
Unique Features of Mobile Commerce

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Abstract While the market potentials and impacts of web-based e-commerce are still in the ascendant, the advances in wireless technologies and mobile networks have brought about a new business opportunity and research attention, what is termed mobile commerce. Commonly, mobile commerce is considered to be another new application of existing web-based e-commerce onto wireless networks, but as an independent business area, mobile commerce has its own advantages and challenges as opposed to traditional e-commerce applications. This paper focuses on exploring the unique features of mobile commerce as compared with traditional e-commerce. Also, there are still some limitations arisen in m-commerce in contrast to web-based e-commerce. Finally, current state of mobile commerce in Japan is presented in brief, with an introduction of several cases involving mobile commerce applications in today's marketplace.

Key words m-commerce; e-commerce; wireless technology; applications and services

1 Introduction

According to the market research firm Strategy Analytics, the global market for m-commerce is expected to reach \$200 billion by 2004^[8]. Wireless technology has recently received much attention from entrepreneurs, investors, business experts and scholars. It opens new avenues for businesses. Similar to the Internet several years ago, wireless technology represents an important new technology that is generating a general fervor. The wireless Internet and its commercial usage, m-commerce, represent opportunities as well as challenges for entrepreneurs. Many researchers assume wireless technology and m-commerce will change the global economic environment to a large extent.

Frequently m-commerce is represented as a subset of e-commerce. Although there are similarities between e-commerce and m-commerce from being able to purchase a product or service in a virtual environment, in this paper, m-commerce is recognized as a unique business opportunity with its own unique characteristics and functions, not just an extension of Internet-based e-commerce. One of the objectives of the paper is to explore the unique features of mobile commerce as compared with traditional e-commerce.

In the sections that follow, definitions and market drivers of m-commerce will be outlined in the beginning, and then the characteristics and existing limitations in m-commerce will be presented as opposed to web-based e-commerce applications. Finally, some cases of m-commerce applications and services in Japan will be offered to illustrate the unique attributes of m-commerce.

At present, there are a variety of definitions for m-commerce used in different kinds of sources and literatures^[1, 7, 10, 11]. From computerworld.com, "Mobile commerce is the use of radio-based wireless devices such as cell phones and personal digital assistants to conduct B2B or B2C transactions over wired, web-based e-commerce systems." The definition given by Searchingmobilecomputing.com shows that "M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as cellular telephones and PDAs." Furthermore, according to the definition given by Tarasewich, P., Nickerson, R.C. and Warkentin, M. in their paper "Issues in mobile commerce"^[10], "Mobile e-commerce (mobile commerce or m-commerce) is defined as all activities related to a commercial transaction conducted through communications networks that interface with wireless (or mobile)

devices. These definitions provide us with an overall image of m-commerce, which describes m-commerce as a commercial activity involved in electronic financial transactions by using wireless devices.

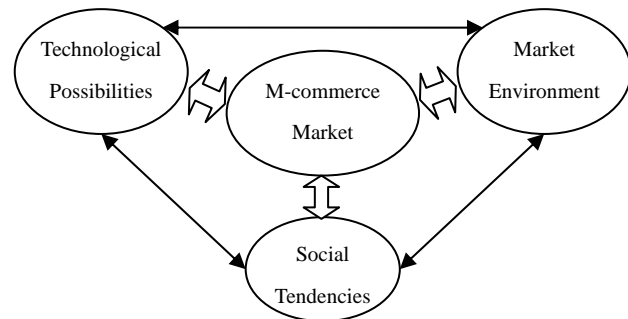


Fig.1 Market drivers for m-commerce

There are different driving factors that encourage businesses to make advances towards the m-commerce market^[1,4,8] (as shown in Fig.1). Firstly, m-commerce holds a promising future due to the penetration of the mobile phone market. Widespread availability of devices can be utilized by suppliers to directly communicate to existing and potential customers. Further, the push from vendors, attractive content, low costs and reasonable prices of the mobile services, substitution possibilities are also promoting substantially the market growth. Secondly, some technology-related factors, such as improvement of bandwidth, development of wireless Internet and software, emergence of new technologies and so on, contribute a great deal to the development of m-commerce market. In addition, some social tendencies, including so-called handset culture and increasing propensity to transact online, can be regarded as another driving force for prosperity of m-commerce.

All of these market drivers enable m-commerce to be an inevitable trend on which businesses should focus their attention. Therefore, it is important for the numerous participants to understand the unique features, framework and possible issues of m-commerce so as to grasp the new business chance and enhance their competitiveness in the future m-commerce market.

2 Unique Features of M-Commerce Applications and Services

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, reachability 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. Examples include mobile phones, PDAs (Personal Digital Assistants). For mobile technology, the major characteristics are mobility and reachability^[6]. Mobility implies that users can carry cell phones or other mobile devices to transact from anywhere in mobile network area^[3]. Reachability of the wireless devices makes it possible for people to be contacted anytime and anywhere and provides users with the choice to limit their reachability to particular persons or times.

The empirical researches and experiences in the environment of e-commerce show that the winners in a new business area are those that can offer added value through the new medium^[9].

Tab.1 Summary of m-commerce characteristics

| Efraim, T., David, K. ^[4] | Michael, S., David, S. ^[8] | Stanoevska-Slabeva, K. ^[9] | Zeng, E.Y., Yen, D.C. ^[12] | Basic characteristics of m-commerce |
|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|
| Ubiquity | Ubiquity | Ubiquity | Currentness | Ubiquity |
| Convenience | Convenience | | Convenience | Convenience |
| Instant connectivity | Accessibility | Immediacy | Accessibility | Accessibility |
| Personalization | Personalization | Identification | Personalization | Personalization |
| Localization | Localization | Localization | Localization | Localization |

The unique features of mobile technology generate value added attributes of m-commerce applications and services. Tab.1 sums up the basic characteristics of m-commerce attributed to the specific features of the underlying technology according to several related researches^[4,8,9,12].

m-commerce application areas resulted from existing mobile technology. The disadvantages can be identified as follows^[2,4,5,10].

Usability: Small screens and keypads of mobile devices, limited messages and browsing of information.

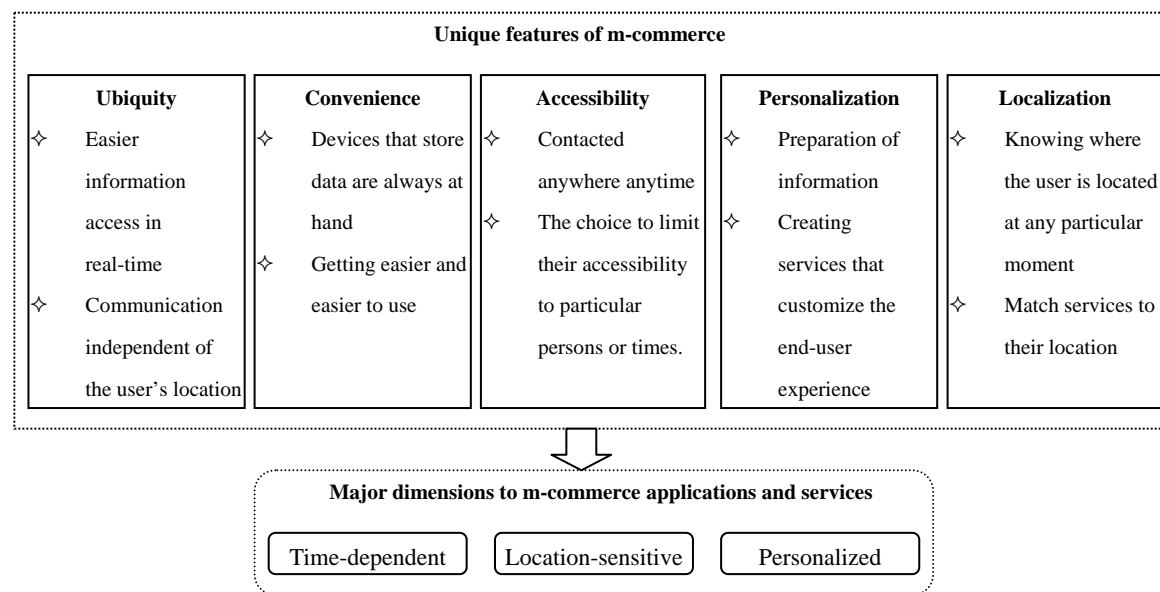


Fig.2 Unique features and major application dimensions of m-commerce

Based upon the literature review, there are some different naming and classification methods for the characteristics of m-commerce. But taken together, they can be summarized as Fig.2. These characteristics bring about a range of distinctions between m-commerce and conventional e-commerce, and also can provide added value compared to traditional usage of the Internet channel. Several identified value-added attributes of m-commerce are ubiquity, convenience, localization, personalization and accessibility.

These five attributes address three major dimensions: location-sensitive, time-dependent and personalized, which make up a three-dimensional space to describe the set of possible customized services. These dimensions correlate with the primary situation determinants that are presently transmittable in mobile networks. The specific features can make more suitable services available for users who have different preferences and changing contexts in time.

On the other hand, as opposed to Internet technology, there are still some limitations in

Technical: Limited memory and computing power, insufficient bandwidth and Limited data transfer capacity.

Basically, these disadvantages are balanced by the unique advantages of m-commerce at the moment. However, as with the growth in the use of mobile technologies, these limitations will have to be overcome. With the developments in wireless technologies and the findings of practical solutions, there will be more widespread acceptance and deployment of m-commerce applications and services.

3 Mobile Commerce in Japan

Japan is one of the countries in which mobile phones have become very closely integrated in the lifestyles of the people. The Japanese mobile market is one of the world's largest with almost 80 million subscribers and approximately 70 million of those have data connections (source Ovum). With the introduction of advanced mobile Internet services, such as i-mode, mobile phones have become an

indispensable tool for daily life.

Japan's mobile operators are expanding the functions of their mobile phones so that handsets can be used not just for ordinary voice calls but also to incorporate such additional functions as sending and receiving e-mails, accessing the Web, utilizing Java applications and so on. Actually, voice service is accounting for less and less share in all the mobile services.

Meanwhile, these are also motivating innovation and diversification of mobile services in the market. In the last several years, the communication style of sending and receiving e-mail by mobile phone, or gathering information and enjoying shopping via mobile phone websites, have become widespread. And with the development of mobile Internet, there have been significant changes in the way people think and live. The following several cases in Japan illustrate some unique features of mobile commerce applications and services from various application areas, which concern mobile transaction, location based service and mobile payment.

3.1 Tsutaya Online (<http://www.tsutaya.co.jp/>)

Tsutaya, which is Japan's largest video and CD entertainment chain, can be regarded as one of the successful examples of what's possible with mobile commerce. It uses the specific features of m-commerce, such as ubiquity, personalization and accessibility, to show others how mobile technology and a good database can help companies take the pulse of their customers anytime, anywhere.

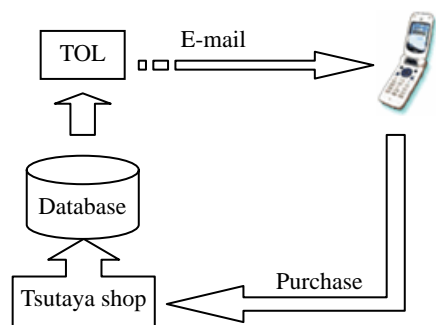


Fig.3 Business model of Tsutaya Online

TOL (Tsutaya Online) is initially a web-focused

business plan to drum up the bulk of customer via the wired web. But the firm quickly realized that a large potential market would be created in step with the growth of wireless market. Since then, their business plan was shifted from a web-centered one to a mobile-centered one.

As shown in Fig.3, the strength of TOL is its rich customer database on the basis of the customer's purchase records. Tying the sizeable database to mobile phones has put customer relationship management into drive. By combining data with mobility, Tsutaya is able to maintain a dynamic individual entertainment tastes and preferences, and then personalize product or service offerings.

Nowadays, TOL has been one of Japan's most popular online entertainment sites. On average, Tsutaya's online customers spend 9 percent more per month than those who shop offline. Meanwhile, TOL's online services also have helped to increase brick-and-mortar parent Tsutaya revenues.

3.2 KDDI's GPS map (<http://www.kddi.com/>)

Another advantage of mobile technology is localization. Technologies like TOA (Time of Arrival), GPS (Global Positioning System), will enable marketers and consumers to access information, services and conduct transactions specific to their location. Knowing where the user is located at a particular moment will be significant to offering relevant services.

By using the specific attributes in mobile technology, KDDI launched a new location information management service, GPS map in 2002, which takes advantage of the highly accurate location measuring capabilities to provide customers with a way to improve transport management, sales and marketing activities and the dispatch of maintenance personnel.

Based on many features incorporated in GPS mobile phones ranged widely from map guidance, information regarding restaurants and traffic to urgent notifications, etc., the new service allows users to see in real time the location of all personnel or vehicles with compatible handsets. It has also many potential applications in areas as diverse as goods delivery and

collection, sales, maintenance, nursing, healthcare, security and event management.

Various surveys have shown that location information capability is likely one of decisive influences on success in the business field. Therefore, in order to increase market share, one of important things for future work will be how to stimulate new demand by developing unique content that makes full use of GPS functions.

3.3 Mobile Suica (<http://www.jreast.co.jp/>)

As one of the most important components of m-commerce applications and services, mobile financial applications could involve a variety of applications such as mobile banking, mobile money transfer and mobile payments, etc.

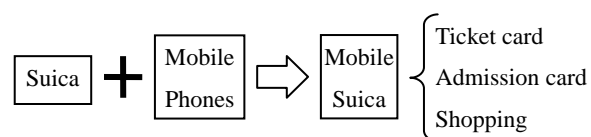


Fig.4 Image of Mobile Suica

Japanese railway operator East Japan Railway Co., Ltd. (JR East) will introduce a new ticket payment system using mobile phones with inbuilt Integrated Circuit (IC) Suica cards, called Mobile Suica (see Fig.4). Suica (Super Urban Intelligent Card) is an IC card system for automatic ticket gates of JR East. It can be used not only as a prepaid ticket card, and also for both a building entry/exit control system and shopping as well. The number of Suica cardholders has increased steadily since the introduction of the system in November 2001. By early June 2003 the number of cardholders already exceeded 6.5 million. The fast pace of growth reflects great enthusiasm of the public to the convenience of Suica.

Owners of mobile phones with inbuilt IC Suica cards will be able to use their phones for paying train travel by passing the phone near the checking machines at the automatic ticket gates. JR East plans the new system to come into effect in 2005 at the latest. The trial period for operating Mobile Suica has started since February 2004. In addition to the convenience of Suica, Mobile Suica attempts to utilize the feature of cellular phones, such as communication function and representational function, to offer new and more convenient service.

Tab.2 outlines correlation between m-commerce features and their applications in the three cases. In essence, the characteristics of ubiquity, convenience and accessibility in m-commerce environment are utilized effectively and widely in these cases above mentioned and some other areas of m-commerce applications and services. They can be regarded as the basic and main benefits and distinctions between the fixed e-commerce services and the new m-commerce services. However, merely the three basic benefits are not enough to ensure a general user acceptance and the success of a mobile application or service. As the experiences in m-commerce market are showing those mobile applications and services that take the specific features of the users' context into account and apply this information to generate an added value for the mobile customers tend to be successful, such as LBS (location based services), personalized internet services, etc.

So far, by connecting its rich customer database with mobility, TOL is capable of personalizing product or service offerings to some extent, while KDDI enables their users to push, receive and access information and services specific to their location with

Tab.2 Correlation between m-commerce features and applications in the cases of Japan

| Features | Tsutaya Online | KDDI's GPS map | Mobile Suica |
|-----------------|----------------|----------------|--------------|
| Ubiquity | + | + | + |
| Convenience | + | + | + |
| Accessibility | + | + | + |
| Personalization | + | - | - |
| Localization | - | + | - |

"+" denotes significant correlation; "-" denotes insignificant correlation.

technologies like GPS. For the meanwhile, there is still not significant embodiment of personalization or localization in the case of Mobile Suica at the present start-up stage. But a series of new and more tailored services will be offered with the advancement and maturity in technology and practice.

4 Conclusion

The development of wireless technology and mobile network has created a challenging research and application area, mobile commerce. As an independent business area, it has its own advantages and features as opposed to traditional e-commerce. The aim of the paper is to explore the specific advantages of m-commerce over traditional e-commerce so that new potential applications and services could become possible in m-commerce adoption. In the meantime, several cases involving mobile commerce applications in today's Japan were presented to show successful penetration and positive perspective of mobile business thanks to the unique features of mobile technology. In such a rapidly changing environment, 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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