

Critical Factors for Adoption of Mobile Commerce Services

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Abstract

Mobile commerce has been a tremendous success regarding individuals' adoption in many developing countries. This paper discusses the realities of m-commerce and the major differences between mobile commerce and Internet-based e-commerce. Based on this understanding, driving critical factors in the adoption of m-commerce applications and services is being discussed. The e paper focuses on factors that lead to success and approval of m-commerce in developing countries

Keywords: M-commerce, e-commerce, wireless communication networks, developing countries, Technology acceptance model, trust

1. Introduction

Mobile phones have become a suitable product to many people, and more users are expected. According to a recent forecast 1, the growing rate of worldwide mobile population will not slow down shortly. Although mobile commerce has not yet become as ubiquitous as some people expected, advances in data networks and growth of the mobile Internet are helping it to gain slow but steady traction in various parts of the world. As shown in Figure 1, the global mobile telecom users will jump from 1.9 billion in 2013 to 5.6 Billion by 2019. The growing pace has been very fast, considering only 0.01% of the world's population in 1997.

According to Gilstrap , Wi-Fi becomes more accessible to people, predominantly in urban markets, public can access more bandwidth-intensive services like video streaming that they normally couldn't have sufficient money to access over cellular.

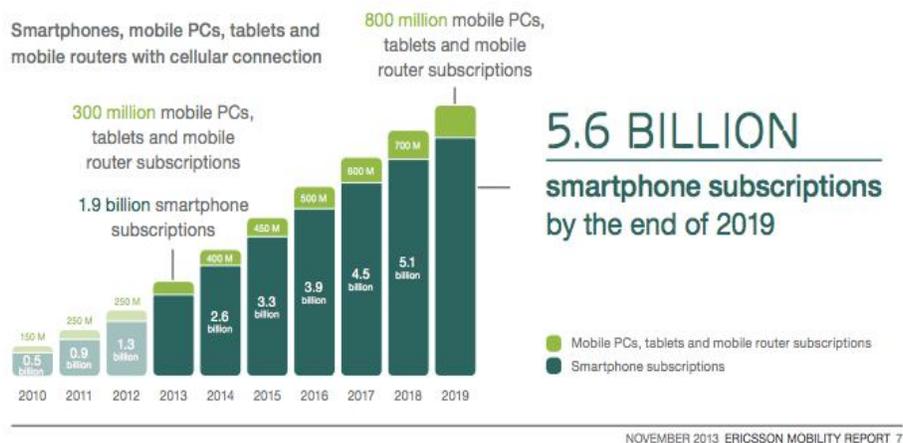


Figure 1 Mobile phone penetration rate

The fiery growth of penetration and usage of mobile devices is frequently noted in research studies (Barnes and Scornavacca 2004; Dholakia et al. 2004; Massoud and Gupta 2003). There are, however, indications of growth in consumer interest in m-commerce services. Research conducted in western Europe finds that consumer interest in m-commerce services and mobile payments increased from 23% in 2001 to 39% in 2003 (Strategy Analytics 2004).

In the UK added value, mobile services grew by 29% to £1.4 billion, which is equivalent to 4.3% of total mobile revenues (Ofcom 2004). Research by ATKearney (2004) finds that worldwide use of the mobile phone to pay for services grew from 3% of respondents in 2003 to 10% in 2004.

According to research, gate, the total number of m-commerce transactions per year is expected to increase from 498 million globally in 2006 to 4.8 billion in 2010. The average m-commerce transaction value is expected to rise from \$7 in 2006 to \$13 in 2010.1 Together with the extensive growth of mobile phone; Hsiao (2004) stated the potential growth of the mobile internet users. When more mobile phone users adopt mobile internet services, the m-commerce industry has a better opportunity for business growth. Mobile commerce is a big change in how people interact with their phones.

It entails new technologies, services, and business models and finally most importantly, consumer demand and adoption. Mobile phones could start to replace our wallets and credit cards in the next few years. But for that to happen, critical issues of security, privacy, interoperability, usability, infrastructure and business models need to be developed rapidly and be addressed by the industry. Possibly the largest single use of m-commerce to date occurred on January 17, 2005, when mobile phone users in the UK donated over £1 million via SMS to the relief fund following the Asian tsunami of 26 December 2004 (Telecom Paper 2005). With the explosion of mobile device adopters and the benefits of business performance improvements, the m-commerce becomes an admired topic to the academy and the industry.

Numerous researchers (Mennecke & Strader, 2003; Haque, 2004; Dean, 2005) tried to figure out how mobile devices work for individuals, how companies implement them, and how wireless information technology implementations benefit companies.

This issue has drawn a lot of attention from researchers to understand the factors that drive individuals' adoption/rejection of this innovation. Many studies have been conducted using traditional adoption models and theories such as the Technology Acceptance Model (TAM) [2, 3], the Theory of Planned Behavior (TPB) [4] and the Diffusion of Innovation (DOI) theory [5]. However, many authors (e.g. [6-10]) have drawn the conclusion that traditional adoption models are insufficient to gain a comprehensive explanation of the factors that affect individuals' intentions to adopt or reject the use of mobile commerce services.

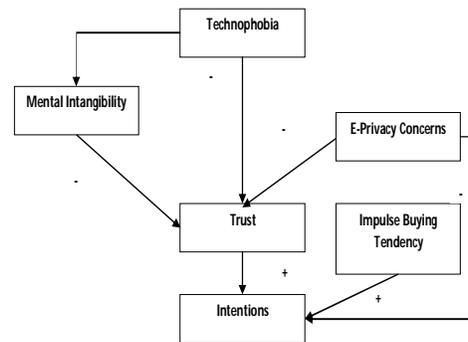
Adoption and usage of m-commerce services have been highly variable between countries; according to Dholakia et al. [2004 p7], their works focused on providing conceptual frameworks. Their theoretical contributions offer snapshots to what value consumers want on m-commerce or to why companies need to adopt the m-commerce. However, there is a need for a practical, systematic framework for a value between consumers and enterprises on adopting m-commerce.

1.1. Purpose of the Study

The objective of this study is to propose a demand model for the m-commerce, in addition to examining driving factors for adaptation of the m-commerce from young consumer's perspectives. This paper explores young people's motivations for using mobile phones. The main question that is being addressed by the study is, "what are the main driving factors that influence young adults in their decision to adopt mobile-commerce services?"

1.2. Theoretical Framework

A theoretical framework is necessary to address this research question. Based on a variety of prior studies and research that relate to this topic, the theoretical framework, which is depicted in Figure 1 is being used as an approach to answering the central research question. One of the constructs in the model, Technophobia, relates to an individual's unease with or unwillingness to use technology and technologically-based product and services. Sinkovics, Stöttinger, Schlegelmilch, and Ram (2002), in their development of a scale to measure technophobia, found that people who suffer higher levels of technophobia are less likely to use technology or to purchase technologically-intensive products and services

Figure 2: A Model of m-commerce consumer behavior

Another construct in the model is Mental Intangibility, which represents the lack of clarity in one's mind that an individual has to an item or concept. Laroche, Bergeron, and Goutal and (2001) found that as the degree of mental intangibility related with a product or a service increases, customers are less likely to trust and finally purchase the product. The third construct in this model is Impulse Buying Tendency. IBT has been defined as "the degree to which an individual is likely to make unintended, immediate, and direct purchases (i.e., impulse purchases)" (Weun, Jones, and Beatty, 1997, p. 306). It is possible, that lack of physical controls, such as tangible goods filling the shopping cart, which impulse buyers may be more likely to engage in m-commerce transactions than non-impulse buyers.

Pan and Zinkhan (2006) were successful in demonstrating that on-line consumers are more likely to trust e-tailers that have clearly stated privacy policies. This lends support to the idea that privacy concerns are one of the most important factors limiting the growth of m-commerce. The final two constructs in the model are Trust and Intentions. Specifically, trust relates the degree to which the customer trusts m-commerce services and plans simply are whether or not the client believes he/she will participate in an m-commerce transaction in the future. Gefen and Straub (2004) found that as customers' trust in electronic products increases, their intentions to purchase the products in the future growth.

2. Mobile Commerce Services

As technology grows and digital content becomes more persuasive, consumers increasingly depend more and more on mobile devices for access to services for all areas of their life. Today's consumers use their mobile phone as an essential accessory, expecting it to function as an all-in-one wallet, organizer, Internet connection, jukebox, game console, messaging device, camera, and phone. Mobile services offer consumers the convenience of ubiquitous access to value-added services and give organizations the opportunity to differentiate their services, create new revenue flow, and build customer loyalty.

Over the past several years, mobile operators, merchants, content providers, and financial institutions have successfully launched a range of mobile applications worldwide. These initial deployment and consumers adoption of these technologies have created demand for a larger set of commerce services that allow customers to use their mobile device to conduct transactions flexibly and conveniently (e.g., to purchase a digital sound such as a ringtone or video clip, or a tangible good, such as a book or a CD).

These services, largely in the areas of entertainment, marketing, banking, ticketing, and retail are likely to drive consumer adoption of mobile commerce services. They will enable providers to differentiate themselves by offering highly personalized services and delivering a rich user experience.

Many of these services are relatively new in the North America market; they are becoming common in European and Asian countries that have a large base of mobile subscribers. Their appearance and increasing popularity is a proof of mobile commerce's growth. As the starting point for a new generation of services, they are already shaping the mobile culture and driving requirements for a comprehensive mobile commerce ecosystem. Mobile commerce is not just another application of e-commerce but combines the advantages of mobile communications with existing e-commerce services.

There are some specific attributes of mobile technology, such as mobility, reach ability, etc., which give m-commerce an advantage over e-commerce [4].

Mobile technology is a broad category that includes all devices, protocols and infrastructures that Allow one to communicate, interact and exchange data with an individual or system anywhere and anytime.

2.1. Examples for M-Commerce Services

The four m-commerce services mentioned in the following paragraphs and pictures were chosen to understand the capabilities of m-commerce. These particular four were picked from the multitude of services and their prospects to succeed in the market and to create revenue for mobile operators were considered unusually high.

a) **Marketing:** Mobile operators and other companies are using targeted mobile advertising and mobile coupons to connect advertisers with specific demographics. Recent mobile campaigns have enabled users to search various categories of products and services in their immediate area quickly, and then access, save and redeem related discounts, promotions, and coupons—all via their cell phone.

b) **Banking and bill payment –** Mobile banking enables customers to use their mobile Phones to receive alerts manage their accounts, pay bills, and transfer funds. Consumers in advanced markets such as Japan, South Korea, Austria, and Norway have willingly gripped these capabilities.

c) **Ticketing –** Mobile ticketing allows device users to purchase tickets for events, Transportation and parking. These services have been widely adopted in Europe and Asia, where consumers use mobile devices to feed parking meters and purchase cinema, train, and ski lift tickets online or at unattended point-of-sale (POS) terminals. Juniper Research has released its report on the mobile ticketing industry, in which that by 2014 nearly 15 billion tickets will be delivered.

d) **Retail and peer-to-peer payments –** Consumers are increasingly comfortable with paying for goods and services and transferring money via mobile devices. In Austria, subscribers use their mobile devices to pay for home delivery shopping services, vending machine and in-store purchases, taxis, and purchases at fuel stations and other retail outlets. In South Korea, subscribers can pay for purchases by using mobile devices that contain a smart chip linked to their credit card account. The device functions as a contactless card at the point of sale, using either radio frequency or infrared technology to complete the transaction.

3. Literature Review on M-Commerce Adoption Factors

Very few studies have explored the adoption factors related to the role of m-commerce users as consumers. While some studies included factors related to this position along other technology-user and network member determinants, the level of importance given to this perspective is very minimal. There seems to be a lack of understanding among researchers in the area of the criticality of including this perspective along the other two. Only a few attempts have been made on this side. Pedersen and his colleagues [11] were among the first to note the need for a triangulation of the three roles highlighted in this study when examining the adoption of m-commerce services.

They integrated concepts from Diffusion, Adoption, uses and gratification and domestication research to come up with a better view and understanding of the issue. [10] On the other hand integrated and extended the concepts of TAM using concepts from the theory of consumer choice and decision making from economics and marketing research to come up with a value- based understanding of the issue.

Also, the long list and the variety of factors that have been investigated in the current literature can be understood by the kind of mobile services and the contexts examined in each study. The nature of different services produces a different set of important factors. For example, examining individuals' adoption of mobile Internet services - where WWW content can be accessed through a mobile screen- may involve a different set of influences compared to mobile parking services where simple SMS is the way to exchange needed information. Because of the wide variety of services under the umbrella of mobile commerce and their unlimited use contexts, the scope of combining existing factors and adding new ones by each study is, therefore, broad.

The following table shows some common factors in adaptation of mobile e-commerce. It is important to note the fact that empirical research in m-commerce tends to be country, sample, context, and service dependent. Each of these factors produces a different set of results. For example, investigating the adoption of mobile Internet among professionals might yield a different set of conclusions compared to a group of teenagers. On the other hand, studying the adoption determinants of an application in a mature market like South Korea and Japan could also give different outcomes than if the same survey Cross-cultural studies of m-commerce usage are, relatively rare; perhaps not surprising given the relative youth of this market.

There have, however, been some cross-cultural studies into an adoption of IT applications. Kim et al. [2004] provide a concise summary of the extant literature and find evidence for significant variations between countries in adoption rates and usage patterns of IT applications. In a comparison of critical success factors governing mobile communications diffusion in Germany and India, Fraunholz and Unnithan [2004] find significant differences between the two countries, though these are examined regarding economic and infrastructural, not cultural, factors. Carlson et al. [1999] examine mobile phone adoption in France and the United States and attribute the significant differences found between cultural differences.

Some studies compare m-commerce infrastructure across countries. Hansen et al. [2003] compare the developments of mobile services in Europe, Japan, and South Korea and suggest technology, economy, market development and structure, marketing, socio-cultural elements, and policy intervention and regulation as the factors of explanation. Bohlin et al. [2003], on the other hand, present new policy implications for future European mobile commerce through analyzing the success factors in Japanese mobile Internet.

Factor(s)	studies
Usefulness, performance expectancies	[6, 7, 16-19]
Enjoyment, playfulness	[7, 9, 10, 18, 20]
Expressiveness, image, lifestyle enhancement	[7, 9, 21]
User satisfaction (with using the service itself)	[21-23]
Relative advantage and perceived value	[10, 24]
Technical Issues such as connection speed, service speed, bandwidth, device limitations, etc	[10, 23, 25, 26]
Contents and functions availability and quality	[16, 18, 22, 23, 26]
Personal innovativeness	[6, 25, 27, 28]
Behavioral Control (self-efficacy, facilitating conditions, etc.)	[6, 7, 9, 25, 29, 30]
Compatibility, prior experience, past relevant knowledge	[1, 16, 19, 24, 28]
Ease of use, complexity, effort expectancies	[1, 7, 16, 18, 19, 24-26, 28, 31]
Service cost, price, fee, perceived financial cost, perceived financial resources	[1, 10, 21-23, 25, 30-32]
Trust, Risk, Security, perceived credibility, privacy issues associated with using a service	[1, 6, 22, 24, 30, 31]
Tradability, exposure to service through marketing	[19, 21, 24, 26, 29]

4. Research Methodology

4.1. The Data Instrument

In order to collect the data necessary to answer the central research question, a questionnaire was developed that, in addition to a cover page that explained the purpose of the study, consisted of three major sections. The first part collected basic demographic information about the respondents. The second section of the questionnaire measured E-Privacy Concerns and the outcome of a serious problem the defendant had suffered from using m-commerce services and transactions. The final section of the questionnaire measured the psychological variables Mental Intangibility, Trusting Disposition, M-Commerce Trust, Technophobia, Intentions, and Impulse Buying Tendency. Each of the scales used to measure the mental constructs or variables had been previously developed, tested, and validated in prior studies.

4.2. Sample Size

The target sample was 150 young adult (18-30) mobile phone users in Saudi Arabia and Iran. Young adults were selected to create a cohesive m-commerce multi-unit in each country, and because consumers under 30 have been found to be faster adopters of mobile services in general [Lee et al. 2002]. 200 questionnaires were distributed in Saudi Arabia and Iran using the convenience sampling method. 80 and 95 questionnaires were collected in Iran and Saudi Arabia respectively

5. Research Findings

5.1. Adoption of M-Commerce Services

Table 2 summarizes the adoption rates of the various m-commerce services, divided into the four categories of communication, information, entertainment and transaction.

The adoption rates of communication services are the highest of the four classes in both Saudi Arabia and Iran. Adoption rates for transaction services are slightly greater in the Saudi Arabia. Adoption rate for information services is slightly higher in Saudi Arabia. Iranian young adult, in general, shows a higher propensity to adopt the entertainment services rather than the transaction and information services.

Table 2 Adoption rates (%) of m-commerce services

	% Adoption among sample	
	Saudi Arabia	Iran
Communication Services		
Voice	100	100
SMS	93	97
MMS	40	38
Video	18	20
E-mail	18	10
Transaction Services		
Ticket purchase	15	12
Small payment	5	2
Banking services	20	29
Information Services		
Entertainment News	15	12
Sports/headline/traffic news	10	12
Weather forecast	16	17
Local area information	7	5
Entertainment Services		
Download game	15	5
Download ringtone	56	75
Download wallpaper/screensaver	30	28
Browse internet	30	32

Respondents were asked to rate the importance of a range of factors influencing their decision to adopt a new m-commerce service using a five-point scale where 1 equaled "very unimportant" and 5 equaled "critical."

Series of questions regarding five categories were asked. Table 6 shows the summary of the factors that the young adults rated for each group in both Saudi Arabia and Iran.

Table 3 Factors influencing adoption of m-commerce services

(** and * indicate significance at $p < 0.01$ and $p < 0.05$, respectively)

6. Discussion

Following the basics of traditional adoption and distribution research, m-commerce adoption researchers built on these basics to develop models that included various variables and concepts drawn from Information Systems Psychology, Sociology, Marketing, Economics and other fields. One of the main baselines of all adoption and diffusion research comes from the concept that humans tend to act or behave according to their predetermined intentions. Intentions are formed by the accumulation of positive and negative attitudes towards an object (a service, product, a persona

One of the main baselines of all adoption and diffusion research comes from the concept that human tend to act or behave according to their predetermined intentions. Intentions are formed by the accumulation of positive and negative attitudes towards an object (a service, product, a person, an organization, an idea, etc.). These attitudes are a result of various perceptions stemming from past experiences and interactions that people encounter in their daily lives.

Building on this line of logic, researchers have therefore focused on users perceptions regarding a broad range of factors. Table 1 in section three of this article presents a summary of the most frequently studied adoption factors and how they relate to each of the three roles or perspectives played by m-commerce adopters. The table also shows if there is a consistency/inconsistency in the results found in each group of factors.

In this research also we have looked at five main categories to measure the intention that results in adoption and usage of the technology. We did not find significant differences between the Saudi Arabia and Iran in identifying important factors influencing adaptation and usage of m-commerce services. We find that in Iran usage of SMS services are a little bit higher than in Saudi Arabia... However, regarding browsing the mobile internet is significantly low in both countries and it might be related to the factors related to infrastructure, availability of services and cost of the service. Further research is required to disentangle the effect of these factors.

For the consumer personal demographic characteristics, Chang (2000) found that gender, monthly allowance and the education level are significantly impacted by consumers' attitudes toward the m-commerce services. Our data also measured these characteristics, and it was found that females and males do not differ regarding their concerns about E-Privacy.

But from the result it is evident that male has more positive attitudes to accept technological innovations if compared with a woman. Regarding E-privacy, it was found that Iranians are less concerned about the privacy and does not think it has a significant impact on an adaptation of m-commerce. The highest mean from all these factors was the trust factor, which respondent from both countries viewed as a sign if I can't influence on adoption.

7. Limitations

In both Iran and the Saudi Arabia students constituted a significant part of the sample; while students are likely to be enthusiastic adopters of m-commerce; they're relatively low income may influence the nature of the services that they adopt. The numbers of respondents choosing some m-commerce services were subtle, and this precluded much statistical analysis. Larger samples in both cultic-units would have been helpful in overcoming this problem. The consistently lower usage and attitude scores obtained Kong may be a function of the manner in which respondents utilized the Liker scales rather than an accurate measure of attitude; calibration of scale use would have been a helpful addition to the research. Some of our findings are not statistically significant, and we wish to address this in future research studies.

8. Conclusions And Recommendations for Future Research

This study deals with consumer's perspectives regarding the m-commerce services. In the process, key determinants of consumer's preference and performance are examined by systematically conducting related studies. By integrating these studies, this study expects to overcome potential limitations of an individual study and enhances the knowledge within consumers' behaviors regarding the m-commerce service adoptions. Furthermore, this study proposes a framework that helps to understand how key determinants impact consumers' usage for the mobile commerce services.

The structure, as shown in Figure 4, consists of several different predictor or variables: (a) technophobia, (b) E-privacy, (c) Trust (d) impulsive buying e) mental intangibility. These predictor variables are domain variables that directly impact consumers' perspectives on intention to use, and adopt mobile commerce. For the future interested studies, the present study provides a model to indicate relationships among all key variables. Some new variables, such as content richness and real-time reach, content creditability, and social influence, the technological requirement that have not been examined in previous studies, can provide new directions for interested research.

Finally, while conceptual studies add acknowledgeable contributions to the current literature, more empirical studies are needed. This report also calls for more empirical tests in the m-commerce area to come up with more reliable and practical recommendations for relevant stakeholders [34, 35]. Also, there is also a need to extend such efforts to cross-national and cross-cultural scales [21]. There have been some attempts on this path (see, for example, [27], [36] but these are still inadequate. For greater insights, interested researchers from different countries should work together on validating and modifying existing and new models in their respective cultures. Such comparative studies would highly help and develop the research area as well as assist national and multinational corporations in the market to better customize their efforts and strategies.

This paper is not very extensive; it theoretically adds to the growing body of IS literature in general and the mobile commerce adoption research in specific. Finally in such a rapidly changing world, it is important to make overall in-depth analysis for future research to take full advantage of the strengths of m-commerce to increase competitiveness in this global mobile marketplace.

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