THE M-COMMERCE – A CATALYST FOR THE DEVELOPMENT AND INTEGRATION OF ROMANIA

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The mobile environment is very complex: there are several ways for the construction/ development of a wireless network, each approach requiring specific applications. Effective use of mobility involves simultaneous coverage of the real-time functionality plus an efficient "store-and-forward" system for transactions and queries/filters. There is lots of information to absorb. Globalization and tough competition require products and services developed at high-level standards on international markets. E-Commerce and M-Commerce operations can be complementary to traditional commercial activities. Certain industrial sectors are more suited to E/M-Commerce processes and naturally they are in a more advanced stage of development. The global evolution and market integration, compulsory requires that Romanian business media and public politics to follow the trends.

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Services for mobile users have grown rapidly and have contributed to changing the nature and purpose of communications. A main element of a "*Mobile Computing*" (teleprocessing system – wireless, ubiquitous, nomad) environment is the fact that the user is no longer required to adopt a stationary position in the network (access to personal/business information being granted to people moving into a various area). In general, the terms "*wireless*" and "*mobile*" are not synonymous. *Wireless* covers the method of transmission. The expanding area of cellular capabilities facilitates the development of integrated networks. The purpose for "*wireless*" becomes the geographic independence of processing. On certain market segments, wireless communications have registered significant progressions, thus stimulating developments in related fields (technical, regulatory, security, legal, business models).

The term "*Mobile Computing*" is focused on applications; it describes the ability to provide electronic data processing, regardless of the location of the user. Transfer options for "*Mobile Computing*" include a number of environments: infrared, cellular, compressed radio transmissions, microwave, satellite services. The goal for "*Mobile Computing*" is to provide freedom/autonomy in processing, users being able to connect to the network anywhere and at any time (picture 1).



Mobile users can be both consumers and providers of data¹³⁶. For example, the employee in the field can start a business-related activity by acquiring and forwarding orders from customers. The operation of the kind meets important business requirements: scaling down the manufacturing cycle, as well as increased flexibility in relation to the consumer. A relevant candidate for "*Mobile Computing*" conducts activities/businesses involving steps like: (frequent) transmission / reception of messages (E-mail) while travelling; (plentiful) checking / updating of information; real time access to company's software / databases. Each activity creates specific requirements in terms of technology, equipment and software.

The mobile environment is very complex: there are several ways for the construction/development of a wireless network, each approach requiring specific applications. Some configurations can be designed more for "*messaging*" than to support heavy-duty file transfers. In other cases, it is not intended for the wireless network to allow the conclusion of certain types of business. "Mobile Computing" requires new methods for network/information management based on (at least) two visible trends: the need to increase mobility, the possibility of a data management independently of location¹³⁷ (picture 2).



Mobility and portability create new markets and applications, combining the users of technology with "personal computing" capabilities. Vertical-type and niche "mobile computing" applications are already present - monitoring supply chains / distribution routes, points of retail. For mobile users there are also common applications E-mail oriented and information / data processing services. Network managers must evaluate technological alternatives (equipment / wireless services) depending on the profile of the target company. Users should have the freedom to

¹³⁶ Amy J.C. Trappey, Charles V. Trappey, Felix T.L. Lin, Automated silicon intellectual property trade using mobile agent technology; Robotics and Computer-Integrated Manufacturing; Volume 22, July 2006 137 Aungst, S.G.; Wilson, D.T., A primer for navigating the shoals of applying wireless technology to marketing problems. 2005; Journal of Business & Industrial Marketing

access people and information in accordance with the job requirements (by default, with the objectives of the company). In general, wireless systems are based either on radio waves (terrestrial or satellite) or on optical communications (infrared). The multitudes of mobile devices - with increasing performances - lead to a growing market of mobile communications, as well as to an enhanced commerce.

The Internet revolution has brought forward two major players: North America (USA) and Europe. Throughout the process, the U.S. showed readiness (speed) in adopting new rules and Internet technologies, while in some areas, the approach of (Western) Europe has been relatively conservative (limited to adopting US innovations). Mobile commerce is a chapter where the two players are close in terms of competitiveness. Europe has adopted a harmonised standard for digital mobile communications¹³⁸, working as true also for the phone generations¹³⁹. A single standard encourages mobile telecommunications (one can receive / make calls / data transfers in any European country), creating economies of scale for operators and service providers (who can sell products to a more numerous population)¹⁴⁰. The result of this policy was the rapid development of mobile technologies.

WiMAX¹⁴¹ success, especially in areas where other broadband Internet options are already implemented, will (largely) depend on the creation of new categories of services – custom-made access to broadband ("personal broadband"). Personalized access to broadband will not be restricted by geographical location (it will always accompany the user; the performances will be maintained, regardless of location). No restrictions to Internet services and sites visited by users will be engaged and it will be sufficiently "intelligent" to be "aware" of the location and the context/framework in which a user accesses a network and its applications¹⁴².

A greater dissemination of residential networks, an increased appreciation for mobile communications and for all types of digital content (voice, data, music, video) are elements contributing to increased demand for broadband connections. Companies take into account the portfolio of solutions for broadband access that provides mobility without interruption. In the future, the attempt to define categories on communications (voice, data, fixed, mobile) will disappear, and users will focus on technologies that offer the best opportunities to meet needs. Mobile broadband access will connect various areas, becoming more reliable and more affordable for ordinary consumers.

Be it the *triple play* (Internet access at high speed, television and telephone services), mobile VoIP services, mobile TV services¹⁴³ or converged fixed-mobile services, applications are becoming the main elements for the business models of service providers. Increasing need for high-speed connections and improvements in the quality of services (QoS / Quality of Service) constitute a good opportunity for WiMAX. Suppliers are trying to launch revenue generating

¹³⁸ GSM/Global System for Mobile Communication

^{139 (}standard) UMTS (Universal Mobile Telecommunications System; allows high speeds data transmission, a wide range of multimedia services)

¹⁴⁰ Balasubramanian, S.; Peterson, R.A.; Järvenpää, S.L., Exploring the implications of m-commerce for markets and marketing. 2002; Journal of the Academy of Marketing Science

¹⁴¹ WiMAX Forum (Worldwide Interoperability for Microwave Access) describes the broadband wireless Internet access technology as an alternative to the classical systems by cable or DSL

¹⁴² Kauffman, R.J., Techatassanasoontorn, A.A., Does one standard promote faster growth? An econometric analysis of the international diffusion of wireless technology

¹⁴³ expenditures in television services on mobile phone will exceed 6.6 billion USD, at international level, until 2012 (study conducted by Juniper Research and quoted by Mediabuyerplanner.com). According to the study, in 2012, television services on mobile phone might reach almost 120 million customers in over 40 countries. Advertising will be part of the income related to television services on mobile phone. It is estimated that the largest percentage of revenues for such services will come from subscriptions and "payper-view" facilities. The largest markets for television services on mobile phone will be, according to the study, U.S., Japan and Italy

services that will differentiate them from other competitors. If the satellite and cable TV operators can use the existing networks, the new entrants must find an effective way to consumers. A quick and economically viable way to become supplier of *triple play* services is the adoption of WiMAX, which allows an operator to provide, in reality, *quad play* (because any service provided can be fixed or mobile). A CATV operator can diversify his offer with the help of WiMAX, by adding high-speed Internet or VoIP telephony. Instead of these applications to be stationary (available only in certain locations), WiMAX allows the operator to make the services available to subscribers, regardless of their location (picture 3).

By using more frequent cellular services an already limited spectrum becomes crowded. Overpopulation may cause losses in quality due to calls blocked / lost, "cross talk" effects (unwelcome insertions during calls). The process of maximizing the use of the spectrum involves (among others): the creation of new services, reducing operating costs, e-commerce applications close to market evolutions. A solution may also be developing services for personal communications.

By building a wireless infrastructure, the mobile environment provides applications and services necessary to the user. Two important features also appear: remote communications and remote data access¹⁴⁴. Typically, real time communication systems required people to manage their activities around a pre-determined area (office, warehouse, point of sale etc.). By eliminating the space constraints, people can become more efficient, more creative, more flexible (qualities essential in the process of acquiring a competitive advantage). Using laptops (PDAs) in critical applications - sales automation, distribution, customer service - becomes a typical practice.

Wireless systems allow businesses to operate in real time, integrating mobile users into corporate information systems. Applications require independence from infrastructure and flexibility to support various communication protocols. Effective use of mobility involves simultaneous coverage of the real-time functionality plus an efficient "store-and-forward" system for transactions and queries/filters.

¹⁴⁴ Jiang-Liang Hou; Bird J. G. Chen, Mobile agent technology and application for online global logistic services; Industrial Management + Data Systems; 2004; ABI/INFORM Global



To compensate signal problems, modem manufacturers take action to equip cellular networks with equipments using advanced protocols for error correction. Wireless modems have evolved – integrated transceiver/receiver, portable and compact data modem. There are at least two market segments for cellular modems: industrial applications (including areas related to retail, storage, production facilities; the systems, at reasonable speeds, are used in general for data collection, facilitating the connection of hand-held devices to the corporate network); general applications (for higher speeds; the users of mobile computing requiring connectivity/mobility within the LAN; are used for transmitting/receiving E-mail, access to databases, file transmission) (picture 4).



There are (still) a number of barriers with respect to widespread adoption of mobile commerce. Thus, business models for mobile commerce are still evolving. Security can be a problem, and spam and unsolicited advertisements can create discontent. Legislation and regulations can play key-roles in the success of mobile commerce. Legislative developments should be adapted to the specific challenges of the mobile communications industry and to its unique needs. The lack of general standards affects the international expansion of mobile commerce. Sometimes, the lack of a global standard may seem useful: a focus on local needs will help (probably) technology to develop faster, but problems may occur with respect to *roaming* between different regions. Mobile commerce is developing at different speeds in different parts of the world (Japan and South Korea adopt new technologies on regular basis; mobile banking services can be popular in areas where conventional banking systems are not up to date).

In the context of mobile commerce, there is a wide variety of payment processes. In the case of telecom operators, the payment for mobile commerce services can be found on user's bill. Alternatively, payment may be made with a credit (debit) card, rechargeable devices such as "e / m-wallet" being also tested. For wireless access to services not provided by network operators, payments should be associated with accounts of debit/credit cards (picture 5). A main problem is authentication¹⁴⁵. In order the mobile transaction to work, it should be easier to use and a more reliable method than cash payments¹⁴⁶.

Mobile commerce security is a special problem, being subject of many technical and standardisation initiatives. The intention is to make mobile services - "*e-bill / e-wallet*" for online purchases - safer, more protected against viruses and software attacks. Platforms are built on strong security technologies, rigorously designed, spread over hardware and software architectures in order to define a trustworthy work environment, to protect the device / terminal during both booting and operations. Platforms take also corporate size. Mobile security is more than simply protection against new viruses and online attacks. It refers to protecting critical assets and information related to businesses.

The global and European environments represent real opportunities but they require an increase in competitiveness (from a local company). Entering new markets asks for a significant amount of flexibility and versatility in order to reach new targets of clients. Local companies will be able



to involve themselves in international transactions pending their ability to rapidly integrate and to make use of modern technologies. Electronics and communication technology provide an opportunity for small and medium-sized enterprises to compete globally on international (and regional) markets as well as to look for global partners.

¹⁴⁵ Ksi-opolski, Bogdan, Kotulski, Zbigniew, Adaptable security mechanism for dynamic environments, Computers & Security, Amsterdam: May 2007, Vol. 26, Iss. 3

¹⁴⁶ Kohli, Rajiv; Susan A. Sherer; Ayelet Baron, Editorial--IT Investment Payoff in E-Business Environments: Research Issues; Information Systems Frontiers; Sep 2003; ABI/INFORM Global

E-Business can be a very rewarding venture, but it should not be undertaken lightly. There are lots of information to absorb. Globalization and tough competition require products and services developed at high-level standards on international markets. E-Commerce and M-Commerce operations can be complementary to traditional commercial activities (a company can use the Internet to sell "conventional" products, delivered by "conventional" means, due to a contact or contract run via the Net). In certain cases, M-Commerce and E-Commerce could encompass a distinct commercial undertaking when selling and delivering digital products over the Net. Certain industrial sectors are more suited to E/M-Commerce processes and naturally they are in a more advanced stage of development.

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