A STUDY ON M-COMMERCE ISSUES AND CHALLANEGES

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ABSTRACT -*Although a large volume of literature is available on mobile commerce (m-commerce), the topic is still under development and offers potential opportunities for further research and applications. Since the subject is at the stage of development, a review of the literature on m-commerce with the objective of bringing to the fore the state-of-art in m-commerce research and applications will initiate further research on the growth of m-commerce technologies. This paper reviews the literature on m-commerce and applications using a suitable classification scheme to identify the gap between theory and practice and future research directions. The 40 m-commerce articles are classified and the results of these are presented based on a scheme that consists of five distinct categories: m-commerce theory and research, wireless network infrastructure, mobile middleware, wireless user infrastructure, and m-commerce applications and cases. A comprehensive list of references is presented. We hope that the findings of this research will provide useful insights into the anatomy of m-commerce literature and be a good source for anyone who is interested in m-commerce. The paper also provides some future directions for research.*

Keywords— Mobile commerce (m-commerce); Literature review; Framework; Future research (key words)

I. INTRODUCTION

While electronic commerce (e-commerce) continues to impact the global business environment profoundly, technologies and applications are beginning to focus more on mobile computing and the wireless Web. With this trend comes a new set of issues specifically related to mobile e-commerce. The purpose of this paper is to examine some of these issues so that researchers, developers, and managers have a starting point for focusing their efforts in this new domain. In very simple terms, one can say: M-commerce = E-commerce + Wireless Web. The days of initial euphoria over the possibilities of mobile technology have transitioned into a time of more cautious enthusiasm. Instead of simply wanting to go mobile, companies are asking for proof that the introduction of mobile services will add value to their businesses. The most important fact is that now mobile touches many areas other than just simply targeting customers. Furthermore, companies initially focused on B2C (business-to-consumer) mobile solutions, are now ending that B2E (Business to Employee) applications to be more strategic. B2E is Business-to-Employee, an approach in which the focus of business is the employee, rather than the consumer (as it is in business-to-consumer or B2C) or other businesses (as it is in business-to-business or B2B). The B2E Solution Set enables global enterprises to fully unlock the potential of their businesses, and optimize their existing assets, through the use of Web-based Portal technologies. B2E moves a wide variety of work to the Web, improving collaboration, productivity and operational efficiency among key stakeholders of any organization by making critical in-formation and tools easily accessible and usable, regardless of an individual's role or location. The mobile technology continues to evolve and present an exciting range of possibilities for both near and long-term solutions. The technologies that once seemed a distant promise such as Bluetooth, location-based services and telemetric, are moving closer to becoming a reality. This fact can make service provider to be capable of providing value-added mobile solutions. Companies are ending that there is no need to simply wait on the sidelines for these next-generation developments to occur, they can leverage devices already in users hands such as non-WAP phones and sync PDAs (personal digital assistants) and readily available technology to introduce equally innovative, strategic solutions today.

II. GOAL OF THE PAPER

The goal of this paper is to explore and present the number of possible issues in mobile e-commerce on which others can speculate. M-commerce (mobile commerce) is the latest high-tech buzzword that turns advanced mobile phones and PDAs (Personal Digital Assistants) into devices, which allow direct access to information while on the move. As a result, new opportunities for businesses are arising. We are trying to bring out potential benefits and challenges Associated with this new technology. It is very essential in today's competitive business world to know the technology completely before adopting it as a critical tool for doing business. Our paper will help in understanding the current state of this ubiquitous computing technology.

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A.1.HSCSD

HSCSD (High Speed Circuit Switched Data) is a circuit switched protocol based on GSM. It is able to transmit data up to 4 times the speed of the typical theoretical wireless transmission rate of 14.4 kbps (kilo bytes per second), i.e. 57.6 kbps, simply by using 4 radio channels simultaneously. The key problem in the emergence of this market is that there is currently only few manufacturers who can provide PCMCIA modem cards for HSCSD clients, which over's a transmission speed of 42.3 kbps downstream and 28.8 kbps upstream. It is therefore likely that HSCSD is never going to reach widespread popularity except in some regions as means to connect laptops to the Internet. The situation that the system is facing is typical to all the wireless network options as the technologies develop at such a great speed that few operators wish to invest into a system, which is going to be outperformed by others in a very short period of time.

A.2. GPRS

GPRS (General Packet Radio Service) is a packet switched wireless protocol that operas instant access to data networks. It will permit burst transmission speeds of up to 115 kbps (or theoretically even 171 kbps) when it is completely rolled out. The real advantage of GPRS is that it provides a connection (i.e. instant IP connectivity) between the mobile terminal and the network but the actual capacity would be consumed only when data is actually transmitted. Pilot GPRS networks are already in place today in many European markets. However, GPRS will require new terminals that support the higher data rates, and these seem to be the bottleneck to the early adaptation of the technology

A.3. EDGE

Enhanced Data Rates for Global Evolution (EDGE) is a higher bandwidth version of GPRS permitting transmission speeds of up to 384 kbps. The number of EDGE users worldwide is set to reach 331.4 million by the year 2007, according to predictions by the experts. This will achieve the delivery of advanced mobile services such as the downloading of video and music clips, full multimedia messaging, high-speed color Internet access and e-mail on the move. It will bring about the modulation changes that will be necessary for UMTS at a later stage. While a number of mobile operators are considering implementing EDGE as an interim data technology between GPRS and UMTS, the success of EDGE depends very much on the timely availability of the products and applications. The opportunity window for EDGE will be very short, unless major delays occur during UMTS deployment.

A.4.3G/UMTS

Standing for "Universal Mobile Telecommunications System", UMTS represents an evolution in terms of services and data speeds from today's 'second generation' mobile networks. As a key member of the "global family" of third generation (3G) mobile technologies identified by the ITU, UMTS is the natural evolutionary choice for operators of GSM networks, currently representing a customer base of more than 850 million end users in 195 countries and representing over 80% of today's digital wireless market [source: GSM Association]. Using fresh radio spectrum to support increased numbers of customers in line with industry forecasts of demand for data services over the next decade and beyond, 'UMTS' is synonymous with a choice of WCDMA radio access technology that has already been selected by approaching 120 licensees worldwide. UMTS is already a reality. Japan launched the world's first commercial WCDMA network in 2001, and WCDMA networks are now operating commercially in Austria, Italy, Sweden and the UK with more launches anticipated during 2003-2004. Several other pilot and pre-commercial trials are operational in the Isle of Man, Monaco and other European territories. Some 250 operators worldwide are also giving their customers a taste of faster data services with so-called "2.5G" systems based on GPRS technology - a natural evolutionary stepping-stone towards UMTS. Many operators are also advancing plans to deploy EDGE technology to increase the speed and capacity of mobile services covered in their current GSM frequency allocations.

III. CHALLENGES IN M-COMMERCE

A. Security

Security is a key enabling factor in M-commerce. GSM provides a relatively secure connection through the PIN (personal Identification Number) when turning on the handset. An authentication protocol between handset and the network through SSL encryption of voice and data is also there in GSM. But it is not enough to convince people. In order to get the confidence of critical mass of consumers, more is expected in the head of security. It looks that the smart cards will be the preferred way of gaining access to a secure system. The smart card can be in the form of a credit card or in the form of a SIM like miniature card. It is possible to run a variety of application on a single small SIM card. Encryption is being used to ensure confidentiality through a secret key in association with the algorithm. This produces a scrambled version of the original message that the recipient can decrypt using the original key to retrieve the content. The key must be kept secret between the two parties. There are two basic methods, which can be used to encrypt a document: symmetric and asymmetric. With the symmetric method the same key is used for encryption and decryption. The problem is that the key has to be transmitted to the recipient of the message, and a third party could gain access to the key during this transmission. Within symmetric encryption both parties have typically a key of 1024 2048 bits. Using asymmetric algorithm, also known as public key methods, a set of two keys is used a private and a public key. Information encrypted using the public key can only be retrieved using the complementary private key.

B. Business

A key challenge that companies will face as they build businesses for the wireless and wired age is that they will need to integrate capabilities and disciplines that are quite separate in most organizations today. These include creative thinking, seasoned business skills, a deep understanding of technology and technical issues in both telecommunications and information systems, an understanding of how all this will evolve, and well-honed skills in design and branding. Executives will need to begin to think now about how to assemble these skills and how to create processes for electively coordinating them. As they build these new digital businesses, executives should not underestimate what they already know. The lessons learned from the many business successes and failures we have seen during the last five years on the wired Web apply to mobile businesses as well, and to the integrated wired and wireless, on-line and on-line businesses of the future. Going forward from here, the opportunities for success in m-commerce will go to those who focus on creating compelling value for customers, rooted in a deep understanding of the mobile experience, who build dynamic infra-structures for the business, and who forge business models that harvest sustainable value from the openings and economics of the mobile Web. Executives are also to think about how to tackle the changes that mobile computing will bring about in the organization. Absence of proper management can have negative elect in the performance of business and lead to failure of mobile computing as such.

IV. Conclusion

The mobile Internet channel has opened up possibilities that business once dreamed of. There is a big gap between what the technology can do today and what the consumer has been led to expect. The good news is that the sources of consumer frustration like slow transmission speeds, difficult user interfaces and high costs - are being addressed by operators and equipment manufacturers. M-commerce players will need to move fast to improve the user interface and over innovative pricing structures. Despite the initial frustrations of the early users, consumers envision that once many of the glitches are worked out, mobile applications will become an integral part of their daily lives. Eighty-two percent of current and potential users think that the mobile device will become their personal travel assistant within the next three years. Eighty-one percent also foresee using these devices as part of their daily routine - for sending emails, getting news and information, and shopping. More than half (70 percent) expect these devices to become universal payment tools. Given this high level of consumer acceptance, the report predicts that by 2003, m-commerce will be where the Internet was in 1998 in terms of transaction value. In the B2C, total revenues generated by m-commerce will reach approximately $100 billion, half of which will come from data transmission charges, e-mail subscription fees, and advertising; the other half will come from the value of transactions and related activities via mobile devices.

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