M-Commerce:
Any Time, Any Place, Any Device

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Abstract

People on the move need services, information and entertainment that move with them. With access to mobile devices, such applications and services can happen here and now.

Mobile phones, mobile Internet access, and mobile commerce are growing much faster than are their fixed counterparts. The projected number of hand-held (mobile) devices will exceed the number of stationary terminals in the world over the next few years.

This paper investigates the current usage of m-commerce technology in the United States. The author attempts to predict the future growth and trends by a market survey of usage, attitude and preferences of the US consumers. Based on the outcome of this research, businesses could determine how they can utilize the current mobile technology to establish a large customer base, gain customer loyalty and target those individuals seen as the most profitable to the company. It also explores customers' impressions on future usage and developments of m-commerce.

1.0 Introduction

*I*t is expected that the number of Internet enabled mobile devices deployed worldwide will exceed one billion between 2003 and 2005, with over 500 million users, generating $200 billion in revenue (Kalluvilayil, 2001). Many companies starting out on the wired web had to compete for `new' customers with no real advantage over another. The big ISP's (Internet Service Providers) such as AOL and MSN certainly had an advantage in that many customers connecting through them would navigate the Internet via their portal. Nevertheless, ISP's soon found to their dismay, that although customers connect through them it did not mean they would automatically think to shop through their particular portal. The m-commerce market for the time being is unlikely to react in the same way because of technological limitations. Customers accessing the wireless web via their mobile phones are unlikely to jump from portal to portal, staying more loyal to favorite sites. As telecommunication companies control the access technology, customers have to go via their portal when connecting to the Internet for the first time. Other portals will be able to compete but will have to work out how to attract customers and formulate valuable relationships with them to encourage loyalty. Once a customer base has been established, those customers that are valuable to the company (i.e. that will pay for goods/services) will need to be targeted. Brick based companies and those of the wired web have used a marketing approach that uses continuously updated information about current and potential customers to anticipate and respond to their needs. This approach is referred to as Customer Relationship Management (CRM), which uses technology form a more personalized relationship between customer and supplier (Peppard, 2000). Although CRM has been used successfully by many e-businesses to gain a valuable customer base, no studies are available to conclude if that is also the case with m-commerce.

This study is aimed at finding what drives American consumers to adopt m-commerce as well as getting a better idea of how they view and use m-commerce in their lives? This will help businesses develop a better picture of what people are looking for regarding this new way of transacting information and doing business?

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Readers with comments or questions are encouraged to contact the author via email.

2.0 Review Of The Literature

Mobile technologies for communications, for accessing the Internet, and for mobile commerce transactions are growing rapidly. Mobile devices have become the fastest adopted consumer products to date. In 2000, more mobile phones were sold than automobiles and PCs combined (Chen, 2000; de Haan, 2000). In the 1990s, the number of mobile phones worldwide grew by 50 % annually compared to less than 10 % for fixed connections. The proportion of mobile phones increased from 1 out of 50 phone connections in 1990 to 1 out of 3 in 1999 (Wellenius et al. 2000). The number of mobile subscribers worldwide increased from 11 million in 1990 to 318 million in 1998 (Wai, 2001) and is estimated to reach 1.2 billion by 2005, with 450 million using some sort of location-based service (Secker, 2001). The fixed telecommunications industry took over 130 years to reach comparable levels of circulation. An estimate suggests that by 2009, there will be more cellular subscribers in the world than fixed line subscribers (ITU 2000). Another study suggests that by 2005, Internet access through wireless devices will outstrip access via personal computers (UNDP, 2001). Furthermore, over 25 % of e-commerce will take place over handheld sets by 2005 (Shaffer, 2000).

To exploit the opportunity created by the exponential growth of mobile phones, companies around the world are rapidly integrating m-commerce technology in their business models. This is happening as much in developed as in developing countries, often with fascinating cross-border differences in initial applications. An exemplary developed-country m-commerce provider is the U.S. Online book retailer Amazon.com, which signed deals with wireless providers Sprint PCS, Verizon, Airtouch, and Nextel to leverage m-commerce technology in the company's offerings (Lindsay 2000). Of fast-moving m-commerce firms in developing countries, a notable example is GWCom. This mobile wireless applications services provider in China launched its wireless portal byair.com in 1998 to provide timely information and e-commerce capabilities such as stock trading and banking to users with mobile phone or wireless palmtop devices in greater China. By March 2000, byair.com had over 6,000 subscribers with up to 3,500 daily stock trades and 250,000 page views. It handled over 30 million information requests and 200,000 wireless stock transactions (Ebusinessforum.com 2000). Wireless users have been using GWCom's application platforms to conduct online trading since 1998 in Shanghai and since 1999 in Shenzhen. In March 2000, 3,000 investors in Shanghai and 100 in Shenzhen were trading stocks over the paging networks managed by GWCom. The average daily volume of 3,000 Shanghai users in early-2000 was $3.6 million, about 30 times as much as the average trading volume on? stockstar.com, the largest and most popular Web-based stock trading company.

Internet providers want to exploit their position in the market to sell information and services. As telecommunication companies (and their portals) are the gateway to the wireless Internet this automatically puts them as the most powerful players in the value chain (Durlacher, 2000). Traditional players in the wired web such as Yahoo and MSN and new players entering the market as content providers or content aggregators may find that to gain a respectable customer base they may have to work with mobile operators rather than competing against them.

While the literature indicates a fast growth of mobile technologies, the usage of mobile phones vary between low and high-income countries. People in the developing countries often use mobile phones because these may be the only kind of phones available readily (Wooldridge, 1999); and in many regions of Eastern Europe, the mobile phone network is often much more technologically advanced than the older fixed-line network. Thus, while mobile phones represent *supplements* to fixed telephones in high-income economies, they are often *substitutes* for fixed telephones in lower-income economies (ITU, 1997). In other words, the developing countries are gravitating to mobile phones because of infrastructure issues (Zuckerman, 2000). In some developing countries such as Cambodia and Venezuela, mobile penetration already exceeds fixed line penetration.

M-Commerce services and applications can be adopted through different wireless and mobile networks, with the aid of several mobile devices. Although there are many systems supporting mobility and many solutions for wireless access, there are issues influencing the performance of the various mobile systems that need to be considered in the design of m-Commerce services and applications.

3.0 Methodology

Three face-to-face interviews were conducted with executives in the mobile phone industry to assist in the design of the questionnaire.   Existing surveys were reviewed and adapted to draft our questionnaire. The draft questionnaire was pilot tested by five people, and amended accordingly. The final questionnaire was distributed randomly at malls, theaters, universities and high schools the large metropolitan area of Houston city during the November - December 2002 period. Participants were asked to fill out the survey of their usage and opinions on the future of m-commerce. The strictly anonymous survey included six categories: Awareness, M-Commerce Applications, Pricing, Security and Privacy, Usability, and Overall Impressions. To encourage participation a prize draw of candy bar was offered.

4.0 Results

Two hundred surveys were passed out and only 136 were returned. 72 (53%) of the participants were females and 64 (47%) were males. 29 (21%) were less than 18 years old, 83 (61%) were 18-40 years old, and 24 (18%) were older than 40 years old at the time of the survey. Table 1 shows the distribution of the demographic data. The majority of the respondents were females, and lives in an urban location.

Table1: Distribution of the demographic data

Gender		Percentage	N
	Males	47%	64
	Females	53%	72
Location	Urban	81%	110
	Rural	19%	26
Age	<18	21%	29
	18-40	61%	83
	>40	18%	24

Table 2 shows the cross reference of gender and the importance of m-commerce to the participants using a liker scale one to four as one being the most important. The results shows that females ranked the easy of use as the most important issue when using m-commerce, while males ranked security and ease of use equally important (See Figure1).

Main Findings

The cumulative responses and percentages were computed. Since no test for significance is appropriate for this type of data, judgments regarding the importance of the mean responses are essentially subjective.
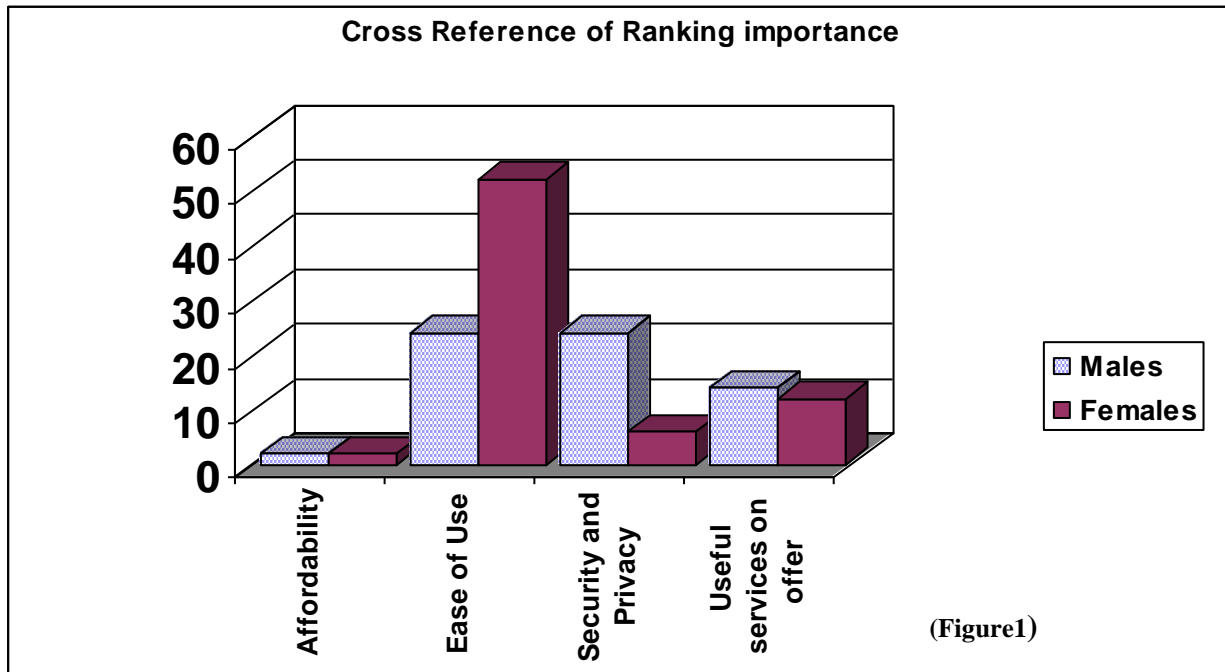
Awareness (Table 3):

Of the participants, 92 (68%) did not know what m-commerce meant. 44 (32%) were aware of m-commerce. 126 (93%) of the participants own a cell phone. 10 (7%) did not know if their cell phone is capable of m-commerce transactions while 103 (76%) do not know how to use their cell phone to conduct an m-commerce transaction. Surprisingly about half of the respondents 61(45%) were unaware if they have actually conducted a transaction that would be characterized as m-commerce!

Table 2 Cross Reference of Gender and Ranking
The m-commerce importance

Rank the following list in terms of importance, when related to m-commerce, by placing the numbers 1 through to 4 in the boxes (1 being the most important):			
Rank importance	Total	Males	Females
Affordability	4	2	2
Ease of Use	76	24	52
Security and Privacy	30	24	6
Useful services on offer	26	14	12

M-commerce Applications (Table 4):

About one third of the participants 41 (30%) said that they used their cell phones to find out sports results and weather followed by 37 (27%) using location-based services such as street navigation. When asked what service interests them most, 120 (88%) preferred entertainment services followed by 90 (66%) said information services. 107 (79%) believe that m-commerce is useful for them.

Cross Reference of Ranking importance

Males

Females

60

50

40

30

20

10

0

Affordability

Ease of Use

Security and Privacy

Useful services on offer

(Figure1)

Pricing (Table 5):

It was almost a tie between preferring a free services or pay for whatever services used. 57 (42%) to 75 (55%) respectively.

Security and Privacy (Table 6):

It seems that most of the participants have no problems with security and privacy. 58 (43%) have no problems while 26 (19%) are impartial.

Usability (Table 7):

83 (61%) participants think that engaging in m-commerce is not confusing. While 88 (65%) believe that m-commerce is difficult to use. It seems that the majority are expecting m-commerce to be hard to use. 106 (78%) think that m-commerce are not user-friendly, 88 (65%) not sure how difficult to engage with e-commerce, and 90 (66%) believe that it is important that using m-commerce should be easy.

Overall Impressions (Table 8):

132 (96%) participants are interested in the m-commerce idea, and 22 (16%) had a positive experience with m-commerce. When the participants were asked to rank the most important benefit of m-commerce, the answer was as follows.

1.   Ease of use 76 (56%)
2.   Security and Privacy 30 (22%)
3.   Useful services 26 (19%)
4.   Affordability 4 (3%)

Table 3 Awareness Responses

Awareness	Choices	N	Percent
Did you, before reading the introductory paragraph above, know what any of the terms, " m-commerce", "mobile commerce", or "wireless commerce" referred to?	Yes	44	32%
	No	92	68%
Do you own a mobile phone or personal digital assistant (PDA, i.e. Palm, Pocket PC)? (Mark as many as are applicable)	Phone	126	93%
	PDA	24	18%
	Pocket PC	12	9%
	Do not know	86	63%
Do you own a device capable of an m-commerce transaction?	Yes	104	76%
	No	22	16%
	Do not know	10	7%
Do you know how to use your device to conduct m-commerce transactions?	Yes	33	24%
	No	103	76%
Have you ever conducted an m-commerce transaction?	Yes	37	27%
	No	38	28%
	Do not know	61	45%

Table 4 Application Responses

M-Commerce Applications	Choices	N	Percent
Mark all of the following m-commerce services that you have used/experienced (mark as many as are applicable)	Information services	41	30%
	Financial services	15	11%
	Purchasing goods	30	22%
	Location-based services	37	27%
	Advertising services	20	15%
Which of the following services would interest you to use m-commerce? (Mark as many as are applicable)	Information services	90	66%
	Financial services	56	41%
	Purchasing goods	38	28%
	Location-based services	15	11%
	Advertising services	31	23%
	Entertainment services	120	88%
"I believe that m-commerce could be useful for me."	Strongly Disagree		
	Disagree		
	Impartial	29	21%
	Agree	58	43%
	Strongly Agree	49	36%

Table 5 Pricing Responses

Pricing	Choices	N	Percent
Please indicate what kind of pricing scheme you pay to use m-commerce:	Free (no fees)	57	42%
	Pay for what you use	75	55%
	Time-based fee		
	Data-transfer-based fee		
	Don't Know	4	3%
"I am happy with the current pricing scheme."	Yes	95	70%
	No	5	4%
	Do not know	36	26%
"Price is an important factor in choosing whether to engage in m-commerce."	Yes	118	87%
	No	18	13%

Table 6 Security and Privacy Responses

Security and Privacy	Choices	N	Percent
	Strongly Disagree		
	Disagree	58	43%
	Impartial	26	19%
"I am concerned with security and privacy when using m-commerce."	Agree	52	38%
	Strongly Agree		
	Strongly Disagree		
	Disagree	14	10%
"I believe that currently there are insufficient measures that would ensure my security and privacy."	Impartial	90	66%
	Agree	32	24%
	Strongly Agree		

Table 7 Usability Responses

Usability	Choices	N	Percent
"I think that engaging in m-commerce is confusing."	Disagree	83	61%
	Impartial	30	22%
	Agree	23	17%
"I think that the devices used for m-commerce are not user-friendly."	Disagree	12	9%
	Impartial	106	78%
	Agree	18	13%
"Difficulty of use is a restriction to engaging in m-commerce."	Disagree	8	6%
	Impartial	88	65%
	Agree	39	29%
"It is important that using m-commerce should be easy."	Agree	90	66%
	Strongly Agree	46	34%

Table 8 Overall Impressions Responses

Overall Impressions	*Choices*	*N*	*Percent*
"I have been engaged with m-commerce, and I am satisfied with my experience."	Disagree	5	4%
	Impartial	18	13%
	Agree	22	16%
"The idea of m-commerce interests me."	Impartial	5	4%
	Agree	94	69%
	Strongly Agree	37	27%

5.0 Conclusions and Discussion

The mobile phone is the perfect vehicle for delivering one-to-one marketing. Operators should link individual characteristics with a database, which can extract or infer preferences. Therefore, operators are in a prime position to leverage the data warehouses they have built over the years.

The question should not be "who owns the customer?" it is "who does the customer buy into?" In a multi-channel, multi-device, multi-source market, the customer can easily switch mobile device, Internet service and portal. All players in the market can strengthen their position by following the main principles of Customer Relationship Management such as: Collect data or negotiate with those that have it, Personalize services wherever possible, Build a strong named brand or associate with others.

Moreover, meeting customer expectations requires sensing needs and responding accordingly with products and services. These will have to provide value to the customer through some kind of efficient and convenient interaction. Cross-reference responses of the important issues related to m-commerce by small businesses revealed similar results as by the consumers (Massoud & Gupta, 2003).

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Notes