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**AN ANALYSIS OF CONSUMERS' NEEDS AND  
ATTITUDES TOWARD MOBILE COMMERCE  
SERVICES**

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STJEPAN UDOVIČIĆ

## **IZJAVA**

Študent Stjepan Udovičić zagotavljam, da sem avtor tega magistrskega dela, ki sem ga napisal pod mentorstvom doc. dr. Irene Vide in skladno s 1. odstavkom 21. člena Zakona o avtorskih in sorodnih pravicah dovolim objavo magistrskega dela na fakultetnih spletnih straneh.

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## List of Abbreviations:

<b>ADSL</b>	asymmetric digital subscriber line
<b>AMPS</b>	advanced mobile phone service
<b>ARPU</b>	average revenue per user
<b>BI</b>	business intelligence
<b>CRM</b>	customer relationship management
<b>DIAL UP</b>	way of connecting to the Internet using a modem and the telephone line
<b>DoS</b>	denial of service
<b>DW</b>	data warehouse/data warehousing
<b>EC</b>	electronic commerce
<b>EDGE</b>	enhanced data rates for global evolution
<b>ERP</b>	enterprise resource planning
<b>GPRS</b>	general packet radio service
<b>HTML</b>	hypertext markup language
<b>IP</b>	Internet protocol
<b>IPTV</b>	Internet protocol TV
<b>LLU</b>	local loop unbundling
<b>MC</b>	mobile commerce
<b>ME</b>	mobile entertainment
<b>MNI</b>	mobile network interconnection
<b>MNO</b>	mobile network operator, wireless network operator
<b>MNP</b>	mobile number portability
<b>MPAY</b>	mobile payment
<b>PDA</b>	personal digital assistant
<b>PIN</b>	personal identification number
<b>PPP</b>	purchasing power parity
<b>PPS</b>	purchasing power standard
<b>PSTN</b>	public switched telephone network
<b>SCM</b>	supply chain management
<b>SIM</b>	subscriber identity module
<b>SOHO</b>	small office - home office company
<b>TAM</b>	technology acceptance model
<b>TCP/IP</b>	transmission control protocol/Internet protocol
<b>UMTS</b>	universal mobile telecommunications system
<b>USO</b>	universal service obligation
<b>VAS</b>	value added service
<b>VDSL</b>	very high bandwidth DSL
<b>VOD</b>	video on demand
<b>VWS</b>	wireless voice service
<b>WAP</b>	wireless application protocol



**WML** wireless markup language  
**3G** third generation networks

## **1. Introduction**

The main features of mobile commerce are saving time, varying locations, mobility and convenience (Venkatesh et al, 2003). Devices and services that are based on wireless network technologies are currently commonplace in our daily practice (Balasubramanian et al., 2002). According to Green et al. (2002), mobile devices and services that will be in the market in the near future hold the potential to transform patterns of information consumption and communication in our everyday life. This might unleash the enormous revenue capacity for participants in the wireless telecommunications value chain. In order for that capacity to be set free, mobile commerce services and accompanying hardware devices (handhelds, cell phones, and personal digital assistants) should be widely adopted by consumers in the mass market. Before mass marketing these devices and services, investors will appraise the value and potential benefits provided to consumers. This is relevant since these services are only as superior as is their ability to fulfill needs of consumers (Porter, 1985). It is therefore a necessity for marketers to identify and understand consumers' needs, wants, attitudes and behavioral intentions towards such innovative - mobile commerce and other wireless solutions (Nohria & Leetsma, 2002; Barnes, 2002). The necessity to collect data on consumer behavior with regards to mobile commerce services is even more important in a cross-cultural context, i.e. when these mobile services are expected to meet and exceed expectations of a consumer in different cultures. In wireless telecommunications this necessity often does exist. Marketers and developers of wireless services targeted for cross national markets should balance the need for service standardization (due to economies of scale) and the need for adaptation to local tastes and preferences. This means that they should identify those mobile service elements that will be consistent across cultures and those that will be unique to each culture (Smith and Reynolds, 2001).

The research area of this document is business (business to business) and residential (business to consumer) marketing of wireless telecommunications services. The focus is on the specific region of marketing in wireless telecommunications business - the mobile commerce. The scope of the text includes the analysis of residential and business consumer needs and attitudes related to existing and some potential mobile commerce services. The scope of this thesis does not include discussion about the current technical platforms, their specifications and abilities in terms of technological performance.

### **1.1 Rationale for the research**

Wireless telecommunications services have reached the mass market. As a consequence of the increased competition in that market, price erosion of wireless voice service is seen in the most of Europe. The common understanding throughout the wireless telecommunication industry is that in a few years, prices of wireless voice services will

decrease significantly. These prices will reach the level just above their wire line counterparts (Harris et al., 2005). From the standpoint of a wireless operator, it is important to become aware of this trend since currently wireless voice service is the most relevant one on the criteria: “revenue per service type”. This actuality is a timely signal for wireless operators to start searching for new revenue streams. Engaging in mobile commerce activities is one of the possible pathways to consider for the future. Some authors mention it as the only one possible (Grami and Shell, 2001).

There exists an uncertainty regarding how well defined consumer needs for mobile commerce services are (BCG, 2000). This insecurity is also related to consumer attitudes and with regards to mobile way of executing commerce (mobile acquisition of goods and services). This is why the objective of this paper is to analyze needs and attitudes of consumers toward mobile commerce services and solutions. The standpoint of the thesis is that the primary purpose of mobile commerce is to a) make the handling of certain processes more valuable for a consumer and b) satisfy other needs of a consumer. If the aforementioned is taken as appropriate, mobile commerce services should have at least some practical application. Mentioned practical application is contained in mobile commerce services’ specific attributes that make them appropriate for satisfying certain consumer needs (delivery of a good or a service) or making handling of certain processes more valuable to a residential or a business entity. Figure 1 suggests that consumer needs for mobile commerce services can be:

- a) Existing - visible,
- b) Existing - latent,
- c) Neither visible nor latent.

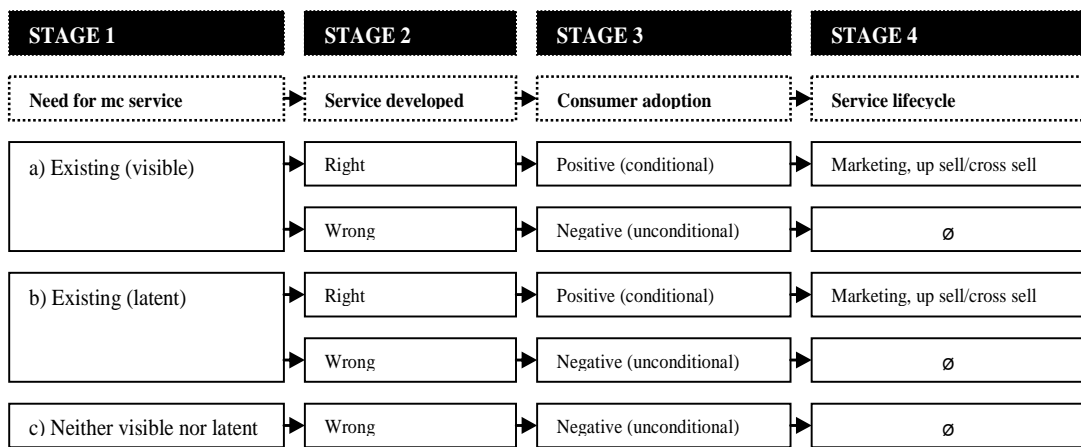
In practice it is occasionally the case that consumer needs for offered mobile commerce products and services do not exist as suggested above under c). As it is displayed in Figure 1, some mobile commerce services offered in the market are indeed developed without detailed insight into needs of consumers and are as such more centered on technology and its capabilities. The fit with the aforementioned needs is then hardly achievable. The final outcome is that those services often do not live up to the challenge of being massively adopted by consumers. In that scenario, those services are rather experienced by a consumer once or twice, rejected and are hence the representatives of the wrong<sup>1</sup> services in terms of their acceptance from consumers in the mass market. Misfit with consumer needs is therefore one of the reasons why mobile commerce services and solutions sometimes fail to be adopted by consumers (Lee et al, 2003). Examined from a different angle, when consumer needs for mobile commerce services do exist (as a visible or a latent phenomenon) it is not always the case that the properties of a mobile commerce service that is developed meet those needs appropriately. As displayed in Figure 1 these are again referred to as the wrong

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<sup>1</sup> Expressions “*right/wrong* services” are here used only to describe the case in a more plastic manner.

services i.e. services that are developed based on some knowledge of consumer needs but, because of their specific attributes, do not exactly meet those needs. As explained before, this occurs despite the fact that consumer needs do exist in latent or clearly visible form. A good example for this is the wireless payment<sup>2</sup> service that is currently available in Croatia. It is designed to enable a consumer with an interface for quick and convenient, cashless payment via a mobile phone and it is available with affiliated partner companies. Despite its enormous market potential and the technical excellence, it did not meet a positive consumer response. On the other side however, due to the existence of credit cards that are well adopted by consumers globally, no one can seriously argue that there is no consumer need for quick, cashless payments. Hence,

**Figure 1:** Factors conditioning success of mobile commerce services



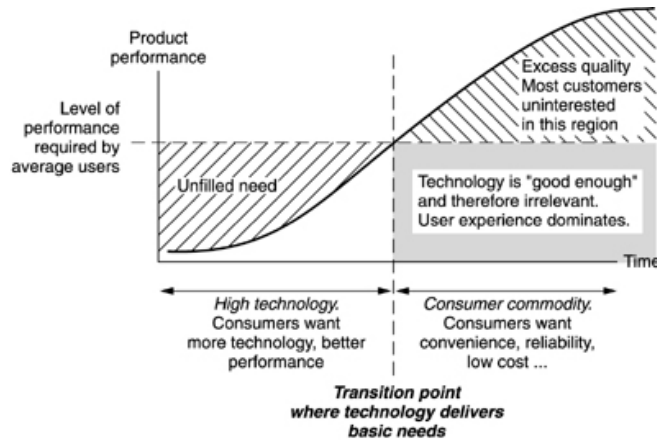
something obviously was erroneous with this particular service and it was apparently not the right one with regards to its ability to meet the needs of consumers appropriately. In Figure 1 a different case scenario is also suggested. Namely, when consumer needs do exist and the right service has been deployed, it is still conditional whether that particular service is going to be marketed, developed further on and, finally, widely adopted by consumers. Factors such as usability, simplicity, usefulness, market education and effective market communication are of key importance then. All these are the conditions that have to be met in order for a service to be widely adopted. The mentioned circumstances will be discussed in the further text.

With regards to consumer adoption of mobile commerce services, another reason for the aforementioned occurrence is product lifecycle per se (Norman, 1998). In its early days, a technology cannot meet all the needs of its customers. Leading-edge adopters, the early adopters, need the technology and are willing to bear both inconvenience and high cost to get it. Meanwhile, they keep demanding enhanced technology and greater performance. With time, the technology matures, offering better performance, lower price, and higher reliability becoming eligible to satisfy consumer needs in the mass market. These phases are shown in Figure 2. Note that when the technology exceeds the basic needs of most of its customers, we are at the transition point. In Figure 2 it is

<sup>2</sup> mPay is available in Croatia and it enables a consumer to pay for goods and services with a mobile phone.

suggested that new technologies start out at the bottom left of the curve, delivering less than the customers require. As a result, customers demand better technology and more features, regardless of the cost or inconvenience.

**Figure 2:** The needs-satisfaction curve of a technology.

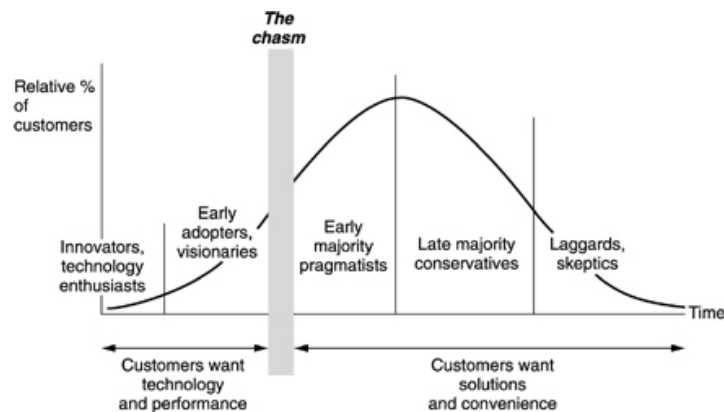


**Source:** Norman, 1998

Additional theory rationalizing the current state in the mobile commerce market is Moore’s (1999) theory of the Chasm. This theory is explained in Figure 3. In the early days, the innovators and technology enthusiasts drive the market; they demand technology (Moore, 1999). In the later days, the pragmatists and conservatives dominate; they want solutions and convenience. Note that although innovators and early adopters drive the technology markets, the groups represent only a small percentage of the market; the pragmatists and the conservatives represent the “big” market. In wireless telecommunication the aforementioned theory can be applied to the following services:

- wireless voice and short message service market: after the *Chasm* (on the right)
- market for mobile commerce services and solutions - before the *Chasm* (on the left)

**Figure 3:** The change in customers as a technology matures



**Source:** Moore, 1999

Despite of the uncertainties that were expressed in the text above, the benefits of mobile commerce services have already been recognized by consumers. This is true in case of many other mobile commerce services. Mentioned right mobile commerce services will be addressed in the further text.

Finally, the rationale for this research affirms that it is important to know more about consumer needs and attitudes regarding mobile commerce before services of such type are developed and pushed in the market. Regarding needs and attitudes for mobile commerce in Croatia, currently we can only discuss the existence of indistinguishable consumer needs and generally mixed consumer attitudes. By describing consumer needs and attitudes related to mobile commerce we can increase the probability that the right services are offered to the right market segments that differ by their needs (i.e. so as the right needs of market segments are addressed by services with the right properties).

#### Research assumptions

This research is based on four important assumptions. Firstly, it is taken as valid that a fit between a value proposition one wireless telecommunications product or a service offers and what a consumer needs determines market success of that product or service (James et al, 2002). Here it is implied that a person recognizes what one needs and that these needs can be accommodated by certain stimuli from the environment. Secondly, it is assumed that attitudes are an important driver of human behavior (Chiou, 1998). This assumption is crucial for its extension, the third relevant postulation. It presupposes that the behavior can be changed if a related attitude is altered (Fishbein & Ajzen, 1975). The fourth assumption for this research is twofold, and is the essence of what will be argued throughout its theoretical framework and the empirical part. It is assumed that a) consumers are inclined toward saving time and shortening certain repetitive everyday processes. The processes in question are usually conducted to achieve certain outcomes which are everyday necessities. Often, those processes have a more valuable alternative for a consumer (process: waiting in bank cue → alternative process: doing ones banking somewhere else and at time that suits one the most). Consumers perceive this savings in time valuable. It is regarding mentioned processes where mobile commerce services hold massive potential in terms of change and added value. In extension to residential and business consumers' perceptions of time savings, it is also assumed that b) business consumers recognize a need to always improve their customer service level, improve the efficiency and speed up the decision making as well as increase sales volumes and profits. Since mentioned is the indispensable condition for business entities to stay in the market, mobile commerce services for businesses will be examined in that direction further on.

Within this document, the four previously mentioned assumptions are considered crucial regarding mobile commerce adoption by consumers. These assumptions are

important also because of a) current low adoption rate of mobile commerce services and b) the need to discover ways to stimulate the adoption. On the other hand - above mentioned assumptions are essential because of the enormous potential of mobile commerce services and solutions. This capacity is reflected in two important attributes of mobile commerce: unconstrained mobility and potential for unimpeded personalization. If the above claims are acceptable, it can be concluded that knowledge about consumer needs regarding mobile commerce conditions successful development of new mobile commerce services. Additionally, the analysis of consumer attitudes regarding mobile commerce is crucial in order to alter them. Together, knowledge about consumer needs and attitudes regarding mobile commerce from a marketers' point of view addresses the question: which service to offer for the best fit to consumer needs and consequently, how to contribute to data portion of the average revenue per user (ARPU)? From a service developer's perspective the question addressed is: what are the concrete specifications of a service that needs to be developed in order for it to be successful in the market?

## 1.2 Problem of the research

Many authors argue that mobile commerce with its value added propositions might be the answer for sustainable profitability of wireless operators (Okazaki, 2005). This is however under a fierce and ongoing debate since the term mobile commerce as a wireless business area has not yet reached a global understanding. It is still questionable on the global stage which services to initially offer, how to carry out billing and which market segments to first target. The problem with mobile commerce research is the general lack of standards and understanding in terms of concepts and theories (Okazaki, 2005).

This thesis aspires to provide answers to some important questions which are currently often raised within the industry. Firstly, what should compensate for the decrease in average revenue per user (ARPU) that was triggered by maturity stage of wireless voice service? It will be argued further that alternatives to wireless voice service unquestionably do exist. However, solving the problem regarding mobile commerce as an alternative lies in answering the following questions: a) what are the types of consumer needs that hold the potential to be addressed best via means of mobile commerce and b) what are the types of services that hold the best properties to address mentioned consumer needs appropriately. Hence, in simple terms - which are the mobile commerce services that would address consumer needs the best and could be charged in a way that average revenue per user is maximized? Further on, solving the dilemma of this thesis implies evaluating the value that Croatian consumers perceive with regards to existing mobile commerce propositions in the market and identifying which are the potential mobile commerce services and solutions that can deliver a unique and sustainable value to a consumer. After addressing aforementioned questions, the problem still persists with screening the more or less favorable attitudes (behavioral influencers) that contribute to consumer adoption of mobile commerce

services and, because of that, influence consumer demand. Answers to problem questions addressed above will provide a basis for recommending broad and concrete alternatives to current wireless voice service and text SMS centricity, providing guidelines for mobile commerce market approach strategy.

### 1.3 Objectives of the research

The widespread availability of mobile phones that can handle digital data and that are connected to digital communications infrastructure means that the scene is set for the widespread adoption of mobile commerce (Balasubramanian et al., 2002). Despite that fact the development of mobile commerce has been rather slow in Europe and across the globe. Researchers suggest various reasons for the delay in consumer adoption process and opinions of different researchers are dissimilar. The majority of authors are however clear in one point: perception of consumers is that the most of mobile commerce services are expensive, poor with regards to service quality and unsatisfactory in terms of their user interface (Jarvenpaa et al, 2003). What does this mean? Firstly, consumers do not perceive that sufficient value has been delivered for the amount of money paid for a mobile commerce service. Secondly consumers do not perceive that these services satisfy their needs with respect to quality and user experience (Pedersen and Methlie, 2003). The third important reason is the fact that a whole mobile commerce concept is quite new and technologically very intense. Because of that fact it is fairly unappealing to a large portion of the market. Namely, mobile commerce propositions still imply significant complexity of usage (Rukzio et al, 2005). That fact surely is repelling and additionally extends the time of consumer reluctance with regards to adoption of such services. Examined from the side of a service developer, the reason why the achieved popularization of mobile commerce services has not met the initial hype lays in the following: the same as in case of electronic commerce, developers and service providers believed that with regards to this innovative way of doing business - everything will run smoothly and problems with consumer adoption will not take place (Durlacher research, 2002). The market showed however that this line of reasoning was flawed in the case of electronic commerce and the same outcome is now visible in case of its wireless variant. The factual proof of this statement is uncomplicated to derive: numerous quantitative forecasts regarding mobile commerce services popularization published just a year or two ago today are incorrect. Again, as in examples of some other, tangible consumer goods, it was realized that growth can come only from services that deliver superior value to a consumer. Therefore, every forecast regarding mobile commerce that excludes solutions concerning consumer adoption and consumer value is at the least unrealistic. There are nonetheless signs which indicate that the mobile commerce concept is resulting in growth. The research conducted in Western Europe found that consumer interest in mobile commerce and mobile payments in specific increased from 23% in 2001 to 39% in 2003 (Strategy Analytics, 2004). The research prepared by ATKearney (2004) suggests that the worldwide use of mobile phones for payments grew from 3% of the respondents in 2003 to 10% in 2004.



**The objective of this research is to produce recommendations in terms of the residential and business market strategy with regards to mobile commerce.**

The specific objectives of this research thesis include analysis of the existing literature and establishment of a working definition of mobile commerce, relevant consumer and business needs and attitudes. Also the objective is to analyse the current state of mobile commerce in the market and identify the constraints and challenges related to it. Based on the empirical study of consumer needs and attitudes regarding mobile commerce in Croatia, this document also has the objective to analyze needs and attitudes of residential and business consumers toward (potential) services delivered via means of mobile commerce. As a final product this thesis will provide relevant discussion, conclusions, recommendations and managerial implications regarding development of the mobile commerce strategy for the future.

#### 1.4 Overview of the research

This research has three main parts: I) Theoretical framework, II) Empirical research and III) Discussion and conclusions including recommendations and managerial implications.

In the theoretical framework field of research is defined by description of mobile commerce and its uniqueness as an area of wireless telecommunications business. Differences between the wireless voice service, as a main current driver of wireless telecommunications business, and mobile commerce are then recognized. At that point it is established that these business areas are by no means the same and that the technologies, business models and consumer expectations related to them are indeed tremendously different. Following to that overlaps, differences and similarities between the mobile commerce and electronic commerce are documented. There it is noted that as with the wireless voice service, the dissimilarities between mobile commerce and electronic commerce do exist and that they are noteworthy. Subsequent to that, the theoretical part steers toward definitions of residential and business consumer needs in general. Developing from the above mentioned the theoretical framework of needs common to both residential and business consumers and relevant to the field of mobile commerce is presented. Both residential and business consumer needs related to swift access to information, the need to save time, need for convenience and need for security during mobile commerce transactions are then addressed. After that the needs that are specific for business consumers and related to mobile commerce are explored. These needs are identified as: - continuous improvement of customer service and - improvement of the efficiency, the sales performance and speeding up of the decision making. Subsequently, the part where mobile commerce relevant needs of both business and residential part are theoretically acknowledged, differences between needs for mobile commerce of the two main consumer sub segments, residential and business consumers, are approved. With

that comparison theoretical framework for consumer needs is closed. After needs, theoretical framework for consumer attitudes is set. Firstly, attitudes are defined as a general phenomenon. Following to that theoretical framework for attitudes common to both residential and business consumers and relevant to the field of mobile commerce is obtained. Attitudes explored in this part are ones related to mobile commerce in terms of price, security, consumers' fear of new wireless information technology and doubts related to its usefulness, simplicity and convenience of mobile commerce applications as well as wireless entertainment and leisure. Subsequent to that, specific attitudes of business consumers are examined and in particular related to attitudes toward mobile commerce applications and services providing business intelligence and timely, business related information, stock market information and mobile commerce banking services. As a sub part of the theoretical framework a special section is then dealing with mobile commerce usability in terms of hardware constraints (wireless devices and handhelds) as well as challenges related to mobile context. Usability part is followed by overview of the market for wireless telecommunications in Western Europe, the Central and Eastern Europe and Croatia. There, mobile commerce potential is shortly evaluated with regards to the wealth of a national economy and in example of Croatia in specific. All findings related to above mentioned topics are then summarized in the theoretical research - chapter summary.

In the part containing analysis of needs and attitudes toward mobile commerce services of Croatian consumers based on empirical data, firstly data collection methods are described and that is followed by description of the questionnaire, its content and target of respondents. In the empirical research it is then continued with a description of the population in the overall sample and the two sub samples: residential and business. Following to that the data analysis part is presented where the structure follows what was presented in the theoretical framework: → analysis of needs common to both residential and business respondents (need for swift information access and wireless e-mail service; the need to save time and the need for convenience) → analysis of needs specific for business respondents only (the need to improve customer service; the need to improve efficiency of business operations, increase sales performance and speed up the decision making). After needs, analysis of attitudes is completed. Attitudes common to both residential and business respondents and relevant for mobile commerce are analyzed: prices, wireless Internet, parking and ticketing services, security, fear of new information technology and doubts regarding its usefulness, simplicity, convenience and wireless entertainment and leisure. Following the framework set in the theoretical part attitudes of business entities are addressed thereafter. Mentioned analysis is followed by summary of empirical research.

In the final part discussion and conclusions, recommendations and managerial implications are presented, main findings are discussed, final conclusions are made and recommendations and managerial implications are deducted.

## **2. Theoretical framework**

There exist three key terms that should be theoretically defined in this document: electronic business, consumer needs and consumer attitudes. For the purpose of clarity, the mentioned key terms will be first set in the framework relevant for the research. This will be done by describing the key terms, clarifying their boundaries and identifying the overlaps among them. Firstly, observable differences between electronic business, electronic commerce and mobile commerce will be explored. Following to that, presentation of differences between traditional wireless voice and mobile commerce services will be conducted. Definitions and discussion on the subject of needs of residential and business consumers in general and related to mobile commerce services and solutions will follow. Subsequently, enlightenment of mobile commerce needs that are specific for business entities will be provided. Differences in needs for mobile commerce services between residential and business consumers will be identified next. Following to that, attitudes of residential and business consumers will be described in general. The focus will then steer toward the description of residential and business consumers' attitudes toward mobile commerce services. Subsequently, assumptions and theories concerning specific business attitudes toward mobile commerce services will be presented. As a part of theoretical framework, succeeding part will deal with the usability of mobile commerce applications and solutions, hardware constraints and challenges related to context. Finally, the macro environment with regards to wireless telecommunications market in Europe, the CEE and Croatia will be described.

### **2.1 What is mobile commerce?**

By many definitions mobile commerce is a subgroup of electronic business. Its development was naturally triggered by the change and the improvement of technology when electronic commerce extended its reach to wireless phones, devices, and handhelds (Eurescom, 2002). Electronic business (EB) however concerns using electronic means to conduct an organizations' business internally or externally (Jelassi & Enders, 2005). The electronic commerce (EC) can be defined as a subset of EB. It assumes the facilitation of the transactions and selling of the services and products online, via the Internet or other telecommunication network (Barnes, 2002). Seen from a different angle, EC is any kind of business transaction, in the course of which the transaction partners employ electronic means of communication, may it be for initiation, arrangement or realization of performance (Kreyer et al, 2002). On the other hand the mobile commerce (MC) is a subset of these two (EB and EC), both in business to business and business to consumer channel with one important difference: at least one side in this interaction uses wireless telecommunication technologies (Ho and Kwok, 2003). It has to be mentioned that mobile commerce assumes mainly data services (non-voice originated services). Nevertheless that in reality it is a data service; standard person to person short message service (SMS) will not be considered a mobile commerce service by this research. In its report Durlacher's research (2003) refers to

MC as any transaction that is conducted via a mobile telecommunication network and which has a monetary value. Another view on MC is that it is a subset of EC. It includes a scope of activities similar to EC. The underlying technology, however, is different since MC is limited to the wireless telecommunication networks which are accessed by consumers using their wireless handheld devices, wireless phones and PDAs (Jelassi and Enders, 2005). MC is a consequence of a technology change, a convergence of the EC but with one distinctive consumer benefit - absolutely unconstrained mobility and the unimpeded potential for personalization (Angermann et al, 2001). This means that a person can access the wireless Internet using ones mobile phone and access filtered information relevant for him/her only regardless to ones' current geographical position. So, in mobile commerce environment there is no real need to be attached to the home-desktop computer. Any online work can be done from any location. Nonetheless, the previous statement is still subject to the following conditions: a) one has to own a mobile phone; b) one is located within a footprint of a wireless telecommunications network. It is even so vital to point out that maybe the most important difference between EC and MC it is not of a pure technical nature. Mentioned diversity is best articulated by the simple paradigm:  $M \neq E$ . The suggestion from this inequality is that MC is not identical as EC. Wireless Internet is not the same as the Internet (desktop Internet) that the mass market is acquainted with. This is because devices and the user interface of the wireless Internet offer significantly different experience in comparison with the Internet (desktop/laptop Internet). A wireless Internet user interface implies smaller keypads and screens sizes, different layout of the content that is displayed, much more brief information (due to limited screen size), scarce design and significantly divergent navigation rules. Therefore, the  $M \neq E$  paradigm suggests that due to their significant dissimilarities, there exists two parallel terms that need to be understood and, as such, looked upon separately - the wireless Internet and the Internet (desktop/laptop Internet). M-commerce presents some unique characteristics and features that can provide customers with added value in terms of benefits such as: anytime and anywhere access, the capability to pinpoint mobile devices' locations for personalization and localization and the functionality to access information at the point of need (Tang & Veijalainen, 2001; Siau et al, 2001). Related to what was mentioned above, Sadeh (2002) notes that MC assumes providing of wireless Internet services to consumers. Leung et al (2003) find that MC can be considered the second technological innovation in the wake of EC. It is an extension of the Internet connected to the desktop computers to wireless devices in a somewhat different environment. As a term that is going to be used throughout this research; mobile commerce is any kind of transaction with a monetary value for which an order and payment are administered over a wireless telecommunications network.

As it is noted in Table 1, wireless operators throughout the globe recognize mobile commerce as the next field for development and growth of their businesses. Most of them already have their expectations set regarding desired margins in MC transactions. As it is displayed in Table 1, those are particularly high in the case of insurance,

gambling and event/transport ticketing. The aforementioned expectations are fairly explicable since no one really doubts the existence of consumer needs for the mentioned services. This is so since those services are moderately established and, in terms of existence of consumer needs, carry relatively low amount of risk. So, needs for these services undoubtedly exist<sup>3</sup> that is an important factor that shaped the discussed expectations described in Table 1. It is interesting to note, all the services listed in Table 1, except perchance gambling, are not the activities of leisure but a pure everyday necessity. Related to the user-consumption process of listed services, in order for desired effect to take place certain action has to be accomplished from side of consumer. For example when (1) the desired effect is transportation from point A to point B, transportation ticket purchasing process has to be conducted. In a situation when (2) the desired effect is minimization of risk implied by an uncertain future - administrative process of insurance purchasing has to be completed. These actions are often long lasting and unpleasant for an average person. A person most frequently considers them worth doing only because of their final outcome. From the previously mentioned examples that outcome is (1) transportation from point A to point B and (2) minimization of risk implied by an uncertain future. Using the mobile commerce applications to shorten the mentioned processes and make them more pleasant to handle is potentially very beneficial for a mass market consumer. Mentioned represents the potential for development of mobile commerce services that could be charged a premium.

The fact that an average margin expectation of wireless operators is 171% higher than the expectations of banks (in Table 1: 4.41% for wireless operators compared to 1.63% for banks) and 12% higher than those of the other players in the value chain (in Table 1: 4.41% for wireless operators compared to 3.94% for other players in the value chain) is fairly natural. Why? Wireless operators are acquainted with this business and rely strongly on their established knowledge about relations with their existing postpaid and prepaid customers. These relations are maintained through customer billing, contractual affairs, promotional offers, customer relationship management and loyalty schemes as well as via community services, value added services and other

**Table 1:** Mobile commerce services: margin expectations of wireless operators

	Shop	Money transfer	Vending	Ticket. Events	Ticket. Transport	Gambling	Insurance	AVG
MNOs	2.40%	2.60%	3.60%	4.50%	4.60%	6.30%	6.90%	<b>4.41%</b>
Bank	1.50%	1.90%	1.50%	1.50%	1.50%	1.50%	2.00%	<b>1.63%</b>
Other	3.10%	2.50%	4.90%	4.10%	4.50%	4.00%	4.50%	<b>3.94%</b>

Source: Arthur D. Little Consultants, 2003

related marketing activities. Wireless operators are fairly confident in the existence of a business case for added value MC activities such as insurance, gambling and transport ticketing. Of course, the prerequisite for achieving that is that such services, offered via a mobile phone, provide superior value to a consumer (superior to situations when same services are offered in the conventional way → selling of the services from

<sup>3</sup> Refer to Figure 1, *Factors conditioning success of mobile commerce services.*

stands and over the counter). It seems that for the mentioned services it is the case. For example, the established process in the example of buying a cinema ticket usually implies: a) walking or driving to a cinema venue (e.g. 15 minutes), b) walking to a ticket stand in a cinema (e.g. 5 minutes), c) waiting in a cue (e.g. 10 minutes), d) purchasing a ticket if there are any left (e.g. 5 minutes with a risk of finding out no tickets were available). Therefore, the entire process potentially consumes a total of 35 minutes, and there exists a risk that no tickets will be available. The mobile alternative might be the following: a) checking for ticket availability using a mobile phone (e.g. 3 minutes), b) in case of ticket availability, buying tickets for desired show (e.g. 1 minute), c) walking or driving to a cinema venue (e.g. 15 minutes), e) no risk that tickets will be sold out. Therefore, the whole process potentially consumes a total of 19 minutes in time and the risk that no tickets will be available is eliminated. The total gain in time (consumer added value) in this example is 16 minutes of free time and neutralization of the risk that all tickets will be sold out. More wireless operators are looking into mobile commerce opportunities daily (Sadeh, 2002). This is so because mobile commerce promises a great future. This future will be driven by its unique features (Cane, 2000; Southward, 2001; Siau et. al. 2001; Sharma & Deng, 2002) not available in traditional e-commerce, thus providing added value and benefits to mobile commerce users. These features include ubiquity, personalization, flexibility, and localization.

## 2.2 Voice Service and the Mobile Commerce: two different game fields?

For the last decade, wireless telecommunications companies' traditional core business was providing to consumers wireless voice services (WVS) and short message services (SMS). The fast liberalization of markets in Western and Central Europe increased the competitive pressure in those markets. Because of that fact, numerous wireless telecommunications companies encountered a necessity to innovate and stretch their service portfolio more into data based services since WVS and SMS revenue shares started to reduce rapidly. Demanding data services required improved network capacities. Knowing this fact wireless telecommunications companies upgraded their networks to enable the transfer of packet data; firstly to basic 2,5G - general packet radio service (GPRS) and shortly after that to enhanced data rates for global evolution (EDGE). Following to that, wireless telecommunication companies upgraded their networks to third generation (3G) - universal mobile telecommunications system (UMTS), which is currently the technology covering the majority of the residential areas in the Western and Central Europe.

The difference between the traditional WVS and services from MC portfolio is in the key operating concepts of these services. Firstly, the WVS has been developed and it is mainly used for communication between two or more people through a radio network on a specific frequency. Thus, in case of WVS people interact with each other using voice service the same as in case of the traditional wire line telephone network (PSTN). On the other hand, Skiba et al (2000) note that the concept of MC most frequently assumes communication of a person with a machine or even a machine to

machine (M2M). When trying to visualize this first relevant difference between WVS and MC the simplest concept to think about is wireless parking service which is offered in most of the countries in Europe. In basic terms wireless parking business model includes a consumer, a mobile phone and a machine platform that takes care of processing and billing for parking place rental. After the service is delivered, a consumer is invoiced for it via the mobile phone bill. Upon payment, wireless operator forwards the amount to the service provider (parking company) after it has cut its share of the revenue as a commission for providing the wireless network infrastructure. In general, the same concept is valid for most of the services based on third party partnerships.

Secondly, the relevant difference is in the area of billing as well as the operating logic for WVS and MC. The billing for voice is still mostly done using the time charge as an accounting model. Time equals seconds, blocks of seconds or minutes. By this model a consumer pays for the amount of time one spends on air talking (Sadeh, 2002). On the other hand, any form of data (MC) service is usually charged by the amount of data transferred measured in Bytes<sup>4</sup>. The reason for this is that within the circuit switched voice transmission, an actual physical connection is dedicated and obtained for the time while two persons communicate with each other<sup>5</sup> (Sadeh, 2002). This dedication of a physical line means that the technical resource is fully occupied for the time of usage. For that period of time, the resource can not be used by some other party since time division multiple access (TDMA) slot is reserved no matter whether it is actually<sup>6</sup> used for any communication or not. Hence, the only reasonable billing in the case mentioned is time based. Circuit switched voice connection also assumes connection setup time and connection termination time. This time is approximately 15-30 seconds. On the other hand, the term packet switched transmission which is most often related to MC represents the type of a network where relatively small units of data called packets are routed through the grid led by the destination address contained within each packet. Breaking communication into packages, which is an important mobile commerce operating concept, enables all the users from the network to share the given resources. As suggested in Table 2, this type of connection is essentially known as

**Table 2:** Packet switching versus circuit switching data traffic

Packet switching	Circuit switching
Efficient for short - to large burst transactions	Good for very large transmissions (e.g. 1 Mb file)
Call setup and termination are almost immediate	Delay in call setup and termination exists
Carries broadcast capabilities	Enables point to point connection
One logon at power up	Logon for every transmission
Air link is generally secure	Air link is not secure

**Source:** Wireless data services, Sharma and Nakamura, 2003, pp.103

connectionless since users are always connected and it is appropriate for short to large

<sup>4</sup> Data quantity unit used is Kilobyte (kB) which equals 1024 bytes. "Block rounding" simplifies billing in a way that customers are charged for blocks of kilobytes. Usually, rounding is done at 10 kB.

<sup>5</sup> Example: ordinary - wire line telephone is still most often circuit switched.

<sup>6</sup> Just a sole fact that a number is dialled and connection is established means that resource is occupied and it cannot be used by others during that time.

burst transactions (Hutchinson Encyclopedia, 2006). The connection can not be fully occupied (Li and Qin, 1998) and there is no time spent for connection setup and its termination. The process of establishing a connection is immediate and both short and large-burst transactions are feasible (Table 2). The network resources are shared between all users that are logged in. This is a very important operating concept for MC. Because of that concept the amount of data transferred as a basis for the billing of customers has shown to be more appropriate than above mentioned time based model.

For the better understanding it is worth to mention that broadband - wire line desktop Internet is basically a connectionless network and, in concept, works on a same principle<sup>7</sup>. The charge criterion most often is the amount of traffic. It is also an imperative to note that with packet switched networks we are discussing always on connections which are neither subject to a time charge accounting model for billing nor to a connection setup time. These properties imply enormous freedom, convenience, and usage affordability for a consumer. Additional properties of such networks are broadcast capabilities, only one logon at the start of the session and air link security (Table 2). There are numerous benefits of the mentioned standard, and the most vital one of them is that consumers can enjoy much more economical tariffs (Table 3). Since price is one of the most important factors influencing consumer adoption of MC, packet switching data and accompanying pricing models contribute to adoption significantly. Mentioned was experienced in Japan by the local wireless operator NTT DoCoMo. Table 3 shows several data tariffs this wireless telecommunications company implemented and the rationale regarding service type they used. Nevertheless the prices from Table 3 seem fairly low, the

**Table 3:** DoCoMo packet based billing – affordable, transparent prices for end consumer

Service	Billing in Japanese Yen (Euros*)
20 characters text	0.9 (0.0623532 Euros)
Look at news	14.7 (1.01844 Euros)
Restaurant information	21.1 (1.46184 Euros)
Mobile banking services	9.7 (0.672029 Euros)
Airline information/reservation services	24.6 (1.70432 Euros)

**Source:** Wireless data services, Sharma and Nakamura, 2003, pp. 104

\*Amounts in Euros were calculated based on the exchange rate from <http://www.xe.com/ucc/> on 4<sup>th</sup> of June 2006.

ARPU share of those data services reached and average monthly figure of 10.9 Euros on the total monthly ARPU of 59.9 Euros. From what was mentioned it is clear that data ARPU portion for DoCoMo's i-mode service is near to 18%. Even today, very few European wireless telecommunications operators have such a fortunate share of data revenue portion in their monthly ARPU. In Croatia, both leading operators have much less than above mentioned 18% data revenue share in their monthly ARPU.

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<sup>7</sup> This definition excludes the dial-up connections to the Internet which are circuit-switched and time-charged.



### 2.3 E-commerce and the mobile commerce

The main differences between EC and MC can be summed up under a) the type of the hardware used, b) the type of network supporting the transaction and c) associated user experience. There exists one important burden on the side of the MC when it is compared with the EC. That difficulty is a limited screen size of the wireless devices which are necessary for MC transactions (Varshney & Vetter, 2002). Comparatively small screen size is a direct constraint that is put upon the type of content that can be displayed and viewed on the wireless devices supporting MC transactions. No larger pictures, animated buttons, interactivity and design are really possible. This visual constraint influences the consumer attitudes at the most important, initial, phase of adoption when one is experimenting with a new service, thinking about its appeal, benefits, and value it might bring to him/her. This increases the probability that a new service will be rejected based on negative first impression. Furthermore, the limited input functionality is associated with the keypad which is fairly small in comparison with the one connected to a desktop computer (Tarasewich et al, 2002). This is another possible constraint for adoption of a certain mobile commerce service. The aforementioned seems true because there most probably exist a number of consumers that will not spend time and effort on learning how to use a new input mechanism. Tiny letters which are scattered rather differently than in the case of ones' desktop computer might influence a consumer in a way so he/she gives up on it before even realizing the real benefits it might offer. Here I refer to a sub segment of consumers with an attitude that simplicity and convenience of usage are highly relevant for adoption of certain service. Small keypad and screen as attributes of a mobile commerce user interface most definitely exclude a whole segment of older consumers. This is so because that kind of a user interface does not meet their needs appropriately.

Devices which can currently be found in the market and are required for MC data transactions have limited memory (Rytkönen, 2001) and processing power (Feldman, 2000). As a result, those handhelds can not be considered a direct supplement to their wire line Internet counterparts. The wireless way of completing transactions would hence be mostly favored for time sensitive and fairly simple tasks that require fast and simple outcomes. A reasonably weak battery power puts a constraint on how much time one can browse the wireless Internet without recharging (Lee et al, 2003). This fact represents a significant deficiency to the mobility argument. Tsalgatidou et al (2001) notice that downloads speed is still not comparable between these two types of the Internet experience and Geng & Whinston (2001) observe that the price of these two is still not analogous. These are the additional burdens put on the wireless Internet. The mentioned differences in key operating concepts are crucial for the way the consumer needs are met and their attitudes created. As it is the case here, some of these differences will be referred as constraints regarding MC in the following chapters. The supplementary difference is the machine communication language of wireless devices that is different from the standard HTML, the language of the World

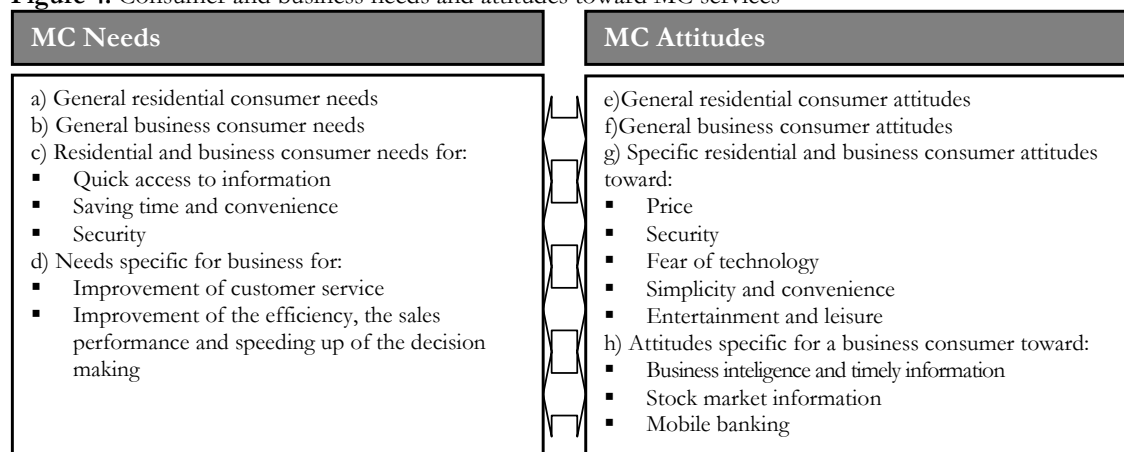
Wide Web (WWW). Gupta & Srivastava (2001) note that these devices use a variation of HTML called the wireless markup language (WML). Such devices therefore must comply with the wireless application protocol (WAP) as the language of the wireless Internet. Any web site that wants to be accessible for users with wireless devices must therefore operate a wireless markup language (WML) version.

In order for MC services to be adopted in the mass market, all the constraints that were mentioned in the text above need to be addressed. This can only be achieved by re-thinking all of the aspects of the user interaction experience and developing the interface as well as the business models which will be considered acceptable and simple enough from the side of a consumer. This implies primarily the need to move away from a paradigm where more content on a web site means a better site. Cases which are known from the recent past, where masses of information are thrown at consumers in the hope that some of it sticks and catches their attention are therefore a matter of past times (Sadeh, 2002). What we should bear in mind are the consumer needs in a particular situation, i.e. the consumer needs when he/she is mobile. Therefore, personalization is a major issue that influences a perception of value that consumers experience with regards to MC services. This means serving consumers with services that are relevant to their current locations, activities, interests and needs. After that, the attitudes toward usage of these services can be managed. Another suggested way to think about these differences is differentiation: developing a number of new services and applications that simply wouldn't be so beneficial and consumer friendly if offered from a desktop computer. Therefore, the comparative advantages for all these services are that they are all positioned around time critical consumer needs that require short, to the point interactions and rapid outputs. MC as profitable business area of a wireless telecommunications companies is a business of identifying these time critical needs and developing compelling wireless services and profitable business models to address those needs.

## 2.4 Consumer needs and attitudes

Consumer needs and attitudes certainly differ with respect to subject in need - residential, consumer, or a business entity. Because of that fact, the needs and attitudes regarding mobile commerce were approached differently for these two sub segments. As it is visualized in Figure 4, needs are initially tackled as a general concept. Subsequently, common needs toward mobile commerce are handled for residential consumers and business entities. Needs specific for business entities are examined deeper. Attitudes are explained as a common, general concept for residential and business consumers. Next, attitudes regarding mobile commerce for both residential and business consumers are explained. Attitudes that are specific for business entities only are dealt with afterwards.

**Figure 4:** Consumer and business needs and attitudes toward MC services



### 2.4.1 General consumer needs

Within the framework of this thesis, a person's need is regarded as a condition requiring relief (Wikipedia, 2006). According to Maslow (1971) an individual is ready to act upon the growth needs if and only if the deficiency needs are relieved. This way, needs act as a behavioral stimuli and steer the behavior of a consumer. Regarding the residential consumers' needs in general, Deci and Ryan (2000) suggest three needs. Although not necessarily arranged hierarchically these needs are: a) need for autonomy, b) need for competence, and c) need for relatedness. Nohria et al (2001) provide evidence from a socio biological theory of motivation and claim humans have four basic needs: a) acquire objects and experiences; b) bond with others in long-term relationships of mutual care and commitment; c) learn and make sense of the world and of ourselves; and d) defend ourselves, our loved ones, beliefs and resources from harm. The Institute for Management Excellence (2001) suggests there are nine basic human needs: a) security, b) adventure, c) freedom, d) exchange, e) power, f) expansion, g) acceptance, h) community, and i) expression. Bonding and relatedness are components of every need theory. However, there do not seem to be any others that are mentioned by all theorists. Franken (2001) suggests this lack of accord may be a result of different philosophies of researchers rather than differences amongst human beings. The previously mentioned needs theories do not take into account the fact that we live in a time when the importance of information is rather significant, yet converse regarding human needs in general. If human beings are to achieve the levels of personality and competencies necessary to be successful in the information age some information needs are surely to be included here. This could be looked into as a separate component of general needs or as an upgrade of the already existing concepts. As noted in previous chapters, in the scope of this research a need will be regarded as a condition requiring relief and will focus on a) services that can bring relief via capabilities of MC ways of delivery (new services which are specific by their attributes of being exclusively deliverable via means of MC) and b) existing services that can be performed by the use of MC and as such bring more value to a residential or business entity (wireless ticketing, parking, banking, e-mail, sales force applications, etc.).

Because of target segments that can be addressed with MC services mentioned above under a) and b) it is essential to understand that most of those services are not satisfying basic consumer needs. Such services are rather addressed to consumer segments on the upper part of Maslow's hierarchy. On the other hand, as noted by Pousttchi and Wiedemann (2003) no such needs will come to light before solving the safety question of MC transactions. Also by theory it is a condition that security is solved first because this need is embedded on the lower part of Maslow's scale. By that reasoning, no further needs will be developed until safety need is relieved. Because of that fact, consumer perceptions regarding mobile commerce security must be managed and made positive.

#### 2.4.2 General business consumer needs

The needs of businesses - legal entities and their management are regarded as those that oblige them to achieve sustainable growth and maximize shareholder value (Brigham and Daves, 2004). Businesses operate in a competitive environment where timely information, speed of operations, customer relationships, and price competitiveness bring the competitive edge to a corporation. The business consumer in general proactively seeks to buy products and services and is generally very sophisticated and specific in his needs. It puts the attention to detail, time of delivery and all the factors that might potentially influence its relation with the end buyer. Business consumer needs are specific because business entities are usually strongly locked within the value chain of their respective industries. These needs in general are therefore not needs of human beings, but needs of organizations. Because of that fact those are specific with regards to their type which is shaped by rules and expectations of their respective industries.

### 2.5 Residential and business needs with regards to mobile commerce

#### Quick access to information

In a contemporary world the need for fast information is entangled in people's everyday lives. In the hierarchy of A. Maslow, this need is positioned somewhere between physiological and self actualization needs. In the Nohria, Lawrence, and Wilson's classification (2001) it would be classified most probably under the need to learn and make sense of the world and of ourselves. Almost every lower positioned need<sup>8</sup> assumes quick access to information in order to be relieved. Hence, the need for information is identified as relevant in the present-day world, and it is a relevant prerequisite for satisfying other superior needs. It will be argued in the empirical part of this research that the shorter the amount of time between the occurrence of a need for information and the point of relief, the greater value for the consumer is created. This statement assumes that present consumers undoubtedly need fast information. Therefore, it remains to be evaluated in the empirical part of this research whether and

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<sup>8</sup> The reference to A. Maslows' hierarchy of needs

to what extent residential and business consumers need quick access to information and whether they need wireless e-mail service.

#### Saving time and convenience

The economic terms time is money suggests that there is an opportunity lost in a situation where time is spent on a certain activity (time could have been spent on some other alternative activity that might have resulted in a greater value for a respective consumer). How much value was created in that situation and how much could have been created if an alternative path was taken? According to that, a portion of money (or value) was wasted if time was spent for an activity that provided less value to the consumer than its alternative option would have done. In example of traditional banking services this means that waiting in a bank cue is an activity of a lesser value then its alternative - conducting ones banking via a mobile phone and saving the time spent for waiting in a cue. The aforementioned is relevant for mobile commerce since, except when it concerns entertainment, MC provides quick solutions for long activities of weak real value (example: waiting in a bank cue). Hence, this savings in time that has been produced by using technologically advanced solutions represents a certain value to a consumer. The argument from above is true if it is understood that consumers do not like to stand in lines waiting to be served and that they do prefer to use the saved time for activities of greater perceived value such as socialization with friends and loved ones, leisure activities, hobby or any action chosen by their own free will and driven by their interest. It is important to note that the definition of value is not the same for all people. However, in this particular case it is assumed that all people most probably have value alternatives to waiting in a bank cue. Previous research has shown that fast processing of a wireless payment transaction was appreciated by 91% of respondents (Pousttchi, 2003). In this case, it is clear that saving time is important to a consumer. In the empirical part of the thesis this benefit will be examined on a sample of residential and business consumers in Croatia. This will be done by evaluating whether residential and business consumers need wireless parking and ticketing services.

#### Security

The security concern related to MC is the risk that some person might use ones mobile phone and create financial or other material harm to the phone owner. On one hand, this might be an actual individual directly using that mobile phone. On the other hand, the same thing can be conducted by a computer that uses the data about that particular device to introduce him self as a phone owner to some other network and make a transaction for the benefit of himself or/and a third party (again some individual). Why is this so? In simple terms, when an owner of mobile phone makes a mobile purchase, his data is encrypted and sent to a certain destination over a wireless telecommunications network. This data can be intercepted and decoded for mistreatment. Previously mentioned transfers that include confidential data such as

passwords or credit card numbers are therefore susceptible to abuse. That is why security has become a rapidly growing concern and the need for security became important to all consumers. MC security basically means being protected from deception. No MC services will be launched successfully if its security has not been dealt with, communicated to consumers and understood as such by consumers. If otherwise, the value of mobile commerce services as well as satisfaction of consumer needs can not be seriously discussed. Hence, consumer needs for security regarding MC will be considered relevant to this research. The most relevant MC security challenges relate to (Weber, 1998):

- a) The mobile device. The mobile phone as well as all the confidential data that is stored on it should be protected from the unauthorized use. The security mechanisms employed here include personal identification number (PIN) or password, secure storage of confidential data on the subscriber identity module (SIM) as well as security of the mobile operating system.
- b) The radio interface. Access to mobile telecommunications network requires the protection of data transmitted in terms of confidentiality, integrity and authenticity. In particular user particular data should be protected from eavesdropping<sup>9</sup>.
- c) The wireless network operator infrastructure. Security mechanisms for the end user often terminate in the access network. This raises questions regarding the security of the user's data within and beyond the access network. Moreover, user receives certain services for which he/she has to pay for. This often involves the wireless telecommunications company and it will want to assure correct billing.
- d) The type of mobile commerce application. In the case of a mobile payment, both sides will want to authenticate themselves before committing to a payment. A customer will want to be assured about the delivery of goods and services that have been paid for. In addition to authenticity, confidentiality and integrity of sent payment information - non repudiation<sup>10</sup> is as well crucial.

In the previously mentioned research (Pousttchi, 2003), the importance of data confidentiality when purchases by a mobile phone are conducted were expressed by 96% of respondents. Importance of SMS or e-mail confirmation of the payment was important to 89% of respondents. The same research suggests possibility of cancellation as important to 86% of respondents and anonymity of the transaction relevant to 66%. As mentioned above, security question answered is the first conditioning factor to be analyzed in depth before any MC operations steps in terms of service launch are taken. This is because consumers are simply not going to accept

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<sup>9</sup> Eavesdropping in this context means unauthorized interception of a data transmission. Information remains intact, but its privacy is compromised. Example: intercepting credit card numbers or classified information.

<sup>10</sup> Repudiation in this context means refusal to acknowledge the existence of the transaction, payment of a debt by either of the sides included.

something that could jeopardize their basic rights for anonymity, confidentiality of information and safety of personal finance. In the empirical part of the thesis, it will not be evaluated whether a need for security is perceived to be important by consumers in Croatia since all theory undoubtedly agrees that this is the case. However, consumer attitudes related to security perception toward mobile commerce services will be evaluated.

#### 2.5.1 Specific needs of businesses with regards to mobile commerce

It is important to understand that in terms of business usage of MC services, the fulfilment of the needs of a certain enterprise is one of the most important factors that will determine the acceptance of the service by a business user. This research will explore specific needs related to MC that a modern enterprise may have: the need to improve customer service, the need to improve efficiency and speed up decision making and the need to increase the number of sales leads.

##### Improvement of customer service

Companies regularly misplace their customers because of slow and inefficient customer service (IBM, 2006). A swift response is very important when customers desire to submit their requests to the customer care via their mobile phones or handhelds and they expect answers punctually. No delay will be tolerated by consumers because they will be constantly targeted with offers by the competition and undoubtedly have many options to choose from. Hence, every future oriented company should put reasonable effort into customer service level and one should do so regardless of their focus: B2C or B2B market (Paloheimo et al, 2004). Businesses should develop applications and services that can shorten the time needed to respond to customers, make an additional inquiry or a clarification. The MC services have the property of being always deliverable to a potential (or existing) customer's mobile phone. The response can therefore be delivered promptly and it is not very possible that a customer will not be found at home or will discard the direct mail that has been sent to him/her. Therefore the MC services hold the potential to directly or indirectly increase the customer service level. It will be investigated in the empirical part whether business customers need to access their customers' e-mails when they are on a business trip and whether they would appreciate to use their mobile commerce applications for such actions.

##### Improvement of efficiency, sales performance, and speeding up of the decision making

In the current competitive environment only those companies that do things better than their competitors survive (Saari et al, 2004). The MC applications can increase efficiency, enhance the flow of information, and speed up decision making. The instant communication and access to corporate databases from mobile devices will make demand forecasting easier (Paavilainen, 2001). Several fields of business are heavily dependant on accurate forecasting especially when products are time sensitive (are quickly outmoded) or when a connection to a subcontractor becomes a critical success factor. Therefore, the correct timing will become increasingly important. Businesses

need the MC enabled applications and services that streamline processes, increase efficiency, and speed up decision making. Because of that, needs for wireless Internet and e-mail access anytime anywhere as well as competitor intelligence information will be evaluated in the empirical part of this research (example: the solvency of the buyer). It will therefore be examined whether business consumers need wireless Internet access and whether they need real time information about solvency of their buyers. Also it will be explored whether business consumers need to view their business banking accounts frequently and if they need a mobile commerce solution that would enable them to view their banking account using their mobile phone

As it was with the beginning of the Internet and EC, steady launch of MC provides opportunities for companies to convert it to consumer value (Rayport and Jaworoski, 2001). In the time when critical mass of consumers is out browsing the WAP and visiting mobile portals those companies will be there to take hold of consumer attention. It is therefore not arguable that running the MC operations is a need for businesses that aim to maintain and improve their competitive position. Increased number of sales leads can be achieved by being present in the wireless virtual space. Selling over the wireless Internet may be even more appealing to consumers in certain situations that require timeliness and swift responses.

Differences in needs related to mobile commerce: residential and business consumers

It can be derived from what was argued above, there exist key differences between business and a residential consumer needs. These differences are briefly summed in the text under.

a) Business entity's needs are mostly satisfied with products and services that are important for a business success of the buying organization (regardless of whether one likes those services or not). The needs of businesses are most often not the needs of a single person but the requirements from all sides of an organization. Purchases are made in such a way that the needs of multiple sides have to be satisfied and often cross functional purchasing committees are formed. The needs of a residential consumer in contrary often are directly associated with a buying subject with exceptions such as: a mother needing something for a child, or a married couple needing something for both of the spouses (KT, 2006). The typical residential consumer often buys a product or a service one likes in some way and, frequently; no complex evaluations of the product are made. In mobile commerce scenario mentioned means that new services will be much easier to trial and test amongst residential consumers than their business counterparts. Businesses will more probably look for fully finalized and specific solutions that match their precise business needs.

b) The business buyer is more sophisticated in his needs. Importantly, the buyer usually is highly aware of his needs and knows a lot about the product and its use. Therefore one demands to be approached in a special way. Nevertheless one might be



fairly sophisticated in his/her needs, residential consumers' approach in satisfying them is habitually not as systematic as this is the case with a business buyer. In case of mobile commerce services, as stressed above, important is to know particular needs and operating principles of differing industries in order to serve them with compelling mobile commerce services.

c) The business buyer is usually a proactive information seeker, constantly on the lookout for information and advice that can help him do the job better. His motivational driver is increasing shareholder's value by decreasing the costs and increasing overall business efficiency. Because of that, businesses are somewhat easier to learn about, educate and inform about new mobile commerce services. However, they become much more difficult to deal with when mobile commerce services are to be implemented to their organizations, fit their organizational structures and satisfy needs of all constituents throughout the enterprise. Residential consumer is however not as complex with regards to mentioned needs and is therefore much more independent and often reactive in his buying behavior of mobile commerce services.

d) Business wireless telecommunications products are more complex. At least, most business products are more complex than majority of consumer products. Following that logic, mobile commerce applications aimed for businesses are more complex and often imply business needs related to extensive solution customization and service adaptation. Certainly, much more involving for the service provider than this is the case with residential mobile commerce applications.

## 2.6 General consumer attitudes

Attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Goyal, 2004). Charles Darwin (1904) defined attitude as a collection of motor behaviors, especially posture, that convey an organism's affective response toward an object. Snyder (1982) defined attitudes as positive or negative views of an attitude object. The attitude object can be a person, particular behavior, or an event. Previous research showed that people can also be ambivalent towards a target, meaning that they simultaneously possess a positive and a negative attitude toward a certain object (Larsen, 2001). Attitude can appear as implicit occurrence that is then evaluated by an indirect measure (De Houwer, 2003). These measures provide an index of a certain attitude or cognition even though participants a) are not aware of the fact that the attitude or cognition is being measured (Brunel et al., 2004), b) do not have conscious access to the attitude or cognition (Asendorpf et al., 2002), or c) have no control over the measurement outcome (Fazio & Olson, 2003). The implicit and explicit attitudes (i.e. the ones people report when they consciously ask themselves how much they like a thing) both affect human behavior. Therefore, attitudes toward mobile commerce applications influence people's behavioral pattern: in pre-adoption, test and active usage phase.

Unlike the personality, attitudes are expected to change as a function of experience (Norton et al, 2003). This is exceptionally important for marketing products and services in high-tech industries such as wireless telecommunications. This happens because these products and services often imply for a consumer a necessity to learn something new and are because of that habitually confronted with initially negative, ambivalent or neutral attitudes of consumers (Fazio & Olson, 2003). There are numerous theories of attitude formation and attitude change which can be held relevant for the needed change in attitudes regarding mobile commerce. One of those theories is about cognitive dissonance. This condition was first proposed by the psychologist Leon Festinger in 1956, and it relates to his hypothesis of a cognitive consistency. By a definition, cognitive system is a system whose organization defines a domain of interactions in which it can act with relevance to the maintenance of itself, and the process of cognition is the actual (inductive) acting or behaving in this domain. Living systems are cognitive systems. Living as a process is a process of cognition (Maturana & Varela, 1980). Related to cognitive dissonance, cognitions which contradict each other are said to be dissonant while cognitions which agree with each other are said to be consonant. The introduction of new cognition that is dissonant with a currently held cognition creates a state of dissonance, the magnitude of which relates to the relative importance of the involved cognitions (Harmon-Jones and Mills, 1999). Dissonance can be reduced either by eliminating dissonant cognitions, or by adding new consonant cognitions. The maximum possible dissonance is equal to the resistance to change of the less resistant cognition; therefore, once dissonance reaches a level that overcomes the resistance of one of the cognitions involved, that cognition will be changed or eliminated, and dissonance will be reduced. As said before, cognitive dissonance arises when there are inconsistencies between cognitions. For mobile commerce it is assumed that these cognitions are especially strong and negative with regards to usage complexity, security, and price of mobile commerce. By that reasoning, many of the consumers are going to prefer the standard way of purchasing certain services over the mobile variant. In order for this to be changed, marketing communication should act to modify these cognitions, create a dissonance, modify an attitude and steer behavior toward mobile commerce service adoption and usage level retention. Besides initiation of a cognitive dissonance as mean of changing consumer behavior toward mobile commerce, persuasion has an important role here also. This is a form of influence that can be used as a means of attitude change and mobile commerce service adoption. The rationale is the following: since the individual is not born with his cognitions, but acquires them, there seems to be no reasonable alternative to the assumption that cognitions bearing on attitude objects are learned (Greenwald, 1968). Further, the most obvious source of such cognitions is the wealth of persuasive messages to which one is exposed via the public communications media as well as through face-to-face communications. Except the stimulating cognitions, attitudes and finally behavior, the effective usage of persuasive communication is important for mobile commerce services adoption. Still, the change in attitude and

behavior toward mobile commerce services adoption can be effective only when the amount-of-knowledge-retained from such communication is sufficient to initiate a real move of the respective cognition. Related to an attitude change toward mobile commerce it therefore exist a connection between (persuasive) communications and cognitive dissonance. Success in altering them, can contribute to the adoption of mobile commerce services.

### 2.6.1 Residential and business consumer attitudes with regards to mobile commerce

As discussed above, it is an attitude that makes a person to favor one thing over another. By the postulates set in the beginning chapters of this research, except of the need, consumer attitudes toward wireless communications in general and mobile commerce applications in particular are what will really drive sales of these types of services. Despite the fact that such services have existed for quite some years now, no large sales volumes of mobile commerce services were tracked in Croatia. However some MC services certainly were the right ones and have achieved relevant success and mass marketing (mobile parking which is a service strongly supported and marketed by the parking companies). Also, a number of mobile commerce services certainly were the wrong ones in terms of meeting the needs of consumers and these did not meet any growth expectations. Other right services that had the growth potential failed to escalate because they have not been systematically communicated in the market by any wireless operator but were rather for some reason kept on a side. These services were used only by consumer segments that had a strong interest in technology and managed to learn about the mentioned services themselves. Mobile commerce usage behavior of the biggest consumer segment: consumers which are average both by their knowledge and interest in technology were skipped or only partially addressed by the communication messages. Apparently, those messages were not persuasive enough to convey the meaning related to potential benefits of such services and change a consumer behavior in a direction of service adoption and service usage. As noted before, there are reasons why the focus should be on changing the attitudes. Firstly, sometimes we can not directly influence service adoption behavior and we have to find a proxy or some other indirect agent (Visser et al, 2003). Secondly, the attitudes have a major role in the shaping of a certain behavior and sometimes the best way to change other peoples' behavior is to change their attitudes about the object in question (Fazio, 1990). The attitudes often condition behavior and if attitudes change, then peoples' referring behavior is very likely to change. So what is a consumer perception on how beneficial is it to use some wireless data tariff that provides access to the Internet? Does the price one has to pay justify the benefits that are realized? Is the security even close to the acceptable level for a consumer to engage in usage of this service? How complex it is to use wireless Internet and how economical is that compared to the desktop access option? One surely asks him/her self these questions before deciding on usage of mentioned services. In case of the Croatian consumer these attitudes are quite unclear. Most definitely they depend on type of the consumer (business and

residential), his/her needs, demographic attributes, preferences and attitudes. It is important to learn more about this because it has been confirmed above that the sole technical excellence as an attribute of a product or a service itself is not enough for sales volumes to happen. Besides needs, the attitudes of consumers and social groups are often the ones that will determine whether any growth in sales will happen and at what pace. The attitudes described in the theoretical framework will be explored in the analysis of the primary market research data in the empirical part that follows.

#### Attitudes toward price

The same as with other wireless services, it is expected that the price points of mobile commerce services will be subjected to a great burden of suspicion from the side of a consumer. Both residential and business entities' attitudes toward prices of mobile commerce services are an obstacle in the area of CEE and hence in Croatia as well. Namely, these consumers are still ultra price sensitive (KPMG, 2006). The previously mentioned facts represent Western Europe as well. Pousttchi (2003) identified that no costs or low costs of mobile commerce transactions per se were relevant for adoption of mobile commerce in case of 92% of respondents. The same research suggested that more than 90% of consumers would not use a mobile commerce service if the usage of that service would be conditioned by a purchase of a new hardware piece. Negative consumer attitudes related to prices of wireless services are traditionally the most hard to deal with and currently most of leading European wireless telecommunications companies struggle with managing the price perceptions of consumers<sup>11</sup>. With regards to mobile music downloads, Vlachos and Vrechopoulos (2003) note that price is the most important attitude predictor in the case of a Greek consumer and very important in case of British and Finnish consumer. Pakola et al (2003) mention the prices as the most important factors when decisions regarding choice of the wireless operator are made. In the empirical part of this thesis it will be evaluated what are the consumer attitudes on wireless prices in general and prices of WVS, SMS and MMS. Following to that, attitudes of consumers related to prices of wireless Internet access, wireless parking and ticketing services will be assessed.

#### Attitudes toward security

Sadeh (2002) notes that mobile communication is prone to a number of security challenges not found in the traditional wire line networks. Firstly, wireless devices are small, portable and hence much easier to appropriate than this is the case with desktop computers. Also those are more likely to be forgotten by their owners and that is also a typical high risk scenario in which fraud takes place. The aforementioned is accurate since there is no conceptual difference between losing a debit card with attached pin number and a handset enabled for wireless payments. Beyond this, the air interface

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<sup>11</sup> In its yearly report for 2004 **Telekom Austria Group** reports next steps for 2005/2006: *Improving price perceptions without damage to revenues*. **Telefonica** in the report to its investors (2006) and related to their operations in the Czech Republic reports next steps for 2006/2007: *Redesign price plan architecture and improve price perception*.

over which communication takes place is also more prone to eavesdropping. Analog communication networks such as advanced mobile phone service (AMPS), which is widely used in the United States, are thoroughly insecure as a number of incidents have been reported when people would use scanners to eavesdrop on conversations, appropriate a credit card or a phone number which they would later re-sell in one form or another. Sharma and Nakamura (2003) challenge the belief of most analysts that security is solely a technology problem. In contrary, they note that with 3G networks and mobile commerce the security problem is clearly identifiable. With 3G and GPRS the most of network use is mapped to transmission control protocol/internet protocol (TCP/IP) and this introduces the risks that denial-of-service<sup>12</sup> (DoS) and loss of confidentiality are created. At the level of a wireless device the things are likely to change too. The handset is becoming more and more powerful in terms of processing power and storage space. From the wireless operators' point of view, the more closely coupled a users' computing component and the air interface processing are, the more likely it is that one will be able to influence the other. It will be up to the handset manufacturers to maintain the separation and stop unintentional or malicious modifications to the way a handset communicates with the radio network and back-end systems of particular applications. For the end user, a consumer, the exposure goes a lot further. The new generation of handsets will in fact have processing power close to that of a desktop computer. They are likely to be running the same software as mentioned devices and will be connected to the wideband 3G networks. This will make them susceptible to the same type of coercion, viruses and denial-of-service attacks (Haataja, 2005). Additionally, billing models that were mentioned may represent a threat because as wireless operators will be charging for both inbound and outbound traffic. End users could face unexpected bills as a result of a behavioral practice currently acceptable on the wire line connection usually operating a flat rate ADSL tariff. As noted above, it is very hard to measure the need for security. The situation with an attitude is somewhat simpler because consumers can be inquired about the level of trust they feel regarding usage of certain mobile commerce service. Despite the need for security which is a fundamental and frozen fact for both business and residential consumers, the attitude can be influenced and altered. The subjective feeling of security is what will usually influence a behavior related to adoption of a mobile commerce service (Crowe et al, 2006). Since it is considered crucial for service adoption, consumer attitudes toward security of MC will be evaluated in the empirical part of this thesis.

#### Attitudes related to fear and usefulness of new information technology

In case of the right service, a technologically advanced mobile commerce solution surely represents a value to a consumer. On the other hand, if these solutions are not made by a principle of end-user-friendliness, they might imply a considerable effort for a consumer with regards to learning about how to operate them. The necessity of

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<sup>12</sup> It is a type of attack on a network that is designed to crash the network by flooding it with useless traffic.

learning as a pre-condition for usage of a mobile commerce service might make a person hesitant in his/her process of a service adoption. Because of existing requirement of effort from the side of the service adopter (consumer), one might put him/her self in a position to re-evaluate whether he/she really wants to use the respective service or not. This claim is supported by the technology acceptance model (TAM) developed by Davis (1989). The model explains that the primary drivers of technology acceptance are a) the degree to which a person believes that using a particular system would enhance his or her job performance and b) the degree to which a person believes that using a particular system would be free of effort. Perceived usefulness and perceived ease of use then affect jointly to a person's attitude toward using the system and thus further to behavioral intention to use the system, which then leads to actual systems' use. In the case of the consumer perception being negative regarding effort required for certain mobile commerce service usage, a feeling of reluctance and ultimately the fear of learning about that new technology can arise. Finally, this burdens the adoption of a potentially successful service (Virtanen et al, 2005). The assumption of this thesis is that the fear of technology attitude tends to be stronger with the older consumers and weaker with the younger ones however not in all instances. The fact is however that the older population surely has more disposable income for the MC services. This disparity of consumer maturity and disposable income represents a considerable challenge for the marketer of MC services. This is the reason why carefully modeled segmentation should be adopted to address appropriately the respective market segments. In the empirical part, questioned attitudes regarding technology and its benefits will be regarding residential and business consumers' perception toward the usage of new information technology products and services and to what extent those attitudes are favorable. Further on, it will be evaluated whether residential and business consumers find that new information technology products have a fully useful application and as such make their everyday life easier. Finally respondents purchase behavior with regards to new information technology will be explored and evaluated.

#### Attitudes toward simplicity and convenience of mobile commerce applications

The attitudes toward simplicity and convenience extend directly to a need to save time, a concept mentioned in earlier chapters. Simplifying and making everyday activities that may be otherwise have been to an extent complex and cumbersome more convenient is what saves time and therefore may be of a great value to a person or group. An empirical research regarding mobile payments done by Pousttchi (2003) claimed that 93% of respondents favored the easy and convenient handling within the MC process of purchasing services and goods. The claim of this research is that in a world of information overload, simplicity and convenience is a need of an average consumer. Customer convenience is mentioned as an important factor for a service adoption by Kinoshita of NTT DoCoMo (2002) and it has been emphasized in his research paper as one of the basic consumer requirements with regards to services properties. Simplicity and convenience are the qualities that consumers value the most

from their wireless operators. Most of the consumers will not be willing to use a mobile commerce service if it is anything else but simple and convenient (Fife, 2001). In the empirical part of the thesis mentioned claims will be tested. It will be evaluated whether consumers find that using a mobile phone for payments would make the process of paying more convenient and simple and whether they consider that the mobile purchase that they recently made was a simple and convenient experience.

#### Attitudes toward wireless entertainment and leisure services

Mobile entertainment refers to leisure related activities performed by end users over a wireless telecommunications network and by using mobile equipment such as handsets. This entertainment includes mobile games, media content consumption such as icons, ring tones, music, images or movie clips, chat and information services on relevant entertainment events (Mobile entertainment forum, 2003). Mobile entertainment, which includes not only gaming but also gambling, adult services, music and location based services, is recognized as the most promising fillip for the industry (Moore & Rutter, 2004). However, it is vital to see such type of entertainment as an activity embedded within user routines, 'inconspicuous consumption' (Shove & Warde, 2002). A lead here can be taken from the way Schroeder (2002) looks at the role that cars, television, and telephones have played in increasing the diversity of leisure and sociable activities in industrialized countries. It is worth remembering that for many consumers the wireless communication device represents a leisure activity per se. This is borne out by the popularity of SMS, downloadable ring-tones and e-mail/chat functions of the wireless Internet (Sidel & Mayhew 2003). So, does a modern man really need entertainment and leisure and what are the related attitudes toward such types of amusement? This question predominately relates to the consumers' eagerness to pay for wireless entertainment products and services. If they are to take it up with eagerness then it has to be not only financially viable for the industry players to develop and run these services, but also financially viable for the consumers to access them (Moore & Rutter, 2004). Cited authors ran focus groups with younger consumers in Finland, England and France demonstrating that whilst some potential young consumers may find the technologies and services on offer extremely cool they often viewed themselves unable to afford them - at least in the near future. The focus groups identified positive attitudes such as I buy movies so I would be prepared to pay for that and I think I'm prepared to do that. I'm prepared to pay a set fee, but I don't want to pay for every single movie download. On the other hand, negative attitudes were also identified. These attitudes were such as I tried it a few time in a try and buy mode, but then they bound me to a charge for it later, that's what's bad about it. The mentioned evidence leads to a conclusion that currently quite some share of the market really is somewhat positive toward wireless entertainment. However, when it comes to paying a fee for a wireless entertainment service, a significant portion of the market becomes apprehensive and reluctant. The presented theory unfolds the real complexity of consumer attitudes related to wireless entertainment. Even if consumer attitudes toward it show to be favorable in the initial phase and a trial period of a

service usage has been conducted by a consumer - a long term purchase commitment may not take place. What is probable to come about after a trial period is an attitude creation associated with the price of the service. It is a challenge for the wireless telecommunications operator then to manage consumer expectations and retain the customers that decided to trial such services. In case of purchasing the MC digital files via ones wireless device (as in the case of other non-digital goods and services), a sole attitude: I like something; I had a positive experience with that something does not determine whether a service has any real future. In the empirical part of the thesis it will be evaluated whether a Croatian consumer plays mobile games and whether one thinks such games are pleasurable. Furthermore, it will be explored whether one would like to acquire additional games on his/her mobile phones and would he/she pay for such games to be delivered to their wireless device. Preferences toward watching short movies on mobile phones will as well be assessed. It will also be questioned whether it would be realistic to expect that a consumer pays for mentioned content. Additionally, it will be explored whether consumers have preferences toward adult wireless content and how willing they would be to pay for it.

#### 2.6.2 Specific attitudes of businesses with regards to mobile commerce

Research by Rosen et al (2000) showed that business organizations react to technology in a characteristic fashion and that there evidently exist sub segments. Some are eager adopters who embrace technology as soon as it is released. The eager adopters enjoy technology, expect to have difficulties using it at the beginning and find solving those problems stimulating and fun. Mentioned research among business executives found 12% to be the eager adopters. Hesitant prove its form the largest group (59% in the mentioned study). Prove its were not described as anti-new information technology nor were they found techno phobic. Rather, they are waiting on the sidelines for someone to show them how that new technology can help them in their everyday lives. They want to know how technology will specifically make their life easier. Sub segment that Rosen (2000) named prove its know that technology has problems and do not necessarily enjoy dealing with those difficulties. This group would rather wait on the sidelines until the difficulties are resolved and then join as users. Resisters made up 29% of the business executives in the mentioned study. Resisters avoid technology. They do not like, want or find it enjoyable. They know that technology has problems and take technological snafus as reflection of a personal shortcoming. Although many resisters are techno phobic, some are not. The key differentiation point between business and residential entities' attitudes toward mobile commerce are embedded deeply in their purpose. While inquiry about the purpose of a human being is highly complex philosophical substance, the purpose of a business entity is somewhat simpler to define. Managers should utilize their business organizations in a way that the total long run market value of the firm is increased (Jensen, 2000). On the other hand, stakeholder theory says that managers should take decisions so as to take account of interests of all stakeholders in a firm (Freeman, 1984). Stakeholders in a firm include all individuals or groups that can substantially affect the welfare of the firm, including



not only the financial claimants, but also employees, customers, communities and governmental officials. From the mentioned citations it becomes clear that organizations must operate in an efficient manner and that a business manager should make decisions that contribute to the business efficiency and the competitive advantage in the long run. If mentioned postulations are taken as valid then attitudes of business entities should in theory incline toward positive area regarding mobile commerce applications that bring efficiency, cut costs, maximize the value of the firm in the long run and contribute to the well being of all of the firms' stakeholders.

#### Attitudes toward mobile commerce enabled business intelligence and timely information

Poor data quality costs companies money in terms of lost productivity and faulty business decisions (Brunson, 2005). It is true that many companies have cleaned up their customer data to enable customer relationship management (CRM) related initiatives. However, their focus has now turned to data in other areas of the business, such as supply chain and finance, as well as to tackling what can seem like problems with intractable data in nearly every business domain. Slowly but surely, enterprises are recognizing information as a strategic part of their business (Arthur & Cooper, 2002). Very few have put the idea of data as an asset into practice, but within many organizations there is a group of individuals who recognize the strategic value of information. Members of senior management have become increasingly receptive to this viewpoint (Brunson, 2005). The evidence that this is happening lies in the fact that business intelligence and data warehousing systems (BI/DW) have become a critical part of other projects with far-reaching implications for the business (CGI, 2004). Companies may not be implementing enterprise-wide BI for BI's sake, but they are incorporating BI/DW into other key enterprise projects that promise to optimize business processes and deliver benefits to the projects' costs structure. In the empirical part attitudes of business entities will be evaluated with regards to importance of replying to e-mails swiftly and the use of services that would enable employees to view and edit attachments using their mobile phones. Further on, business consumers will be evaluated with regards to their attitudes on subjects such as how useful is it to them to have timely information about solvency of their buyers and whether they would be willing to pay for a mobile commerce service that would enable them to receive information about solvency of their buyers to their mobile phones in real time. Finally, business consumers' attitudes related to their willingness to financially compensate for content related to their business that would be delivered to their mobile phone will be assessed.

#### Attitudes toward mobile commerce enabled stock market information

Even though the stock market in Croatia is rather in its beginning than a mature phase of development, its adulthood will happen in the next decade. Users of real-time stock trading services often encounter problems on the topic of control when they leave

their desktop computer (Nylander et al, 2003). For instance, professional stock traders would like to bring their desktop environment on a laptop, PDA, or mobile phone to meetings as well as to the coffee room. This is true because in practice there will be long periods of intense trading, radical market changes, preference changes, and other factors that will contribute to the need for full control and up to date information (Brewster & Murray, 2003). As well as professionals, owners of securities will most probably want to have at all times at least one channel of swift and consistent information on the state of their securities. In the empirical part of this research it will be evaluated what are business consumers' attitudes related to what was mentioned above. Therefore, would business consumers pay for the information about stock from their portfolio delivered to their mobile phones on demand?

#### Attitudes toward mobile commerce enabled wireless banking services

Some research suggest that mobile banking might bring profit only if banks offer services for free, as users' interest in performing financial transactions over a mobile phone is rather low all over Europe (Deutsche Bank, 2002). Even if the service were offered free of charge to the end user, banks still show concern related to a) the risks of handset theft and b) their ability to track legitimate transactions as wireless banking users move from one country to another (MCI, 2006). By mentioned information, business prospects for wireless banking are still limited. In the narrow field of appeal, online trading and enabling payments might be successful in the medium term since this mode of conducting transactions represents a fairly thorough change compared of to the conventional one. The previously mentioned Deutsche Bank research (2002) claimed only e-mail was considered more important when business users were asked about their expectations from 3G services. However, in the same research it is suggested that among technology enthusiasts on liners who plan to acquire a 3G device expect to receive additional value by having access to ad hoc information as well as wireless banking conveniences. Mobile banking is already widely possible today, however, a lucid business model is not in sight yet. This is important since businesses will not invest in such innovative services if those services can not be charged for appropriately (Kreyer et al, 2002).<sup>13</sup> Mobile cash could be another successful business area. Since the customer will ultimately decide about the establishment of payment procedures (Kreyer et al, 2002; Pousttchi et al, 2002), customer specific topics, such as the need for a pre-registration or the technology required to use a mobile cash as a mean of payment, procedures surely have to be examined. While most current mobile payment procedures are based on a simple message exchange via SMS or the WAP, some wireless payment procedures require dual slot or dual chip phones. Other mobile payment procedures even require the installation of special software tools. The mobile

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<sup>13</sup> MCI (2006) notes that occurrence is conditioned by lack of accord between wireless operators, banks and credit card companies. While wireless operators demand greater share of revenue (transaction based charging), banks and credit card companies stress there is no *free space* within their margins to comply with wireless operators' wishes.

payment procedures themselves are either token or account (user name-password) based. Within token-based procedures virtual cash is then exchanged whereas account-based procedures settle payments via the customer's settlement-account. The payments are either deducted via prepaid, instant-paid or post-paid methods and may be settled via various payment methods such as prepaid-cards, digital wallets, direct debiting, offline payments, credit cards or phone bills (Kreyer et al, 2002). An important constraint to this way of making cash transactions is the transaction monetary size. If the transaction is charged on the customers' monthly invoice for wireless telecommunications services, it represents a significant risk for a wireless telecommunications company in terms of receiving the funds that were credited. This is the main reason why Vodafone's company in Germany decided to welcome the wireless payments but only up to the amount of 5€. They prefer every greater charge to be directed to the credit card issuer as Vodafone is not able to manage the associated financial risk (MCI, 2006). Except the need of a business consumers for wireless banking solution that would enable a business manager to be in touch with his/her banking account while on the business trip, it will be assessed in the empirical part of the thesis whether business consumers would check their banking account daily via their mobile phone if they would be offered such a service for a reasonable price. Also, it will be evaluated whether they would pay all of their bills using a mobile phone if such a service would be accessible. Business consumers' attitude related to their belief that paying bills over a mobile phone is a secure practice will be evaluated then after.

## 2.7 MC usability: hardware constraints and challenges related to context

Even though it is not the primary subject of this thesis, it is important to understand the constraints related to the consumer interface for mobile commerce because it directly influences consumer adoption of such services. The user interface is the environment in which online users communicate, search for information and transact. These transactions can take form of wireless Internet browsing, content downloads, instant messaging, wireless banking and other similar behaviour (Chau et al, 2002). Thus, an important precondition for success and user adoption of the MC services is that consumers' experience formed via the wireless interface satisfies both ones sensory and functional needs (Bellman et al, 1999). In simple terms this means that services are useful and easily utilizable.

### Mobile commerce - hardware constraints

The facts discussed above gain in importance when one looks at wireless Internet surveys indicating that usability is still the greatest source of consumer aggravation and an immense challenge for developers (Forrester, 2002). Also, prominent research suggests that mobile browsers can manage many of the static information types found on web pages: images, tables, frames, forms (Kamba et al, 1996). Related to that, in a near future it will not be difficult to envisage handheld browsers that are almost identical to the ones used by full size desktop computers (Jones et al, 2003). Identical

in all but one, important respect: the display area. Display size is the first mobile commerce constraint and one unlikely to change both because of technical limitations (we are still a long way off from the foldable display), and also the requirements of utilization: these devices have to be small enough to be held in the hand or to fit in a pocket. Full width (640 pixels) small screen displays can be achieved without too much difficulty from a technical and practical perspective; display heights though will remain much more limited (Jones et al, 2003). Some mobile devices such as the Nokia 9290 communicator have larger screens, but even these remain much smaller than the smallest desktop or laptop display. Thus, the MC interface should be developed to compensate for the limited visual display of the devices. The mobile setting and device constraints suggest that a successful EC interface design does not necessarily correlate to the successful MC design (Tsalgatidou & Veijalainen, 2000). It is therefore an imperative to improve the design elements of the MC interfaces to foster consumer adoption.

The second important constraint for mobile commerce is a small size of a keyboard and somewhat cumbersome input interface that enables a person to interact with a machine. Petite keypads and small letters limit the input functionality and inflict a vital limitation on consumers' ability to grasp content (Andreou, 2003). Limited input functionalities interfere directly with time saving which is one of the most important features of mobile commerce (Nokia, 2005). Small keyboards and input interfaces put a burden on simplicity and convenience that are often mentioned as major musts of the mobile commerce interfaces (Gong & Tarasewitch, 2004). In terms of usability a fair share of the existing mobile commerce solutions currently operating in Europe do not ease the process of conducting mobile commerce transactions (Haneberg et al, 2002). The mentioned solutions are still rather complicated and tiresome for the end user and data input in the MC context is still not as convenient and straightforward as this is the case with its EC counterpart (Lin, 2001). No handheld device wireless device has a data entry system that approaches the ease-of-use of a fully operational PC keyboard. RIM's Blackberry two-thumb QWERTY<sup>14</sup> keyboard is the most efficient text entry interface currently available for a wireless device. Still, for most of the other devices, until much better speech recognition becomes available for wireless devices, data entry and overall interaction will remain limited (Haneberg et al, 2002).

The third relevant constraint regarding mobile commerce is the memory chip of a mobile handheld device which is still somewhat limited, offering far less storage space than a regular PC. Even though more and more handhelds' memories are expandable - for memory-intensive tasks devices like the PDAs still store information by synchronizing with an external storage devices like laptop or a PC. Also, the wireless handheld device does not have a fast and powerful processor like a desktop PC. Due

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<sup>14</sup> It refers to the key scheme for the Standard English language keyboard. The other common scheme is DVORAK. Both refer to the first 5 letters in the upper left of the alphabetic part of the keyboard. Both were ordered in attempts to optimize the speed of typing.

to the need to save battery power, a wireless device uses slow and comparatively weak processors (Hu et al, 2005). As a result, they can only offer simple features that do not require much processing power. For example, rendering 3-D graphics would not be an appropriate application for a wireless device.

The mobile devices of the future will be more powerful, less heavy, and comprise new interfaces to the user and to new networks. Nonetheless, a major problem, which has not been solved yet, is the energy supply. This, fourth constraint to mobile commerce, burdens it because of the following fact: more features are built into a device the more power it needs (Keng, 2001). Consequently, the higher the performance of the device, the faster it drains the batteries. Wireless data transmission (a key operating concept for mobile commerce) consumes a lot of energy (Schiller, 2000). Due to all the mentioned facts, it is difficult for a hardware manufacturer or a wireless service provider to guarantee for an unconstrained mobility as a user experience. This means that browsing the Internet via a telecommunication network can be to such an extent energy consuming that it can terminate a battery of a mobile device within a few hours. Regardless of the constraints, the existing research shows that the content that is offered is equally important as is the ease of use (Verisign, 2005). In particular, the ease of use was regarded as the most important while the choice of content and personalization followed shortly.

#### Mobile commerce - challenges related to context

Context captures how web sites are developed, consisting of both functionality and aesthetics (Rayport & Jaworski, 2001). Given the mobile setting, the linking structure that connects pages seamlessly but efficiently is a must because it is needed that even a somewhat distracted consumer can easily navigate through the material that is presented. So the first challenge is that shallow menu structure (more information graspable per page) rather than a deep hierarchy is applied. This is so because a deep hierarchy increases the cognitive burden by forcing more choices over more levels (Kim, 2001). Another alternative is adopting a layered sequential selection process employing sub-menus linked to which the tasks users are most likely to proceed. This differs from a field selection process requiring users to return to the main menu to move on to the next process (Pascoe et al 2000). Insufficient display space requires partitioning information into separate pages, thus making the issue of section breakdown important. Users must scroll up and down more often to read the separate pages and the resulting increase in their navigation activity significantly lowers their performance (Jones et al, 2003). If a page is provided containing a brief summary with key content, users can better understand a body of information fragmented over separate pages (Buyukkokten et al, 2002).

Type of content is a second usability challenge for mobile commerce. Content is what a mobile site presents, comprising the offering, appeal, multimedia mix, and content type (Rayport & Jaworowski, 2001). The mix of product information or promotional

messages can be adapted according to consumers' purchase environment by virtue of context-aware applications. The adjacent selection method makes the near by located-objects emphasized or easier to choose (Schillt et al, 1995). Such located-objects include a nonphysical service routinely accessed from particular locations, such as bank accounts, or the set of places users want to know about such as gas stations or restaurants (Schillt et al, 1995). Multimedia mix is recommended to overcome limitations due to the lack of output screens because this way information and appeal can be presented in layers so deep menus are not needed. By converting some part of content into audio format, the output space can be saved also (Kristoffersen & Ljungberg, 1999). Non-speech sound is also advised, given its language-independent and fast nature (Brewster et al, 1998).

Community, as a third important argument, concerns interaction between users, including interactive and non-interactive communication. Communal information regarding mobile setting enhances interactive communication between users: they can connect to other users who reside nearby, or to those who have useful knowledge about products. Since consumers sometimes feel more satisfied when shopping with friends, interactive communication enabling opinion exchange about products is beneficial. Such capability can be realized with information exchange methods available on a small screen (for example SMS or graphics describing products transferred through a user's contact list).

As fourth important challenges brought are customization and personalization. They refer to a mobile site or portal's capability to modify itself or to be customized by users so as it is personalized to ones own needs and wants (Rayport, J. and Jaworski, 2001). Undoubtedly, delivering personalized information is a critical factor concerning the effectiveness of a site: it has the ability to treat people based on their personal qualities and prior history with it; and moreover, it has the ability to change (customize) its resources (products, information or services) to better fit the needs of each user (Georgiadis at al, 2005). Information regarding a user's mobile setting enables the automatic adaptation of the mobile interface and some part of such tailoring is associated with content. Customization reduces information load by filtering unnecessary information, thus alleviating the constraints of the limited visual display. Moreover, MC provides enormous potential for personalization, since mobile devices always carry the user's assigned identity and the uniqueness of ones' usage pattern (Pierrakos et al, 2003).

Communication is defined as dialogue between sites and users: broadcast, interactive, and hybrid (Rayport, J. and Jaworski, 2001). This challenge implies that targeted advertising through SMS or video mail is worth consideration. Time and weather changes are useful cues for selecting a message to be broadcast. Alternatives to the limited keypad input devices are needed to promote consumer feedback, such as multiple-choice answers or multimedia formats, such as voice and video mail transfer.

The next important challenge for mobile commerce adoption is connection. It refers to the extent of formal linkages between sites, consisting of outsourced content, percentage of home site content, and pathways of connection so as a wireless user is served to ones most at one place (Laudon & Traver 2003). In a mobile setting, pathways to other sites provide users with information needed in dynamic situation so it is a challenge to the service provider to offer that effectively in a mentioned manner. For example, the adaptive map linked only to the Web sites of nearby stores reduces the number of alternative pathways and offers limited number of relevant options to a consumer in search for merchandise offered by mentioned stores. A continuing concern is that consumers may still feel lost while navigating along these pathways, as the limited display makes it difficult to utilize navigation aids, such as a brief site map that helps users identify their locations (Deitel et al, 2002). Accordingly, placing an icon that leads to the starting page with one click of cancel button is recommended.

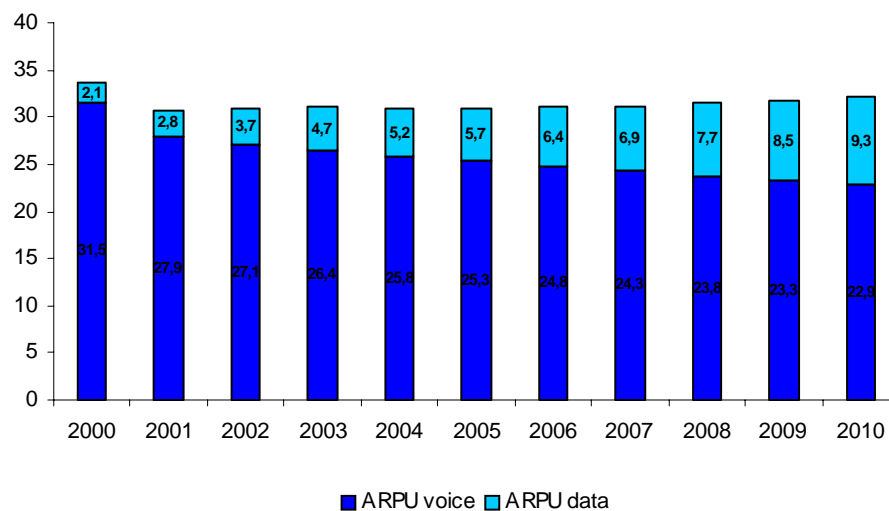
Commerce is concerned with interfaces related to sales of goods and product services, such as a shopping cart and order tracking (Elliot & Phillips, 2004). No business entity will show interest for implementing any form of mobile commerce in its operations if the challenge of a web site being commercial was not resolved before. A secure payment method demanding minimal attention is required in the distracting mobile setting (Schwidorski-Grosche & Knospe, 2003). By inserting a certificate of authentication into mobile phones, financial service providers and mobile commerce retailers conduct mutual authentication. Condensing a set of processes across several steps into a one-click checkout process becomes available by taking advantage of the known user profile containing a user's name, address, and a preferred delivery option (Weitzel & König, 2006)

## 2.8 Wireless telecommunications Europe: prospects for mobile commerce

According to the Analysys (2005) a majority of Western European countries will have exceeded 100% SIM card penetration by the end of 2006. The highest penetration of wireless services was reached at the end of 2005 in Luxembourg (160%), Italy (119%), Portugal (114%) and Sweden (112%) (Informa, 2006). Total wireless subscriptions in Western Europe reached 409 million at the end of 2004 and this figure was estimated to be 437.1 million at the end 2005 (Eurostat, 2006). The estimated yearly growth for the coming years is 10.6%. In the CEE countries this estimated growth is even higher reaching up to 30% and more in some countries with low starting positions [Lithuania (45,1%), Poland (32,7%) and Latvia (26%)]. Western Europe's dense and advanced telecommunications network places this region at the forefront of emerging technologies. New technologies including wireless networks, 3G mobile networks and satellite broadband have increased the reach and versatility of telecoms' provision. Effective regulatory controls have enabled rivals to infringe on the incumbents' market shares in all the telecom sub sectors (Gartner, 2006). A key development during 2005 was the structural separation of British Telecom. In the coming years, that will have

repercussions for operators and regulators elsewhere in Europe (Network Strategies, 2006). The deployment of Next Generation Networks (NGN), the moving infrastructure to an IP packet-based and full service typology will see the end of PSTN lines with a final outcome of the full migration to IP based networks by 2009 (Viatel, 2006). Similar moves by France Telecom with its NeXT strategy will be echoed by other incumbents as media convergence and technology provision sweep away the analogue networks (France Telecom, 2005). All the mentioned developments lead to one conclusion: data and mobile commerce services become more and more important as leading telecommunications operators strategically prepare their resources for this convergence. As a support for the mentioned claim, data displayed in Figure 5 show that the pure voice revenues will be decreasing due to fierce competition and pressure on prices. Because of this fact and the need to safeguard their revenues and keep investors satisfied - wireless telecommunications companies will be required to prepare their infrastructures to accommodate high speed data transfer and differing mobile commerce services and solutions. This will hardly be achieved only by messaging (MMS) services. Therefore, more lucid data and mobile commerce business models should be found and deployed.

**Figure 5:** ARPU voice/data forecast (approx. 85% SMS and MMS; EU 15 + Norway and Switzerland)

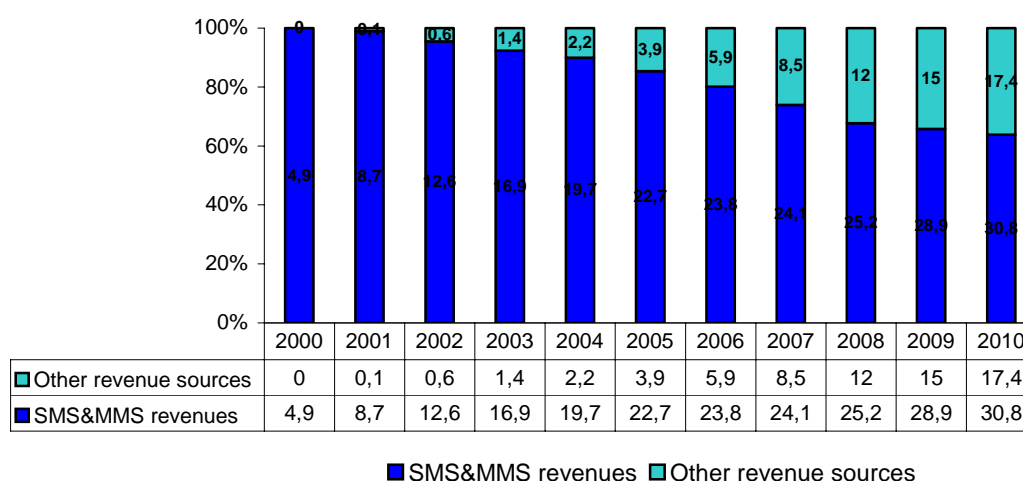


Source: F. Puyol, 2005

By emphasizing the stagnation or at least to say, a deceleration, of revenues that originate from SMS and MMS traffic, in Puyol's forecast (Figure 6) it is unmistakably suggested that revenue safeguarding actions should be pointed toward services that stimulate data traffic and mobile commerce services. Taking into consideration that the mentioned strategies would be successful, the impact to overall revenues would only be as strong to keep the total revenues in their current sizes. The suggestion from Figure 6 therefore is that voice revenue are going to be decreasing in the coming periods.



**Figure 6:** ARPU data forecast: data revenues 2010; EU 15 + Norway and Switzerland



Source: F. Puyol, 2005

Europe's maturing broadband and Internet markets have been a key beneficiary of the technological developments, the widespread ADSL2+ and VDSL network upgrades have been undertaken thus furnishing the means for delivering triple play services including Internet Protocol, Television (IPTV), Video on Demand (VoD) and other digital media (Redback networks, Whitepaper, 2006). Much of this development has derived from the European telecom market liberalization, and a regulatory environment promoting competition. The EU New Regulatory Framework has directed competition, fixed network and mobile network interconnection<sup>15</sup> issues, local loop unbundling (LLU)<sup>16</sup>, competition requirements for number portability<sup>17</sup>, licensing regimes, carrier pre-selection<sup>18</sup>, and the universal service obligation<sup>19</sup> (Kiessling & Blondee, 2006). These measures have been complemented by the EU eEurope 2005 schedule and the strategy for its i2010 program (European Commission, 2005). This highly aggressive market with players who are fighting for every subscriber is indeed one of the most competitive worldwide.

### 2.8.1 Central and Eastern Europe (CEE)

The telecom markets that make up CEE are not as homogenous as are those in the Western Europe. Significant differences in usage behavior, services and ARPU often exist even within a single country. This situation reflects the various stages of

<sup>15</sup> Interconnection is equal access to networks between incumbent and competitive local exchange carriers (Dang-Nguyen & Penard, 2006)

<sup>16</sup> LLU is the process of allowing telecommunications operators to use the twisted-pair telephone connections from the telephone exchange's central office to the customer premises. This local loop is owned by the incumbent local exchange carrier – ILEC (Groebel & Schnepfleitner, 2000)

<sup>17</sup> Number portability is a term used to describe the capability of a customer to retain their existing telephone number(s) – and quality of service – when switching local service providers (Kim et al, 2004).

<sup>18</sup> CPS means the service whereby the Customer is able to pre-select a service provider other than the Access Provider to carry his/her calls according to the all calls option (TRA, 2004).

<sup>19</sup> USO implies Geographic dimension - availability of service, Distribution Equity dimension - accessibility and affordability of telecom service to low income users and Disability dimension - accessibility, usability and affordability of service for disabled people (South African Government Gazette, 1998)

economic development in each country i.e. region within a country. The 10 new EU member states mark a new era in the CEE as the countries in the region integrate themselves with their western neighbors. The requirements of the EU and the World Trade Organization (WTO) have been a major influence behind the liberalization of the telecommunications sector in the region (Arthur D. Little, 2003). As a result of the liberalization, the prices of services have decreased, resulting in an increased uptake of new services such as broadband Internet (Showcase Europe, 2006). The wireless market in the region is facing increased competition as more and more operators have to find new sources of revenue due to the maturing or saturated markets. This has also led to the introduction and uptake of the wireless data and content applications. The telecommunications industry in the CEE is growing spectacularly. Growth in both revenues and number of customers consistently remains higher than the one in the Western markets. During 2004 the total telecoms revenue of the CEE increased at an average rate of approximately 8 percent. The same rate for the 15 EU countries (EU-15) was 3 percent. Growth rates in the wireless telecommunications industry are particularly impressive: mobile operators in CEE increased their customer base by 36 percent and revenues by 17 percent in 2004, compared to 9 percent and 5 percent respectively for mobile operators in the EU-15 (Prism, 2005). With regards to the political stability in the CEE and the Southeast in particular - it has remained stable. The individual countries, Bulgaria and Romania are both scheduled to join the EU in 2007 (The Economist, 2003). Croatia is a candidate country (EU, 2006) as well as Macedonia and the potential candidate countries also include Albania, Bosnia and Herzegovina, Macedonia as well as Serbia and Montenegro (EU, 2006). These countries are in varying stages of implementing the EU's regulatory framework for wireless telecommunications. In 2005, Bulgaria privatized its remaining 34.6% state-owned stake (Punjab, 2006). Montenegro sold its remaining 51.12% majority stake to Deutsche Telecom which re-branded its wire line incumbent<sup>20</sup> into T-Com and the wireless counterpart into T-Mobile (The World Bank, 2003). Bosnia has been set to privatize its incumbent telecom operator in 2006 and is resolving the ownership disputes it inherited from the past (ICEG, 2006). Romania plans to complete the privatization of its remaining 45.99% stake in 2006 (Rompres, 2006).

The Czech Republic, Lithuania and Cyprus had penetration levels in excess of 100% as at March 2005, with Estonia, Slovenia and Greece near 100% (EU, 2006). The third generation mobile services have been launched in Slovenia, Hungary and the Czech Republic. The launch of 3G services has been delayed in Poland numerous times by the operators (EU, 2006). A number of countries also offer Enhanced Data Rates for GSM Evolution (EDGE). The commercial launches of the 3G services have occurred in Croatia in 2005 (EU, 2006). The state of dynamic wireless telecommunications sector reflects the various stages of market development of each country, each with their associated opportunities and challenges in terms of penetration, ARPU levels and mobile content. Faced with the prospect of intensifying competition in their traditional

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<sup>20</sup> Formerly or presently government owned (public) telecommunications company.

markets, the incumbents have turned to broadband to exploit the opportunity presented by their extensive untapped customer bases thereby fuelling the market.

### 2.8.2 Croatia

The Croatian market is characterized by two major MNOs and an entirely liberalized market of wireless telecommunications. The market leader is a former state owned incumbent T-Mobile (previously called CRONET and HTMobile, a wireless division of T-HT: Croatian Telecom). It is a subsidiary of Deutsche Telecom i.e. a part of its wireless division T-Mobile International. T-Mobile is a market leader, has a market share in excess of 50% and nearly three fourths of domicile business customers. VIPnet is a subsidiary of Telekom Austria Group, i.e. its wireless division: Mobilkom Austria. It has positioned itself as an innovator within the market having gained market share very quickly after its entrance in the market. Currently, both of the leading operators offer UMTS services. However, VIPnet that started its 3G first with Vodafone live (supported by the strategic partnership of its mother company Mobilkom with Vodafone) evidently acquired more experience with data and value added services (VAS) as well as with mobile commerce. It was also recognized by the market as a leader regarding wireless data services. Realizing the necessity of price cuts for wireless data services and broadband data, T-Mobile launched its Web 'n' Walk data propositions for business and residential consumers and that way utilizing its enormous 3G capability. In residential consumer areas, T-Mobile utilizes its t-zones sticky portal that is to boost the operator's data revenues. The third operator that entered the market in September 2005 is TELE2. This operator is mostly recognized by its low WVS and SMS prices and no frills philosophy. It emphasizes prices as its major consumer proposition. TELE2 made both of the existing already existing wireless companies to decrease prices as a response to their offer. TELE2 is a basic GSM operator still concentrating only on voice and SMS and despite the announcements, it has not introduced any form of a data or mobile commerce strategy. Mobile commerce in Croatia is in its mature phase of service lifecycle regarding some services (Croatia was one of the first to introduce a very successful mobile wireless parking service). Still, it must be noticed that Croatia is a very young market regarding most of the other potential MC services such as mobile banking and mobile entertainment.

### 2.8.3 Wealth of Croatian households: prospects for mobile commerce spending

Croatia has a highly open economy and the EU is its main trading partner. Since 2000, the sum of exports and imports of goods and services has increased from close to 100% of GDP to about 110%, with the share of the EU and the Euro area constituting almost 70% and 50% respectively (ECB, 2006). Croatia's external position is characterised by a substantial merchandise trade deficit. This partly reflects the fact that tourism services constitute a key export item, but this is also attributable to the strong import demand arising from households' optimistic income growth expectations

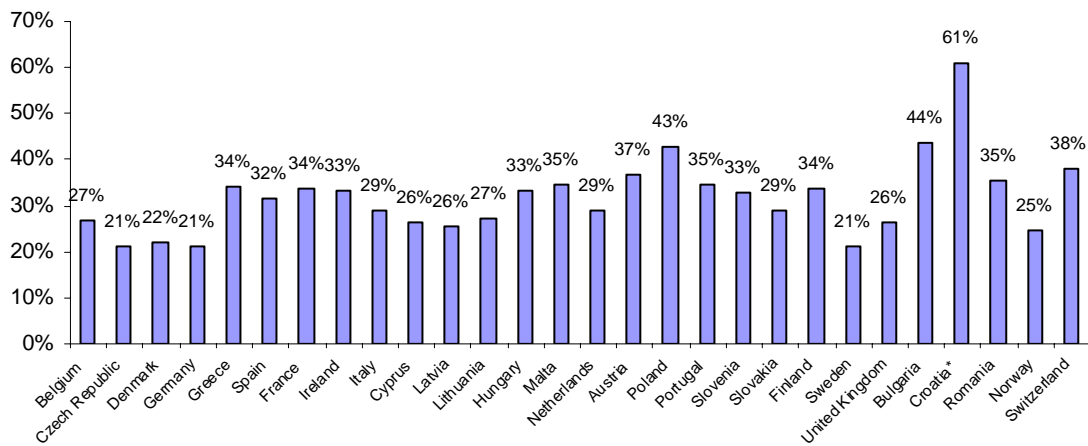
(ECB, 2006). Finally, Croatia's trade deficit partly stems from the need to foster the accumulation and modernization of the country's capital stock. On the export side, Croatia has been relatively slow in upgrading its export structure. Ships, textile products, minerals, basic materials and manufactured goods increasingly commoditised on the global markets still feature prominently among its exported goods (Chamber of Commerce - Croatia, 2006). Tourism is a highly competitive industry in the country. Croatia's pattern of export specialisation therefore makes it vulnerable to adverse shocks arising from global competition. In the long term, a rise in competitiveness will be important for external stability. There is room for improvement, as wage costs are relatively high compared with those of the other countries in the region and high value-added goods and knowledge intensive products constitute only a low proportion of exports (ECB, 2006). There are also still opportunities for privatisation in major export sectors, such as tourism or shipbuilding, as a substantial part of FDI is still oriented towards non-export sectors. This explains why the share of Croatian exports in key markets has grown less rapidly than the share of exports in comparable countries. In terms of external financial conditions, Croatia has benefited from the heightened global appetite for risk. The risk premium on euro-denominated assets issued by the Croatian government has been well below JPMorgan's EMBI Global index and has also benefited from the country's investment-grade status (JPMorgan, 1999). Investors' sentiment has been reinforced by the prospect of EU accession. Nonetheless, the economy remains vulnerable to the potential risks arising from a sudden change in the financial environment.

With the purchasing power standard (PPS) value of 46, according to this relative indicator of wealth, Croatia is less wealthy than all of the countries that recently joined the EU with the exception of Latvia (Eurostat, 2006). By the same indicator, Croatia is more wealthy than both of the countries that are about to join the EU in 2007, Bulgaria and Romania<sup>21</sup>. The wealth of the country might be an indicator about the acceptance and profitability of an average subscriber in a country. However, despite the clearly low wealth expressed by PPS, Croatian consumers have a very high inclination toward wireless telecommunications services usage. This is factual data since, expressed as a share of country's average ARPU in PPS, Croatia is on the top of the list with ARPU share in PPS of 61% (Figure 7). This is one fact that characterizes Croatian wireless communications consumer as very active, and the one that likes the service and spends a large sum of income on wireless communication compared with consumers from some other countries. Since measured ARPU is strongly correlated with PPS (0.84) it could be argued that a strong precondition for the increase in wireless ARPU is the increase in overall economic performance of a national economy and GDP per capita. This would however be only an indication based on the assumed influence of GDP size on consumer spending on wireless telecommunications.

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<sup>21</sup> For detailed PPS list and country AVG ARPU see Appendix 1.

**Figure 7:** Share of ARPU in PPS for a sample of European countries



Source: Euro monitor, 2006 (combined with authors' observations and data from other sources)

## 2.9 Theoretical framework - chapter summary

Due to decreased WVS portion of ARPU (triggered by fierce competition and obvious price wars) all wireless communications companies are considering different forms of a strategic turns toward mobile commerce services and various data-traffic-intensive applications. By analyzing consumer needs and attitudes regarding mobile commerce, the goal of this research was set as: to provide in depth analysis and recommendations with regards to MC marketing strategy. As a summary of various definitions that were elaborated in this chapter, the mobile commerce has been defined as any kind of transaction with monetary value that is done in order to acquire a good (digital or physical) or a service for which the order and payment have been administered via a handheld device while the transaction has been carried out via a mobile telecommunications network. Nevertheless it is tightly related, the concept of MC is to some extent different from EC because of significant inequalities in the service usage experience for a consumer. Also, it was concluded that wireless voice services carry a differential in two main respects when compared to mobile commerce: a) WVS: transfer of voice originated impulse - MC: transfer of data, b) the billing concept.

Consumer needs were identified as an important influencing factor having a great impact to the market expansion of MC services. In terms of the assessment of needs, the focus of the empirical part of the study will be on the description and the analysis of consumer and business needs regarding MC. It was concluded that needs most probably vary in case of residential and business consumers. Residential consumers' needs regarding MC were discussed in scope of the need for information; need to save time, convenience-simplicity-instant connectivity, need for security, need for entertainment and leisure need. Needs of business consumers were discussed in the same manner as residential consumer needs but

additional dimensions were added. Namely, need to increase customer service level, need to increase efficiency and to speed up decision making as well as the need to increase number of sales leads and improve sales performance were identified as needs that hold attributes specific for business entities. Furthermore, attitudes were regarded as mental states involving beliefs, feelings, values and dispositions to act in a certain ways. Attitudes were concluded to be important behavioral influencers and as such were marked important for adoption curve of the mobile commerce services. Attitudes related to pricing of services, service usage complexity, fear of technology, doubt regarding value and usefulness of MC services and technology in general, attitudes regarding purchase of various content and similar were investigated. As noted above, important conclusion was that attitudes are one of the most important factors in shaping a particular behavior. Accordingly, by changing attitudes, consumer behavior related to MC can be changed. This conclusion is of a special importance for this whole document.

Except of the previously mentioned consumer needs and attitudes, mobile commerce usability is another important factor that influences consumer adoption of MC services. With this respect, hardware constraints and context challenges were discussed and some key success factors were identified as: screen size, processing power of devices, battery time, keypad size, memory size, context of mobile web sites, type of content that is displayed, the existence of interactive mobile community, easy communication interface, personalization, commerce and similar.

A brief overview of telecommunications market in the EU, CEE and Croatia provided insights into the situation and major developments in these markets. Decrease in WVS ARPU was mentioned as a relevant problem of most of the MNOs in Europe. The consumers of CEE countries were concluded to be significantly price sensitive. The same problem was related to Croatia as well. Since Croatia's economy is a very indebted one (especially in the segment of households) some doubts were expressed related to disposable income of consumers - the one that could potentially be spent for mobile commerce services. It remains to be further explored what is the size of that disposable income and whether its size is significant for the mobile commerce business case. Certainly, lucid business models should be developed to serve the price sensitive consumers of the mentioned geographical areas. It was as well concluded and marked important, that the mentioned business models bring superior and unique value for their users - residential and business consumers. Under providing "the unique value" we assumed simplifying the everyday processes that are otherwise very time-consuming and cumbersome to conduct.

### **3. Empirical research of needs and attitudes toward mobile commerce services**

In the theoretical part of the research, key concepts were explained and the framework for analysis of consumer needs and attitudes was set. In the empirical part of the research, the goal is to appraise above mentioned postulations on actual data gathered in the primary market research. Data for this research was collected via a questionnaire. In that questionnaire residential respondents and business entities were inquired about their needs and attitudes with regards to mobile commerce services and applications - both existing and potential. Empirical part of this thesis is structured in a following way that firstly data collection methods are described and that is followed by description of the questionnaire, its content and target of respondents. It is then continued with description of the population in the overall sample and the two sub samples of respondents: residential consumers and business entities. Following to that data analysis is presented. That presentation follows the structure that presented in the theoretical framework: → analysis of needs common to both residential and business respondents (need for swift information access and wireless e-mail service; the need to save time and the need for convenience) → analysis of needs specific for business respondents only (the need to improve customer service; the need to improve efficiency of business operations, increase sales performance and speed up the decision making). After needs an analysis of attitudes is completed. Analyzed are attitudes common to both residential and business respondents and relevant for mobile commerce services and applications: prices, wireless Internet (prices and usage), wireless parking and ticketing services, security and fear of new information technology, mobile commerce simplicity and convenience and wireless entertainment and leisure. After mentioned analysis summary of empirical research is obtained.

#### **3.1 Data collection**

Data for this research was collected through different institutions in Croatia: a) high schools and universities for the purpose of analysis of residential consumer needs and attitudes and b) business organizations and associations for the purpose of analysis of needs and attitudes of the business entities. Regarding the process of data collection per se - within every participating organization (school, university, business organization or an association) an inside agent was identified and asked to distribute questionnaires within his/her organization. High schools and universities showed immense interest and were generally reasonably proactive while conducting the project. Business organizations and associations nonetheless showed a noteworthy resistance to this type of methodology. This reaction was an expected one since academic research was not in their direct business interest (was not related to their core business and was burdening the internal resources). Still, a very high percentage of business organizations reacted positively and the quality level of data that was collected was very high. The geographical areas where data collection took place were residential

spaces within and around the cities of Rijeka, Pula, Zagreb, Osijek and Split. The process of data collection was the following: I phoned an institutional representative<sup>22</sup> to ask whether his/her organization would be interested in participating in the research. If and after he/she agreed to it, I sent a number of questionnaires per standard post. Filled questionnaires were received within the time of one month at the most. Nine out of ten institutional representatives agreed to take part in the research (business organizations: 40%). Ninety per cent of the questionnaires that were returned were properly completed by the respondents.

### 3.2 The questionnaire

The questionnaire: content

Empirical data for this research were gathered via a print questionnaire consisting of 70 questions. As presented in Table 4 the questionnaire consisted of four groups of questions: a) general questions about demographics, lifestyles and perception toward new information technology, b) questions evaluating existence and strength of a need for certain mobile commerce service or application c) questions evaluating existence and strength of an attitude toward certain mobile commerce services, d) questions evaluating existence and strength of a need and attitude for certain mobile commerce services concerning specific business users. The questions used were multiple choices, dichotomous and scale type. The questionnaire itself can be found in Appendix 2 of this document.

**Table 4:** Structure of the questionnaire: primary research

Question type	Question target
a) General demographics and lifestyle	Residential + business consumer
b) Existence and strength of a need	Residential + business consumer
c) Existence and strength of an attitude	Residential + business consumer
d) Existence and strength of a need and attitude	Business consumers only

The questionnaire: target groups of respondents

Targets of the questionnaire were both residential and business consumers. All respondents answered the first three sections of the questionnaire which evaluated: a) general demographics, lifestyles and perception toward new information technology, b) existence and strength of a need for certain mobile commerce service c) existence and

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<sup>22</sup> In case of high school the chosen representative was the respective Principal. He/she was explained what was the project about and what would be expected from his/her institution. Upon acceptance, he/she was instructed to assign and empower several professors to disseminate questionnaire to pupils and one to collect filled questionnaires and mail them back to the provided address. The same process was made with universities with one difference: the role of the Principal was *played* by the chosen department head (e.g. Faculty of Economics in Split: Head of the Marketing Department). In case of business organizations, the contact person was a company secretary. She/he was contacted and instructed about the purpose of the project, explained that it would be desired to get an official approval from the respective decision maker so the data collection process within an organization could be conducted legitimately. Upon approval, full description of the desired process was given to the respective secretary who then forwarded it to the inside *agent* for execution.



strength of an attitude toward certain mobile commerce services. People that ran established businesses, decision makers but also respondents who aspired to or were just about to engage in a business of their own (entrepreneurs, craftsmen) were considered in the fourth part of the questionnaire which evaluated: d) existence and strength of a need and attitude for certain mobile commerce services concerning business users in specific.

### 3.3 Description of the overall sample

Overall, the sample consisted of 712 respondents. Out of that 535 (75.1%) were residential and 177 (24.9%) business entities. The described method of data collection resulted with a sample of fairly unequal gender distribution. Four hundred and ninety eight (70.2%) of respondents were female and 211 (29.8%) were male. The average age of a respondent was 23.83 years. Overall respondents' average net income was 5.927,00 HRK<sup>23</sup>. This was calculated as a weighted average<sup>24</sup> of income range medians. The calculated average income was somewhat higher than the official Croatian average net income which is estimated at 4.400,00 HRK<sup>25</sup>. The majority of respondents lived in the cities of 100.000+ populations (28.9%). Twenty three point five per cent of respondents lived in municipalities with 2.000-10.000 people. Somewhat less (22.4%) of the overall sample population answered the lived in up to 2.000 people communities and 13.1% answered that in their area lives 50.000-100.000 people. Twelve point one per cent of respondents lived in municipalities of 10.000-50.000 people (12.1%). The distribution of subscribers within the sample population was the following: T-Mobile 53.5 %, VIPnet with 48%. Only 5.1% of subscribers from the sample had TELE2 subscription. Since the sum of wireless service providers' share within the sample exceeded 100% (53.5%+48%+5.1%=106.6%) it can be concluded that a share of respondents used more then one wireless communications provider. This is a common occurrence where a consumer uses more then one subscriber identity module (SIM) to avoid expensive interconnection charges between operators. Concurrently, one uses T-Mobile SIM for calls toward T-Mobile network, VIPnet SIM for calls toward VIPnet network etc. Sample data shown that 6.9% of respondents have VIPnet subscription beside the one from T-Mobile (my main subscription is with T-Mobile but I have additional VIPnet SIM that I use for calls toward VIPnet network). When approached from a different angle, this number accounts for 7.6% of VIPnet's customers that are also T-Mobile subscribers (my main subscription is with VIPnet, but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). Within a sample

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<sup>23</sup> 817.86 EUR by Croatian National Bank exchange rate on 14/07/2006, source: [www.hnb.hr](http://www.hnb.hr)

<sup>24</sup> Question regarding income was posed as a multiple choice one. The respective options were income ranges: a) up to 2.000 HRK; b) 2.001-4.000 HRK ... f) more then 10.000 HRK. In calculation of an average income for the whole population the weighted average was calculated in the following way: median a) was 1.000 HRK (between "0" and 2.000), median b) was 3.000 HRK (between 2.000 and 4.000 HRK ... median f) was fixed at 10.000 (lower range boundary). Final weighted average was calculated by the formula: [per cent of respondents that chosen a)] x 1.000 + [per cent of respondents that chosen b)] x 2.000 ... per cent of respondents that chosen f)] x 10.000.

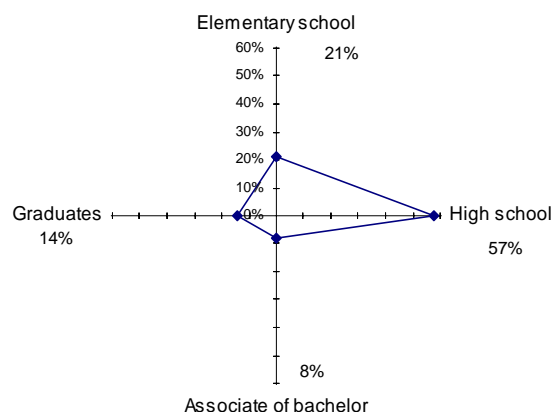
<sup>25</sup> 607.15 EUR by Croatian National Bank exchange rate on 14/07/2006, source: [www.hnb.hr](http://www.hnb.hr), data about average income taken from Republic of Croatia's Central Bureau of Statistics, [www.dzs.hr](http://www.dzs.hr).

population there exists 3.2% of T-Mobile users that also use TELE2 (my main subscription is with TELE2 but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). This number accounts for 33.3% of users of TELE2 (my main subscription is with TELE2 but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). VIPnet has also doubling of customers with TELE2, namely 3.2% of VIPnet's customers have TELE2 subscriptions (my main subscription is with VIPnet but I have additional TELE2 SIM that I use for calls toward TELE2 network). This accounts for 30.6% of TELE2's subscribers that are also subscribed to VIPnet (my main subscription is with TELE2 but I have additional VIPnet SIM that I use for calls toward VIPnet network).

### 3.3.1 The sub sample of residential consumers

The sub sample of residential wireless telecommunications users (N=535) was unequally distributed by gender as well consisting of 29.9% male respondents and 72.1% females. The average age of a respondent in this sub sample was 22.97 years. This residential sub sample is therefore quite similar to the overall sample regarding the age of respondents. Residential respondent's average net income of 5.840,00 HRK<sup>26</sup> calculated as a weighted average<sup>27</sup> of income range medians is much higher than the official Croatian average net income which is estimated at 4.400,00 HRK. Regarding the size of the municipality they lived in, 25.1% of respondents live in an populated area of more than 100.000 inhabitants; 24.7% in an area of 2.000-10.000. Twenty three point nine per cent of respondents live in areas of up to 2.000 people and 14% in regions of 10.000 to 50.000 citizens. Twelve point three per cent of respondents live in the regions of 50.000 to 100.000 people. As noted in Figure 8: 21% of respondents had only elementary school education, 57% finished some high school, 8% held associate or bachelor's degree and 8% were graduates.

**Figure 8:** Residential sub sample: Education (N=535)



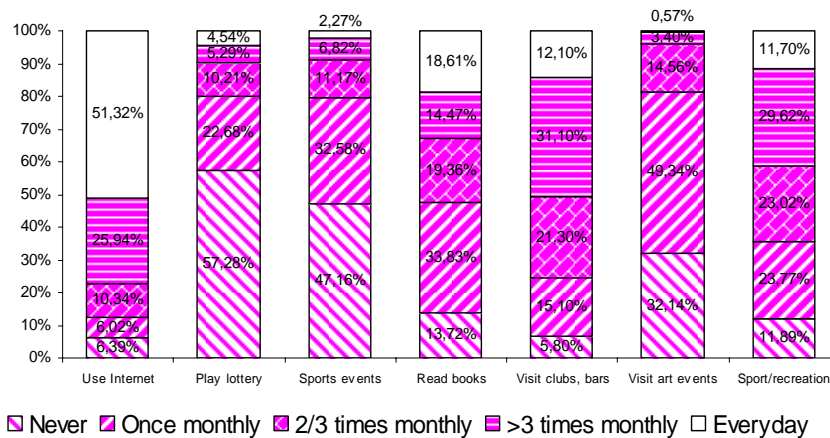
Furthermore, as suggested in Figure 9, lifestyle of residential consumers differs on the following: a) more than half of the sample population uses the Internet on a daily basis

<sup>26</sup> 805.85 EUR by Croatian National Bank exchange rate on 14/07/2006, source: www.hnb.hr

<sup>27</sup> Refer to description of the methodology on the previous pages

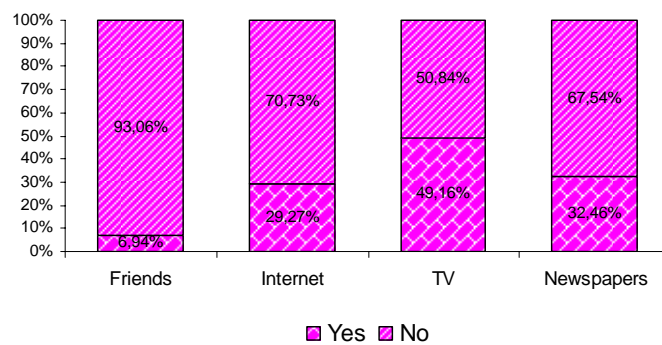
and an additional 26% does that more than three times in a week, b) 57% of the sample population never plays lottery and additional 27% does that 2-3 times monthly, c) forty seven per cent of the sample population never visits sport events and supplementary 33% does once a month, d) 17% of the sample population reads books everyday and further 34% does that once monthly, e) 12% of the sample population visits clubs and bars everyday and additional 31% does that more than three times in one month, f) almost half of the sample population visits art events once in one month and g) twelve per cent of the sample population does some form of sport everyday and supplementary 30% engages in sport activities more than three times in one month on average.

**Figure 9:** Potential for mobile commerce services: Lifestyle data - residential consumers (N=535)



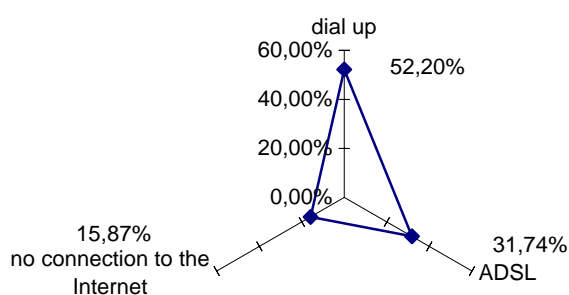
The population of above described residential consumers sub sample mostly collects their information from the television (Figure 10). The second most popular source of information is the newspapers, followed by the internet.

**Figure 10:** Behavioral data: information sources of residential consumers



Regarding the Internet usage within the sample population, 84% of the residential sample population has personal (not public) Internet access. Thirty two per cent of the residential consumer sub sample has personal (not public) broadband Internet access (Figure 11).

**Figure 11:** Residential sub sample: type of Internet connection used



Fifty five per cent of respondents within residential consumer sub sample answered they have T-Mobile subscription and 47.2% noted VIPnet as their main wireless service provider. Only 4.7% of residential consumers answered that they have TELE2 subscription as their main wireless service provider. Regarding the overall sample, there were overlaps among the residential consumers that use more than one provider. Seven per cent of T-Mobile subscribers within the sample also had a subscription from VIPnet (my main subscription is with T-Mobile, but I have additional VIPnet SIM that I use for calls toward VIPnet network). That number accounts for 8% within VIPnet's subscribers (my main subscription is with VIPnet, but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). Three point one per cent of T-Mobile subscribers also have TELE2 subscription (my main subscription is with T-Mobile, but I have additional TELE2 SIM that I use for calls toward TELE2 network). This number accounts for 36% within TELE2 (my main subscription is with TELE2, but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). Double subscriptions are 3.2% of VIPnet subscribers also using TELE2 (my main subscription is with VIPnet, but I have additional TELE2 SIM that I use for calls toward TELE2 network). This number is 32% for customers whose main wireless service provider is TELE2 (my main subscription is with TELE2, but I have additional VIPnet SIM that I use for calls toward VIPnet network).

### 3.3.2 The sub sample of business consumers

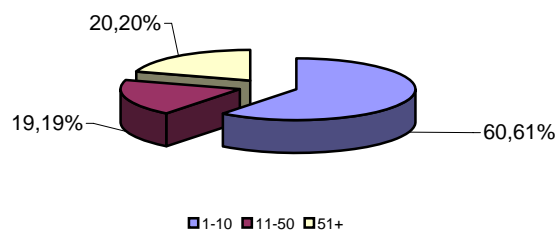
The sub sample of business wireless communications users (N=177) was unequally distributed by gender of respondents. It consisted of 35.4% male and 64.6% female respondents. The respondent's average age within the business consumer sub sample was 26.43 years. Average net income level of this sub sample was calculated as a weighted average<sup>28</sup> of income range medians and it was 6.183,00 HRK<sup>29</sup>; which is also fairly higher than this was the case for residential sub sample. For the business consumer sub sample, 40.4% of respondents lived in a city of more than 100.000

<sup>28</sup> Refer to description of the methodology in case of the overall sample

<sup>29</sup> 853.18 EUR by Croatian National Bank exchange rate on 15/07/2006, source: www.hnb.hr

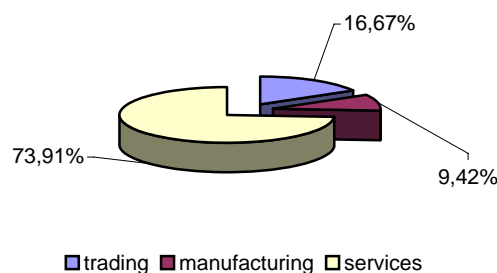
inhabitants. Mentioned group was followed by 19.9% of respondents living in municipalities with 2000-10.000 people. Seventeen and a half per cent of respondents lived in towns with up to 2.000 residents and 15.8% in cities with 50.000-100.000 inhabitants. Six point four per cent of respondents lived in residential areas with population of 10.000-50.000 residents. Regarding shares of wireless service providers within business consumers sub sample: T-Mobile occupied 49.7% share of the sample and VIPnet accounted for the rest of 50.3%. Consequently, no business wireless communications users stressed they had TELE2 as their main service provider. As for overlaps and usage of more then one wireless service provider, the situation was the following as follows: 6.8% of T-Mobile subscribers said they also have VIPnet active subscription (my main subscription is with T-Mobile, but I have additional VIPnet SIM that I use for calls toward VIPnet network). This same analogy for VIPnet is that 6.7% of their subscribers also use T-Mobile (my main subscription is with VIPnet, but I have additional T-Mobile SIM that I use for calls toward T-Mobile network). As noted in Figure 12, most of the business sub sample respondents are from very small enterprise segment (61%), the rest of respondents are employed in small and medium sized enterprises (39%).

**Figure 12:** Business sub sample: distribution by size of the company (number of employees) (N=177)



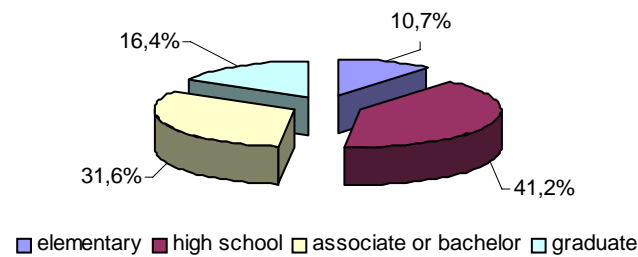
Regarding the industry split of the companies from the business consumer sub sample, it is suggested in Figure 13 that 74% were in the industry of providing different types of services (service sector), 17% were traders of general goods and only 9% were involved in manufacturing of private and industrial goods.

**Figure 13:** Business sub sample - distribution by industry type (N=177)



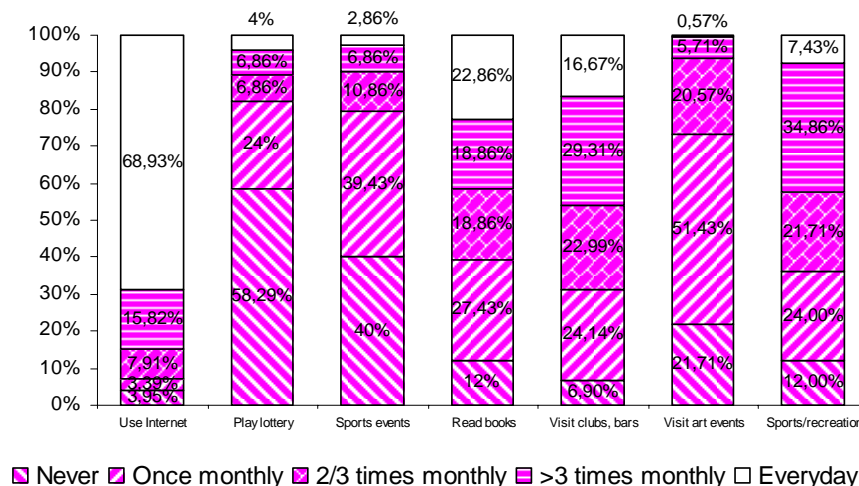
The education of respondents from the sub sample of business consumers showed somewhat different pattern when compared to the sub sample of residential consumers. Namely, these respondents had generally higher education. As noted in Figure 14, 11% of respondents had only elementary school education, 41% finished high school, 32% held associate or bachelor's degree and 16% were graduates.

**Figure 14:** Business sub sample: Education (N=177)



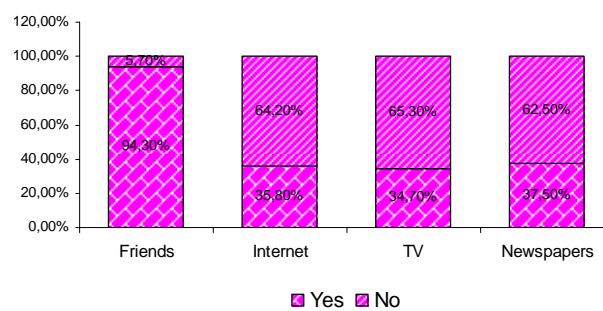
The potential for mobile commerce services expressed by ones lifestyle pattern for business consumers within the respective sub sample demonstrated slight differences in comparison to the residential sub sample. As suggested in Figure 15, lifestyle of business consumers from the sub sample is indicative in the following: a) fairly high share of sample population (69%) uses the Internet on a daily basis and additional 16% does that more than three times in one week, b) 58% of the sample population never plays lottery and additional 24% does that once in a month, c) 40% of the sample population never visits sport events and supplementary 39% does that once in one month, d) 23% of the sample population reads books everyday and further 27% does that once in one month, e) 29% of the sample population visits clubs and bars at least one time in one month and additional 17% does that everyday, f) more than one half of the sample population visits art events once in one month and g) 7% of the sample population does some form of sport everyday; supplementary 35% engages in sport activities more than three times in one month.

**Figure 15:** Potential for mobile commerce services: Lifestyle data - business consumers (N=177)



As for the sources of information for respondents from the sub sample of business consumers, the significant difference compared with residential consumers was in the fact that businesses informed themselves much more through friends (Figure 16). Ninety four per cent of business consumers noted they did inform themselves by talking with friends and relatives. By the data from the sub sample, business consumers used the Internet more intensively than residential consumers and the same patterns were visible for newspapers (38% noted they inform themselves via the newspapers). Significant share of businesses do not collect their information from the television.

**Figure 16:** Behavioral data: information sources of business consumers (N=177)



#### 4. Data analysis

Data analysis follows the same line of reasoning that was utilized for the questionnaire design and the theoretical framework. The overall sample and the sub samples are created (described separately in the previous parts). Building upon that, the analysis of business and residential consumers' needs and attitudes toward mobile commerce services and applications follows. Firstly, the needs of the residential and business consumers related to the need for quick access to information, wireless e-mail and the need for convenience and time saving are assessed. Following to that the focus is on general and specific needs of the business respondents related to improvement of customer service, business effectiveness and sales performance as well as the needs for speeding up of the decision making. The path announced in the theoretical framework is followed; differences between the needs of business and residential consumers are analyzed, spotted and commented. Business and residential consumer attitudes are approached in a way that residential and business consumer attitudes related to mobile commerce services are analyzed (prices, security, fear of new information technology and doubts related to its usefulness, simplicity and convenience of mobile commerce services and wireless entertainment and leisure services). Subsequently and with regards to business intelligence and timely information, stock market information and wireless banking services - attitudes specific for of business consumers are assessed. After the aforementioned, the analysis of differences between attitudes of residential and business consumers are spotted and commented. Finally, conclusions regarding both sub samples are presented at the end of the chapter.

## 4.1 Data analysis - consumer needs and attitudes

### 4.1.1 Residential and business consumer needs - analysis

#### The need for quick access to information and wireless e-mail service

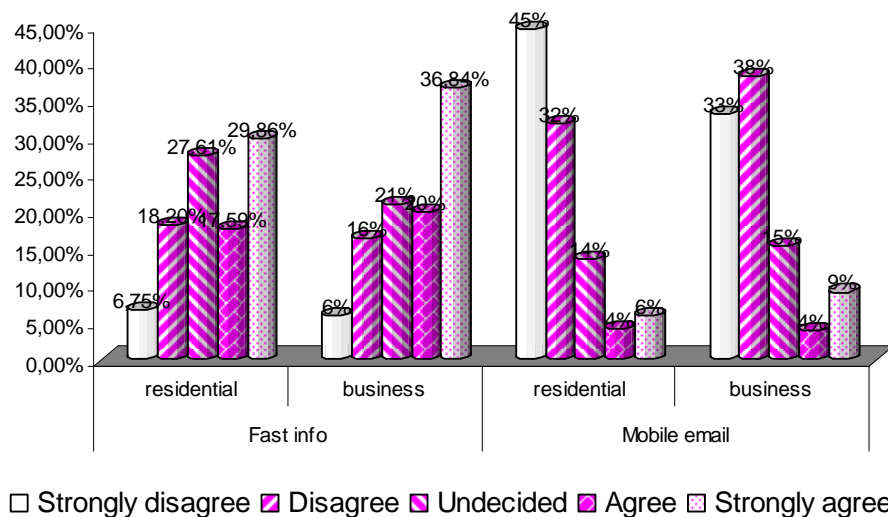
As it is presented in Figure 17, in the sub samples of residential and business consumers it was found that a very similar (small) portion of residential (6.8%) and business consumers (6%) strongly disagreed that they need quick access to information. Regarding the need for wireless e-mail service the finding was somewhat dissimilar. Strong disagreement related to the need for wireless e-mail service was much more visible with the residential (45%) than the business consumers (33%). This finding is considered to some extent normal since it was assumed that business entities need wireless e-mail service for their everyday operations more than their residential counterparts. The same pattern was found in case of fast access to information. Namely, 18.3% share of the residential sub sample consumers disagreed they needed this feature. Sixteen per cent of business consumers disagreed they needed fast information access. On the part of wireless e-mail service, 32% residential consumers disagreed they needed this service. Thirty nine per cent of their business counterparts also stressed so. The already visible pattern of difference between residential and business consumers is even more indicative when percentage of respondents who agreed and fully agreed on questions measuring the need for mobile commerce services that would deliver timely information and wireless e-mail service are taken into consideration. Namely, 17.6% of the residential consumers agreed they needed fast information access and 20% of business respondents stressed so. The same percentage of residential and business respondents agreed they needed wireless e-mail service (4%). The most important, 29.9% respondents from residential consumer sub sample strongly agreed they needed swift access to information and 36.8% of their business counterparts thought they needed this benefit. Regarding wireless e-mail service, 6% of residential consumer sub sample respondents strongly agreed they needed it and 9% of their business counterparts thought they needed mentioned advantage. Significantly more residential than business consumers were indifferent in their perceptions of whether they do or don't need fast access to information (27.6% of sample population in case of residential and 21% of business consumers). Somewhat opposite situation was found in case of wireless e-mail service where 5% of residential consumers were identified indifferent with regards to their need for mentioned service. This was the case for 6% of respondents from the business consumers sub sample.

To a significant extent, it is visible from the above described findings that a) fast wireless access to information is a somewhat more desirable feature for the business consumer and b) nevertheless in lesser extent than this was the case with swift access to information; wireless e-mail service is as well a more desirable



feature for the business consumer (the portion of residential consumers who strongly disagreed was also much larger). Business and residential consumer sub samples were different with regards to the need for fast information and the need for wireless e-mail service i.e. businesses are more inclined to use mentioned mobile commerce services.

**Figure 17:** Needs for fast information and mobile e-mail: residential versus business consumers

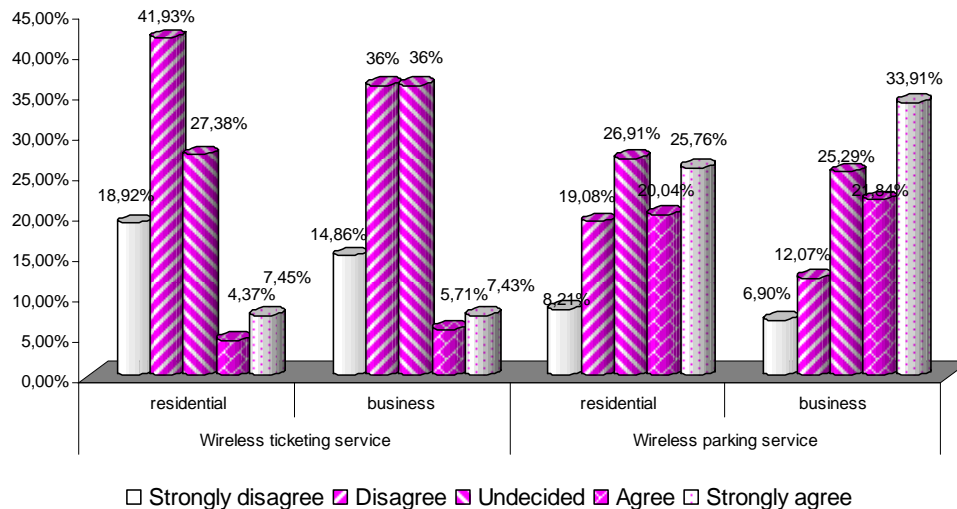


The need to save time and the need for convenience

The need to save time as and the need for convenience were both evaluated by measuring respondent’s need for services: wireless parking and wireless ticketing. This path was taken since it was indirectly assumed in the theoretical framework that both of these services/types of services provide significant savings in time and a fair amount of process-related user convenience. Similar pattern was found as with previously evaluated need for fast information access and the need for mobile e-mail as data from business sub sample suggested that business consumers needed these kinds of services more than their residential counterparts (wireless parking service in particular). As it is visible in Figure 18, higher percentage of respondents strongly disagreed they needed wireless ticketing compared to those that thought so with regards to wireless parking service (ticketing: business 14.9% - residential 18.9%; parking: business 6.9% - residential 8.2%). A similar pattern is visible with the share of respondents that disagreed they needed these services (ticketing: business 36% - residential 41.9%; parking: business 12.1% - residential 19.1%). The visible difference was in the agree area where wireless parking service certainly took the lead in consumers’ preferences. Five point seven per cent of business respondents from the sample agreed they needed wireless ticketing service and this was so for 4.8% of residential consumer respondents. Regarding wireless parking service, 21.8% of business respondents agreed they needed wireless parking service and 20% of their residential counterparts stressed so. The portion of respondents that strongly agreed they needed wireless ticketing service was 7.4% for the

business sub sample and 7.5% for the residential counterpart. This situation was much more indicative for the wireless parking service. A little less than 34% of business respondents strongly agreed they needed wireless parking service and a bit fewer than 26% of residential consumers also stressed so. Related to the needs of both business and residential part, the share of undecided respondents was somewhat higher in case of the need for wireless ticketing service (residential: 27.4%, business: 36%).

**Figure 18:** Respondents' answers: need for wireless parking and ticketing services



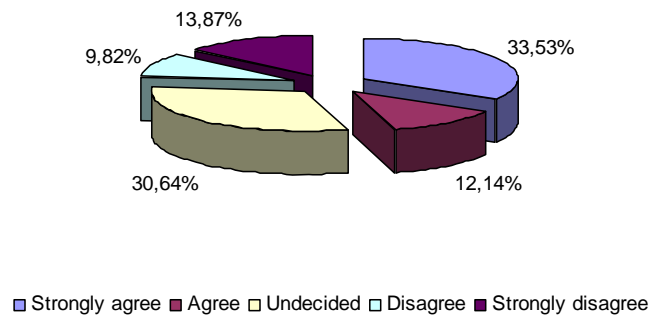
The conclusion related to the above mentioned mobile commerce services is that a) in general wireless parking service seems appealing to both business and residential consumers. When compared between the two sub samples, b) business consumers showed stronger need for mentioned service. Regarding wireless ticketing service the conclusion is that c) there was a high share of respondents which were undecided or not sure of whether they thought they really needed this service or not.

#### 4.1.2 Specific needs of business consumers - analysis

##### Need of a business to improve its customer service

The need to improve customer service was evaluated based on business consumers' answers to the following question: Capability to reply swiftly to my customers' and business partners' inquiry by e-mail is what I need for my business. As it is suggested in Figure 19, only 9.8% of respondents from the business consumers' sub sample strongly disagreed with mentioned statement. Nine point eight per cent disagreed and 30.6% were undecided. Twelve point one per cent of respondents agreed that they needed the capability to reply swiftly to their customers' and business partners' inquiry by e-mail and 33.5% strongly agreed they needed such a capability.

**Figure 19:** The need of businesses to improve the service by replying to their customers' inquiries via e-mail quickly



From the data presented above it can be concluded that more than half of the respondents from the business sub sample need the capability to reply swiftly to their customers' and business partners' inquiries by e-mail.

Need of a business to improve the efficiency, sales performance, and speed up the decision making  
 The needs of businesses regarding improvement of the efficiency, the sales performance, and speeding up of the decision making were evaluated on the example on the following mobile commerce services: a) the mobile commerce service that provides information related to real time evaluation of ones buyers: examination of the buying company's type, credit ability and risk profile, b) wireless Internet access and c) wireless business banking services.

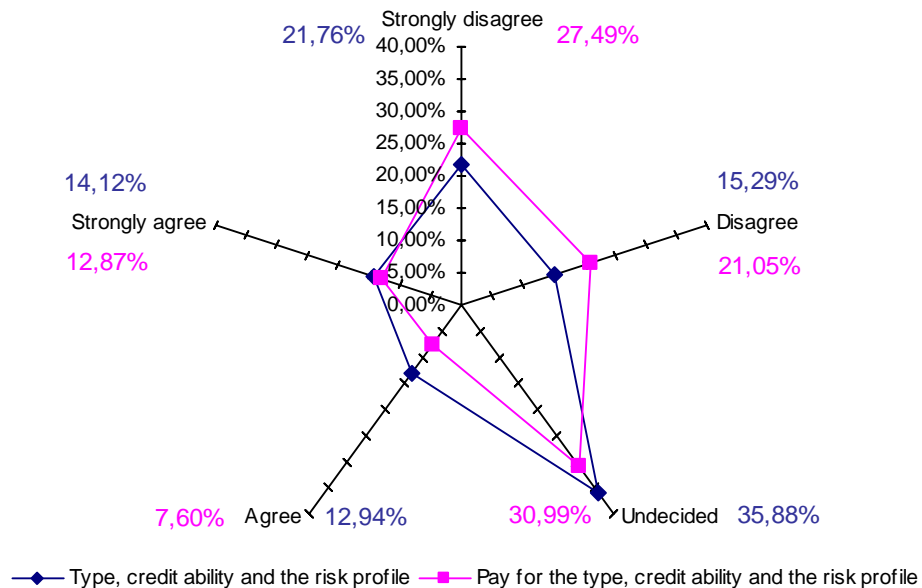
Need of a business to examine a buying company's type, credit ability and risk profile  
 Business consumers' needs regarding improvement of the operational efficiency, the sales performance, and speeding up of the decision making were evaluated on the example of the mobile commerce service that provides information related to real time evaluation of ones buyers: assessment of the buying company's type, credit ability and risk profile (Figure 20). The statement evaluating this business need in the questionnaire was posed in two ways:

1. "I need a service that can enable me to screen the type, the credit ability and the risk profile of the company that buys goods from my organization"
2. "I need a service that would enable me to screen the type, credit ability and the risk profile of the company that buys goods from my organization and I am ready to pay a fee for such a mobile commerce service"

Fourteen point one per cent of respondents strongly agreed they needed such a service and 12.9% agreed strongly when the statement included a fee to pay. Twelve point nine per cent

of respondents agreed to the above mentioned statement and 7.6% stressed the same in case when statement included a charge. The share of undecided respondents was 35.9% for the statement variant 1) and 31% for the statement 2). Fifteen point two per cent of respondents disagreed they would use a service under variant 1) and 21.1% disagreed they needed a service in the scenario 2). On the other hand, 21.8% of respondents strongly disagreed on statement variant 1) and 27.5% meant so for its variant 2).

**Figure 20:** The need of businesses for a service that enables them to screen the type, credit ability and the risk profile of their buyers

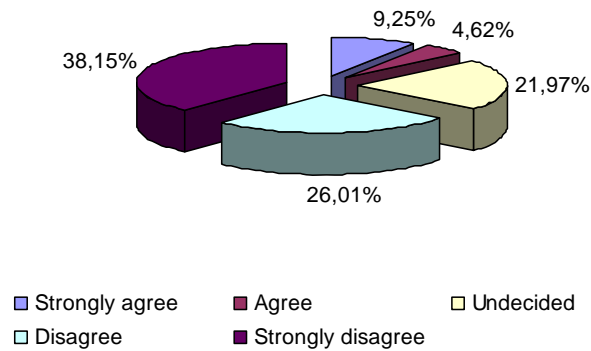


It can be concluded that a) in general, lesser percent of respondents stressed they needed above mentioned service in its variant 2) than 1). Further on, b) a high share of undecided respondents was found for both variants of the statement.

#### The need of businesses for wireless Internet service

Wireless Internet service provides a business person the capability to access the Internet when one is out of the office. This way it contributes to the efficiency of that person since it is not needed that one returns to the office to reply and send e-mail messages, create and view business documents etc. To evaluate business consumers' need for such a service, respondents from the business sub sample were asked to rate to what extent they agreed on the following statement: "For my business - I need wireless Internet service" (results are displayed in Figure 21). Thirty eight point two per cent of the respondents strongly disagreed to the mentioned statement and additional 26% disagreed. Twenty one point nine per cent of respondents were undecided. Only 4.6% of respondents agreed they needed such a service and 9.3% strongly agreed. The results presented above lead to a conclusion about the current cognitions of business customers toward wireless Internet access.

**Figure 21:** The need of businesses for wireless Internet access



From the previously noted facts, it can be concluded that only one tenth of the respondents strongly agreed they needed wireless Internet service and additional 4.6% agreed on the same question asked.

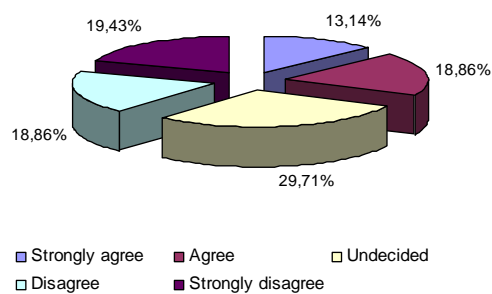
#### The need of businesses for wireless banking service

Services supporting wireless banking provide a fair amount of added value in terms of time management of a business person (Pousttchi & Schurig, 2004). It was assumed in the theoretical framework that this wireless feature might be appealing to a business person. During the field work two statements regarding this topic were posed to respondents: a) “Often, I need to view my business banking account when I am out of the office” and b) “I need simple wireless banking solution”. The answers of respondents are displayed below under a) and b) respectively.

##### a) Need of businesses to view ones business banking account when one is out of the office

As described in Figure 22, 13.1% of business respondents strongly agreed on the statement and additional 18.9% agreed. Thirteen point one per cent of respondents strongly disagreed with the mentioned statement and 18.9% disagreed. A high 29.7% of respondents were found undecided on the posed statement.

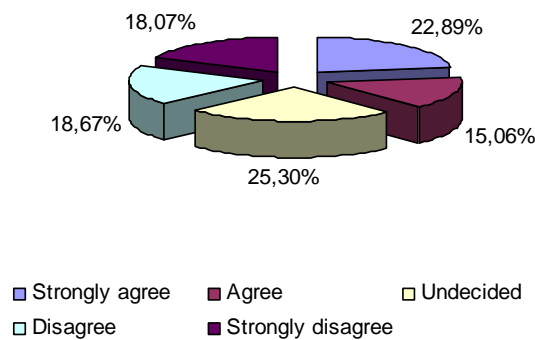
**Figure 22:** The need of business consumers: view their business banking account when out of office



b) Need of businesses for a simple wireless banking solution.

In Figure 23 the summarized answers to the question are charted. From the results presented it is clear that 22.9% of business respondents strongly agreed that they need the mentioned solution and supplementary 15.1% agreed. A little more than 18% of respondents strongly disagreed that they have needs for mobile banking solution and 18.7% disagreed. As with the previously explained statement a fairly high share of undecided respondents were identified in case of this statement also.

**Figure 23:** Do businesses need a simple wireless banking solution?



Regarding the two statements that evaluated business consumer's needs for wireless banking services when they are out of the office and their need for wireless banking solution the following conclusions can be drawn: a) business consumers' answers from the sample suggest that they show lesser need to do their banking when they are out of the office than a need for a simple wireless banking solution (when shares of answers on the agree side of the Likert scale are summed, 32% of respondents (strongly) agreed they needed to do their banking when they were out of the office and 38% of respondents (strongly) agreed they needed a wireless banking solution. Further on b) a fairly high share of respondents were undecided in case of both need to do ones' banking when out of the office (29.7%) and a need for a wireless banking solution (25.3%).

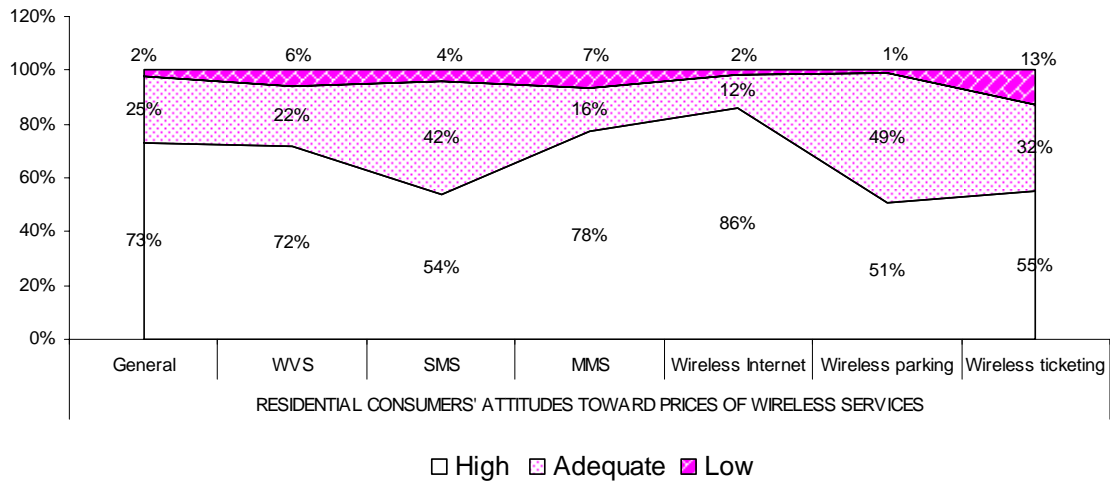
#### 4.1.3 Residential and business consumer attitudes - analysis

##### General attitudes toward prices of wireless telecommunications services

Due to a general consumer perception, prices still represent an important obstacle to the realization of a genuine desire of an average consumer: unlimited freedom in wireless communications for an affordable price. Figure 24 is supports this claim. A major portion of residential consumer still find prices of wireless communication generally high (73%). SMS is perceived not as expensive compared to all other mentioned services (54% of respondents thought it was expensive). The prices of services that imply data transfer such as MMS (78% of respondents though it was expensive) and wireless Internet (86% of respondents thought it was expensive) were both perceived as fairly high. Wireless parking service is perceived the least expensive even though it is a value added service (51% perceive its price as a high one).

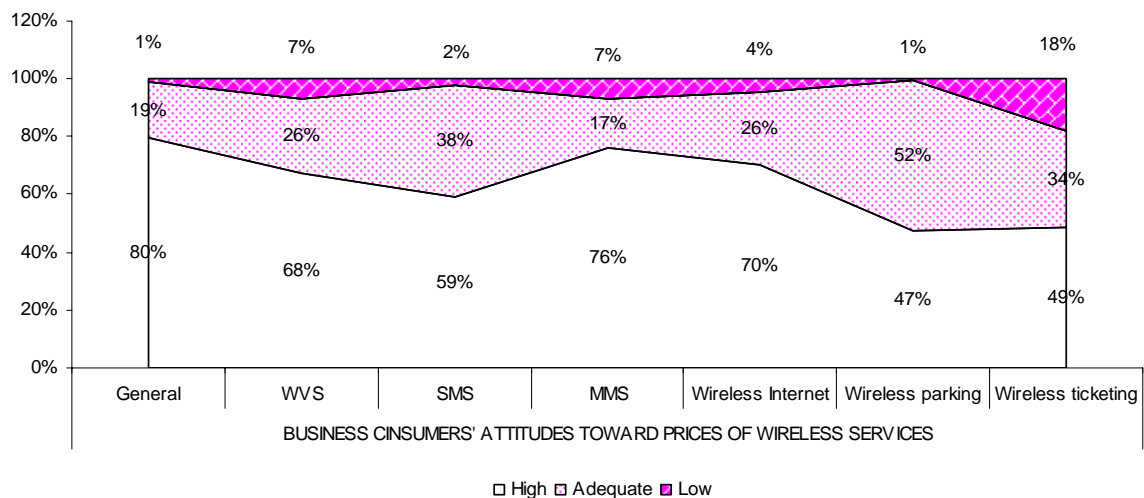
Similar finding relates to Wireless ticketing service which whose prices were perceived as high by 54% of respondents from the residential consumer's sub sample.

**Figure 24:** Residential consumer's attitudes toward prices of wireless communication services



In case of business consumers the attitudes toward prices of wireless communications were similar as in case of previously described residential consumers (Figure 25). Namely, 80% of business respondents thought that the prices of wireless communications in general were high. Sixty eight per cent thought that wireless voice service's price was high and 54% thought so in case of SMS. Services that imply data transfer were as well perceived somewhat expensive. Namely, 78% of respondents thought MMS prices were high and 86% thought so for the wireless Internet service. As it was with residential consumers, the price of wireless parking service was considered the least expensive in case of businesses: 51% of respondents thought this service was expensive. Following to that, 55% of business respondents thought wireless ticketing service was expensive.

**Figure 25:** Business consumers' attitudes toward prices of wireless communication services

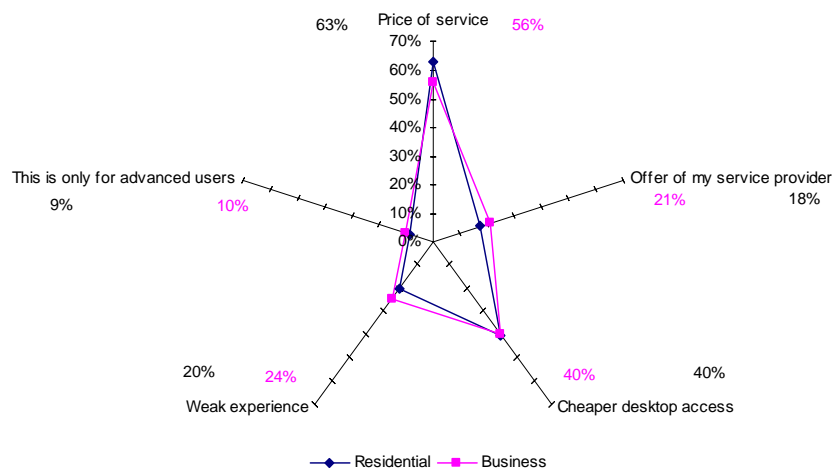


From the above described attitudes toward prices of wireless communications services and chosen mobile commerce services it can be concluded that a) generally both residential and business consumers thought that the prices of wireless communication services in general were high. Further on, b) prices of mobile commerce services such as MMS and wireless Internet were considered the highest among all chosen services. Additionally, c) mobile commerce services whose purpose is mostly convenience and saving of time (wireless parking service and wireless ticketing service) were considered the least expensive even though these are classified as more expensive VAS type services (more expensive on the per unit criteria).

#### General attitudes toward wireless Internet service

When wireless Internet is evaluated in detail, residential and business consumers' attitudes toward this service showed similar patterns. As it can be observed from Figure 26, the most of the residential and business respondents see prices of the service as the most relevant obstacle to its usage. This fact is somewhat more relevant on the part of residential (63%) than business consumer (56%). As a second obstacle, perceived less expensive ADSL desktop access is identified in case on side of 40% both residential and business respondents. Following to that, weak wireless Internet experience and offer of the wireless service provider are recognized. Wireless Internet is only for advanced users was a notion chosen by only 9% of residential and 10% of respective business respondents.

**Figure 26:** What consumers perceive as an obstacle to using the wireless Internet service? <sup>30</sup>



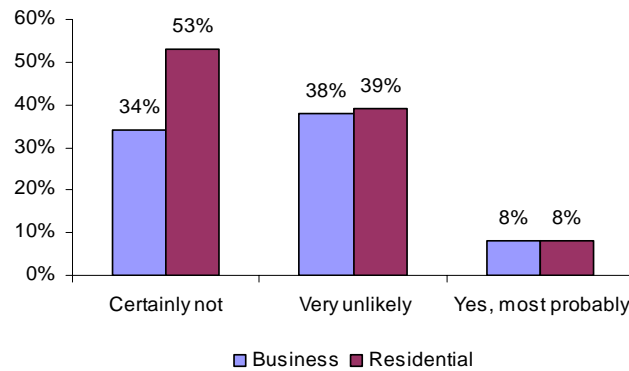
Related to the attitudes regarding whether one planned to subscribe to a wireless Internet tariff plan in the coming year, consumers' answers charted in Figure 27 suggest this was highly unlikely to occur. By the data presented 54% of businesses will certainly not do so and additional 38% thought this was very unlikely. A modest 8% planned to acquire a wireless Internet subscription in the next year. Regarding residential consumers this situation is very similar as 53% of the respondents stressed they were not to acquire a wireless

<sup>30</sup> a) price of service, b) offer of my service provider, c) cheaper desktop access, d) weak Internet experience, e) this is only for advanced users



Internet package from their service provider in the next year and a supplementary 39% thought this was very unlikely to occur. Same as with business consumers, a poor 8% of the respondents can be expected to acquire a wireless Internet tariff plan in the next year.

**Figure 27:** Will consumers subscribe to wireless Internet service in the next year?

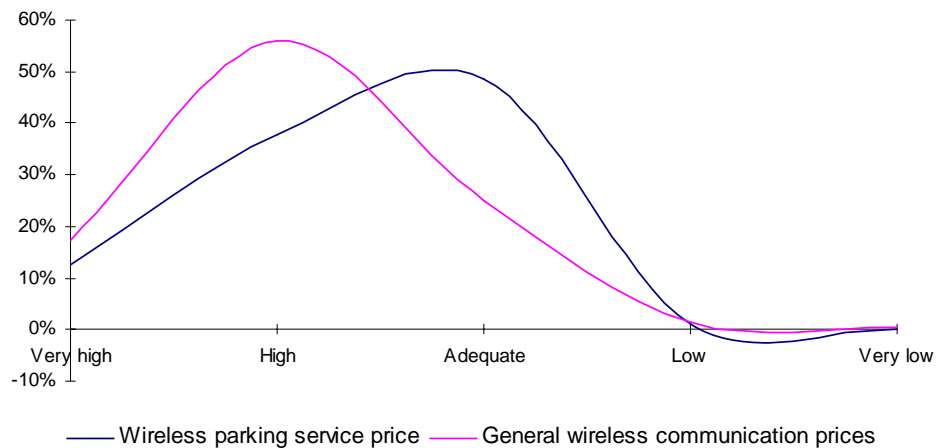


From the above discussion it can be concluded that a) the main obstacle to mobile commerce services adoption in case of wireless Internet service for both residential and business consumers is the perception of price. Even though the prices decreased significantly in the year 2006 and the service became more available in the mass market, negative consumer perception of prices as “very high” is still significantly present. Additionally, b) second important obstacle to wireless Internet service still is the availability of the wire line ADSL Internet access provided from the wire line broadband enterprises. Nevertheless wire line and wireless Internet are not direct substitutes, consumers still perceive them as such and are mostly willing to have one, not both. Regarding the prospects for wireless Internet service adoption, a very small portion of respondents from both residential and business side agree they are about to purchase the service in the upcoming year.

As it was argued in the introductory chapter, mobile commerce services only have potential in situations where it can provide a clear value to a consumer and in those situations prices are assumed not to be the obstacle to adoption. Related to that assumption, it is interesting to examine the following price attitudes to certain services that are not purely content based but are rather simplifications of everyday processes that are time consuming and frequently inconvenient (e.g. paying for parking and purchasing cinema and theatre tickets). In the following part these services are going to be examined more in detail. From the chart in Figure 28 it is clear that prices of the wireless parking service for both residential and business respondents are perceived generally lower compared to prices of wireless services in general (under which mostly wireless voice service is assumed). Since consumer value from this proposition is significant saving of time (it is instant) and a fair amount of convenience (no change-coins needed for the parking machine, only a VAS SMS sent to clearly communicated destination) the low price perception

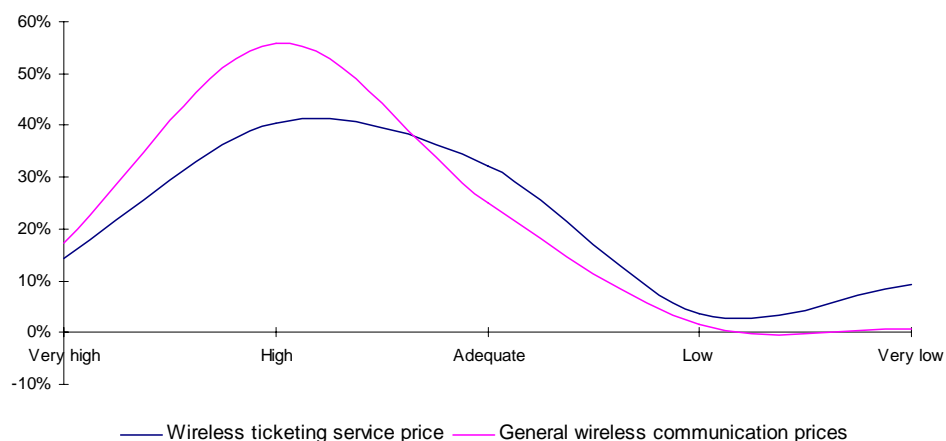
regarding this service is somewhat understandable because, as it was discussed in the opening chapters: the challenge with mobile commerce value added services is not about the price a consumer has to pay, but about the need that is satisfied (i.e. the value that is delivered to a residential or a business entity). Therefore, prices for the following services are not perceived by consumers as “very high” even though they are *de facto* higher on “per unit” basis. The results are presented in the text that follows.

**Figure 28:** Differences in price perception: wireless parking service and wireless communication prices in general



The same pattern as with the wireless parking service was found in case of wireless ticketing service. Mentioned pattern is charted in the Figure 29 and it is assumed that reasons for this finding are the same as in case of the above mentioned service enabling for a consumer a simple and convenient parking payment process.

**Figure 29:** Differences in price perception: wireless ticketing service and wireless communication prices in general



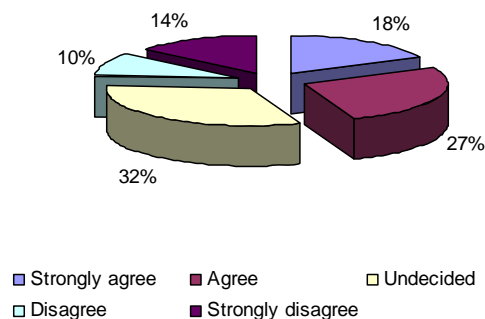
Regarding prices of wireless parking and ticketing services, respondent’s answers led to following conclusions: a) nevertheless they are fairly high, prices of wireless parking service are perceived lower than prices of wireless communication in general and b) prices of wireless ticketing service are perceived lower than prices of

wireless communication in general and as such follow the same pattern as in case of wireless parking service. Additionally, c) the consumer value out of mentioned propositions is significant saving of time (it is instant) and a fair amount of convenience (no change needed for the parking machine/ticket purchase - only a VAS SMS sent to clearly communicated destination). Due to that fact, the perception of low prices related to mentioned services is somewhat understandable. As it was discussed in the opening chapters of this thesis, d) this is due to the fact that the challenge with mobile commerce value added services is not related to their price, but to relieving the *right* need of the respective consumer and doing that in the *right* way in terms of service delivery.

#### Attitudes toward security of mobile commerce transactions

As it was argued earlier and noted by other authors (Pousttchi, 2003), it is the perception of security that is the first prerequisite for adoption of any mobile commerce service. As it is presented in Figure 30, most of residential consumers that were inquired about their perceived security of the mobile purchase that they have recently made were undecided (32%). Eighteen per cent of the respondents strongly agreed that the transaction was secure and 14% agreed. Eighteen per cent of respondents strongly disagreed that a purchase they recently made using their wireless device was secure and 27% disagreed to the statement.

**Figure 30:** Is it secure? Residential consumers' perceptions - security of their recent wireless purchase



From the residential consumers' sample data it can be concluded (as it was assumed in the theoretical framework) that security still is a concern and might be an obstacle to mobile commerce service adoption.

#### Attitudes toward fear and usefulness of new information technology

Fear of technology implies the reluctance to acquire new knowledge of information technology. As suggested in Figure 23 fear of technology is fairly equally distributed in case of residential and business respondents. Residential and business respondents were asked to choose one of three offered answers for every one of three dimensions that were measured: a) ones general self perception (me and new information technology), b) ones perceived general usefulness of new information technology and c) ones' purchase behavior regarding new information technology.

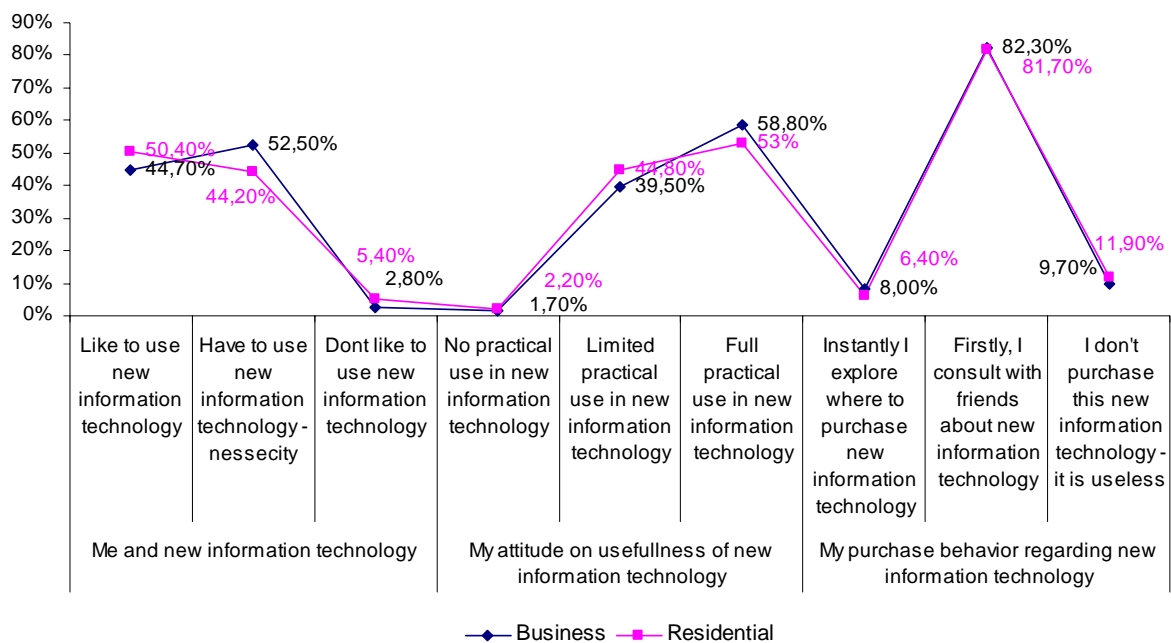
### General consumer self perception with regards to new information technology

As described by Figure 31, the most of residential as well as business consumers from the sample generally like to use new information technology (50.4% of residential and 44.7% of business consumers). With regards to respondents' understanding of the claim: "it is a necessity of life to use new information technology in contemporary times", somewhat more business respondents reacted (52.5%) compared to their residential counterparts (22.2%). Fairly low percentage of both residential and business respondents stressed they don't like new information (5.4% of residential and only 2.8% of business respondents).

### General perceived usefulness of new information technology

Fairly low percentage of both residential and business respondents thought that there is no practical use in the new information technology (2.2% in case of residential and 1.7% in case of business respondent). Forty four five per cent of residential respondents thought that there exists a limited practical use in new information technology and this was the case with 39.5% of their business counterparts. Fifty three per cent of residential respondents thought there does exist a full practical use for products and services delivered via means of new information technology and this was so for 58.8% of their business counterparts.

**Figure 31:** Residential and business consumer attitudes toward new information technology



### Purchasing behavior regarding new information and wireless technology

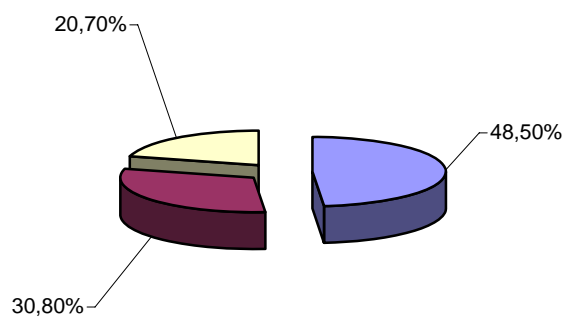
A comparatively equal pattern was found for both residential and business respondents with regards to their purchasing behavior. As it is clear from Figure 31, similar patterns of respondents' answers are visible for both residential and business sub samples with considerable peak on "consulting with friend with regards to which product or service of new information technology (not) to purchase".

From data of both sub samples, it can be concluded that a) in general significant dislike of new information technology was not found (even though this was assumed to be found in the theoretical framework). Further on, b) most of the respondents from both sub samples recognize that products and services delivered via means of new information technology have limited or full functional and/or practical use and c) respondents from both sub samples stressed they would primarily consult with their friends before they purchase a product or a service that can be characterized as new information technology.

### Simplicity and convenience

One of the assumed key pre-conditions for adoption of mobile commerce services and applications by consumers is the usage simplicity of such services (MeT, 2003). Related to sub samples of residential and business consumers from the research, Figure 32 describes the share of consumers that made a purchase using their mobile phone (a screening inquiry for the question about simplicity and convenience of mobile purchases). As it is evident from the Figure 32, 30.8% of respondents made a purchase using their mobile phone more than once.

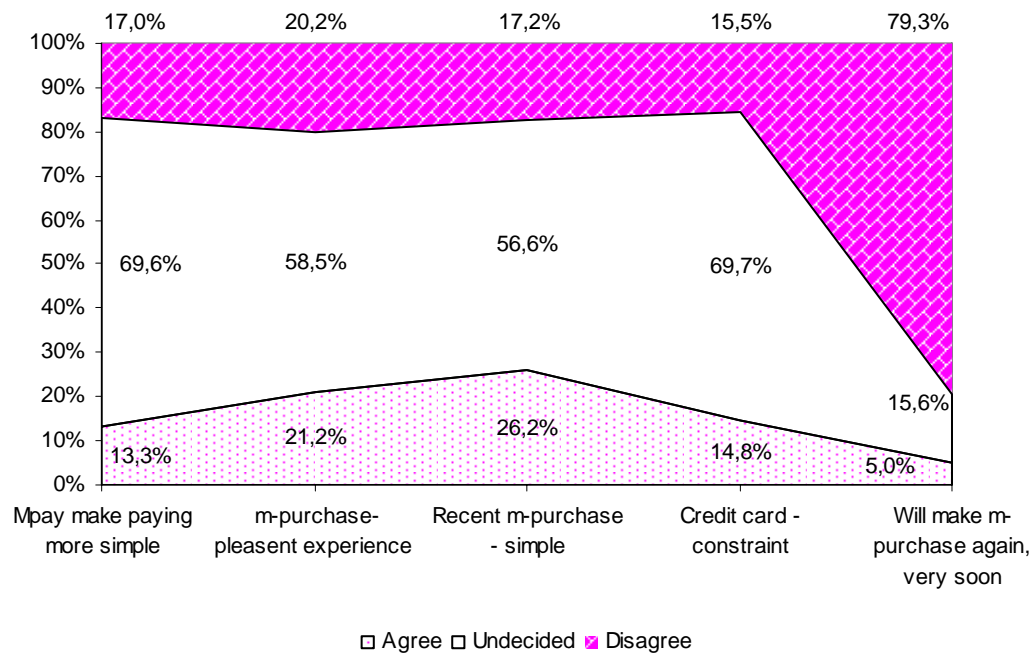
**Figure 32:** The share of residential and business consumers that ever made a mobile purchase



Further on, in Figure 33 results regarding residential consumers' attitudes toward mobile purchasing are displayed. For attitude evaluation, these questions were posed using scales with three levels: agree undecided and disagree. On the first glance it is rather clear that many of the respondents were undecided regarding the statements. In relation to mPay service 13.3% of respondents agreed that this service makes paying for goods and services simpler and 17% disagreed. Sixty nine point six per cent of respondents were undecided. On the question of how pleasant was the process of mobile purchase, 21% of respondents agreed it was pleasant, and 20.2% disagreed on such a statement. Fifty eight point five per cent of respondents were undecided. On the question of simplicity, 26.2% of respondents found their recent mobile purchase simple and 17.2% didn't go through a simple experience. Fifty six point six per cent of respondents were undecided. Only 14.8% of respondents agreed that the requirement of a credit card as a collateral for mobile purchasing is a constraint to this type of purchasing and 15.5% disagreed on the statement. A significant

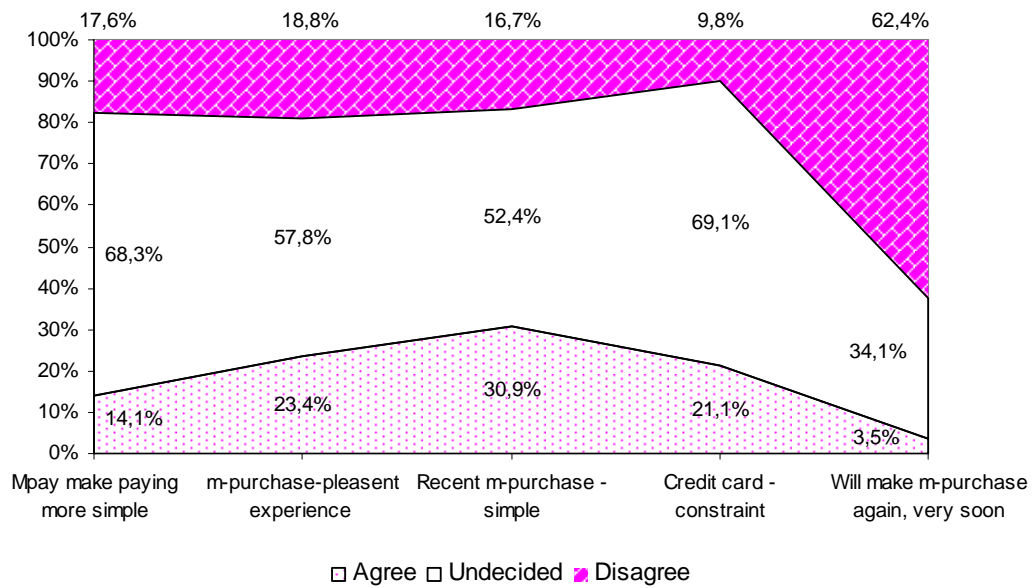
69.7% of respondents were undecided. Residential consumers' intention of making another mobile purchase in the near future is unlikely since only 5% of respondents agreed they would do so, 79.3% disagreed and 15.6% were undecided on prospect for such an action in near future. The last answer indicates strong consumer disbelief with regards to future wireless purchases.

**Figure 33:** Residential consumers' attitudes toward mobile purchasing



The same statements were posed to the respondents from the business consumers sub sample as well (Figure 34). In relation to mPay service 14.1% of respondents agreed that this service makes paying for goods and services simpler and 17.6% disagreed. Sixty eight point three per cent of respondents were undecided. On the question of how pleasant was the process of mobile purchase, 23.4% of respondents agreed it was pleasant, and 18.8% disagreed on such a statement. Fifty seven point five per cent of respondents were undecided. On the question of simplicity, 30.9% of respondents found their recent mobile purchase simple and 16.7% didn't go through a simple experience. Fifty two point four per cent of respondents were undecided. More than in the case residential respondents, 21.1% of respondents agreed that the requirement of a credit card as a collateral for mobile purchasing is a constraint to this type of purchasing and 9.8% disagreed on the statement. Significant sixty nine point one per cent of respondents were undecided. Business consumers' intention of making another mobile purchase in the near future is unlikely since only 3.5% of respondents agreed they would do so, 62.4% disagreed and 34.1% were undecided on prospect for such an action in near future. Business consumers' negative beliefs in future prospects of wireless purchases were somewhat milder than this was the case with their residential counterparts. However, strong negative beliefs were found here as well. The sample data does not assume great prospect for this type of services.

**Figure 34:** Business consumers' attitudes toward mobile purchasing

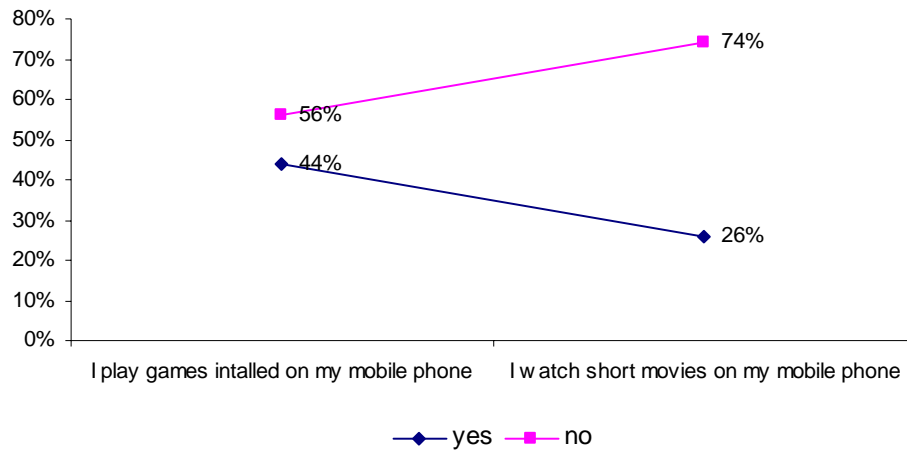


Regarding both residential and business respondents following conclusion can be drawn: a) more than half of all respondents purchased a good or a service using their mobile phone at least once. Therefore, a significant share of the respondents made that first step and gave this type of services a chance. Further on, b) except the topic related to making a mobile purchase in a near future that was fairly negative, all statements faced fairly high and even share of undecided respondents. It might be assumed that some form of confusion and ambiguity exists among consumers and with respect to these types of services (however, this statement doesn't necessarily have to be correct). Finally, c) business consumers' answers seemed somewhat more encouraging with regards to mobile purchase behavior; however, statistics on their answers still leave a fairly large space for doubt. Due to very high shares of undecided respondents, it is matter of further research to explore this finding more into detail.

#### Attitudes toward wireless entertainment and leisure

Mobile entertainment is a large and growing market. Depending on which market forecast is consulted, the estimates are in the range of 5 billion to 11 billion dollars until 2007 (Eurescom, 2006). Since early 2000, the market has grown by 10,000 percent to now. Entertainment has evolved from TV, the computer and Internet to mobile handsets. Mobile entertainment has the advantage that it is very pervasive (Eurescom, 2006). Wireless entertainment and leisure was tested only on the sub sample of residential consumers. As it is visible from Figure 35, 44% of respondents played or continuously play mobile games that are pre-installed on their mobile devices. Only 26% of residential consumers watch short movies on their mobile phones what confirms the prior assumption about relative lesser popularity of this type of content.

**Figure 35:** Residential consumers' usage of wireless entertainment

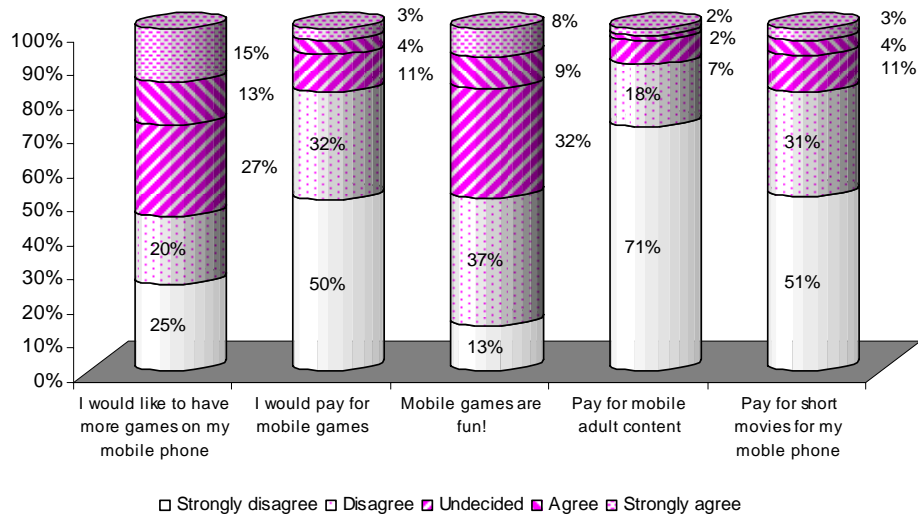


When a more detailed analysis of the preferred types of wireless entertainment and leisure is conducted, this topic becomes somewhat clearer. In Figure 36 it is visible that 15% of residential consumers from the sample strongly agreed that they would like to have more mobile games on their personal mobile device and 13% agreed. Twenty five per cent of respondents strongly disagreed on their want for mentioned features and additional 29% disagreed and 27% of respondents were undecided with regards to this topic. Still, only 8% of respondents strongly agreed that mobile games were fun to play and 9% agreed. Thirteen per cent strongly disagreed on this statement and 37% disagreed leaving 32% of respondents undecided. When the question of having additional mobile games on ones mobile device was constrained with payment of a fee for having such a feature, respondents showed much more reluctance. Only 3% strongly agreed they would use such a feature and supplementary 4% agreed. Fifty per cent of respondents strongly disagreed they would have a feature if it included a fee and 32% disagreed. Eleven per cent of respondents were undecided on the topic. Regarding purchase of short movies and adult content, residential respondents were not found interested as high 71% strongly disagreed they would pay for adult content to be delivered to their mobile phone. The similar pattern was identified in case of short movies where 51% strongly disagreed they would pay for such kind of a mobile content.

It can be concluded that nevertheless a fairly high share of residential consumers from the sample played mobile games that were pre-installed on their mobile phones a) fairly low share of those respondents would accept to pay a fee for such an entertainment content (however, a constraint of the residential consumers sample has to be taken into consideration, as rather insignificant number of children were included into its population – less than 1% of under the age of fifteen). Furthermore, b) short movies and adult content didn't seem to stimulate the excitement of respondents from the residential consumers sub sample. So, residential consumer's behavioral pattern regarding mobile gaming is that a large number of consumers play. However, there exists a significant difference between those who like to have additional mobile games and those who would actually pay for that type of the content.



**Figure 36:** Residential consumers' usage and attitudes toward wireless entertainment



#### 4.1.4 Specific attitudes of business consumers - analysis

As it was in the case of needs, attitudes were also analyzed for the sub sample of business consumers. This was done separately because as it was assumed in the theoretical part that the nature of a businesses entity is quite a lot different when compared to the residential entity.

##### Business intelligence and timely information

Results of business consumers' responses on questions and statements evaluating attitudes toward business intelligence and timely information are presented in Figures 37 and 38. Respective questions and statements were: a) responding to my e-mails swiftly is good for my business, b) I would use a service that would let me download, view and edit attachments from my mobile phone, c) It is useful to have timely information about the solvency of my buyers, d) I would pay for a service that would deliver timely information about solvency of my buyers to my mobile phone, e) if this would be offered and had an appropriate price I would view my banking account daily using my mobile phone, e) I am interested and I would pay for business related content to be delivered to my mobile phone.

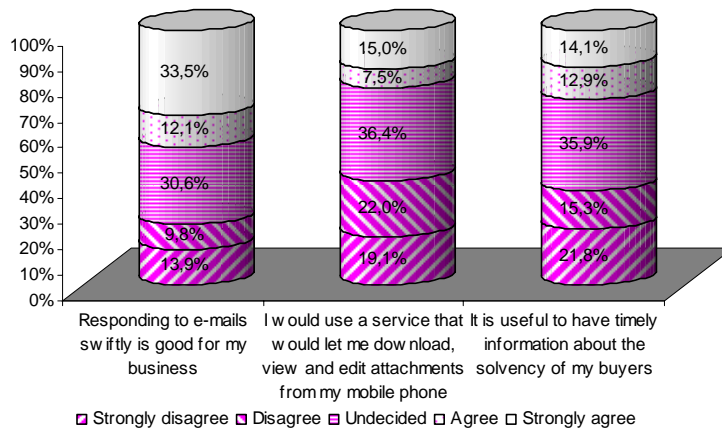
##### Swift e-mail communication

As it is presented in Figure 37, this statement was strongly agreed upon from the significant part of the business respondents (33.5%) and additional 12% agreed. Thirteen point nine per cent strongly agreed and 30.6% were undecided.

##### Usage of a service that would enable download/view/edit of attachments

As presented in Figure 37, 15% of respondents strongly agreed on this statement and 7.5% agreed. Nineteen point one per cent strongly disagreed and 22% disagreed leaving 36.4% of respondents undecided.

**Figure 37:** Business consumers' attitudes toward mobile business intelligence, delivery of timely information (a)



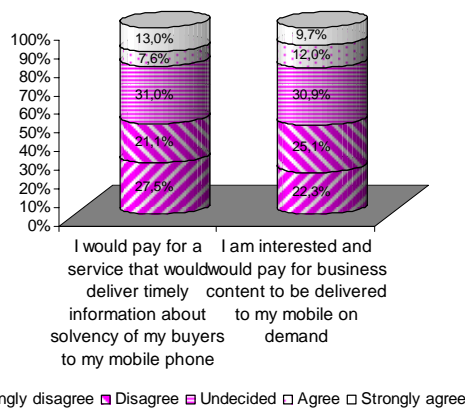
Usefulness of timely information about solvency of ones buyers

Lesser than in case of previous two statements, 14.1% of respondents strongly agreed to this statement and 12.9% agreed. A somewhat higher percentage than in previous two statements (21.8%) strongly disagreed on this one followed by 15.3% that disagreed. Thirty five point nine per cent of respondents were undecided.

Would one pay for a service delivering timely information (solvency of buyers)

In times when information is often regarded as them most important asset, interesting finding is that only 13% strongly agreed on this statement and additional 7.6% agreed. Twenty seven point five per cent of respondents strongly disagreed on this statement and supplementary 21.1% disagreed. Thirty one per cent of respondents were undecided. Similar answers were gathered from respondents regarding other statement evaluating the interest and readiness to pay for business content to be delivered to my mobile phone on demand.

**Figure 38:** Business consumers' attitudes toward mobile business intelligence, delivery of timely information (b)



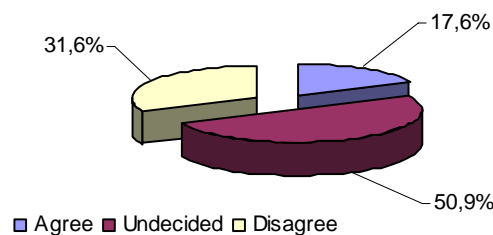
It can be concluded from data presented in Figures 37 and 38 that: a) wireless e-mail service appealed to the respondents from the business sub sample the most (33.5% strongly agreed

and confirmed their attitude that responding to their e-mails swiftly is good for their business. Furthermore, b) all the other evaluated services were more or less equally supported by respondents (13-15% of respondents strongly agreeing) except the one about business related content that would be delivered to ones mobile phone (9.7% strongly agreed). Finally, c) nevertheless a small one, there apparently exists a market niche for distribution of business related content, timely information and business intelligence if conclusions are drawn from this sub sample of data.

#### Wireless access to stock market information

Access to information about the stock market was of little interest for a business consumer. From Figure 39 it is observable that only 17.6% of respondents agreed they would pay for stock information to be delivered to his/her mobile phone. Thirty one point six per cent of respondents disagreed that this service would assume any value to them and their firms. Fifty point nine per cent of respondents were undecided regarding this statement.

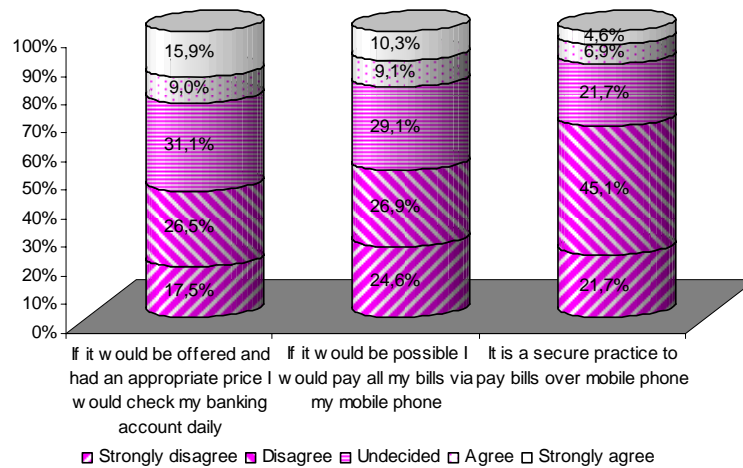
**Figure 39:** Business respondents' opinions about stock information delivered to their mobile phone



#### Business wireless banking

Presented in Figure 40 are the answers of business consumers related to their attitudes toward wireless banking services. By this data, 15.9% of business respondents would surely view their banking account via their mobile device daily and additional 9% would most probably conduct such practice as well. Seventeen point five per cent of them surely would not do so and 26.5% most probably wouldn't. Thirty one point one per cent were undecided whether they would or wouldn't behave as it was described above. Somewhat lesser percentage of business consumers strongly agreed they would pay all of their bills using their mobile phone (10.3%) and additional 9.1% agreed. Twenty four point six per cent of respondents thought they surely wouldn't conduct such a practice and additional 26.9% most probably wouldn't. The share of undecided respondents was 29.1%. When they were inquired about their perceived security of wireless banking transactions, most of the respondents disagreed this practice was secure (21.7% strongly disagreed and supplementary 45.1% disagreed). A high 21.7% of respondents were undecided. From the data presented it is indicative that some potential for business wireless banking services does exist.

**Figure 40:** Business consumers' attitudes toward wireless banking services



It can be concluded that a) there exists some potential for business wireless banking in Croatia however b) users' perceptions regarding security of this type of banking practice are not in favor to quick consumer adoption of the service.

#### 4.2 Data analysis - chapter summary

##### **The overall sample and the residential/business sub samples: summary**

The overall sample was constituted of more female than male respondents. The overall sample population was fairly young i.e. under thirty years old. Respondents from the overall sample had higher income than the official Croatian average. The sample grasped customers of all three relevant wireless communications companies in Croatia: T-Mobile, VIPnet and TELE2. Most of the respondents, however, stressed they were customers of T-Mobile. Very high share of all respondents stressed they used the Internet on an everyday basis. Within the residential sub sample it was evident that most of the respondents use the television as their most frequent source of information. More than three fourths of them have some form of personal Internet access. Business entities from the sample were mostly SOHO<sup>31</sup> type companies. The majority used the Internet on an everyday basis and a high ninety four per cent most frequently inform themselves by conversing to their friends and relatives.

##### **Data analysis related to the needs for mobile commerce services: summary**

The analysis of the residential and business consumer needs showed some fairly visible patterns. With regards to the services providing quick access to information and the wireless e-mail; both appeared as significantly more desirable services for a business than a private entity. Similar pattern was visible when sample data was tested for services providing savings in time and convenience. Namely, wireless parking service was more appealing to both residential and business entities than the wireless ticketing service. Stronger need for both mentioned services was shown from the part of business respondents with wireless parking

<sup>31</sup> Small office/home office company

clearly having the lead as a type of the service that was needed more. Regarding the specific needs of the business entities from the sample, improvement of the customer service via means of mobile commerce was stressed as needed by more than half of all respondents. Improvement of the efficiency, the sales performance and speeding up of the decision making via means of mobile commerce was of interest to the business respondents. However, charging a fee to use the service seemed to be concerning to the respondents because higher share of them stressed they needed a service in its free of charge than the variant implying a charge to pay. On the subject of wireless Internet access for their everyday business operations, only one tenth of business respondents strongly agreed they needed this service. Wireless banking service seemed somewhat appealing to business respondents as nearly thirty two per cent of them answered they needed to access their banking account when they are out of the office. Slightly less than thirty eight per cent stressed they needed a wireless banking solution.

#### **Data analysis related to the attitudes toward mobile commerce services: summary**

The attitudes of both residential and business respondents from the sample regarding prices of wireless communication services are that those prices are generally high. These attitudes were stronger when services that include more intensive data transfer such as MMS and wireless Internet access were examined and less strong in case of SMS. Nevertheless they are de facto more expensive on per unit base and classified as value added services (VAS) which usually carry higher prices; wireless parking and ticketing services were considered the least expensive out of all tested services. When wireless Internet access was examined in specific, a) price of the service and b) already existing subscription to an ADSL type of wire line connection were identified as the most important constraints to adoption of the service. Concerning the topic of mobile commerce security: attitudes of respondents from both residential and business consumer sub samples shown significant concerns on how secure mobile commerce services actually are. Generally positive responses with regards to the fear of new information technology can be attributed to both residential and business sample population. The dislike of mentioned technologies was not found as most of respondents thought that there was full or at least limited use of products and services that are perceived by consumers as a new information technology. In addition to that and related to purchase behavior, most of residential and business respondents from the sample population would consult with their friends before purchasing any new information technology good or service. On the subject of wireless purchases: a) more than half of all respondents made a wireless purchase at least once in their life, b) a low percentage of respondents thought they would make another one in a near future (one year was mentioned as a reference time) and c) when compared between residential and business sub samples, the least appeared as more inclined toward making convenient and swift wireless purchases. With regards to entertainment, distribution and sales of mobile games and short movies to residential consumers' wireless device showed low potential. In case of services that would provide timely information and business intelligence to business entities, a) wireless e-mail service

showed the mass market potential and b) possible market niche was identified with regards to distribution and sales of business related content as a personalized product. Answers of the business sub sample respondents indicated potential for wireless business banking. However, serious security concerns were identified related to the topic of wireless business banking.

## **5. Discussion and conclusions**

In the empirical research some assumptions made in the theoretical framework were confirmed. Mobile commerce service and applications indeed hold a great potential. In case of some services, this potential appeared as more significant. Still, the major dispute with regards to consumer adoption still seems to be the price of these types of services. On the other hand, some high value services did not show any price - consumer value misfit. In the following text, most important findings are discussed.

### **The consumer need, the right service and the area after the Chasm**

As in most of Europe, mobile commerce in Croatia is in its development stage (Prism, 2006). The revenue potential related to mobile way of service delivery is however significant. As it was argued in previous chapters, consumer need is an important factor that drives demand for certain products and services. Due to complexity of product-service development process it is important that a newly developed service a) is focused on relevant needs of consumers and on b) is improved in a way that when the time comes - it is ready to leave the niche market segment (innovators and early adopters) to offer its benefits to the conservative mass market consumer.

#### **Level 1: service is focused on relevant needs of consumers**

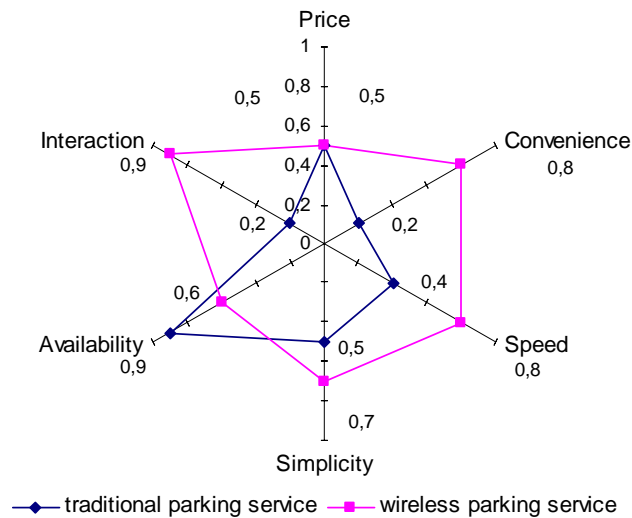
Those needs were referred to as the *right* needs (Figure 1 in the theoretical framework: existing - visible or latent). In order to know the needs for development of potential new services, the needs have to be analyzed and described. By doing that, it can be determined whether they exist, whether they are addressable via means of mobile commerce applications and whether it is economically justified to develop such services applications. What above mentioned needs surely have to have in common is to be applicable in the mass consumer market in the final phase of their lifecycle.

#### **Level 2: service is improved to offer its benefits to the mass market - commodity good**

As suggested by Figures 2 and 3 at the beginning chapters of this thesis (in the theoretical framework), as the mobile commerce technology matures it offers better performance and usability, lower price, and higher reliability. At that time more conservative consumers in the mass market become ready to adopt it. As mentioned above, this is because the performance, usability, price and reliability of those mobile commerce services become implicit and the benefits become easily recognizable to a consumer from the mass market (Figure 2 in theoretical framework - area after the Chasm).

Current position of mobile commerce services in Croatia is that neither enough is known about needs of consumers for those services nor the area after the before mentioned *Chasm* has been approached. One exception to this claim is wireless parking services that surely reached its mass marketing phase. Hence, some mobile commerce services did manage to deliver that unique value to a consumer in the wide market. Why is that so i.e. why some mobile commerce services (wireless parking service) manage to reach the mass market consumer and others do not (mPay)? On the example of the wireless parking service we can see the essence of value that a consumer receives from this service. Based on that service we can build an argument further on. Example of wireless parking service compared traditional and wireless variant of the process of payment for a parking place. Assumed dimensions that influence the consumer perception of value provided by the mentioned service were assigned 0-1 points. The results as suggested in Figure 41 are: a) offered for the same price charted means of service delivery are paired on the dimension of **price** (0.5:0.5). However, b) the **convenience** dimension of the wireless variant of the service seems much more powerful in the case of wireless (0.8) than the traditional variant (0.2). This is so because in the wireless variant there is 1) no need to have money in small denominations in order to consume the service, 2) no wallet is needed and 3) no need to come back to the parking site and add more coins to a parking machine when parking time has expired (time can be renewed from any location by sending an SMS). Regarding the dimension of process **speed**, c) the wireless variant of the service once again appears more appealing (0.8) than the traditional one (0.4). This is because 1) it requires only an SMS sent to a clearly communicated destination ( $\approx 15$  seconds) while 2) traditional variant requires entering coins into the parking machine ( $\approx 60$  seconds). Regarding the dimension of **simplicity**, d) wireless parking is simpler (0.7) because it requires fewer steps to deliver a final outcome when compared to the traditional one (0.5). **Availability** of wireless parking service is e) lesser (0.6) compared to the traditional variant (0.9) because not all areas have the infrastructure coverage (wireless network footprint). On the dimension of **interaction**, f) wireless variant of the service (0.9) surely exceeds its traditional counterpart (0.2) since it has the ability to alert the user when parking time has expired and therefore support certain form of person to machine interaction. When the values on all dimensions are summed, traditional parking service with total score of 2.7 is comparatively minor to its wireless variant with sum score of 4.3. This is the factual, core evidence that satisfaction of consumer needs is one of the most important determinants that maneuver the consumer adoption of mobile commerce services and one of the basic answers why some mobile commerce services succeed and some don't (i.e. why some services are the *right* ones and some are the *wrong* ones). Mentioned evidence is also a simple explanatory reason why did this service deliver so much success on the market of wireless telecommunications in Croatia. The pattern explained above will be mentioned again in the chapter where conclusions of this document will be presented.

**Figure 41:** Value chart - traditional parking service vs. wireless parking service



Back to the implications of Level 1 and Level 2 and the comparison of wireless parking service with its traditional variant in Croatia. The reason why this example was used was to show that needs base approach to mobile commerce services adoption actually works in practice as well. Regarding **Level 1:** existing need is was identified (need of consumers to pay for parking time → receive benefits of parking a car in a secure destination), *right* and compelling service was developed and the service was economically justified: it was a mass market proposition. As for **Level 2:** the service has been improved with years and as it passed the mentioned *Chasm* area is currently adopted in the mass market.

### **The mobile commerce situation: time and space - context sensitive needs**

When approached from the mobile commerce perspective consumer needs in all probability should be regarded considering their **context** of **time** and **space**. This means that mobile commerce services are most likely best suited to satisfy the needs that are time critical and need immediate resolving by means of a quick decision and a simple action. Also, needs addressable via means of wire line desktop computer Internet are certainly not the same as those that are easily satisfied via a wireless handheld device. These needs are needs that occur when a person is mobile, not at home and not at work. They occur rather when one is out on the street, driving a car or using public transportation, waiting in a cinema, bank or a cue of a local government office. There are certainly numerous new applications such as public transportation ticketing, event ticketing, parking, small purchases in coffee shops and cafeterias, bookstores, highways (toll payment) and basically in all situations where a transaction can be made by one or two pushes of a button and the monetary value of the transaction *per se* is small enough to be billed to ones telephone bill. Even easier, when the service application concerns mobile content, the execution of service is straightforward since distribution of a digital content is much simpler than the integration with the third party technical platform (e.g. cinema company billing system in case of wireless ticketing).



### **The usability: the mobile commerce is not equal to electronic commerce**

What should be highlighted is that technology is really not the point in case of mobile commerce applications and services. Suggestion from this research is that meeting consumer needs is the point. Because of limited screen size, memory, and processing power, wireless technology sets limits on what can be accomplished with it. Developing new applications for these devices will require ingenuity. Along with technology constraints, one must also respond to the expectations of the end users - consumers. Unlike workstation or desktop users who are accustomed to working with big screens, large amounts of memory, and relatively complex technology, residential consumers want devices that are simple, intuitive, and reliable. For these consumers, rebooting a cell phone in the middle of a conversation or conducting an online stock transaction in a complex manner just is not acceptable. Even corporate users who are highly computer literate have the same expectations of simplicity, reliability, and ease of use when it comes to their wireless devices. It is extremely important therefore to understand what was said above because technology indeed is the enabler but experience teaches us that besides having the right need identified and the right service in place, customer centricity and usage simplicity determine further success.

### **The needs and attitudes toward mobile commerce: Croatian consumer**

Several key findings imply that there still exists a large gap between what the technology can now do and what the consumer has been led to expect. Nearly one-third of the early users surveyed in Europe abandoned m-commerce after only a few tries (BCG, 2000) and the similar situation was found within the sample population of this research (almost none of the respondent stressed they will make another wireless purchase in less than one year time). This leads to a conclusion that the drop out rate is still very high. Mobile users think the initial costs and operating fees are too high so if there is any, they will be very reluctant on trialing a service. Most want low flat fees, which are a staple of the wire line Internet. Consumers' priorities are to communicate more effectively and save time. They are not satisfied with mobile commerce applications in these key areas: speed, ease of typing in text, and ease of navigation. There is a broad concern about privacy and security as a fair share of respondents from the research sample stressed their concerns related to mobile commerce security. The good news is how reminiscent this all is of the plight of the wire line Internet about five years ago. At that time, the Internet was in its own early stage of adoption. It, too, had serious problems related to market acceptance, stemming from narrow bandwidth, slow transmission speeds, difficult user interfaces, and high costs. And it, too, was the object of dire predictions that it would never make it commercially. Very strong preferences of both residential and business consumers for wireless parking type of service lead to a conclusion that function and a concrete benefit is what they really expect from mobile commerce service. It is therefore highly unlikely that a lack of functionality will be tolerated by a consumer. Due to only one mobile commerce fully covered area in Croatia (parking), there still exists a great potential in the areas of city public transportation and similar contexts. It is a challenge, however, to develop the mobile commerce services that fit mentioned contexts and appeal to a consumer because of their uniqueness and value that is delivered compared to the existing ways of delivery.

## 5.1 Conclusions

### **I. Behavior is affected by attitudes and behavioral intentions.**

For example this intention might be to satisfy a certain need which, in turn, is affected by attitudes toward the act and by subjective norm. The first component, attitude toward the act, is a function of the perceived consequences people associate with the behavior. The second component, the subjective norm, is a function of beliefs about the expectations of important referent others, and his/her motivation of complying with these referents. Mentioned are important factors that influence adoption of mobile commerce services and especially concern market communications as means of altering consumer attitudes with regards to mobile commerce services and applications.

### **II. Consumers recognize value of some existing mobile commerce services.**

In the case of electronic commerce all of mobile commerce revenue potential will merit those companies that manage to create superior mobile commerce services focusing on consumer value and improvement of ones quality of everyday life. The mentioned potential can only be grasped if consumer needs for those services exist and are clearly described prior to service development and roll out. Additionally, an in-depth understanding of consumer mobile experience is a necessity since a consumer will simply not use the service if it is cumbersome, complicated, long lasting in terms of process, unreliable and insecure. Here it is referred to the mobile commerce context: time and space. The attitudes of consumers toward wireless parking service suggested that consumers do recognize value in some mobile commerce services.

### **III. Time saving and convenience are considered important by consumers.**

Analyzed data suggested that consumers attribute pertinent importance on the time saving and convenience related to things they do everyday. Developers of mobile commerce applications and services should hence strive to deliver an output that saves time and enables convenient handling of mentioned everyday dealings to a consumer. Mobile commerce services that can contribute to the above mentioned will very probably be appreciated by consumers and, as such, will stand fair chances for adoption and mass marketing. This conclusion was derived from results of data analysis that are presented in Figure 17 (fast information and wireless e-mail service and Figure 18 (wireless parking and ticketing services).

### **IV. Usability is a challenge that should not be undermined.**

In terms of usability, simple services should be offered and no mass scale learning should be required for a consumer in order to use the service. In circles of mobile commerce applications developers' it is often forgotten that most of consumers are not engineers and

that they don't find it entertaining to take several days testing a service and to learning about all of its functionalities. An everyday case scenario is that the service will be dropped if not understood in first two or three tries. The inequality of  $M \neq E$  (mentioned in the theoretical framework in under "What is mobile commerce?") here should be taken seriously since, as described above, mobile commerce implies an indeed exceptional consumer experience that can by no means be taken equal to context and experience of electronic commerce. The usability of mobile commerce services available in Croatia is still not at a level that would be satisfactory in terms of mass market acceptance of such services.

#### **V. Price will probably not represent a dispute if first-class value is offered.**

With regards to consumer price perception - prices of wireless telecommunications in general as well in case of mobile commerce services are perceived as very high. However, prices did not imply any difficulties in case of services that were perceived by consumers as ones that deliver superior value. Despite the fact that the primary market research data suggested that general price perceptions of consumers was that prices of wireless telecommunications services in Croatia are very high (Figure 24 and Figure 25) - some discrepancies suggested different conclusions. As a verification of what was claimed above, the consumer value curve in example of wireless parking service can be re-examined (Figure 41). Firstly, this service was perceived by respondents as the least expensive one. Secondly, because of the unique value it provides it was an inevitable success. Hence, prices become less of an issue in cases where innovative services that deliver superior consumer value are offered.

#### **VI. Security of mobile commerce transactions still represents a concern.**

Related to security concerns (Figure 30), these are still pertinent as significant share of respondents did not perceive mobile commerce transactions as risk free procedures. However, analyzed data suggested no significant dislike of new information technology. The most of respondents thought there was a fair amount of practical use in services delivered via means of new information technology (Figure 31).

#### **VII. Mobile commerce entertainment - not very promising.**

Analyzed data samples communicated that wireless entertainment and leisure applications were not highly desired by Croatian consumers. This was especially the case when acquisition of mentioned applications was conditioned with payment of a monetary fee. The mentioned conclusion comes from results that are displayed in Figure 35.

#### **VIII. Wireless e-mail service: THE application?**

Of all other applications, wireless e-mail service was identified as the most desired application for a business consumer and, generally, one would not hesitate to compensate

for it by payment of a monetary fee. This was especially obvious in case of business consumers (Figure 17).

#### **IX. Wireless Internet: biased in terms of need for the service and price.**

Analysis of data suggested that 87% of respondents answered they either did not need the service or were undecided (Figure 21). Regarding price, a fair share of Croatian consumers perceives the service as fairly expensive (Figure 24, 25 and 26). Related to consumer acquisition of a wireless Internet tariff plan in the period of one year, only 8% answered positive (Figure 27).

#### **X. Existing need for wireless banking services for business consumers.**

As presented in Figure 23, a moderate 38% of respondents agreed they would need such a service. That leads to a conclusion that the potential for a simple wireless banking solution targeted at a business user exists.

### **5.2. Recommendations and managerial implications**

It shows that despite the many limitations mobile devices have it is worthwhile considering developing them. Mobile commerce may become the key driving force for developing mobile applications just as electronic commerce facilitated the development of World Wide Web applications. Mobile data networks together with the Web provide companies and organizations with many new possibilities. With third and fourth generation digital media phones, broadband digital wireless networks, and mobile hypermedia, new concepts for electronic commerce and communication can be studied, modeled, constructed and measured. Recommendations and managerial implications regarding the development of mobile commerce applications and the market approach can be seen in the sections below.

#### **I. Analyze consumer needs to filter out the most promising consumer usage scenarios.**

Depending on the context and situation, different mobile commerce applications will meet dissimilar consumer interests. As a general rule, using mobile commerce services to resolve difficulties consumers have in their everyday lives and doing that swiftly should be sufficient for the positive feedback about that wireless service from the consumer. Shortly, the more frustrating the process of obtaining certain service in its *traditional* form is (e.g. waiting in a bank cue) - the higher probability exists for a mobile commerce application simplifying that process to be adopted by a mass market consumer. For example, in an area of a large city one should look for opportunities in situations where cues of people are formed, service is needed instantly and there is no genuine need for a personal face-to-face contact with the representative of the service provider. Concrete illustration of the mentioned situation is event ticketing (theatre, cinema, soccer game etc.) where the process *per se* (ticket stand) wouldn't suffer if it would be moved and executed through a wireless sales channel (wireless device). The key success factors in mentioned case are a) that the price if the service bought

through a wireless sales channel is lower or at least equal to the one in the traditional sales channel and b) that accessibility and usability of the service are of such nature so they do not narrow the segment of potential users (should be simple).

## **II. Develop mobile commerce services that are rapid, convenient and simple**

The need for simplicity of mobile commerce applications was already mentioned above; it is somewhat more in detail emphasized here as well. Some of the consumers are engineers. However, the fact of the matter is that most of them are not engineers and they will not understand mobile commerce applications that require even a slight involvement in terms of service setup, advanced menu browsing etc. Data presented in the theoretical framework suggested that it is an important requirement for mobile commerce services that they are made simple, in the spirit of the plug & play philosophy. Related to that, the time consumed from the mobile commerce service initiation to the final delivery of the benefit should be by all means minimized. Consumers are just not ready to wait

## **III. Compete in value instead of price**

As it was noticed in case of wireless parking service, nevertheless wireless parking service was de facto the most expensive one on per unit basis (in all comparisons, one hour parking is more expensive than one minute of a voice call), it was perceived by consumers as the least expensive. This is so because the consumer recognized the superior value provided by that service and were by no means reluctant with regards to paying a premium for usage of that service. When the right services are offered and the right consumer needs are addressed, prices will not represent a difficulty.

## **IV. Educate about security of mobile commerce applications - be honest**

No service is perfect and there is no such a product that could be attributed as absolutely safe and sound. It is therefore recommended that the approach where efforts are made trying to create such an impression with mobile commerce services should be given up. Consumers should be communicated a risk as well as accompanying actions from the side of service provider that minimize and control that risk.

## **V. Focus the strategy in wireless entertainment**

As this was suggested by the empirical data, consumers were found very reluctant in terms of purchasing wireless entertainment and downloading it to their wireless devices. Services within the wireless entertainment field should therefore be focused. It is a suggestion that not all existing entertainment services are offered but only the most profitable ones. Preferably, offered entertainment services should be the ones that can be offered in some form of exclusivity. Therefore, not all of

wireless entertainment should be done, only the most popular and sustainable forms of it should be chosen and marketed.

#### **VI. Offer different solutions for business wireless e-mail access**

All forms of questions that were posed to the respondents with regards to wireless e-mail service gave fairly the same answers: both residential and business respondents greatly appreciated this service. The mentioned was especially visible in case of the business consumers. Because of that fact, wireless operators should aspire to provide this service and look for compelling business models to achieve the best return on investment regarding this service. Instant e-mail and wireless office applications are therefore the examples of potential services that hold great potential for the future.

#### **VII. Pay attention to usability and context of mobile commerce applications**

The most significant feature of mobile technology is the mobility per se: the ability to access services ubiquitously, on the move, and through wireless networks and various devices, such as, personal digital assistants (PDA) and mobile phones. Compared with traditional electronic commerce, where transactions are commonly conducted through stationary desktop and laptop computers, mobile computing provides users with more freedom, as they can access information and services without having to find a physical space, such as, an office or an Internet café with an Internet connection. Concept of mobility can be regarded in three dimensions of human interaction; spatial, temporal and contextual. The spatial and temporal dimensions: anytime and anywhere computing, whereas the contextual dimension extends the definition further. Contexts in which people reside continuously frame their interaction with others, including people's cultural background, particular situation or mood, and degree of mutual recognition. It is a recommendation for wireless operators and service developers to be driven by satisfying consumer needs and re-thinking about how to deliver value to a consumer, increase their satisfaction and well being. Hence, when new MC services are being planned in detail one should always have in mind the reason for developing such a service and the target for which the respective service is developed. Important contextual and usability constraints were discussed in the theoretical framework of this document.

#### **VIII. Wireless Internet: simplify communication (benefits, pricing logics)**

The wireless mobile commerce service that was regarded as one of the most expensive ones among all other wireless services was wireless Internet access. In terms of understanding the service, the answers of consumers from showed analogies with the dial up Internet connections. It was perceived expensive, slow and consumers thought it had "time charge" billing. It is really a challenge to change such a strong consumer perception. However, the logics of ADSL pricing seem to put light on this difficulty. Recommendation is that as it is the case with

the wire line ADSL Internet - bulk data packages meeting specific consumer needs are made. The emphasis should be on educating a consumer why wireless Internet is needed, for which purposes and in which situations as well as on how it is charged.

#### **IX. Offer wireless banking and other financial services to business customers**

As it was mentioned before, a relevant share of business consumers need to do their banking transactions when they are out of the office and a fair share of them would like to be offered some form of a simple wireless banking service. As the relations between wireless operators and banks regarding this topic are still quite undefined, it would be very hard to propose the type of cooperation between these institutions - the one that would result with the right wireless banking services offered in the market. The sole thing that can be recommended is that the need among business consumers for such services exists and that the development process should be directed toward innovative services that could satisfy that need. For the realization of such projects both banks and wireless service providers should find common understanding and align their business interests.

#### **X. Personalize, display only relevant information and ensure usefulness.**

Compelling mobile commerce services should be adapted and tailored to each and every user's own needs and capabilities. They should use their users' terminology and their navigational structure should be organized in the way in which users think. They should include only relevant information because in the mobile commerce context, "the more is better" paradigm is not valid. Mobile commerce services should be developed so that they make life easier to their users.

### **5.3 Limitations and future research**

Related to mobile commerce services and applications, different authors suggest diverse current states and future scenarios of that business area. Attempt with this document was to give overview of those authors' work and screen the situation in Croatia. It is important to highlight that this research was conducted with limited resources and that for more detailed assessment of consumer needs and attitudes toward mobile commerce services, surely, a more extensive study should be conducted. The future research will certainly give indications about how the wireless Internet is going to be positioned and what are the types of services that consumers will demand the most. The information presented in chapters of this document indicates that one thing seems very probable. Wireless Internet and mobile commerce services and applications are here to stay.

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## Appendixes

### Appendix 1: PPS and ARPU for selected countries

	<u>PPS</u>	<u>ARPU</u>	<u>ARPU/PPS</u>
Belgium	119	32	27%
Czech Republic	71	15	21%
Denmark	122	27	22%
Germany	109	23	21%
Estonia	51	N/a	N/a
Greece	82	28	34%
Spain	98	31	32%
France	110	37	34%
Ireland	138	46	33%
Italy	103	30	29%
Cyprus	84	22	26%
Latvia	43	11	26%
Lithuania	48	13	27%
Luxembourg	227	N/a	N/a
Hungary	60	20	33%
Malta	69	24	35%
Netherlands	125	36	29%
Austria	123	45	37%
Poland	49	21	43%
Portugal	72	25	35%
Slovenia	79	26	33%
Slovakia	52	15	29%
Finland	113	38	34%
Sweden	118	25	21%
United Kingdom	117	31	26%
Bulgaria	30	13,1	44%
Croatia*	46	28	61%
Romania	31	11	35%
Turkey	29	N/a	N/a
			N/a
Iceland	123	N/a	N/a
Norway	154	38	25%
Switzerland	132	50	38%

## Appendix 2: The questionnaire

Pri ispunjavanju ove ankete imajte na umu sljedeće: 1. nema točnih i netočnih odgovora, ukoliko niste sigurni u odgovor na postavljeno pitanje – napišite ono što smatrate ispravnim, 2. anketa je neprofitabilna, a izvodi se radi izrade magistrarskog rada, 3. vaš identitet nije predmet Ankete – anketa je u potpunosti anonimna!

D1. Vaš Spol (zaokružite jedan odgovor!)

- muški
- ženski

D2. Vaša dob (upišite na crtu) \_\_\_\_\_

D3. Vaše bračno stanje (zaokružite jedan odgovor!)

- oženjen/udana/u izvanbračnoj zajednici
- razveden/a
- udovac / Udovica
- samac

D4. Vaša (ili vašeg kućanstva) ukupna mjesečna primanja su (zaokružite jedan odgovor!)

- do 2.000 kn
- 2.001 – 4.000 kn
- 4.001 – 6.000 kn
- 6.001 – 8.000 kn
- 8.001 – 10.000 kn
- više od 10.000 kn

D5. Koja od nabrojanih vrsta zaposlenja najbolje opisuje Vaš radni status? (zaokružite jedan odgovor!)

- zaposlen puno radno vrijeme
- honorarno zaposlen
- samozaposlen - sam sebi poslodavac  
*(obrtnik, vlasnik tvrtka, slobodno zanimanje, poljoprivrednik)*
- nezaposlen
- učenik / student
- umirovljenik
- domaćica
- na stručnom usavršavanju

D6. Vaša županija (upišite na crtu) \_\_\_\_\_

D7. Živite u naselju (tip naselja – zaokružite jedan odgovor!)

- do 2.000 stanovnika
- 2.001 – 10.000 stanovnika
- 10.001 – 50.000 stanovnika
- 50.001 – 100.000 stanovnika
- više od 100.000 stanovnika

D8. Vaše obrazovanje je: (zaokružite jedan odgovor!)

- nezavršena osnovna škola
- završena osnovna škola
- završena srednja škola
- završena viša, visoka škola ili fakultet
- postdiplomska izobrazba

D9. Koliko često... (zaokružite: 1 za «nikada», 2 za «jednom mjesečno», 3 za «dva do tri puta mjesečno» 4 za «više od tri puta mjesečno», 5 za «svakodnevno»). (Zaokružite jedan odgovor!)

	1	2	3	4	5
1 ...se bavite sportom ili rekreacijom?					
2 ...posjećujete kulturne i umjetničke priredbe?					
3 ...odlazite u lokale, noćne klubove, diskoteke i slično?					
4 ...čitajte knjige?					
5 ...posjećujete sportske priredbe?					
6 ...igrate igre na sreću?					

D10. Informirate se... (zaokružite jedan odgovor!)

- čitajući novine
- gledajući televiziju
- surfajući Internetom
- preko prijatelja
- ništa od ponuđenog

D11. Vaš mobilni operater je: (zaokružite jedan ili više odgovora!)

- T-Mobile
- VIP
- TELF2

D12. Konšitate se Internetom (zaokružite: 1 za «nikada», 2 za «jednom mjesečno», 3 za «dva do tri puta mjesečno» 4 za «više od tri puta mjesečno», 5 za «svakodnevno»). (Zaokružite jedan odgovor!)

1	2	3	4	5
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D13. Vaša Internet veza je... (zaokružite jedan odgovor!)

- dial up veza
- ADSL veza
- nemam vezu na Internet

D14. Generalno, cijene usluga mobilne telefonije su: (zaokružite jedan odgovor!)

- vrlo visoke
- visoke
- primjerno
- niske
- vrlo niske

D15. Za sebe možete reći da: (zaokružite jedan odgovor!)

- volite konštitivati nove tehnologije (računala, mobitele i sl.)
- konštitivati nove tehnologije jer su nužnost današnjice (jer, ukoliko ih ne bi koristili to bi vas ometalo u svakodnevnom životu i poslu)
- ne volite nove tehnologije, naporne su i zahtijevaju stalno učenje i previše energije, a upotreba istih vas opterećuje

D16. Vaš stav je da novi visokotehnoški proizvodi... (zaokružite jedan odgovor!)

- nemaju neku korisnu primjenu
- imaju ograničenu korisnu primjenu
- imaju potpunu korisnu primjenu i kao takvi, čine vašu svakodnevnicu jednostavnijom i kvalitetnijom

D17. Kad izade neki novi proizvod visoke tehnologije, Vi:

- odmah krenete u istraživanje o mjestu gdje bi se isti mogao kupiti
- sačekate da vidite što kažu prijatelji - ima li taj proizvod kakvu korist
- niti ne razmišljate o kupovini jer, te stvari visoke tehnologije su besmislene

U1. Svoj mobilni telefon koristite za... (zaokružite jedan ili više odgovora!)

- razgovore
- SMS
- MMS
- pristup Internetu
- plaćanje karata na filmskim festivalima, u kinu i sl.
- igranje igara koje su na telefonu instalirane
- surfiranje WAP stranicama (t-zones, Vodafone live)

Cijene ..... usluga mobilne telefonije su: 1 «vrlo visoke», 2 «visoke», 3 «primjerno», 4 «niske», 5 «vrlo niske» (zaokružite po jedan odgovor za svaku uslugu!)

P1. glasovnih usluga	1	2	3	4	5
P2. SMS-a					
P3. MMS-a					

P4. Pristup Internetu preko mobilnog telefona u Hrvatskoj je još uvijek nedostupna stvar zbog... (zaokružite jedan ili više odgovora!)

- cijena te usluge
- trenutne ponude operatera
- mogućnosti pristupa s kućnog računala za nižu cijenu
- relativno slabog iskustva Interneta i zaslona mobitela koji je često premalen
- to je usluga koju trebaju samo napredni korisnici

P5. U roku od godine dana ćete se pretplatiti na jednu od Internet tarifa kako bi mogli surfati sa svog mobilnog telefona (1 - «nikako», 2 - «možda», 3 - «vjerojatno», 4 - «vrlo vjerojatno», 5 - «sigurno») (zaokružite jedan odgovor!)

1	2	3	4	5
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S1. SMS Parking je korisna usluga (Zaokružite: 1 - «potpuno nekorisna», 2 - «djelomično korisna», 3 - «korisna», 4 - «vrlo korisna», 5 - «iznimno korisna») - (zaokružite jedan odgovor!)

1	2	3	4	5
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S2. Cijena SMS Parkinga je... (zaokružite jedan odgovor!)

- vrlo visoka
- visoke
- primjerno
- niske
- vrlo niske

S3. Kupovina karata za nogometne utakmice, kino, kazalište i sl. SMS-om je korisna usluga (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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S4. Cijena kupovine karata SMS-om je prihvatljiva (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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S5. Kupovina karata SMS-om je usluga koja nam je potrebna (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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- U sljedećim pitanjima zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite za svako pitanje jedan odgovor!)

A1. Trebam pristup e-mailu putem mob. telefona	1	2	3	4	5
A2. Traženje informacija o proizvodima i uslugama je dugotrajno i iscrpljujuće					
A3. Volim gledati reklame za stvari koje me zanimaju					
A4. Primao-la bi reklame o proizvodima koje me interesiraju na mobilni telefon					

P1. Koristio-la sam svoj mobilni telefon za plaćanje (parking, kino, download igara i sl.) (zaokružite jedan odgovor!)

- Nikada
- Jednom ili dva puta
- Često

(Ako ste izabrali 1. - sljedeća pitanja na koja odgovarate su P2., P3., a nakon toga odgovarate na pitanja pod M; ako ste izabrali 2. ili 3. sljedeća pitanja na koja odgovarate su pod P4., P5., P6., P7 te nakon toga odgovarate na pitanja pod M)

P2. Plaćanje mobilnim telefonom bi učinilo proces plaćanja ugodnijim i jednostavnijim (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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P3. Siguran-na sam da ću vrlo brzo napraviti svoju prvu kupovinu u kojoj ću platiti koristeći svoj mobilni telefon (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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P4. Kupovina mobilnim telefonom bila je ugodno iskustvo (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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P5. Mislim da je kupovina koju sam napravio koristeći svoj mobilni telefon bila sigurna (Zaokružite: 1 - «uopće se ne slažem», 2 - «djelomično se slažem», 3 - «slažem se», 4 - «vrlo se slažem», 5 - «potpuno se slažem») - (zaokružite jedan odgovor!)

1	2	3	4	5
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Pri ispunjavanju ove ankete imajte na umu sljedeće: 1. nema točnih i netočnih odgovora, ukoliko niste sigurni u odgovor na postavljeno pitanje – napišite ono što smatrate ispravnim, 2. anketa je neprofitabilna, a izvodi se radi izrade magistarskog rada, 3. vaš identitet nije predmet Ankete – anketa je u potpunosti anonimna!

P6. Kupovina mobilnim telefonom bila je jednostavna (Zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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P7. Upotreba kreditne kartice kao osiguranja za mobilno plaćanje je ograničavajući faktor ove vrste plaćanja (Zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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P8. Mobilno plaćanje je prekompleksan proces, nemam vremena baviti se time (Zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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M1. T-Mobile-a i VIPnet-a pružaju uslugu mobilnog plaćanja? (zaokružite jedan odgovor!)

1. Da
2. Ne

Za sljedeća pitanja zaokružite (1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

G1. Kad trebam informacije, trebam ih brzo	1	2	3	4	5
G2. Spreman-na sam platiti za brzu informaciju	1	2	3	4	5

G3. Igram igre instalirane na mojem mobilnim telefonu (zaokružite jedan odgovor!)

1. Da
2. Ne

(ako ste odgovorili s 1. sljedeća pitanja su G4. i G5. i G6.; ako ste odgovorili s 2. sljedeće pitanje na koje odgovarate je pod G7.

G4. Igre na mob. telefonu su zabavne (1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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G5. Volio-lijela bih imati dodatne igre na svom mobilnom telefonu (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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G6. Platilo-la bih da se dodatne igre dostave na moj mobilni telefon (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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G7. Rado gledam kratke filmove na svom mobilnom telefonu (zaokružite jedan odgovor!)

1. Da
2. Ne

(Ako ste odgovorili pod 1. sljedeće pitanje je G8. Ako ste odgovorili pod 2. preskočite G8. i idite na G9.

G8. Platilo-la bih za download kratkih filmova na svoj mobilni telefon (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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G9. Platilo-la bih za dostavu sadržaja za odrasle na moj mobilni telefon (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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Sljedeća grupa pitanja odnosi se na vaše poslovne potrebe. Ako ste vlasnik tvrtke, menadžer ili poslovan čovjek, odgovorite na ova pitanja s posebnom pažnjom!

B1. Često trebam pristupiti svojem e-mailu kad sam na poslovnom putu (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B2. Odgovoriti brzo na na e-mailove koje dobijam od svojih kupaca i poslovnih partnera dobro je za moj posao (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B3. Koristio bi uslugu koja bi mi omogućila da spremim, uređujem i šaljem attachmente (datoteke, priloge u e-mailu) preko svog mobilnog telefona (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B4. Za moj posao, trebao bi mi pristup Internetu preko mobilnog telefona (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B5. Korisno mi je imati pravovremene informacije o solventnosti mojih kupaca (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B6. Platilo bi SMS servis koji bi mi na zahtjev ispostavljao informacije o solventnosti mojih kupaca u stvarnom vremenu (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B7. Platilo bih za informacije o dionicama iz mog portfelja dostavljene na moj mobilni telefon u stvarnom vremenu (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B8. Često sam u situacijama kada mi je potrebno provjeriti svoj poslovni bankovni račun (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B9. Trebao-la bi jednostavno rješenje preko kojeg bi mogao-la pogledati svoj bankovni račun, a koristeći svoj mobilni telefon (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B10. Ako bi to bilo ponuđeno i imalo prihvatljivu cijenu, dnevno bi pregledavao svoj poslovni račun koristeći svoj mobilni telefon (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B11. Zainteresiran-a sam i platilo-la bi sadržaje koji su vezani uz moj posao/tvrtku, a koji bi mogli biti dostavljani na moj mobilni telefon na zahtjev (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B12. Ako bi to bilo moguće, plaćao-la bi sve/neke svoje račune putem svog mobilnog telefona (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B13. Plaćati račune mobilnim telefonom je sigurna praksa (zaokružite: 1 -“uopće se ne slažem”, 2 “djelomično se slažem”, 3 – slažem se, 4 – “vrlo se slažem”, 5 - “potpuno se slažem”) – (zaokružite jedan odgovor!)

1	2	3	4	5
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B14. Moja tvrtka odnosno tvrtka za koju radim ima (zaokružite jedno)

1. 1-10 djelatnika
2. 11-50 djelatnika
3. 51 – 100 djelatnika
4. 100+ djelatnika

B15. Industrija u kojoj moja tvrtka posluje je...(zaokružite jedno)

1. trgovina
2. proizvodnja
3. usluge

Imate komentar u vezi s ovom anketom? Upišite ga u prostor ispod!

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Želite li da vas se kontaktira u vezi ove ankete? Napišite svoj kontakt telefon na crtovlje ispod.

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Hvala!