

The Evolution and CSFs of Mobile Business

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I. Introduction

The Internet and mobile telephony are two of the successful technologies of the 20th century and have formed another promising technology, mobile Internet access (Pioneer Consulting, 2002). This mobile Internet access offers a sizable market opportunity with global equipment revenues expected to grow from \$3.1 billion (USD) in 2002 to \$19.1 billion in 2008.

According to Intermarket Group (2002), the number of world-wide mobile Internet users is expected to grow 18-fold between 2000 and 2005. There were 39 million mobile Internet users in the world as the end of 2000, which is projected to increase to about 729 million by 2005.

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Geographically, Europe will have the highest concentration of mobile Internet users by then, with 194 million people going online with a mobile device, up from 7 million in 2000. The number of mobile Internet users in North America will increase from 2 million to 89 million in the same period, while the mobile Internet population in Latin America will grow from 100,000 to 52 million. In the Asia-Pacific region, 79 million people will have wireless web access by 2005, up from 30 million in 2000.

Since the number of world-wide mobile Internet users has been increasing rapidly, the mobile business which is a variety of applications of mobile Internet has gained attention among the related industry and academics. However, most researchers mainly focus on the issues concerning the trend of the mobile Internet services (e.g., Han, 2001), forecast of marketplace (e.g., Baskerville Communication Corporation, 1999; Ovum, 1999; The Strategis Group, 1999), technology (e.g., Unwired Planet, 1999), and demographic characteristics (Chae, 2000).

The purpose of this paper is to project the evolution of mobile business and identify its critical success factors (CSFs). Based on the literature review in the area of mobile business models in Chapter 2, the research method on the evolution of mobile business is proposed in Chapter 3. This evolution is projected in Chapter 4 and the CSFs of mobile business are identified in Chapter 5, followed by conclusions in Chapter 6.

II . Literature Review

Previous research (e.g., Varshney et al., 2000; NTTDoCoMo; Ovum, 2000; Durlacher, 2001; UMTS Forum, 2001; ARC Group, 2002) has attempted to classify mobile business models, yet there is no generally accepted classification scheme up to date. This Chapter reviews the previous literature on mobile business models and proposes a new classification scheme.

1. Literature on Mobile Business Models

Varshney et al. (2000) classifies mobile applications into ten classes (See <Table 1>). Of particular interest are mobile inventory management, product location, and proactive service management.

<Table 1> Classes of Mobile Commerce Applications

Class of Wireless Applications	Examples
Mobile Inventory Management	Tracking the location of goods and services, such as boxes, packets, troops, or cattle
Product location	Locating certain items, such as TVs, VCRs, or car
Proactive Service Management	Transmitting information about aging components, such as automobile parts, to vendors
Wireless Reengineering	Improving business service, such as claim adjustments or insurance
Mobile Auction and Reverse Auction	Offering, selling, and bidding
Mobile Entertainment Services	Providing services such as video on demand
Mobile Office	Providing services for businesspeople, such as traffic jam reports, airport and flight information, vacation reservations, and procurement of products and services
Mobil eDistance Education	Offering classes using streaming audio and video
Wireless Data Center	Providing downloadable information from data warehouses
Mobile Music and Music on Demand	Allowing downloading and storing of music from the internet

(Source : Varshney et al., 2000)

As shown in <Table 2>, ARC Group (2002) adds location based service as part of mobile business applications. However, the criteria on which these applications are classified are not explicitly explained.

<Table 2> ARC Group 's Classification of Applications

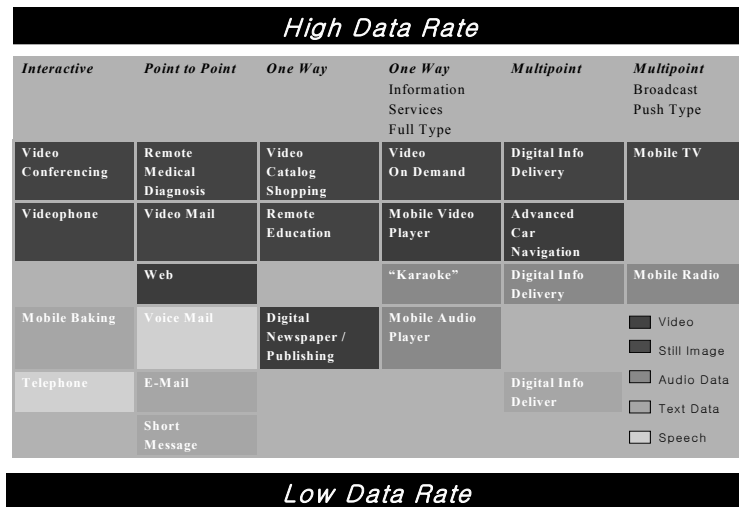
Classification	Example of Applications
Communications	SMS, e-mail, Instant chat/mobile instant messaging Multimedia messaging e-mail Unified messaging Intranet messaging
Value Added Services(VAS)	Information services e.g. news, weather & stock quotes Entertainment e.g. games, music and video
m-Commerce	Retail Ticket purchasing Banking financial trading
Location based	Navigation Traffic conditions Rail timetables Restaurant finder

(Source : ARC Group, 2002)

In October 2001, NTT DoCoMo launched the first Third Generation (3G) mobile services for voice and high-speed data communications (www.allnetdevice.com). This service is named FOMA (Freedom of Multimedia Access) and enables users to connect with anyone, anytime, and anywhere.

They classify mobile services on the basis of data rate on Y-axis and interactive, point to point, one way, and multipoint on X-axis, as shown in Figure 1. A strong point of this classification is that the multimedia service which is expected to be available through the technical development of mobile Internet in the future.

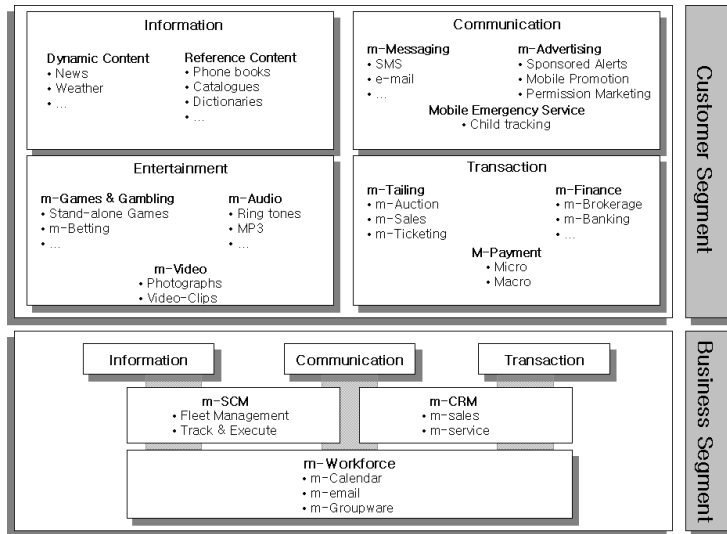
(Source : www.nttdocomo.com)



<Figure 1> Current and Emerging Docomo's FOMA Services

According to Durlacher (2001), business services and applications will remain distinct from consumer applications. The progression from 2G towards 2.5G and 3G will manifest itself in gradually richer information content, greater interactivity, and some new application features such as location dependence, personalization, and services. The 3G application and service space is mapped in <Figure 2>.

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<Figure 2> Mobile Service Overview(Durlacher, 2001)

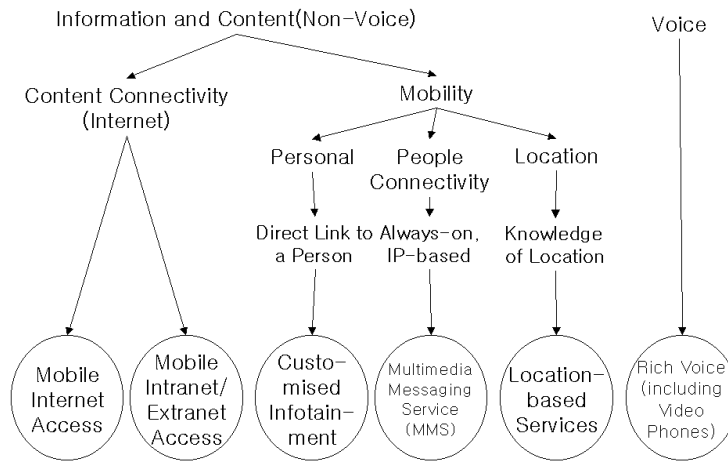
Ovum (2000) proposes that mobile e-commerce applications fall into three main categories, as shown in <Figure 3>. These categories include goods, service, information, and the other criteria of segmentation are B2C and B2B. This segmentation still has limitations in that the characteristics of mobile Internet, such as location based, service and personalization are not reflected.

(Source : Ovum, 2001)

	Goods	Services	Information
Business-to-consumer	<ul style="list-style-type: none"> Shopping Vending Trading 	<ul style="list-style-type: none"> Gaming & Gambling 	<ul style="list-style-type: none"> Paid-for Information Advertising
Business-to-business	<ul style="list-style-type: none"> Procurement Trading 	<ul style="list-style-type: none"> Ticketing E-cash Banking Discounts & Loyalty schemes 	

<Figure 3> Ovum 's Application

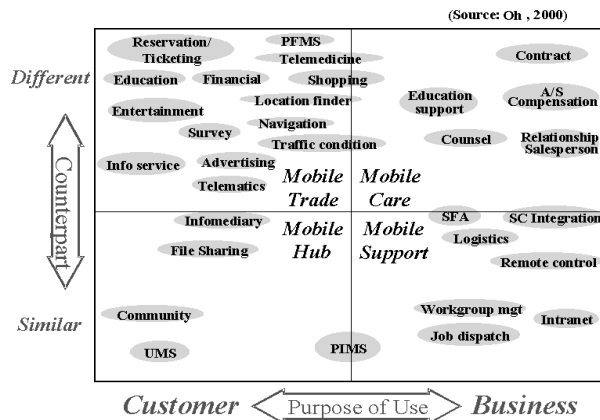
Universal Mobile Telecommunications System (UMTS) Forum (2001) provides 3G-based mobile service categories that represent the major areas of demand for 3G-enabled services over the next 10 years (See <Figure 4>). These categories include Mobile Internet Access, Mobile Intranet/Extranet Access, Customized Infotainment, Multimedia Messaging Service (MMS), Location-based Services, and Rich Voice (simple and enhanced voice).



<Figure 4> 3G Service Framework(UMTS Forum, 2001)

Oh (2000) introduces The 2×2 Matrix as a new classification scheme of mobile business (See <Figure 5>). X-axis is divided into Business and Customer on the basis of Purpose of Use and Y-axis is divided into Different and Similar on the basis of Counterpart.

(Source : Oh, 2000)



<Figure 5> Mobile Business Models

2. Proposed Classification

According to the classification scheme of Customer and Business proposed by Oh (2000), Table 3 summarizes the mobile business models listed in the literature reviewed and the new services to emerge in the future. These services will be possible by the development of mobile Internet technology.

<Table 3> Proposed Classification

Purpose of Use	Classification	Services	V	A	N	D	O	Oh	Ar	
Customer	Finance	PFMS						✓ ✓		
		Payment - Micro, Macro				✓ ✓				
		Banking		✓	✓	✓				
		Financial Trading - Stock		✓						
	Transaction	Shopping - Vending/ Retail/ Trading - Reservation - Ticketing			✓			✓	✓ ✓ ✓	
		Auction - Reverse Auction	✓ ✓			✓				
		Telemedicine							✓	
	LBS(Location based Service)	Medical Diagnosis				✓				
		Operation								
		Location Finder - Product Location - Child Tracking	✓				✓		✓	
		Telematics - Traffic Conditions - Navigation - Proactive Service Management	✓			✓			✓ ✓ ✓	✓
		Rail Timetables								

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Purpose of Use	Classification	Services	V	A	N	D	O	Oh	Ar	
	Entertainment	Games/Gambling - Stand-alone games - m-betting	√			√ √ √		√		
		VOD			√					
		AOD - Ring Tones - MP3 - Karaoke	√			√	√ √			
	Info Service	Digital Newspaper/Publishing				√			√	
		Digital Info Delivery				√				
		Weather					√			
		Reference Contents - Phone Books - Catalogues - Dictionaries					√ √ √ √			
		Infomediary							√	
		Stock Info								
		Education	m-Learning	√		√				
	Advertising	Sponsored Alerts Mobile Promotion Permission Marketing					√ √ √ √		√	
		Communications	Community						√	
		UMS - SMS - e-mail - Voice Mail - Video Mail - MMS					√ √		√	
			√				√			
			√							
			√							
			√							
		Real Time Chat - Instant Chat - Mobile Instant Messaging								
	File Sharing	√						√		
	Video Conferencing				√					

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Purpose of Use	Classification	Services	V	A	N	D	O	Oh	Ar	
Business	FFA (Field Force Automation)	Education Support						√	√	
		A/S						√	√	
		Compensation						√		
		Contract	√					√	√	
		Counsel	√					√		
		SFA						√	√	
	Remote Support	Procurement								
		Logistics - Inventory management	√						√	√
		Remote Control/Telemetry							√	√
		Job Dispatch							√	
		Fleet Management					√			√
	Managerial Support	PIMS - Scheduling - Name Card - Calendar							√ √ √	

V : Varshney et al., 2000; A : ARC Group, 2002;
 N : NTT DoCoMo(www.nttdocomo.com);
 D : Durlacher, 2001; O : Ovum, 2000; Oh : Oh, 2001;
 AR : Atlas Research Group, 2002

3. Literature on CSFs

The successful development of the mobile business market will depend on operators taking advantage of the following capabilities within the mobile environment (Durlacher, 2000). As these capabilities, they list six key success factors : customer ownership, personalization, localization, ubiquity, timeliness, and convenience (See <Table 4>).

<Table 4> Key Success Factors

Key Success Factor	Explanation
Customer Ownership	Subscriber data, such as billing address, mobile phone number, e-mail address, choice of mobile device and calling patterns, are becoming ever more valuable in the light of mobile commerce. In addition to passive collection of user behavior and data, companies will be able to benefit from users actively providing and specifying their own choices and preferences to the portal provider.
Personalization	Personalization is about creating services that customize the end-user experience for the individual subscriber.
Localization	There are several competing technologies that enable mobile location or positioning services. Location-sensitive information becomes key in mobile commerce.
Ubiquity	The ability to receive information and perform transactions from virtually any location is especially important to time-critical allocations, such as stock and options trading as well as betting.
Timeliness	Mobile enables the transmission and use of time-sensitive information whose value is inherent in its immediate delivery.
Convenience	Making life easier for people and taking away the pain of unpleasant tasks and activities. Technology in itself is exciting, but only its use to increase the quality of life makes it valuable.

(Source : Durlacher, 2000)

On the other hand, Ovum (2000) asserts that mobile commerce succeeds in situations where applications meet the three Cs in Table 5 : Convenience, Cost, and Compulsive.

<Table 5> Three Cs

Three Cs	Explanation
Convenience	High
Cost	Low or Acceptable
Compulsive	To Use

(Source : Ovum, 2000)

Based on the assumption that the value of a service to subscribers is determined how much they are willing to pay, ARC Group (2000) argues that this willingness to pay depends the factors

such as utility, timeliness, exclusivity, personalization, panache, and convenience of a service (See <Table 6>). Both personal and business users take these factors into account when determining whether a service provides adequate return-on-investment (ROI).

<Table 6> Customer ROI

Factors	Explanation
Utility	Does the service make a subscriber's life easier?, Does it help them make money or provide solid entertainment?
Timeliness	Does the service deliver time-critical information?, Does the subscriber have time to act on the information?
Exclusivity	Are there other places to obtain this information?, Are those other places cheaper or easier to access?
Personalization	Is this information customized for the subscriber? Is it designed to meet their individual needs?
Panache	Is this a trendy service? Is there image value in subscribing to it?
Convenience	How hard is to use this service?, Does it require access codes or the input of information that is not normally at a user's fingertips? Is the access device ergonomically designed?

(Source : ARC Group, 2000)

Oh (2000) asserts that the strategies of mobile business need to include 3Cs such as Convenience, Contents, and Cost since mobile Internet is strong in ubiquity but is weak in interface in comparison with fixed Internet. Han (2001) tests these 3Cs and asserts that Convenience is the most critical factor that influences the overall satisfaction of mobile Internet users.

<Table 7> summarizes the prior research on the CSFs of mobile business.

<Table 7> Summary of Literature on CSFs

Author	Success Factors
Oh(2000)	Convenience, Cost, Contents
Dulacher(2000)	Convenience, Customer Ownership, Personalization, Localization, Ubiquity, Timeliness
Ovum (2000)	Convenience, Cost, Compulsive
ARC(2000)	Utility, Timeliness, Exclusivity, Personalization, Panache, Convenience
Han(2001)	Accuracy, Variety, Updatedness, Input, Security, Speed, Screen Interface, Success in Access/Communication, Cost

4. Generic Strategies

Porter (1985) argues that a firm's relative position within its industry determines whether a firm's profitability is above or below the industry average. The fundamental basis of above average profitability in the long run is sustainable competitive advantage. There are two basic types of competitive advantage a firm can possess : low cost or differentiation. The two types of competitive advantage, combined with the scope of activities for which a firm seeks to achieve them, lead to three generic strategies for achieving above average performance in an industry : cost leadership, differentiation, and focus. The focus strategy has two variants, cost focus and differentiation focus (See <Figure 6>).

(Source : Porter, 1985)

		Competitive Advantage	
		Lower Cost	Differentiation
Competitive Scope	Broad Target	1. Cost Leadership	2. Differentiation
	Narrow Target	3A. Cost Focus	3B. Differentiation

<Figure 6> Generic Competitive Strategies

In cost leadership, a firm sets out to become the low cost producer in its industry. The sources of cost advantage are varied and depend on the structure of the industry. They may include the pursuit of economies of scale, proprietary technology, preferential access to raw materials and other factors.

A low cost producer must find and exploit all sources of cost advantage. if a firm can achieve and sustain overall cost leadership, then it will be an above average performer in its industry, provided it can command prices at or near the industry average.

In a differentiation strategy a firm seeks to be unique in its industry along some dimensions that are widely valued by buyers. It selects one or more attributes that many buyers in an industry perceive as important, and uniquely positions itself to meet those needs. It is rewarded for its uniqueness with a premium price.

The generic strategy of focus rests on the choice of a narrow competitive scope within an industry. The focuser selects a segment or group of segments in the industry and tailors its strategy to serving them to the exclusion of others.

The focus strategy has two variants. In cost focus a firm seeks a cost advantage in its target segment, while in differentiation focus a firm seeks differentiation in its target segment. Both variants of the focus strategy rest on differences between a focuser’s target segment and other segments in the industry. The target segments must either have buyers with unusual needs or else the production and delivery system that best serves the target segment must differ from that of other industry segments. Cost focus exploits differences in cost behavior in some segments, while differentiation focus exploits the special needs of buyers in certain segments.

5. Proposed CSFs

As shown in <Table 8>, the CSFs that are identified in the literature and need to be considered are incorporated on the model of the generic strategies.

<Table 8> Generic Strategies of Mobile Business

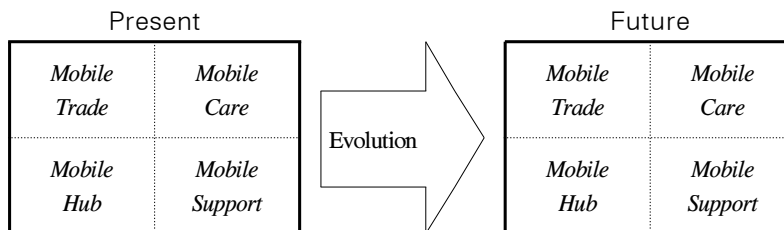
Constructs	Subconstructs	Items	References
Cost Leadership	Cost	Contents Fee Packet Transmission Charge Mobile Device Price	Oh, 2001 Ovum, 2000 Han, 2001
Differentiation	Convenience	Timeliness Screen Interface Input	Dulacher, 2000 ARC, 2000 Han, 2001
	Contents Character	Exclusivity Personalization Panache Localization Utility Compulsive	ARC, 2000 Dulacher, 2000 Ovum, 2000
	Contents Management	Accuracy Variety, Updatedness	Han, 2001
	Technical Aspects	Success in Access/Communication Security, Speed	Han, 2001

III. Research Method

This Chapter describes the research model proposed in this study and the questionnaire and subjects of the survey conducted for the study.

1. Research Model

In order to project the evolution of mobile business, The 2x2 Matrix proposed by Oh (2000) is utilized for building the research model (See <Figure 9>). The mobile business models classified in Chapter 2 are to be mapped on each of the four quadrants : Mobile Trade, Mobile Hub, Mobile Care, and Mobile Support.



<Figure 9> Research Model

2. Survey Questionnaire

The survey questionnaire is composed of four categories : General use of mobile Internet, Present and future demand of mobile Internet, overall importance and satisfaction of mobile internet, and general demographics.

Two steps are needed to develop the questionnaire for this research. First the measurement was developed from the literature review. Second the pilot tests of this measurement were conducted to college students. Each respondent was to choose from a 1-to-7 Likert scale to indicate the importance of each measurement instrument.

3. Subjects

Through an Internet survey, the total of 1180 data were collected for a period of one week, and the effective data of 685 were selected. <Table 9> shows the demographic characteristics of the respondents.

<Table 9> Demographic Characteristic

Category		Frequency	Percent(%)
Sex	Male	353	51.5
	Female	332	48.5
Year	Below 20	41	6.0
	20-24	171	25.0
	25-29	183	26.7
	30-34	169	24.7
	35-39	77	11.2
	Above 40	44	6.4
Occupation	Middle/high school student	21	3.1
	University/graduate student	159	23.2
	Salaried Man	330	48.2
	Specialists	41	6.0
	Self-employed	34	5.0
	Others	100	14.6
	Total	685	100

IV. Evolution of Mobile Business

This Chapter discusses the present and future demands of mobile business and analyzes the difference between these two demands.

1. Present and Future Demand

<Table 10> shows demand by services. At present, the mobile services of Ring Tone/Character Download are most frequently used, followed by e-mail/SMS/MMS and News/Weather/Phone Book/Dictionaries.

<Table 10> Demand by Service

Constructs	Present		Future	
	Mean	Std. Dev.	Mean	Std. Dev.
PFMS	1.89	1.42	3.46	1.93
Payment	2.90	1.76	4.49	1.85
Banking	2.63	1.83	4.54	1.83
Stock	2.21	1.72	3.69	2.06
Shopping/Reservation/Ticketing/Auction	2.98	1.78	4.78	1.78
Telemedicine	1.62	1.15	2.97	1.75
Location Finder	2.92	1.85	4.73	1.81
Telematics	2.50	1.76	4.53	1.94
Games/Gambling	3.24	1.87	3.78	1.92
Ring Tone/Character Download	4.81	1.68	5.27	1.58
VOD/AOD	3.20	1.95	4.51	1.96
News/Weather/Phone Book/Dictionaries	3.45	1.88	4.82	1.74
Customized Info Delivery	2.42	1.61	3.92	1.89
m-Learning	1.99	1.45	3.18	1.85
Advertising	2.07	1.48	2.90	1.80
Community	2.86	1.82	3.81	1.94
e-mail/SMS/MMS	4.71	1.94	5.34	1.74
Real Time Chat	2.18	1.56	3.26	1.92
File Sharing	2.06	1.51	3.58	1.93
PIMs	2.75	1.87	4.07	1.93
Video Conferencing	1.60	1.19	2.94	1.79
Education Support	1.60	1.20	2.65	1.75
A/S	1.78	1.36	2.99	1.87
Compensation	1.66	1.23	2.87	1.88
Counsel	1.81	1.41	3.03	1.92
SFA	1.64	1.25	2.74	1.82
Procurement	1.55	1.12	2.57	1.74
Logistics	1.59	1.21	2.74	1.87
Telemetry	1.55	1.13	2.66	1.80
Fleet Management	1.62	1.24	3.08	2.05

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<Table 11> shows the rankings of each mobile service, one at present and the other in the future. The mobile service of e-mail/SMS/MMS will be the most popular in the future, followed by Ring Tone/Character Download and News/Weather/Phone Book/Dictionaries.

<Table 11> Ranking of Mobile Services

Constructs	Present		Future	
	Mean	Ranking	Average	Ranking
Ring Tone/Character Download	4.81	1	5.27	2
e-mail/SMS/MMS	4.71	2	5.34	1
News/Weather/Phone Book/Dictionaries	3.45	3	4.82	3
Games/Gambling	3.24	4	3.78	13
VOD/AOD	3.20	5	4.51	8
Shopping/Reservation/Ticketing/Auction	2.98	6	4.78	4
Location Finder	2.92	7	4.73	5
Payment	2.90	8	4.49	9
Community	2.86	9	3.81	12
PIMS	2.75	10	4.07	10
Banking	2.63	11	4.54	6
Telematics	2.50	12	4.53	7
Customized Info Delivery	2.42	13	3.92	11
Stock	2.21	14	3.69	14
Real Time Chat	2.18	15	3.26	17
Advertising	2.07	16	2.90	24
File Sharing	2.06	17	3.58	15
m-Learning	1.99	18	3.18	18
PFMS	1.89	19	3.46	16
Counsel	1.81	20	3.03	20
A/S	1.78	21	2.99	21
Compensation	1.66	22	2.87	25
SFA	1.64	23	2.74	26
Fleet Management	1.62	24	3.08	19
Telemedicine	1.62	25	2.97	22
Education Support	1.60	26	2.65	29
Video Conferencing	1.60	27	2.94	23
Logistics	1.59	28	2.74	27
Procurement	1.55	29	2.57	30
Telemetry	1.55	30	2.66	28

2. Analysis of Evolution

The paired t-test of mobile services shown in <Table 12> indicates that there are significant differences in demand between at present and in the future.

<Table 12> Paired T-test of Mobile Services

Present - Future		Paired Differences			t	df	sig(2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair1	PFMS	-1.57	1.84	7.03E-02	-22.322	684	0.000
Pair2	Payment	-1.59	1.81	6.90E-02	-23.091	684	0.000
Pair3	Banking	-1.92	1.92	7.32E-02	-26.173	684	0.000
Pair4	Stock	-1.47	1.92	7.35E-02	-20.050	684	0.000
Pair5	Shopping/Reservation /Ticketing/Auction	-1.80	1.87	7.13E-02	-25.187	684	0.000
Pair6	Telemedicine	-1.35	1.67	6.38E-02	-21.129	684	0.000
Pair7	Location Finder	-1.81	1.93	7.36E-02	-24.602	684	0.000
Pair8	Telematics	-2.04	2.11	8.06E-02	-25.243	684	0.000
Pair9	Games/Gambling	-0.54	1.54	5.87E-02	-9.284	684	0.000
Pair10	Ring Tone/Character Download	-0.46	1.31	5.01E-02	-9.244	684	0.000
Pair11	VOD/AOD	-1.31	1.87	7.13E-02	-18.394	684	0.000
Pair12	News/Weather/Phone Book/Dictionaries	-1.37	1.85	7.08E-02	-19.306	684	0.000
Pair13	Customized Info Delivery	-1.51	1.90	7.24E-02	-20.795	684	0.000
Pair14	m-Learning	-1.18	1.70	6.51E-02	-18.153	684	0.000
Pair15	Advertising	-0.83	1.75	6.69E-02	-12.365	684	0.000
Pair16	Community	-0.95	1.76	6.73E-02	-14.078	684	0.000
Pair17	e-mail/SMS/MMS	-0.63	1.65	6.31E-02	-9.971	684	0.000
Pair18	Real Time Chat	-1.08	1.75	6.67E-02	-16.170	684	0.000
Pair19	File Sharing	-1.52	1.90	7.26E-02	-20.987	684	0.000
Pair20	PIMS	-1.31	1.93	7.38E-02	-17.779	684	0.000
Pair21	Video Conferencing	-1.34	1.80	6.89E-02	-19.473	684	0.000
Pair22	Education Support	-1.05	1.65	6.29E-02	-16.666	684	0.000
Pair23	A/S	-1.21	1.86	7.12E-02	-16.984	684	0.000
Pair24	Compensation	-1.21	1.76	6.73E-02	-17.948	684	0.000
Pair25	Counsel	-1.22	1.83	6.99E-02	-17.451	684	0.000
Pair26	SFA	-1.10	1.70	6.51E-02	-16.879	684	0.000
Pair27	Procurement	-1.02	1.57	6.01E-02	-16.894	684	0.000
Pair28	Logistics	-1.14	1.72	6.56E-02	-17.398	684	0.000
Pair29	Telemetry	-1.11	1.72	6.58E-02	-16.934	684	0.000
Pair30	Fleet Management	-1.46	2.01	7.69E-02	-18.923	684	0.000

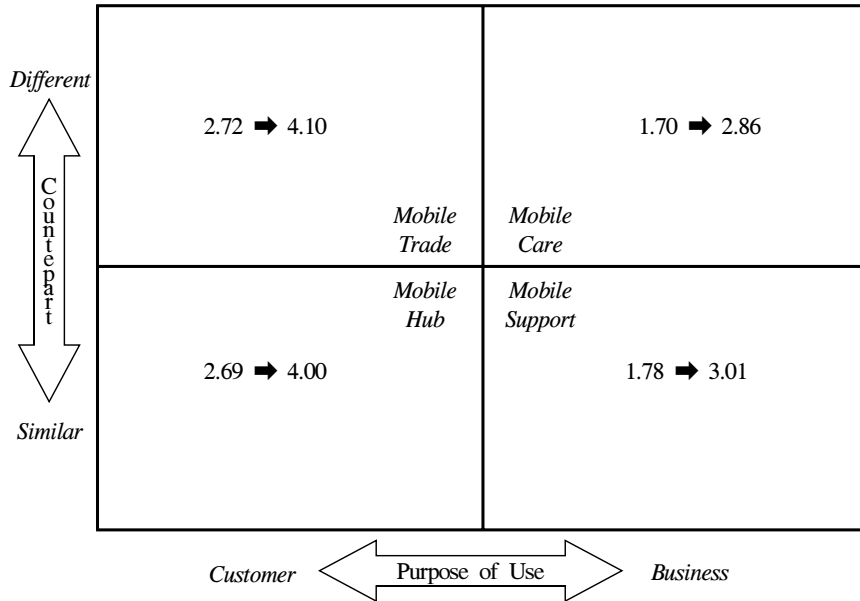
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The mobile services classified in this research are mapped on each of the four quadrants in The 2x2 Matrix proposed by Oh (2000). This provides an insight on the evolution of mobile business among the four quadrants. The results from the analysis of the data collected reveals that mobile business is evolving from the quadrant of Mobile Trade to the quadrant of Mobile Trade (See <Table 13>).

<Table 13> Difference in Demand

Constructs	Mobile Business Service	Present	Future	(2) - (1)	Ranking
		Average of Mean (1)	Average of Mean (2)		
Mobile Hub	Community e-mail/SMS/MMS Real Time Chat File Sharing	2.69	4.00	1.31	2
Mobile Trade	PFMS Payment Banking Stock Shopping/Reservation/Ticketing/ Auction Telemedicine Location Finder Telematics Games/Gambling Ring Tone/Character Download VOD/AOD News/Weather/Phone Books/Dictionaries Customized Info Delivery m-learning Advertising	2.72	4.10	1.38	1
Mobile Care	Education Support A/S Compensation Counsel SFA	1.70	2.86	1.16	4
Mobile Support	PIMS Video Conferencing Procurement Logistics Telemetry Fleet Management	1.78	3.01	1.23	3

As shown in <Figure 10>, the degree of the demands at present and in the future in each quadrant are mapped in The 2x2 Matrix. The result of this study supports that of Han (2001) which states one and half year ago that mobile business is evolving from the quadrant of Mobile Hub to the quadrant of Mobile Trade.



<Figure 10> Evolution of Mobile Business

V. CSFs of Mobile Business

This chapter describes the descriptive statistics, the reliability and validity, and the analysis of CSFs.

1. Descriptive Statistics

<Table 14> shows the importance of each CSF when mobile Internet is used. The result from

the analysis of data collected indicates that Security is the most important, followed by Speed and Success in Access/Communication. Although all these three are of Technical Aspects, there is no significant difference in importance between Technical Aspects and Cost.

<Table 14> Importance of CSFs

Constructs	Mean	Std. Dev.
Contents Fee	6,14	1.155
Packet Transmission Charge	6.19	1.16
Device Price	5.75	1.31
Timeliness	6.05	1.18
Input	5.78	1.21
Screen Interface	5.54	1.20
Personalization	5.19	1.25
Exclusivity	4.55	1.36
Panache	4.30	1.44
Localization	5.07	1.39
Utility	5.68	1.24
Compulsive	4.62	1.46
Accuracy	5.96	1.20
Variety	5.69	1.22
Updatedness	5.94	1.18
Speed	6.38	1.05
Security	6.43	1.07
Success in Access/Communication	6.35	1.09

On the other hand, mobile Internet users are most satisfied with Localization, followed by Accuracy (See <Table 15>). These are of Contents, which reveals that mobile Internet users are most satisfied with Contents than any other.

<Table 15> Satisfaction of CSFs

Constructs	Mean	Std. Dev.
Contents Fee	2.97	1.50
Packet Transmission Charge	2.82	1.52
Device Price	2.81	1.53
Timeliness	3.34	1.43
Input	3.49	1.50
Screen Interface	3.45	1.37
Personalization	3.32	1.33
Exclusivity	3.21	1.31
Panache	3.57	1.36
Localization	3.81	1.34
Utility	3.54	1.38
Compulsive	3.32	1.32
Accuracy	3.68	1.39
Variety	3.50	1.43
Updatedness	3.52	1.46
Speed	3.14	1.65
Security	3.39	1.60
Success in Access/Communication	3.24	1.64
Overall Satisfaction	3.34	1.12

2. Reliability and Validity

In order to ensure that the variables comprising each research construct were internally consistent, reliability assessment was carried out using Cronbach's alpha. As shown in <Table 16>, the internal consistency reliability coefficients for the research constructs in this study are all well above the 0.80 level. The Cronbach's alpha values indicate a satisfactory reliability by a widely used rule of thumb of 0.60, which is suggested by Nunnally (1978).

<Table 16> Reliability of Importance

Constructs	Cronbach's Alpha	Constructs	Cronbach's Alpha
Contents Fee	0.9267	Localization	0.9285
Packet Transmission Charge	0.9264	Utility	0.9244
Device Price	0.9283	Compulsive	0.9318
Timeliness	0.9243	Accuracy	0.9243
Input	0.9244	Variety	0.9248
Screen Interface	0.9253	Updatedness	0.9245
Personalization	0.9269	Speed	0.9253
Exclusivity	0.9309	Security	0.9255
Panache	0.9329	Success in Access/Communication	0.9257

In order to support the validity of the variables in this research, a factor analysis with Varimax rotation was performed. The results extracted 5 constructs, Contents Management, Contents Characteristics, Convenience, Cost, Technical Aspects, omitting items if factor loading below 0.5 (See <Table 17>). This result supports the classification of the CSFs proposed in this study.

<Table 17> Result of Factor Analysis

Constructs		Factors				
		1	2	3	4	5
Contents Management	Accuracy	0.729				
	Variety	0.775				
	Updatedness	0.683				
	Utility	0.623				
Technical Aspects	Speed		0.723			
	Security		0.809			
	Success in Access/communication		0.789			
Cost	Contents Fee			0.818		
	Packet Transmission Charge			0.830		
	Mobile Device Price			0.734		
Contents Characteristics	Exclusivity				0.803	
	Panache				0.864	
	Localization				0.539	
	Compulsive				0.629	
Convenience	Input					0.674
	Screen Interface					0.737
	Personalization					0.687
	Timeliness					

Extraction Method : Principal Component

Rotation Method : Varimax with Kaiser Normalization

3. Analysis of CSFs

<Table 18> compares the average of means in Importance and the average of means in Satisfaction. In terms of the differences between these two averages, Cost is the critical issue, followed by Technical Aspects, Contents Management, Convenience, and Contents Characteristics.

<Table 18> Difference in CSFs

Factor	Constructs	Importance	Satisfaction	Difference in Average	
		Average of Means (1)	Average of Means (2)	(1) - (2)	Ranking
Contents Management	Accuracy Variety Updatedness Utility	5.82	3.56	2.26	3
Technical Aspects	Speed Security Success in Access/communication	6.39	3.27	3.12	2
Cost	Contents Fee Packet Transmission Charge Mobile Device Price	6.03	2.87	3.16	1
Contents Characteristics	Exclusivity Panache Localization Compulsive	4.64	3.48	1.16	5
Convenience	Input Screen Interface Personalization	5.50	3.42	2.08	4

VI. Conclusions

The contributions of this study are twofold. The result of the analysis of data collected from the survey indicates that mobile business is expected to evolve from the area of Mobile Trade to the

same area in the future, having evolved from that of Mobile Hub. Second, the CSF of mobile business includes Cost, followed by Technical Aspects, Contents Management, Convenience, and Contents Characteristics.

Although the findings in this research provide meaningful contributions in the area of mobile business, the research has some limitations. For example, a better survey in the future will necessitate participants from network operators, contents providers, and solution providers.

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<국문초록>

모바일비즈니스의 진화방향과 핵심성공요인

오 재 인

전세계에 걸쳐 모바일 인터넷 사용자 수가 급속히 증가함에 따라, 이러한 모바일 인터넷을 기반으로 제공되는 다양한 어플리케이션 즉 모바일 비즈니스는 관련 업계나 학계에서 지대한 관심 분야로 등장하게 되었다.

하지만 기존 연구는 주로 모바일 인터넷 서비스들의 동향, 전망, 기술, 인구학적 특성 등에 국한되어 있는 실정이다. 더구나 망 사업자나 콘텐츠 제공자를 배제한 채, 사용자 중심으로 서베이가 이루어졌다.

본 연구의 목적은 모바일 비즈니스의 진화방향을 예측하고 핵심성공요인을 도출하는 것이다. 주요 연구 결과는 모바일 비즈니스는 Hub에서 Trade로 진화할 예정이며, 핵심성공요인은 Cost, Technical Aspects의 순이라는 것 등이다.

