Mobile Commerce: Promises, Challenges, and Research Agenda

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INTRODUCTION

Background

Advances in wireless technology increase the number of mobile device users and give pace to the rapid development of e-commerce using these devices. The new type of e-commerce, conducting transactions via mobile terminals, is called mobile commerce. Due to its inherent characteristics such as ubiquity, personalization, flexibility, and dissemination, mobile commerce promises businesses unprecedented market potential, great productivity, and high profitability. This paper presents an overview of mobile commerce development by examining the enabling technologies, the impact of mobile commerce on the business world, and the implications to mobile commerce providers. The paper also provides an agenda for future research in the area.

Features of Mobile Commerce

Promising unlimited information, entertainment, and commerce, mobile commerce gives users the ability to access the Internet from any location at any time, the capability to pinpoint an individual mobile terminal user’s location, the functionality to access information at the point of need, and a need-based data/information update capability. Mobile commerce has features not available to traditional e-commerce, some of which we discuss next:

1. Ubiquity: Through mobile devices, business entities are able to reach customers anywhere at anytime. On the other hand, users can also get any information they are interested in, whenever they want regardless of where they are, through Internet-enabled mobile devices. In this sense, mobile commerce makes a service or an application available wherever and whenever such a need arises.

2. Personalization: An enormous number of information, services, and applications are currently available on the Internet, and the relevance of information users receive is of great importance. Since owners of mobile devices often require different sets of applications and services, mobile commerce applications can be personalized to represent information or provide services in ways appropriate to the
specific user.
3. **Flexibility.** Because mobile devices are inherently portable, mobile users may be engaged in activities, such as meeting people or traveling, while conducting transactions or receiving information through their Internet-enabled mobile devices.
4. **Dissemination.** Some wireless infrastructures support simultaneous delivery of data to all mobile users within a specific geographical region. This functionality offers an efficient means to disseminate information to a large consumer population.

### Outline of Paper

The article is structured as follows. We will first describe overall mobile commerce business activities. Next we present an overview of mobile commerce technology and a mobile business model. We then highlight the issues affecting mobile commerce application and service providers. Finally, we suggest possible directions for future mobile commerce research.

#### MOBILE COMMERCE BUSINESS ACTIVITIES—ANO OVERVIEW

The essence of mobile commerce revolves around the idea of reaching customers, suppliers, and employees regardless of where they are located. It is about delivering the right information to the right place at the right time. This flexibility of mobile commerce is made possible by the convergence of the Internet, enterprise applications, and wireless technology. In this section, we focus on mobile commerce business activities. We describe the unprecedented enthusiasm mobile commerce has generated, and discuss new value-added mobile commerce applications.

**Mobile Enthusiasm**

Mobile commerce, enabling information exchange and purchases using mobile devices, means different things to different people: to customers, it represents convenience; merchants associate it with a huge earning potential; and service providers view it as a large unexplored market. Japan and Europe are already witnessing early successes in mobile commerce. In Japan, NTT DoCoMo’s iMode phone has emerged as a great success highlighting the application of wireless technology to a business environment. Introduced in February 1999, NTT DoCoMo iMode provides a continuous Internet connection via mobile phones, and connects users to a wide range of online services, many of which are interactive. All services link directly to the iMode portal Web site, and users can access any service virtually instantly by pressing the mobile phone’s dedicated iMode button. iMode has already attracted more than 13 million Japanese consumers, particularly youth. Connected continuously to the Internet, these 13 million users can send e-mail, get stock quotes, and play online games. Soon they will be able to use on-line map guides and even conduct commercial activities by phone.

Europe has also embraced a simple mobile data service wholeheartedly. Short Message Service (SMS) technology makes wireless e-mail a reality, and the new Wireless Application Protocol (WAP) facilitates Web browsing and other Web-based transactions on mobile phones. Bluetooth, another European data initiative, further establishes a common standard for a wide range of appliances and industrial devices to communicate wirelessly. With new developments in technology, it is estimated that more than half of the European mobile commerce market in the next few years will include financial, advertising, and shopping services (Muller-Veerse, 2000).

North America, where people tend to have a PC-centric view of the Internet, has lagged behind in applications of mobile technology. But companies here have started to realize that they might miss business opportunities if they don’t get a share of the current mobile commerce market, and they are attempting to catch up. Cellular operators such as Sprint PCS and Verizon now offer customers wireless access to news, the weather, sports, and financial information. MasterCard International and Motorola announced they would collaborate on mobile commerce projects. These examples demonstrate that the global enthusiasm for wireless technologies is rapidly converging on mobile commerce.

#### Value-Added Applications

As mobile commerce extends the current Internet sales channel into the more immediate and personalized mobile environment, it also revolutionizes the business world by presenting it tremendous opportunities to provide additional value to hard-to-reach end customers. These value-added services include:

1. **Easy, timely access to information** (e.g., the latest availability of flights). Delivering a service that not only reaches more people but also is available all of the time, mobile commerce enables consumers to make purchases from wherever they are whenever they are ready. This will result in an increase in revenue to the company providing the mobile services.
2. **Immediate purchase opportunity** (e.g., last minute purchases of tickets or gifts). Provided with a personalized, immediate opportunity to purchase, the customer will make the purchasing decision on the spot and not go to an alternate source.
3. **Wireless coupon based on user profiles.** Since a mobile device’s location can be determined precisely, the stores around the mobile device user can transmit user-specific information, such as current sales or specials, and alert the user about similar upcoming events. Wireless coupons, which enable an advertiser to deliver a geographically targeted and time-sensitive message to a willing consumer directly with a promotional offer virtually anytime and