

Diffusion of Mobile Commerce Application in the Market¹

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Abstract

With the rapid proliferation of mobile devices, mobile commerce is widely considered to be a driving force for next-generation e-commerce. Mobile commerce application has attracted the attention of both practitioners and academics. This paper analyzes the diffusion of mobile commerce applications using a new classification scheme that based on the perspective of market. This classification—mobile communication service, mobile information service, mobile transaction service and mobile interaction service, reflects the diffusion of mobile commerce application in the market. It will provide useful insights into the anatomy of mobile commerce application and help us find and design new mobile applications. We also provide some recommendations for future research into mobile commerce applications.

1. Introduction

The rapid growth of mobile applications has given rise to a new term—mobile commerce, or m-commerce. Due to the fact that m-commerce is still at its initial stage, there is no unified definition of it. As Barnes (2002) pointed out, any transaction or economic values managed through at least one kind of mobile terminal equipments on the mobile telecommunication network, are considered a part of mobile commerce[1]. In this paper, mobile commerce is defined as the application of wireless communications networks and devices to the execution of transactions with monetary value—either direct or indirect [2].

As we known, mobile applications have become especially valued in an age where time is precious and the weight attached to convenience is high. Also, the rapid proliferation of wireless devices, including mobile phones, personal digital assistants (PDAs), and other handheld devices, has made mobile commerce a major driving force for the next wave of electronic commerce. In addition, mobile commerce is expected to have an even greater impact on organizations, as wireless technologies and application begin to challenge the existing process, strategies, structures, roles of individuals, and even cultures of organizations.

Many scholars and analysts have asserted that there is a huge market potential for mobile commerce applications. It is becoming one of the major topics of interest for the IS research community and a key priority for many business organizations. The eyes of scholars and industry representatives are now on the opportunities offered by wireless media, envisaging that the next—or the real phase of e-business growth will be in the area of mobile commerce.

2. Classification of mobile commerce application

There are potentially an unlimited number of mobile commerce applications, which leads to a demand for classification, since currently, it is almost impossible to cover the whole range of potential mobile commerce application. To help understand mobile commerce, we reviewed the classification of mobile commerce application. It will allow developers and providers to strategize and effectively design and implement mobile commerce applications.

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In general, mobile commerce applications have two major attributes: mobility and reachability. According to these attributes, mobile commerce application can be classified into the following six categories: Time-critical services (e.g. SMS-based notifications or alerts); Location-aware and location-sensitive service (e.g. mobile advertising, product location tracking); Identity-enacted service (e.g. mobile bank, mobile micro-payments); Ubiquitous communications and content delivery services (e.g. video-on-demand, interactive game); Business process streamlining; Mobile office [3]. Senn (2000) classified mobile commerce applications into three main categories: transaction management (e.g. payment, shopping), digital content delivery (e.g. E-mail, short messages) and telemetry services (e.g. status monitoring, smart messaging) [4]. Varshney and Vetter developed a more detailed class of mobile commerce applications roughly categorized by mobile commerce models based on mobile characteristics. The applications are classified into 11 categories, including mobile financial applications, mobile advertising, mobile inventory management, locating and shopping for products, proactive service management, wireless re-engineering, mobile auctions or reverse auctions, mobile entertainment services and games, mobile offices, mobile distance education, and wireless data centers [5]. Yuan and Zhang (2003) argue that value propositions in mobile commerce which define the relationship between seller offerings and buyer purchases by identifying how the seller achieves the buyer's needs originate from mobility and location awareness and are contrary to Internet-based e-commerce. Therefore, they group various mobile commerce applications based on these value propositions into six categories (Ubiquitous communication, Emergency and time critical information services, Location-sensitive service, Pocket e-wallet, portable entertainment, Improving productivity of mobile workforce) [6].

From the perspective of marketing, Nysveen, Pedersen, and Thorbjornsen propose a grid of mobile Internet service classification that employs four primary axes: person-interactive versus machine-interactive, and goal-oriented versus experiential service [7]. "Person interactivity" occurs between people through a medium, while "machine interactivity" refers to the interaction between people and the medium. In the latter, users can freely modify the content and form of a mediated environment. A goal-oriented process is defined by utilitarian benefits, while an experiential process provides hedonic benefits. From the perspective of market, we could perceive the diffusion trend of mobile commerce application in

market, from communication service, information service to transaction service and interaction service. In this paper, we incorporated the diffusion of mobile commerce application with perspective of marketing as a new analytic framework (Figure 1). In the next section, we will analyze the diffusion of mobile commerce application based on this framework.

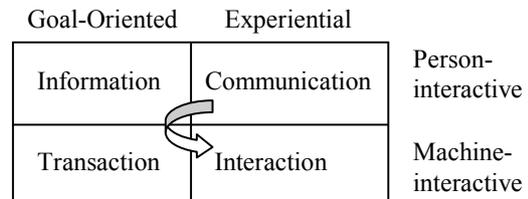


Figure 1 Diffusion of m-commerce application in market

3. Diffusion of mobile commerce application

To promote mobile commerce, there should be less focus on increasing the speeds of wireless data networks now and more on developing compelling applications. With an increasingly mobile society, more and more people are on the move. Many interesting services can be offered to these people through mobile device and wireless networks. This includes mobile communication service, mobile information service, mobile transaction service, and mobile interaction service.

3.1. Mobile Communication services

Mobile communications facilitate personal contact anytime, anywhere. While voice and short messages are currently the primary form of mobile communication, future mobile devices such as 3G phones are capable of handling much more information and providing broader bandwidth. As a result, ubiquitous communications can become an important application in m-commerce.

Some researchers seem to agree that e-mail services will become an initial killer wireless application for mobile commerce. This assumption is supported by the result of consumer surveys conducted by Accenture. Gordon Xu et al (2006) carried out a Delphi survey and the result indicated that short message service (SMS) was most likely killer application of m-commerce. They also identified four features of SMS and the critical success factors in m-commerce [8].

3.2. Mobile information services

Since people have different information needs and preferences, one of the challenges for mobile information systems is to take advantage of the convenience of handheld devices and provide personalized information to the right person in a preferred format. Dongsong Zhang(2003) proposed a generic framework for delivering personalized and adaptive content to mobile users. It introduced a variety of enabling technologies and highlights important issues in this area [9].

Finding the geographic location of a person is commercially valuable because, in a mobile society, people and goods are in motion, and tend to become lost in this mobile environment [10]. If a service could help pinpoint the location of a mobile device to the degree of precision appropriate for different applications, significant value could be added.

Location-based services (LBS) are services that generate commercial activity by using geographic location (i.e., place-related) information of the mobile devices, along with information about services and products available in (certain degree of) physical proximity. LBS include locate-info service, mobile advertising, product location tracking service, locate-a-friend service, mobile inventory management, and patient monitoring service. These services generated great interest among researchers and developers, primarily due to the presumed potential for: (1)user empowerment, (2) the estimated market for location-based advertising, (3)and the ability to handle many emergency situations(e.g., airline flight schedule changes, stock price alerts and quotations, home burglar alarms).

Varshney (2003) presented an integrated location management architecture to support the diverse location requirements of m-commerce applications. The proposed architecture is capable of supporting a range of location accuracies, wider network coverage, wireless multicast, and infrastructure dependability for m-commerce applications [11]. Varshney (2005) also identified and discussed several vehicular mobile commerce applications as well as wireless and networking challenges. He presented possible solutions for vehicular mobile commerce and defined several research problems that should be undertaken [12].

Mobile advertng can also be a very important part of mobile commerce applications. Using demographic information collected by wireless service providers and the information on the current location of mobile users, very targeted advertising can be done. The advertisements sent to a user can also be location-

sensitive to inform a user about various on-going specials (shops, malls, and restaurants) in surrounding areas.

3.3. Mobile transaction services

The power of mobile commerce is primarily due to the anytime-anywhere connectivity of wireless devices, which provides enormous opportunities for business process innovation. Mobile services can also be used to enhance the efficiency of business processes and reduce transaction costs or improve service quality.

Mobile financial applications are likely to be one of the most important components of mobile commerce. These could involve a variety of applications such as mobile banking and brokerage service, mobile money transfer, and mobile micro-payment. These services could turn a mobile device into a business tool, replacing bank, ATM, and credit cards by mobile money. Certainly more work is needed in providing transaction support in the applications and network infrastructure. Secure transactions are required before any of these applications are widely deployed.

Herzberg(2003) believed the use of secure and convenient mobile personal devices could revolutionize the payment, banking, and investment industries worldwide. He also discussed some of the challenges and opportunities involved in their use for making secure payments and authorizing banking transactions [13]. Clayton et al(2004) presented a classification scheme of m-commerce, examined the relative strengths and weaknesses of the models, and discussed developing trends and their implications for mobile commerce in the brokerage industry[14]. Niina et al(2004) investigated some mobile financial applications, including both mobile payments and banking services, showing how the new financial services can be deployed in mobile networks and identifying the main players in the mobile financing value chain. They used examples from the European context to highlight the features of the new services as they explored the players' particular strengths and weaknesses in providing the services[15].

3.4. Mobile interaction services

Entertainment is an important interactive service that mobile commerce could provide. It includes mobile games, mobile music, video-on-demand and other services. The convergence of entertainment, Internet and telecommunication industries has taken steps towards creating completely new ways to spend time, so mobile games are revolutionizing

entertainment. Mobile games are interactive in nature and it allows players to experience virtual worlds far more exciting than everyday life. In Japan the downloadable wireless entertainment is become extremely popular. It has changed the way people wait for transportation or just kill time. This development has begun also in western world and China.

Kleijnen et al(2004) published an interesting study of mobile gaming adoption in the Netherlands. They applied a series of sophisticated multivariate analyses to examine mobile gamers' profiles. Their paper is one of the few empirical studies of this topic [16]. Pavlos and Adam(2004) investigated customers' preferences and attitudes towards mobile music services in Europe through an exploratory research approach. Their findings suggested mobile music providers should design tailored marketing mix programs towards sufficiently meeting the needs of customers in the emerging mobile music industry [17].

4. Conclusions and research directions

M-commerce has attracted the attention of both practitioners and academics. Research activities on m-commerce have increased significantly. In this paper we have attempted to provide a general picture of the main characteristics of mobile commerce application in the market.

Through review the research literatures of m-commerce, we can find that current research is heavily skewed toward consumer issues. It seems that the most popular m-commerce application is that supporting financial activities. Mobile banking and payments are issues that have been widely discussed by researchers.

On the aspect of methodology, the existing body of research on mobile business has a disproportionately high level of secondary research studies. So there should be an increase of empirically-based studies (surveys, interviews, experiments, action research, ethnography, and so on) as well as simulation.

In addition to the above conclusions, we would like to offer the following suggestions for further research in mobile commerce applications:

Firstly, Mobile commerce researchers should begin to focus their efforts more carefully. Among the applications, m-commerce entertainment services and games have a great deal of market potential and will dominate global m-commerce revenues in the future. Additional research is required in other related areas such as mobile education, mobile supply chain management, and so forth.

Secondly, since the bright prospect for mobile commerce, many industries have sought to join this

arena. The mobile commerce value chain is thus formed, and new business opportunities are created for the participants. Among the participants, telecommunication operators are the most critical and dominant. So it is necessary to exploit a game-theoretic approach of based on mobile commerce value chain for analyzing relation between the participants.

Lastly, as application of RFID technology grows, they are bound to offer new opportunities in the future. Therefore, the combination of RFID and mobile commerce, which can be called mobile RFID, becomes a new focus of future business. An important research that should be pursued is suitable models for the adoption of RFID in organizations, and the RFID's impact on supply chains.

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