tat.com.tw/; http://www.hank.net.tw/index.jsp.