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Mobile Commerce: The Next Driver of Market Growth

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ABSTRACT

There has been tremendous growth in wireless technology in the last decade. This advancement has changed people do business in mobile environment (M-Business). This is where M-Commerce or Ubiquitous Commerce (U-Commerce) step in which promises to allow shoppers to purchase goods and have services using mobile phones, wearable PCs and handhelds and in the same way brings challenges for both individuals and society. This paper is intended to bring out the facts about the feasibility of M-Commerce today; the strength and opportunities, the weaknesses and threats lying ahead. The highlight of this paper is to explore the issues that arise from the effects of M- commerce and the challenges lying ahead from which in future, the researchers may spell-out the ways to serve M-commerce as drivers of the growing market demand in the long-term.

Introduction

Mobile and wireless communications are the technologies with user-centric based and have highly penetrated in the global. In recent days, different types of systems are being applied for different application areas. Further developments are expected to evolve from existing and emerging systems. In future, most of the systems and applications will be mainly designed from a user-centric perspective [1]. The rapid development in the internet and related technologies changes the ways we live. People are more attracted towards wireless and mobile devices (such as cell phones, laptops, notepads, Personal Digital Assistants (PDAs), palmtops. They like to buy theatre tickets while waiting to board a plane, or monitor financial markets and scan e-mail between meetings, play games, surf internet wherever they may be. These facilities are provided by the advent of electronic commerce (E-Commerce) [2].

While 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. Mobile technology is the most pervasive communications technology in the world [3]. The mobile Internet is accessible from anywhere and at any time, and this is the advantage that the carriers are trying to exploit in a variety of services [4]. This advanced mobile and internet technologies coined together, enable people to be connected any time, any place, without being tied to a wired infrastructure. This feature allows mobile users to have mobile business transactions termed as Mobile Commerce [5], allowing Business-to-Employees (B2E), Business-to-Business (B2B) and Business-to-Consumer (B2C) applications [6]. These applications move processes, information, products and services closer to clients, partners and consumers. Meanwhile, "Anywhere / Anytime" access and its potential for B2E, B2B and B2C via wireless technology accounts for M-Commerce's tremendous demand.

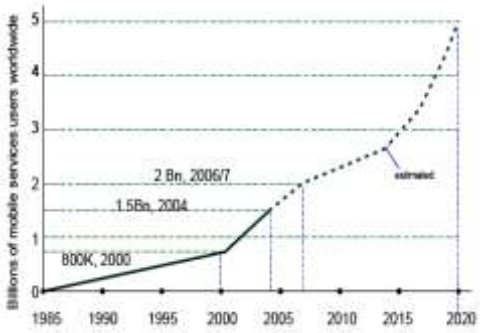

Fig. 1: Gartner's forecast on the Worldwide M-Commerce users

Yang expected the growth of worldwide M-Commerce users to be 1.67 billion by 2008 [7]. But, according to research by Gartner, the growth reached 2 billion in 2006 itself and by 2010 that will reach beyond 3 billion [8] as shown in fig 1. Here the mobile subscribers selection criteria are based on the low pricing scheme, special offers for new subscribers, good coverage, the phone provided was bundled with the contract bundled with the contract, reputation, the people to be contacted should have chosen the same provider, company telephone and good customer service. Mobile services include Banking and financial services, Shopping, Entertainment, Information and News, Travel booking, Ticket reservation, e-mail etc. According to independent research findings, M-Commerce, the conducting of business and services over portable, wireless devices, will soon be a dominant force in business and society. Realizing the usage and need of the M-Commerce technology, and increasing

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growth rate of M-Commerce users, this paper intends to brief its challenges and issues and examines an analysis of SWOT (Strength, Weakness, Opportunities and Threat) over M-Commerce.

The paper is organized as follows. In Section II, the technical background related to mobile commerce is introduced; applications of M-Commerce are presented in Section III. Section IV examines the strength, weakness, opportunities and threats related to M-Commerce (SWOT analysis on M-Commerce).

Technical Background

Known as next-generation E-Commerce, M-Commerce enables users to access the Internet without needing to find a place to plug in [9]. Mobile Commerce (also known as Ubiquitous Commerce (U-Commerce), owing to the ubiquitous nature of its services) is the ability to conduct commerce, using a mobile device e.g. a mobile phone (or cell phone), a Personal Digital Assistant (PDA), a smart-phone while on the move, and other emerging mobile equipment, like desktop mobile devices[10]. Peter Keen and Ron Mackintosh defined M-Commerce as the extension of E-Commerce from wired to wireless computers and telecommunications, and from fixed locations to anytime, anywhere, and anyone device [11]. Therefore, M-Commerce is any transaction with monitory value that is conducted via internetworking and involves the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access. It is a natural result of synthesizing two strongly emerging trends: E-Commerce and pervasive computing. On the one hand, E-Commerce is enabling new ways of doing business. Easy sharing of information, dissolution of distance, competitive costs, and improved efficiency are driving the phenomenal growth of both web-based consumer shopping B2C, online inter-enterprise transactions or *B2B*, and *B2E*.

The emerging technology behind M-Commerce is based on the Wireless Application Protocol (WAP) architecture which includes use of other technologies such as SMS services over a number of carriers (Global System for Mobile Communications (GSM), Interim Standard 95 (IS95), Code Division Multiple Access (CDMA), Wideband Code Division Multiple Access (W-CDMA)), Bluetooth applications, 2G, 2.5G, 3G,Wi-Fi, IRDA etc. (shown in the figure(2) and also the integration of low level digital carriers to IP based services through WAP or Compact HTML [12]. M-Commerce covers terminals, standards, transaction models, middleware, or security; potential business models, methods; and design approaches to develop M-Commerce applications.

Fig 2. Technologies supporting M-Commerce

Applications

Six business applications have been identified are;

- Extended packaging: consumers access additional information about products through their mobile phone.
- Content purchase and delivery: digital products such as videos, games and music can be trialed and sold via mobile phones.
- Mobile coupons: mobile phones are used both to capture and redeem coupons and discounts
- Authentication: mobile phones are used to check whether or not a product is genuine.
- Re-ordering: Mobile phones are used to reorder products with orders sent to the supplier in a standard format.
- Mobile self-scanning: consumers in supermarkets use their mobile phone (rather than a device supplied by the supermarket) to scan products as they do their shopping.

The industries deploying M-Commerce shown in figure (3) include [13]:

- Financial transactions services, which includes mobile banking as well as brokerage services
- Telecommunications, which includes service changes, bill payment and account reviews
- Service/retail, as consumers are given the ability to place and pay for orders on-the-fly
- Information services, which include the delivery of financial news, sports figures and traffic updates.

These industrial M-Commerce applications can be classified as B2B, B2C and B2E as below [14].

Business-To-Business (B2B)

Business-To-Business was originally coined to describe the electronic communications between businesses or enterprises in order to distinguish it from the communications between businesses and consumers (B2C). It eventually came to be used in marketing as well, initially describing only industrial or capital goods marketing. It is widely used to describe all products and services used by enterprises.

Business-To-Consumer (B2C)

In B2C transactions, online transactions are made between businesses and individual consumers and there is no need for retailers. Businesses sell products and services through electronic channels directly to the consumer. The major activities involved are information sharing, ordering, payment, fulfillment, and service and support.

Information Sharing

A B2C M-Commerce model may use some or all of the following applications and technologies to share information with customers:

- Company Web site
- Online catalogs
- E-mail
- Online advertisements
- Message board system
- Newsgroups and discussion groups

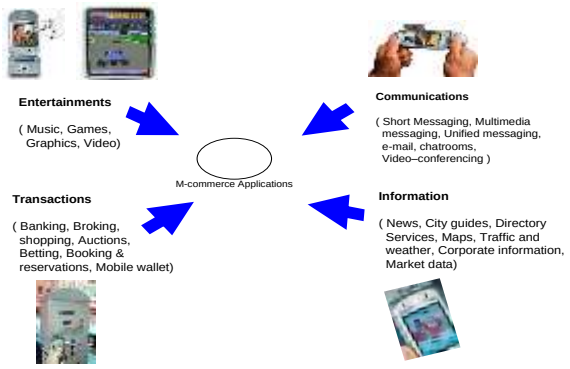

Fig 3. M-Commerce Applications

Ordering

A customer may use electronic forms similar to paper forms or e-mail to order a product or service.

Payment

There are a variety of options. These include:

- Credit cards
- Electronic cheques
- Digital cash

Fulfillment

The fulfillment function could be very complex depending upon the delivery of physical products (books, videos and CD's) or digital products (software, music, electronic documents). Fulfillment is responsible for physically delivering the product or service from the merchant to the customer.

Service and Support:

Service and support is more important in M-Commerce than traditional business because M-Commerce companies lack a traditional physical presence and need other ways to maintain current customers. Examples include:

- E-mail confirmation
- Periodic news flash
- Online surveys
- Help desk
- Guaranteed secure transactions
- Guaranteed online auctions

These five activities all need to be used in conjunction with one another for a B2C business to be successful.

Business-to-Employee (B2E)

B2E M-Commerce uses an intra-business network which allows companies to provide products and/or services to their employees. Typically, companies use B2E networks to automate employee-related corporate processes. There are potentially an unlimited number of M-Commerce applications, and table (1) shows some important classes of applications and provides examples within each class.

Though M-Commerce is applied many of the fields in day-to-day life, there comes a set of challenges and issues related to M-Commerce.

SWOT Analysis

SWOT Analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities and Threats involved in a project or in a business venture. It identifies the internal and external factors that are favorable and unfavorable to achieving that objective. This SWOT analysis is being performed on M-Commerce in order to identify its issues as weakness and threats so that more researches may be motivated and to direct the M-Commerce in a more successful manner.

Strength

Market demand, handset availability and network interoperability are among the contributing factors cited. Also the strength of M-Commerce is based on four factors: the anticipated ubiquity of devices, online access for a large portion of the world's population, location sensitivity of the devices, and authentication and authorization capabilities [15]. Varshney and Vetter argue that each of the levels in the framework which encompasses (i) Wireless (Network) Infrastructure, (ii) Mobile Middleware, (iii) Wireless User Infrastructure and (iv) Mobile Commerce Applications play a critical role in M-Commerce success and deployment [16]. Gartner Group's Dataquest, HSCSD is an early adopter scenario that gives operators a competitive edge with corporations [27]. Essentially it is profiled for bulky data transfers. Conversely GPRS, is quick and agile. As a packet-switched bearer, it promises service upto 115 Kbps, Enhanced Data for GSM Evolution (EDGE), upto 384 Kbps. Although speed may be a concern for WAP surfers, technology such as 4G will enhance that in the very near future. So a mobile device can provide with continuous links to the Internet, e-mail, interactive touch screen experiences which provides innovative service delivery [9].

High Quality-of-Service (QoS), Positioning services and location-aware services provide highly convenient and customized services [17]. For wireless carriers, to recoup the costs of building next-generation wireless data networks, M-Commerce represent new revenue streams. Using Bluetooth technology, much of this communication could even be between devices rather than people and advertisers will be able to team with carriers to deliver their message.

In consumer markets, mobile marketing is expected to be a key growth area. The immediacy, interactivity and mobility of wireless devices provide a novel platform for marketing. The personal and ubiquitous nature of devices means that interactivity can be provided anytime and anywhere. The information from all transactions is used to generate personality profiles, which makes it easy to draw conclusions about personal interests of each customer. Based on these profiles, wireless coupons will inform us about current offers. Instant messengers technology, the small applications currently used on Internet home pages, which can inform users if one of their friends is online or if a flight is delayed, will be put into cellular networks. The users will be able to program the cellular device to indicate if a specific person is within a certain distance.

Weakness

Lack of data security and digital identity are the major weakness for wireless communications [18]. Wireless Local Area Network (WLAN) present its own set of risks listed below:

- WLAN transmission can be 'listened to' up to a mile away using inexpensive receivers
- Many existing WLAN installations do not use WLAN built-in encryption capabilities
- Antivirus solutions are difficult to implement
- Privacy in data transmission is not maintained

Over the next decade, billions of people will gain access to mobile devices. Many of them will be functionally illiterate, and only a small percentage will be comfortable with English. A polyglot environment will place a large premium on language translation, clear interactions, and speech interfaces, but even after 30 years of research in these fields, sophisticated applications remain scarce [19]. Recent Mobile devices are not as fast as a fixed connection, or have anything like the graphics

or processing power of a PC and they are limited with memory and computational power. The small screen size of mobile terminals is also a major deterrent to many applications [20]. Still, M-Commerce relies on proprietary solutions and there are no standards for M-Commerce [28].

Although 4G networks are able to deliver multimedia services and mobile Internet to any 4G device anywhere, anytime and at anyplace, a full range of services must be offered in order to achieve reasonable Pay-Back-Periods (PBP) and not to mention the Return-On-Investment (ROI). Moreover, both operators and service providers will have to follow a different business model in expanding the fourth generation mobile marketplace. Critical mass will have to be reached very quickly. The networks are so expensive that the roll out just for high-end users would not lead to a positive business case – the diffusion into the mass and mainstream market would take too long. It may be said that without a full range of 4G terminals from the very beginning, the diffusion of services on fourth generation mobile networks could be delayed by some years.

Opportunities

Opportunities for mobile commerce are also great, and users can look forward to new forms of business interaction and uses of location information that are culturally appropriate and commercially valuable. Size and growth rate of the mobile market is the key driver of the mobile services market. "Third world" citizens will be able to communicate easily anywhere and engage in business without geographical limitations [19].

Moore says the 'payment gateways', are a company or organization that provides an interface between the merchant's point-of-sale system and the payment system [21]. The service may involve the purchaser's bank paying directly to the seller's bank, or through a credit card company, all facilitated by the payment gateway provider [22]. The WAP gateway has been profiled to gather extensive billing detail for each transaction, e.g., the download of content (both volume and time), Universal Resource Locators (URLs) visited, and other typical events during a WAP session. This information is stored in a generic, flexible format in a billing log. This, in turn, interfaces to a mediation platform, which translates it into valid Call Detail Records (CDRs) and passes them to the billing agency or credit card company's billing system. The billing could be

- Transaction-based, where the services are paid according to service usage, with different prices possible for different services
- Subscription based, with a monthly fee
- Flat rate, with one price for all
- Free, where the content provider may pay the operator for the airtime
- A combination of the four billing options

The billing log receives "billable events" from the event manager. The gateway's billing data interface requires only minor tuning to adjust its data formatting for different billing systems. In this way, WAP gateway's flexibility enables operators to introduce and bill for new services easily without having to make changes to their existing billing systems. However, service roaming is difficult if transaction-based billing is used. The billing possibilities are as follows;

- Monthly fee (similar to the Internet model)
- Amount of data, or time based
- Commercials
- Service transactions
- A combination of these options

Billing is a very market-sensitive problem and one solution is not possible. Without a doubt, the biggest change will be more choices, and in the end, markets will decide between free versus price for M-commerce. Tickets can be booked via the mobile; people have the flexibility of purchasing them on the go. Retailers can send coupons and loyalty cards that can be presented at the sales counter. The mobile platform can be used to deliver news alerts, stock market reports, sports schedule and results or traffic information [23]. Paper catalogues can be replaced by sending periodic alerts to the customers. Companies can reach consumers and select their target audience for a particular product or brand. M-Commerce will provide the platform for several industries to address existing customers, provide them with better services and also give them the ability to get to new customers. These opportunities and what mobile commerce will look like in the future depend on the creation of an open and neutral infrastructure trusted by both businesses and consumers to enable a fast and easy adoption of the technology.

In a few years, designers will be able to implement wireless access, global positioning, and information management on a single chip. Data-enabled cell phone costs will plummet as manufacturers climb the learning curve. Network capabilities will be supported by installed equipment with low incremental operating costs. Several analysts predict that data-enabled cell phones will outnumber PC-style laptops and desktops by around 2003 and that the number of users will grow by hundreds of millions each year thereafter. For the first time, "third world" citizens will be able to communicate easily anywhere and engage in business without geographical limitations.

Threats

An obvious risk with remote networking is loss or theft of mobile devices. Although mobile telephone service can be cancelled and the problem of its loss reduced to the compromising of phone book entries, for large businesses a lost mobile computing device could also seriously compromise sensitive corporate information. In the wrong hands, it may cause untold financial losses, and could quickly cost the business its competitive edge. Without safeguards, in a best-case scenario, when a device is stolen and/or sold, critical information stored on it is erased and lost. Mobile viruses can spread attacks quickly through the network [25].

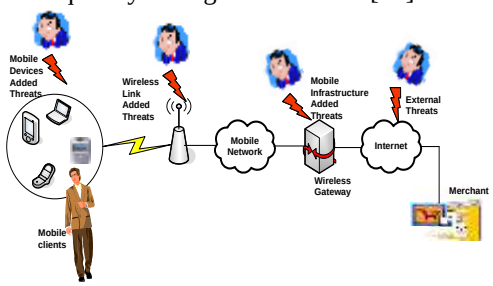

Fig. 4. M-Commerce Security Threats

Other important but seldom considered risks include: allowing employees to use their personal wireless devices or home computers for business purposes, or to use personal E-Mail services on a business computer at home as shown in figure (4). Both these practices, at a minimum, run the risk of virus infection. The Mobile Commerce Security and Privacy Risks and threats are [26];

- Wireless Infrastructure Security Risks
- Mobile Middleware Security Risks
- Wireless User Infrastructure Security Risks
- Mobile Application Security Risks

Wireless Infrastructure Security Risks:

Poor physical Controls around Access points (APs), malicious individual are able to change settings on the AP. Employees can also accidentally damage the AP thus interrupting communications. AP signal degradation occurs if the environment surrounding the AP consists of large solid objects, which could prevent and decrease signal strength such as thick cement walls, floors and ceilings. Poor configuration of APs which leads to low encryption settings for the AP, allows outsiders to gain entry to their network. Hackers in WLAN automatically detect 802.11b signals and connect with the network, view data available from the network and alter / steal the data of a company. Open IR ports on laptops enable users to make an unauthorized connection. Weak encryption standards were discovered to have many design flaws where its vulnerabilities have been widely published on the internet.

Wireless User Infrastructure Security Risks:

The nature of the device being exposed in various environments and being valuable, causes it to be more exposed to malicious acts. Mobile devices are generally small in nature and thus prone to damage. Situations where the employee would leave the company without deleting company information exposing the organization to a real risk of sensitive information being leaked to the public or the employee using the information for his/her own advantages. Given the ability for content to be exposed to different environment, such as different companies and even at home, other people including family members and friends may gain access to sensitive and private information. Unauthorized software may be illegitimate and/or corrupt existing data on the device. Mobile devices are able to roam around in insecure and privates areas and may visit unauthorized and illegal websites or can conduct fraudulent activities without being noticed. Social engineering may enable passwords on the device to be intercepted especially when the device is with the person in different environments with many people (Client sites, shopping centers, public transport etc). Viruses sent over a network or accidentally downloaded from the internet will be transmitted directly to the device and possibly corrupt hardware, software and data components of the device. Customers lose valuable data due to SIM cards on their mobile phones and PDAs being damaged or lost.

Mobile Application Security Risks:

The application layer of the M-Commerce framework directly affects the user of the mobile application and the through the practical use allows organizations to collect, transmit and store customer data. Therefore any risks which directly affect the user found within the literature review, namely privacy risk, have been placed into the category. Malicious Individuals who steal / borrow these phones have the ability to undertake ID fraud as they can conduct transactions on the phone under the previous owner's name. Limited storage space places limitations on data backup making it more possible for a user to lose his/her data. Mobile user's privacy is not maintained as his/her geographic location can be traced through the use of specialized technology. Users will not be able to view policies or any other form of legal contract or obligations, thus may not know their rights. This is due to the small screen on devices. As users will constantly use their phones for mobile for everyday services such as banking and paying bills they may be more at risk to harmful side effects like health risks.

In the table 2, M-Commerce SWOT / TWOS matrix, we examined that,

- S-O strategies pursue opportunities that are good to the future
- W-O strategies overcome weakness to pursue opportunities
- S-T strategies identify ways that the M-Commerce can use its strengths to vulnerability threats.
- W-T strategies establish a defensive plan to prevent the M-Commerce's weakness from making it highly susceptible to threats

The above strategies and technological outcomes constitute some critical issues which are to be confronted in order to increase the use of M-Commerce services in the Global. To that end, the present study supports future research in this area, by providing an M-Commerce research framework including the critical business and technology factors that should be further investigated. The interaction between business and technology factors implies the need for multidisciplinary research initiatives, towards enhancing the ultimate offering. Conclusive research designs can elaborate on the provided critical success factors, towards providing concrete theoretical insights, direct managerial implications and challenging future research directions. To that end, business on one hand will be effectively supported by the corresponding theoretical guidelines and implications, while customers will be able to enjoy high quality of services and support.

Conclusion

People live fuller, mobile lifestyles these days. They value convenience and have a lot of things that they want to do. They are comfortable with E-Commerce and willing to transact over the mobile to simplify their lives and optimize their time. M-Commerce is such a technology which offers a new business opportunity to enterprises and consumers within reach, even as barriers to its development fall away. The penetration of M-Commerce in global population, vary between different countries and markets. Applications and wireless devices promise to evolve together, each driving the introduction of innovative and powerful features in the other. The opportunity is much beyond mobile bill payments and can include all forms of transactions including merchant payments, utility bill payments, peer-to-peer money transfer and any other transaction scenario that the consumer faces today. The SWOT/TOWS matrix on M-Commerce analyses and draws strategies to compete in an increasingly digital marketplace. The M-Commerce need to develop synchronized value-added content, synthesized business models that go together with emerging technologies, which can create key mobile features and serve as drivers of the growing market demand.

References:

[1] Werner Mohr, "Vision for 2020?", SPRINGER Journal Wireless Personal Communications, ISSN 0929-6212 (Print) 1572-834X (Online), Volume 44, Number 1, Jan'2008, pp: 27-49.

[2] Little, M.C. Shrivastava, S.K., "Integrating the Object Transaction Service with the Web", Proceedings of the Second International IEEE Conference on Enterprise Distributed Object Computing Workshop, EDOC '98, La Jolla, CA, USA, ISBN: 0-7803-5158-4, 3-5 Nov 1998, pp: 194-205.

[3] Baladron, C.; Aguiar, J.; Carro, B., Sanchez-Esguevillas, A., "Integrating User-Generated Content and Pervasive Communications", IEEE Pervasive Computing, Volume: 7, Issue: 4, ISSN: 1536-1268, Oct.-Dec. 2008, pp: 58-61.

[4] Samuel Pierre, "Mobile computing and ubiquitous networking: concepts, technologies and challenges", Science

[5] Direct Telematics and Informatics, Volume 18, Issues 2-3, May-Dec'2001, pp: 109-131.
[6] Rajnish Tiwari, Stephan Buse, Cornelius Herstatt, "From Electronic to Mobile Commerce Opportunities through technology convergence for business services", CACCI Journal, Vol. 1, 2008.
[7] Christer Carlsson, Pirkko Walden and Jari Veijalainen, "MOBILE COMMERCE: Decision Technologies for Management Track", IEEE Proceedings of the 36th Hawaii International Conference on System Sciences (HICSS'03), 0-7695-1874-5. IEEE Computer Society, 2003.
[8] Kurnia, S.; Heejin Lee; Song Yang, "Understanding Consumersapos; Expectations of Mobile Data Services in Australia", IEEE Proceedings of the International Conference on the Management of Mobile Business, ICMB 2007, 9-11 Jul'2007, pp: 14.
[9] Senn, J.A., "The emergence of M-Commerce", IEEE Computer, Volume 33, Issue 12, Dec 2000, pp: 148 – 150.
[10] A GS1 Mobile Com White Paper, "Mobile Commerce: opportunities and challenges", Feb'2008.
[11] www.allbusiness.com/electronics/commercial-industrial-electronics-radio/11484012-1.html
[12] Keen, P.; Mackintosh, R., The Freedom Economy: Gaining the M-Commerce Edge in the Era of the Wireless Internet. McGraw-Hill, 2001.
[13] Kalle Lyytinen, "M-Commerce - Mobile Commerce: a New Frontier for E-business", IEEE Proceedings of the 34th Hawaii International Conference on System Sciences - 2001.
[14] Kalakota, R.; Robinson, M.: M-Business: The Race to Mobility. McGraw-Hill Companies, 2001.
[15] Paavilainen, J.: Mobile Business Strategies: Understanding the Technologies and Opportunities. Addison-Wesley, 2002.
[16] John Garofalakis, Flora Oikonomou, Vasilios Stefanis, "System's Design and Implementation for Easy Creation of Mobile Commerce Systems", IEEE Proceedings of the Third International Conference on Internet and Web Applications and Services, 978-0-7695-3163-2, 2008.
[17] Varshney, U., Vetter, R. and Kalakota, R. "Mobile commerce: A New Frontier", IEEE Computer: Special Issue on E-Commerce, Oct' 2000.
[18] Nenad Jukic, Abhishek Sharma, Boris Jukic, Manoj Parameswaran, "M-Commerce: a location-based value proposition", ACM transactions on Managing E-Commerce and mobile computing technologies, ISBN:1-931777-46-2, 2003, pp: 19 – 27.
[19] David Phu, Rodger Jamieson, "Security Risks in Mobile Business", IEEE Proceedings of the International Conference on Mobile Business (ICMB'05), 0-7695-2367-6/05, 2005.
[20] Stuart Feldman, "Mobile Commerce for the Masses", IEEE Internet Computing, Nov-Dec'2000, http://computer.org/internet/
[21] MacCormac D, Deegan M, Mtenzi F, Brendan, "Implementation of a System to Support Mobile Computing Sessions", 2nd International Conference on Pervasive Computing and Applications, ICPCA 2007, 26-27 Jul'2007, pp: 521 – 526.
[22] Mobile Payments & M-Commerce - The Future Opportunities & Challenges, www.WATBlog.com, Nov 10 2008.
[23] M. Litoiu1, D. Krishnamurthy, J. Rolia, "Performance stress vectors and capacity planning for E-Commerce applications", Springer Berlin International Journal, ISSN 1432-5012, Volume 3, Number 4, May 2002, pp 309-315.
[24] Ziv N.D, "Toward a new paradigm of innovation on the mobile platform: redefining the roles of content providers, technology companies, and users", International Conference on Mobile Business, ICMB 2005, 11-13 Jul'2005, pp 152 - 158.
[25] Thomas M. Chen, "Trends in Viruses and Worms", The Internet Protocol Journal, Volume 6, Number 3, Sep' 2003.
[26] Fourati A, Ayed H.K.B, Kamoun F, Benzekri A, "Security issues of M-Commerce over hotspot networks", IEEE Wireless Communications and Networking Conference, WCNC'2004, Volume 2, 21-25 Mar'2004, pp: 837 – 838.
[27] Ji-Xaun, Janet Huges, "Analyzing Privacy and Security Issues in the Information Age - an Ethical Perspective", WSEAS Transactions on Information Science and Applications, Issue 1, Volume 6, January 2009, pp : 126-135, ISSN: 1790-0832.
[28] Sajjad Waheed, Mohammed Abul Hasan, "Cellular Mobile Telephone Operators' Role in M-Commerce", WSEAS Transactions on Communications, Issue 9, Volume 4, September 2005, ISSN 1109-2742, pp 943-947, http://www.wseas.org
[29] Ondřej Hynčica, Františ̌ek Zezulka, Petr Fiedle, "Wireless Standards for Mobile Platform" WSEAS Transactions on Communications, Issue 5, vol 4, May 2005, ISSN 1109-2742, pp 191-210, http://www.wseas.org