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Ramin Vatanparast

Hamed Z. Qadim

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A COMPARATIVE STUDY OF CONSUMERS' INTENTION TO USE MOBILE INTERNET IN USA, RUSSIA AND CHINA

¹ Ramin Vatanparast, ² Hamed Z. Qadim

¹ Nokia Inc., Mountain View, California, USA

² Asia Pacific International College, Iran

Abstract

As the mobile Internet has been used explosively worldwide, the effects of cultural factors on mobile Internet usage have been an interesting issue. Cross-cultural studies on the mobile phone internet may improve our understanding of individuals' attitude toward mobile phone internet in different countries and provide advantages for marketing of mobile internet services in different cultural contexts. This paper uses an extension model of Technology Acceptance Model (TAM) to provide the theoretical foundation for this study. The data was collected through a survey study of over 3000 consumer in 3 countries of USA, Russia and China. The findings present several insights into the position of mobile phone internet usage in the different market. Such insights allow mobile service providers and mobile marketers to create more customized strategies to launch new internet based services or mobile marketing campaigns. This paper ends with both theoretical and practical implications and limitations of the study results.

INTRODUCTION

Advances in mobile technology have changed the business environment significantly. Devices and systems based on mobile technologies have become a common place in our everyday lives (Balasubramanian, Peterson & Järvenpää, 2002), increasing the accessibility, frequency and speed of communication. As a result, mobile technologies have the potential to create new markets, change the competitive landscape of business, create new opportunities, and change existing community and market structures (Stewart & Pavlou, 2002). New technological developments and fusion of two intense and global trends of the mobile/wireless and the Internet, allow permanent Internet access via mobile devices. However, it should be noted that from the system's perspective, most mobile phone internet systems, especially cellular phones, have a lower level of available resources in comparison to those provided by the stationary Internet. While mobile phone internet devices are very portable and handy, they have smaller screens, less convenient input/output facilities, and lower multimedia processing capabilities than do desktop computers. As a growing proportion of the hundreds of millions of mobile handsets sold

globally each year, is mobile Internet capable in one form or another, the importance of mobile Internet is inevitably going to rise worldwide. The spread of mobile Internet presents a solution to falling ARPUs and presents many opportunities to operators, equipment manufacturers, content and service providers, new entrants from the Internet world and other mobile industry sectors.

Moving the Internet to mobile devices presents plenty of potential for consumers and businesses in the mobile environment by brand-new and yet unimaginable application areas. In general, the mobile Internet can be defined as the convergence of mobile communications and the Internet, providing the Internet through wireless connections (International Telecommunication Union Internet Reports 2002). Whereas, Hong and Tam (2006) defined the mobile Internet as a collection of mobile data services accessed only through a mobile communication network. This study adopts the definition of the mobile Internet by Chae and Kim (2003), "wireless access to the digitized contents of the Internet via mobile devices." Therefore, for the purposes of the study, accessing the stationary Internet through the wireless LAN (Wi-Fi) of a laptop is not regarded as the mobile Internet. The mobile Internet shows that is more intended for personal and individuals' needs and expectations. (Hong and Tam 2006, Kim and Chan 2007, Kim et. al. 2004, Lee et. al. 2005). The mobile Internet may be a suitable domain to investigate the effects of cultural traits on the individual user's intention to use and behavior (Thong et. al. 2006). Understanding the effects of culture on the adoption of mobile Internet users, may help mobile Internet service providers to tackle low profit and consumer adoption issue (Kleijnen et al. 2004).

Mobile service is defined as "A radio communication service between mobile and land stations, or between mobile stations (ITU Radio Regulations, 2004). However, this definition does not fully capture the unique characteristics of next generation multimedia mobile services with wireless Internet connections. The increased number of mobile phone users has allowed for a growing variety of value-added services. Nowadays, with numerous individual values added mobile applications, the mobile service providers are attempting to enter this growing value-added

service market. A more appropriate definition of mobile service, based on expectations of its end users, would be a service that is available through mobile radio access at anytime and anywhere possibly through heterogeneous mobile devices (Zhang and Zheng 2007).

Mobile Internet has received much attention, particularly as an infrastructure for the next wave of services. The use of the mobile Internet has been increasing rapidly (Francis 1997, Davidson et al. 2000). According to a new report released by ComScore (2009), the number of people, accessing Web on their mobile handsets doubled between January 2008 and January 2009. Interestingly, however, the adoption or usage patterns of the mobile Internet and popular mobile Internet services are significantly different by country (Pedersen 2001). In Asian countries, a mobile Internet-enabled phone has become recognized as a necessity in daily life, more than a communication device. Based on a ComScore study, (2008), conducted in Japan, the first country that launched mobile internet, it has been estimated that 53.6 million people in Japan are using a mobile device to access the Internet, a figure nearly equaling the 53.7 million who accessed the Internet from either a home or a work computer in June 2007. Popularity of mobile services varies in different countries, for example, download service is the most popular one in China, whereas email is the most popular one in Japan (Lee et al. 2002). However, in North America, the mobile Internet is not as popular as in Asian countries (Scully 2001). Based on the latest report of Nielsen Mobile, "The Worldwide State of the Mobile Web" as of May 2008, 15.6 percent of mobile subscribers in the US, makes regular use of the mobile Internet on their devices, totaling some 40 million subscribers. This is just a subset of the 95 million US mobile subscribers who pay for access to the mobile Internet (through data plans or some other setup) but do not use it quite so regularly. The UK is not far behind, with 12.9 percent actively using the 'Net' on their mobile devices. Such data, illustrates a different adoption pattern of mobile Internet in different markets. Such an outcome not only broadens the spectrum of technological applications and services but also presents plenty of potential opportunities for customized mobile Internet businesses. The current Internet applications and services will possibly be provided through novel application areas or mobile Internet browsers in the mobile environment. For operators and mobile equipment manufacturers, the spread of mobile phone internet presents new opportunities in the area of content and service delivery in the Internet world.

This paper is composed as follows: In the next section, we review previous studies in the field of technology adoption and specifically those related to TAM and its application to mobile Internet usage. Based on the theoretical background, a research model is proposed along with research hypotheses. We then describe the research procedures employed to test the proposed hypotheses. In the next section, we do a detail data analysis on the data we gathered through our survey study. We conclude the paper by acknowledging number limitations of our study and discussing the implications of our findings for mobile Internet service providers, and suggestions for future researches.

THEORETICAL BACKGROUND

Culture was defined by Hofstede (1980) as "the collective programming of the mind that distinguishes the members of one group or category of people from another". Therefore, the cultural characteristics of individuals include a constellation of psychological traits, attributes, and characteristics (Matsumoto et al. 1999). Most information systems' research on cultural issues treated culture at the country level. For example, Kralisch et al. (2005), argues that users' cultural backgrounds influence their Web site navigation patterns. However, sometimes within-country heterogeneity is greater than between-country heterogeneity and as the result using country as a surrogate for the individual is likely to be misleading. Ford et al. (2005) have proposed identifying users' individual-level cultural characteristics. Conceptualization of culture at the individual level reflects the multilayered cultural values accumulated in the self (Erez and Gati 2004). Technologies like the mobile Internet, designed for individual users who have different needs and expectations, and are based on voluntarily used, in accordance with the individual preferences of the users (Hong and Tam 2006). Models based on national or other group cultures may be essential for understanding behaviors within organizational contexts (Karahanna et al. 2005), however, as we are interested in how cultural characteristics influence an individual's voluntary Internet usage, a model based on individual cultural characteristics is more appropriate (McCoy et al. 2005). There is little knowledge about how consumers react to mobile Internet and this gap becomes even wider when this issue is addressed on an international basis. Despite the importance of cultural and market specific factors, not much research has been conducted on comparing adoption of mobile Internet in different markets. Previous research on the mobile Internet mostly focused on technological developments, usability issues, and

mobile telecommunication policies (Kristoffersen and Ljungberg 1999, Gruber 2001, Gruber and Verboven 2001). Rarely has research been done to investigate the usage differences of mobile Internet from a cross-cultural perspective.

Many empirical studies have tested the TAM model and confirmed that these factors do correlate with the usage. Technology Acceptance Model (Davis et al. 1989) was initially designed to predict a user's acceptance of information technology and usage on the job. TAM has become a well-established, robust, powerful, and parsimonious model for predicting user acceptance (Venkatesh and Davis 2000) and become the most broadly applied model of user acceptance and usage (Ma and Liu 2004). TAM is grounded in the Theory of Reasoned Action (Fishbein and Ajzen 1975) and Theory of Planned Behavior (Ajzen 1991) and compares favorably with TRA and TPB (Venkatesh and Davis 2000). Chang et al. (2000) and Cheung and Chang (2001) studied factors affecting the acceptance of Internet in workplace settings. Their analyses revealed that perceived ease of use, and usefulness (increase the job performance) influence their acceptance and usage behaviors. Lederer et al. (2000) report the results that support TAM in general in which increases the probability of returning user to use mobile Internet. Morris and Turner (2001) explored the role of experience in changing relationships among TAM variables in the Internet usage context. Kim & Kwahk, (2007) have investigated the influences of different factors such as perceived usefulness and ease of use on the consumers' usage of mobile phone internet. Lee et al (2002) have also studied the value structure of mobile phone internet usage between Japan and Korea. Some other conducted research have surveyed the impact of performance expectancy, effort expectancy, social influences, and facilitating conditions on the attitude and intentions of the consumers towards using mobile technologies (Park et al. 2007).

External variables, both individual and organizational, are important considerations with respect to the process of adopting new information technologies. Both the indirect and the direct effects of these external variables on user behavior must be considered. Seyal and Rahman (2003) have confirmed that external variables such as; demographics, task characteristics, computer exposure, and institutional support, do contribute towards both perceived ease of use and perceived usefulness that further affects the attitude of the students in predicting the Internet usage in an educational institution. Seyal and Rahman (2007) tested and built argument based on TAM to study the usage internet by the business executives with three external variables of computer attitude,

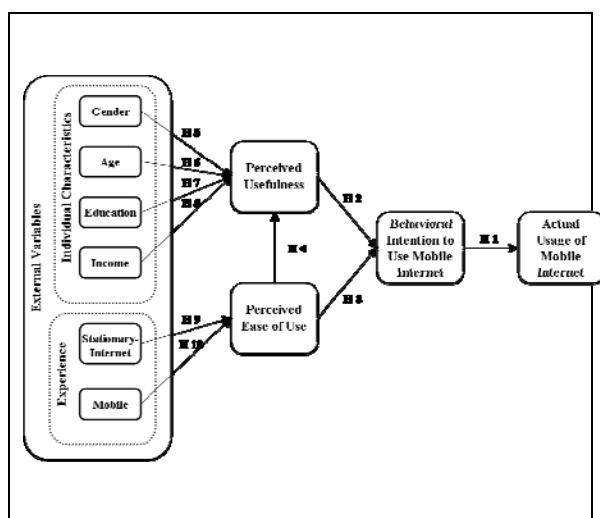
computer self-efficacy, and personality. Their study has shown that computer attitude has a significant effect on perceived ease of use. Whereas, computer self-efficacy has a significant but negative effect on perceived usefulness and has a positive and significant effect on perceived ease of use. Seyal and Rahman (2007) have found that the 'perceived ease-of-use' and 'perceived usefulness' constructs fully mediate the influence of external variables on usage behaviors. Their study shows that external variables could have direct effects on usage behavior apart from their indirect effects. Seyal et al. (2007) confirmed in their study that prior experience with the Internet has a strong impact with the utilization of the Internet. Kim and Lee (2001) attempted to explain the mobile Internet acceptance in Korea using the TAM. In their use of TAM, they specifically considered user characteristics (age, education, use frequency, and experience of cellular phones, income, etc) and social pressure representing subjective norms. Their findings show that the acceptance and usage behavior are affected by some of the user characteristics such as age, education, and use frequency of cellular phones as well as social pressure. Due to limitations in their statistical analysis, Kim and Lee (2001) suggest that their results should be interpreted with caution. A study of the pattern of mobile Internet spread worldwide and within given countries from the viewpoint of innovation diffusion and adoption literature could provide valuable insights (Takacs and Freiden 1998).

RESEARCH MODEL AND YPOTHESES

The rapid growth of the mobile Internet has significant implications but cannot be simply accepting the rules of the stationary Internet. The mobile Internet differs significantly in various aspects from the stationary Internet. We need to analyze the characteristics of the mobile Internet from three different perspectives: user, system, and culture (Chang and Cheung 2001). First, from the user's perspective, mobile Internet devices are usually more personal and individual than stationary Internet devices (Igbaria et al. 1997). As a result, the mobile device always carries its user identity, and it will be affected by individual characteristics. From the system's perspective, most mobile Internet systems, especially cellular phones, have a lower level of available resources in comparison to those provided by the stationary Internet. Nevertheless, previous experience and tenure of consumer's on mobile device and Internet access in stationary devices may play a role in attitude toward mobile Internet. From the cultural perspective, cultural differences among the

countries may be one of the main causes for the different usage and adoption patterns of the mobile Internet due to different values and needs. As mobile communication can only be operated locally while stationary Internet can be accessed anywhere in the world, it could be concluded that mobile communication is fundamentally characterized for a local market, whereas the stationary Internet is for a global market. In comparison to the stationary Internet, the mobile Internet is more dependent on the characteristics of local culture. A cross-cultural investigation, therefore, is more in need for mobile Internet research. Cultural issues and in relation consumer's characteristics plays an important role on consumer's access to Internet. Two individuals may have different cultural characteristics even though they live in the same country (Ford et al. 2005, McCoy et al. 2005, and Straub et al. 2002). There is, then, a growing agreement that culture is important as an individual-level variable (Matsumoto et al. 1999). The main objective of the present study was to examine how the cultural characteristics of individual users affected their intention to use and actual usage of mobile Internet. The study investigates the different usage patterns of mobile Internet users in three countries in three continents. These three countries were selected to have two countries from emerging markets, China, and Russia and one western country, USA. The Technology Acceptance Model (TAM), which has been widely used in technology and service adoption studies, is modified and employed to provide the theoretical foundation for this study (Figure 1).

Figure 1



TAM assigns a considerable weight to two key determinants of perceived usefulness: “the degree

to which a person believes that using a particular system would enhance his or her job performance” and perceived ease-of-use “the degree to which a person believes that using a particular system would be free of effort” (Davis 1989). These two concepts are fundamental to understanding the core workings of TAM. Perceived usefulness and ease of use from user's attitude towards technology that leads into intention to use a technology. Four hypotheses, H1 to H4 in Figure 1 originated from the TAM to explain computer usage behavior. TAM proposes that perceived usefulness and perceived ease of use largely determine whether a technological innovation will be used. In addition, the improved technology acceptance model (Davis, 1993) proposes that perceived usefulness is influenced by perceived ease of use, but not vice versa. This relationship has been confirmed in a number of other studies (see for examples, Davis et al., 1989; Davis, 1993; Taylor and Todd, 1995; Chau, 1996). Therefore, we hypothesized that if consumers found mobile Internet easy to use, then they would also find it useful. The TAM further postulates that behavioral intention to use a particular technology is determined by attitude and perceived usefulness. Past studies invariably show that the latter factor has a large impact on intention, either directly or indirectly via attitude. The level of behavioral intention, in turn, determines the likelihood that actual usage will occur (Ajzen and Fishbein, 1975; Davis et al., 1989). These relationships were examined in the context of mobile Internet using the following hypotheses:

Hypothesis 1: *There will be a positive relationship between Intention to use and service usage.*

Hypothesis 2: *There will be a positive relationship between Perceived Usefulness and Intention to use.*

Hypothesis 3: *There will be a positive relationship between Perceived Ease of Use and Intention to use.*

Hypothesis 4: *There will be a positive relationship between Perceived Ease of Use and Perceived Usefulness.*

External factors such as gender, age, education, income, and prior experience have been proven to play a role in intention to use and usage of Internet (Seyal and Rahman 2007, Seyal et al. 2007). The selected external factors reflect individual differences. User's gender affects usefulness and ease of use expectancy, where it is expected that males to be more likely to rely on perceived usefulness when determining to accept a technology with his highly task oriented nature (Park et al. 2007). On the other hand, female's technology acceptance may be determined mainly by perceived ease of use rather than usefulness under cognitions related to gender roles. The effect

of gender has been studied in the area of technology acceptance research in a variety of technologies like web-based shopping (Slyke et al. 2002), e-mail (Gefen and Straub 1997), Internet (Seyal and Rahman 2007, Seyal et al. 2007), Internet banking (Lichtenstein and Williamson 2006), mobile technologies (Park et al. 2007) and so on. Significant invariance between relationships in the technology acceptance process can be expected through gender differences (Lu et al. 2003). Gender differences and gaps in IT acceptance and usage are diminishing, as the technologies are more widely diffused (Zhou et al. 2007). Vigne et al. (2005) found that men and women did not show significantly different behaviors in mobile shopping in Spain with 86% of penetration rate. Possible moderating effects due to gender still exist in countries such as China where the infiltration rate of the mobile technologies is about 20%. Previous researches show that men have a more positive attitude toward accepting and using new technologies (Songan & Noor, 1999; Gefen & Straub, 1997; Igbaria et al. 1995; Pijpers et al. 2001). In regard to mobile phones, gender has shown to be relevant in forming overall attitudes, where men and women perceive mobile phones and their usage differently (Ozhan Dedeoglu, 2004). Ling (2001) reported that the role of the mobile phone differs between genders.

Hypothesis 5: There will be different Perceived Usefulness values between men and women.

Zmud (1979) documented that the demographic variables such as age influence the successful use of computer applications. Czara et al. (1989) found that younger people learn computer skills more easily than by older people. Older people have more difficulty generating syntactically complex commands (Egan and Gomez 1985) and make more errors in information search. In general, young people are heavy users of mobile services (Dickinger, et al., 2004a and 2004b), as for them mobile devices are as much as a fashion accessory as they are a communication device (Robins, 2003). Considering these facts, we conclude that younger consumers value accessing Internet via mobile devices to a higher extent than older consumers' value and show a more positive attitude toward them. Pijpers et al. (2001) illustrated in their study that age had a negative relation to technology acceptance.

Hypothesis 6: There will be a negative relationship between Age and Perceived Usefulness.

Enhanced abilities and more favorable attitude towards information systems have been associated with higher levels of educations (Hubona and Kennick 1996). Davis and Davis (1990) reported that end users that are more educated significantly

outperformed those with less educations in a training environment. Several studies have reported that higher levels of education are positively related to favorable computer attitudes and negatively related to computer anxiety (Howard 1988, Igbaria and Parasuraman 1989, Raub 1981). Lucas (1978) reported that individuals that are more educated, have more positive attitudes towards information systems than those who are less educated individuals. Harrison and Rainer (1992) maintained that education and training are effective techniques to overcome negative attitudes towards computers to enhance individual computer skill. Based on results from previous researchers, people with lower education levels are anticipated to be more sensitive to the efforts required to adopt new technologies in an early stage, as the technology presents a sort of barrier to them (Szajna 1996; Venkatesh and Morris 2000). Agarwal and Prasad (1999) identified that several individual differences including level of education have significant effects on TAM's beliefs. Ozhan (2004) reports that as educational level increases, the level of negative attitude toward mobile phone increases also. In china, mobile technology users are mainly predominated by the educated young generation (Tan and Ouyang 2004).

Hypothesis 7: There will be a positive relationship between Education and Perceived Usefulness.

Financial barriers emerge as most important determinants of an individual's decision to use mobile services. The cost considerations shift attention from the value creating capabilities and reflect consumers' desires for reasonably priced services over anything else. Sarker and Wells (2003) consider economic conditions as an influencing factor on adoption and usage of mobile phones. Consumers in every country divide into high and low income based on where their household's income falls on their county's income distribution curve. The technology attitude and income variables are both split into two groups. Even though some income-based differences in access to and use of the mobile telephone had been seen, but Rich Ling in his book *The Mobile Connection* (Elsevier, 2004) concludes that the "digital divide" issues associated with the personal computer and the Internet do not appear to apply to the world of mobile telephony.

Hypothesis 8: There will be a positive relationship between Income and Perceived Usefulness.

Numerous studies have related the impact of experience to computer usage behaviors. Levin and Gordon (1989) reported that those who owned computers were more motivated to become familiar with computers, and had more favorable attitudes towards computers, than those did not own

computers. There have been many studies in past showing positive relation of personal computer ownership (Rahim et al. 2000), personal computer knowhow (Igbaria et al. 1995), Frequency of personal computer usage (Igbaria et al. 1995; Igbaria & Chakraborti 1990), and personal computer experience (Igbaria & Chakraborti, 1990; Igbaria, 1992; Aljabri & Al-Khalidi, 1997) to actual usage. Experience has been demonstrated to have a large effect on performance with a specific system (Egan and Gomez 1985, Singley and Anderson 1979). Within the Internet experienced and Internet inexperienced group, research supported that inexperienced people tend to simultaneously depend on subjective norm and social pressure as well as self-experience. However, experienced people are more likely to be explained only by self-experience identity (Venkatesh and Morris, 2000). The effect of subjective norm and social pressure may decrease in time as experiences related to the system are accumulated. Venkatash and Davis (2000) supported a moderating effect of experiences on the perceived usefulness, as they found out that experience tends to increase the intention to use the technology. In the mobile domain, consumers who are more familiar with mobile technology can be considered the consumers who first use mobile services, like mobile Internet. Therefore, consumers who find mobile technology useful and easy to use and those who have experience with stationary Internet, have a more positive attitude towards mobile Internet. If the technology is useful and easy to use by the consumers, the acceptance of the technology is likely to be positive as well (Nathwani and Eason 2005). Therefore, the perceived usefulness and ease-of-use can influence the consumer's attitude towards a technology (Glassberg et al. 2006). TAM has been used in different fields of research such as skill training (Venkatesh, 1999) and consumer behavior in an online environment (Koufaris, 2002).

Hypothesis 9: There will be a positive relationship between stationary Internet experience and Perceived Ease of Use.

Hypothesis 10: There will be a positive relationship between mobile phone experience and Perceived Ease of Use.

The purpose of using mobile Internet by the current and potential users around the globe appears to be mostly personal, contrary to work-related purposes. Therefore, their use of mobile Internet is assumed voluntary in this study. Based on the review of TAM literature, we propose the above research model (Figure 1) in an attempt to explain differences in usage of mobile Internet by the current users in three different countries. We use age, gender, education and income as part of user individual characteristics and stationary Internet

experience and mobile phone experience as elements affecting prior experience that facilitates usage of mobile Internet. All of these antecedents are adopted from previous studies that are listed in table 1

Table 1- Empirical studies testing TAM

Studied Technology	Researcher
Email	Davis 1989, Sproull 1991, Rice and Aydin 1991, Markus 1994, Gefen and Straub 1997, Straub et al. 1997, Gefen & Straub 1997
PC and related office software usage	Davis et al. 1989, Thompson et al. 1991, Mathieson 1991, Igbaria et al. 1995
Voice mail	Adams et al. 1992, Straub et al. 1995
Computerized and Group Support System	Lu & Gustafson 1994, Chin and Gopal 1995, Szanja 1996, Lou et al. 2000
Internet use, Internet services	Yang & Choi 2001, Slyke et al. 2002, Lu et al. 2003, Seyal, and Rahman 2003, Lichtenstein and Williamson 2006, Seyal and Rahman 2007, Seyal, Rahman and Tajuddin 2007
IT usage	Hubona and Kennick 1996, Veiga et al. 2001, Pijpers et al. 2001, Seyal et al. 2002

RESEARCH METHODOLOGY

Large-scale on-line surveys were conducted in US, Russia and China, using a questionnaire with battery of 35 questions at around the same time in order to increase the external validity of the results. The back-translation method was used to maintain the linguistic integrity of the questionnaire across the three countries. Respondents were solicited via banner advertisements on the Web sites of several popular portals. Survey data were collected as follows. Before going to the main questionnaire was presented, it was asked if the participant owns a mobile phone and had used mobile Internet services at least once. If the respond was yes, then the participant was allowed to continue to answer the main questionnaire. In other hands, respondents were asked to provide their mobile phone numbers, which telecommunication companies could use to verify prior. The research has been exploratory, asking more than 3000 consumers in three countries in a period of 3 months in the last quarter of year 2007. The questions were broad enough to include different aspects of mobile technologies, especially mobile internet. All data were collected via online survey and respondents were drawn from demographically diverse groups of mobile phone users, who have agreed to participate in the online survey. The questionnaire was distributed among the responders via email. The study aims at delivering high-level metrics to clarify issues

regarding mobile Internet usage. Quota sampling was used to select a demographically representative sample in each country, based on nested age and gender groupings as determined by each country's most recently available census population proportions. The portion of each country's population covered in Table 2.

Table 2 - Research participants' age statistics

Cou- ntry	N	M user s	Rang e	Mi n Age	Ma x Age	Mea n	Std. Dev.
US	1432	1070	94	13	85	43.66 131	18.230
Rus- sia	1579	1517	76	13	85	35.04 75	13.298
Chi- na	1125	1100	92	15	85	36.65 244	14.555

The countries selected for the survey are from different cultural contexts to investigate whether the impacts of these factors on the intentions of the consumers to use the mobile internet in different countries are the same or not. As it has been discussed in the introduction, United States of America is one of the frontiers in the usage of mobile internet. In addition, China and Russia had been considered due to big opportunities in their market of mobile technologies. For the present study, in the context of mobile internet, we define a task as an objective or a function that is performed using Internet service, such as email, download & upload files, instant messaging, online search and purchase orders, online services and online game and gambling. In order to measure the real sense of the consumers in each of the constructs in the model, we used the 5-point scale Likert. It should be noted that some of the scales were reverse-coded where required. Based on the research model, the endogenous variables comprise of perceived usefulness and perceived ease of use and the exogenous variables include gender, age, education, income, stationary Internet experience, mobile experience. Table 3 summarizes the descriptive mean values for the constructs of the model for the consumers in these three countries.

Table 3 - Descriptive summary of responds

Perceived Usefulness	Perceived Ease of Use	Behavioral Intention to Use	Actual Usage	Income Level	Education Level	Stationary Internet Usage	Mobile Usage

U S A								
M e a n	3.3	1.9	2.1	1.5	2.6	4.3	2.8	3.2
ST D V	1.3	1.4	1.17	1.1	1.3	1.5	2	1.2
R u s s i a								
M e a n	3	3.3	1.9	1.9	3.6	2.5	3.1	3.3
ST D V	1.5	1.3	1.1	1.3	1.5	0.7	1.2	0.8
C h i n a								
M e a n	3.2	3.5	2.5	2.2	4.2	4.7	3.2	3.1
ST D V	1.3	1.5	1.2	1.4	1.3	0.6	1	1.1

The minimum is 1 and the maximum is 5 for all of the constructs

In order to validate the fitness of the model the AMOS software has been utilized for measuring the fitness. The posterior predictive p value that has been described by Lee & Song (2003) was measured for the model in each of the cultural contexts to assure that the model is fitting for the study in all the three countries. Based on Gelman et al. (2004) a posterior predictive p-value should be near 0.5 for a correct model, and the values toward the extremes of 0 or 1 indicate that a model is not plausible.

In analyzing the relationship between the factors and the actual usage and/or the intentions of the consumers, we computed the coefficient of correlation to find out how much and in what way the effects are. The coefficient of correlation is a statistical measure of how well a regression between two variables is fit. The coefficient of correlation lies in a range of minus one to one and the nearer the absolute of the coefficient is to unity, the higher is the correlation. The sign of the coefficient also determines whether the correlation is in the inverse direction or not. For example, if the coefficient of correlation between the two variables is negative, it means that as one of the variables increases the other one will decrease. In our analysis, the coefficients more than 0.2, were assumed to be considerable.

For analyzing the gender differences, a t-test was conducted and the p-value was calculated to see if there exists a significant difference between different genders on the intention to use the mobile

internet or not. The p -level reported by a t -test represents the probability of error involved in accepting our research hypothesis about the existence of a difference. Technically speaking, this is the probability of error associated with rejecting the hypothesis of no difference between the two categories of observations. Null Hypothesis is typically statements of no difference or effect. A p -value close to zero signals that your null hypothesis is false and typically that a difference is very likely to exist. Large p -values closer to one imply that there is no detectable difference for the sample size used.

STUDY RESULTS

The fitness measurement of the model was done using the AMOS software in which the posterior predictive p values were extracted for the data of each country. Table 4 shows that the posterior predictive values for each country are around 0.5, which implies that the model is plausible, based on Gelman et al (2004).

Table 4 - Fit measures for the model in different countries

	USA	Russia	China
Posterior P value	0.51	0.51	0.50

Questionnaire data was analyzed by using SPSS with which we computed the coefficients of correlations to investigate the hypothesis that we had defined for the research. In addition to that, we also applied the T-test to determine the gender influences. Actually, we calculated the correspondent p value, which shows whether there exists evidence against the null hypothesis, which is "no difference between men and women in their perceived usefulness of mobile internet technology". Table 5 summarizes the results of the analyses for all the target countries.

Table 5 - Summary results of the analyses

	USA	RU	CH
H1	0.469**	0.417**	0.507**
H2	0.038	0.296**	0.251**
H3	0.413**	0.296**	0.405**
H4	- 0.164**	0.418**	0.111**
H5 (p values for the t-test)	0.0373	0.067693	0.046261
H6	0.081*	-0.015	-0.043
H7	-0.049	-0.027	0.026
H8	-0.009	0.132**	0.112**
H9	0.128**	0.149**	0.129**
H10	0.085**	0.140**	0.117**

*Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed)

The result of correlation analysis revealed that positive correlation between behavioral intention and actual usage is supported in all the countries. The correlations show that the behavioral intention is one of the antecedents of usage behavior of the customers in all the cultural contexts. The results of previous research (Venkatesh, Morris, Davis, 2003) have also proven that behavioral intention (attitude) has a direct effect on the actual behavior (usage). The role of intention as a predictor of behavior (e.g. usage) is critical and has been well established in IT services (Ajzen 1991; Sheppard et al. 1988; Taylor and Todd 1995b). Christer Carlsson et al (2006) have also found out that the behavioral intention does have a positive effect on the actual usage of mobile services. In addition, the studies of Nysveen et al (2005a) confirmed that attitude toward the use is a direct determinant of mobile services' usage.

Referring to the analysis results shown in table 5, clearly the positive correlation between perceived usefulness and behavioral intention is not supported in USA. The coefficients of the correlation show that the hypothesis is supported in Russia and China. In contradiction to our results which reveal how the impact of perceived usefulness on behavioral intention is different in different countries, some other studies had proven perceived usefulness as one of the dominant antecedents of usage behavioral intention regardless of the cultural context. The studies of Venkatesh et al (2003) showed that perceived usefulness has been considered the most powerful tool for explaining the intention to use the system. In addition, Bhattacharjee (2001) suggests more satisfaction is gained through on-line services that are found more useful than the services that are not perceived useful. This implies that perceived usefulness is likely to be a key factor in the post-adoption behavior of mobile Internet users. Studies of Lee et al (2007) also proved that perceived usefulness is a significant determinant of users' satisfaction in Korea, Hong Kong, and Taiwan, although they have also proven that the results are different through different cultural lenses. On the other hand, in some other studies the relationship between the perceived usefulness and behavioral intention has not been supported (Jackson et al 1997; Lucas and Spitler 1999; Bhatti 2007). In addition, the studies of Kim and Kwahk (2007) showed that usefulness and emotion are indirect antecedents of both usage and intention through perceived value, and overall they do not directly influence usage and intention. Studies of Kim, H. Chan, and Y. Chan (2007) also support these findings suggesting that for the services to be useful, service providers should focus on satisfying the users' needs and desires in ways that are

impossible in other typical similar services. Our findings explain why these surveys differ from each other as we have found both results in different cultural contexts. In other words, the reason why the results of the survey are different lies in the fact that the effect of perceived usefulness is dependent to the society in which the survey is conducted. For example, the results of studies of Lee et al (2007) in Korea, which has probably more similarity with China, are near to our findings in China. An explanation to why in some countries the effect of perceived usefulness on intention to use is more dominant might be related to the extent of joblessness and social welfare in each country. Thus in countries with less joblessness and greater social welfare, the usefulness of the technology for consumers' jobs may be less important than the countries with more competition for acquiring a job. The gross domestic product (GDP) of each country is very often positively correlated with standard of living (Sheffrin 1996) and based on a study conducted by International Monetary Fund (2009) we can see that US has higher GDP comparing to Russia and China. In another study by Global Career News (2006), the same ranking is determined for unemployment rates of the countries. These are consistent with our findings, as our study has revealed that in US the relationship between perceived usefulness, behavioral intention cannot be proven while in China, and Russia the hypothesis is supported. The positive correlation between perceived ease of use and behavioral intention is supported in all the countries. Therefore, it can be concluded that perceived ease of use is one of the antecedents of the behavioral intention in these cultural contexts. Previous studies (Straub et al 1999; Bhattacharjee 2001; Wu & Wang; 2005; Bhatti 2007; Wu, Tao & Yang 2007) have also revealed that perceived usefulness is a significant determinant of users' behavioral intention. Lee et al. also studied perceived usefulness as a post adoption perception of users and proved that it is a strong determinant of satisfaction of users in three different Asian countries. In addition, the correlation between perceived ease of use and perceived usefulness is only supported in Russia. Even the result in US is in the contrary direction of what has been expected by the hypothesis H4. Making the service easier to use is even more important in Russia in order to increase the adoption rate in customers, perceived usefulness will increase the behavioral intention. The studies of Taylor and Todd (1995) also suggest that easiness of using technologies have influence on users' future attitude and intention towards using the technology. Nysveen et al (2005) also found out that perceived ease of use influence

perceived usefulness of the consumers. Although perceived ease of use has been proven to have strong effect on intention to use, some studies have revealed that perceived ease of use is important in the early stages of the adoption (Venkatesh 2000). In other words, through the passage of time, the effect of perceived usefulness will be lessened and in the early stages of a technology adoption usefulness will be more important. A survey conducted by ComScore in 2008 showed that the internet audience has grown 27 percent, which is the highest growth in the world. This conveys that Russia is in its early stages of technology adoption and that might be a good reason why perceived ease of use has an impact on perceived usefulness in Russia. While perceived ease of use is an important factor in different countries, only in Russia it also has a positive correlation with perceived usefulness that indeed increases the importance of ease of use in Russia.

The results of t-test revealed that there is a difference between men and women in their perceived usefulness. Research on gender differences indicates that men tend to be highly task-oriented (Minton and Schneider 1980). Therefore, performance expectancies, which focus on task accomplishment, are likely to be especially salient to men. Gender schema theory suggests that such differences stem from gender roles reinforced from birth rather than biological gender per se (Bem and Allen 1974). This suggests that in different cultural contexts with different gender roles the effect of the gender on the adoption of the technology is different. The surveys conducted to investigate the effect of gender on adoption of an IT services has revealed different results. For example, studies of Westlund and Bohlin (2008) revealed that there is a gendered dimension in the use of internet services as men use the internet more frequently especially the search engines, news sites and sports. The studies of Ozhan Dedeoglu (2004) have also revealed that men and women perceive mobile phones' usage differently. On the other hand, Slyke et al (2002) showed that gender does not have a significant impact on the adoption of web based services. Bigne et al (2007) also proved that gender does not have a significant impact on intention towards M-Commerce. Bigne et al explained that the differences between genders tend to disappear due to changes in social habits and in the greater level of introduction and development of the new technologies. Their study has confirmed the results of other researches' findings (Modahl 2000, Siegel 2003) which had concluded that women are becoming more engaged in virtual environments and that mobile use is becoming more and more widespread and thus the effect of gender is decreasing. Therefore, just like

ease of use the effect of gender is likely to be more important in the early stages of the product. Skyle et al (2002) have referred to *New York Times* (July 1999) that the internet gender gap is disappearing. However, they have stated that empirical studies has shown that men and women have an equal intention to use the internet only for business purposes and other usages such as shopping and entertainment are still different between men and women. Thus it seems that the effect of gender is different in different cultural contexts, and it does not remain constant in them. A research conducted by TNS (2009) has revealed that surprisingly a lot of activities that used to be done traditionally are now being done by women through online services. This means that not only changes in gender roles but also the diversity of the services that IT technologies (e.g. mobile internet) provide for different gender roles decrease the effect of gender on the perceived usefulness of the technology. Thus this is an important finding for the service providers that through studying the gender roles and customizing their services to become useful for them, they can decrease the effect of gender, and therefore, they can have a greater segment of the market. As our study reveals at the time being the service providers should understand that men and women have a different idea about usefulness of the mobile internet in all the countries.

There is weak evidence supporting the effect of age on perceived usefulness of the customers in almost different cultural contexts. In some previous studies, it has been observed that young generations are more interested in mobile technologies and services (Dickinger, et al., 2004a and 2004b). Actually, it has been observed that mobile devices, more than being as means of communication, are used as fashion accessories (Robins, 2003) that may be a good reason why mobile technologies are more favorable to younger generations. Some other studies of mobile service adoption support our findings. For example, Bracket and Carr's (2001) findings in investigating web ads revealed that age did not influence the attitude of the consumers. In addition, the studies of Haghirian et al (2005 & 2006) imply that the age of the consumers did not have a significant influence on the perceptions of the users towards mobile marketing.

There is no evidence that supports the positive relationship between the education levels and perceived usefulness of the service in the customers. In addition, there is no evidence of existence of relationship between the income levels and perceived usefulness in US. However, the results reveal weak evidence of such a relationship in Russia and China. Similar to our findings, Haghirian et al (2005 & 2006) also could not find

strong and supporting evidence for negative effect of education on consumers' attitude towards mobile services. In contradiction, the studies of Park et al (2007) showed that education has a significant moderating effect on the main antecedents of attitude of the Chinese consumers towards using mobile technologies. Moreover, some other studies indicate that early-adopters of internet related services for mobile devices are people with a high income and educational level (Matsuda 2005, Versakalo 2006, Ohlsson 2007, OPA 2006, and Kivi 2007). Pederson et al (2003) also found out that there exist differences in perceived expressiveness, enjoyment, attitudes, interpersonal influence and use of different educational levels. Users that were more educated found the services less expressive and enjoying, and had a less positive attitude towards the use. They also used less and felt a less interpersonal influence in using. Park et al (2003) also found that there were income differences in external influence, self-efficacy and intention to use. High-income users felt a less external influence and more self-efficacy but also reported higher intentions to use the service. Regarding the issue of education it should be noted that through the passage of time internet activities categories are broadened and the cover a vaster range of activities. The pew internet and American life project tracking surveys (2008) has resulted in a list of 72 activities, which are popular tasks people do using internet. This decreases the effect of education on perceived usefulness as people with less educations also find internet useful in their daily activities. On the other hand, the mobile internet costs have been lessened and therefore, people with lower incomes can afford to use the technology. However, the World Bank categorization of the countries based on the income level shows that China and Russia are among lower and upper middle-income countries while United States is a high-income country. These statistics are in consistency with our results as we have revealed the weak impact of income in Russia and China as well. Eventually, the experience of working with stationary internet on PC and experience of working with mobile phone could not be proven to have a strong impact on ease of use in different cultural contexts. A study of Park et al (2007) also supports our findings as they found that the moderating effect of past internet experience is insignificant. Therefore, it is concluded that the mobile internet service providers do not need to focus on more educated and high-income customers, and they can present the service to a wider range of customers. The same conclusion is true for the previous background of working with stationary internet and mobile phones, which highlighted that the service

providers can include consumers with little or no previous background of working with stationary

CONCLUSIONS AND DISCUSSIONS

Throughout this study, we fulfilled the objectives of the survey. We tried to provide an answer to whether the service providers are to customize the service based on the effect of endogenous variables, or they should focus on specific segments of the market (effect of exogenous variables). In other words, we tried to see if the relationships between the constructs of the TAM model are different for the consumers in different cultural contexts or not. We utilized the AMOS software for testing the validation of the model and the results of model validation analysis showed that the model is plausible for the analysis in all the target countries. As a whole the results of this survey revealed that exogenous variables (except for gender) have little or no impact in almost all the cultural contexts and thus the service providers do not need to focus on a specific segment of market in different cultural contexts. On the other hand, the endogenous variables have different impacts in different countries emphasizing on the fact that the service has to be customized for each cultural context to have the highest adoption in each country.

In some aspects, our findings are supported by other previous studies. However, we have revealed new findings. We have not only worked out the correlations between the constructs of the model, but also we have compared the results between three countries with different cultural contexts. We tried to investigate how these factors affect intentions towards mobile internet usage and how these impacts differ in different countries. Although we have revealed the existence of such difference, the underlying reasons of these differences between different cultural contexts are not known. This understanding may help the providers even more in developing their future services and products before entering each specific market.

RESEARCH

LIMITATIONS/IMPLICATIONS

The study has its own limitations. Therefore; we suggest that our results should be interpreted with caution. The mobile services are now presented globally in different cultural contexts and understanding whether cultural differences affect adoption behavior of consumers is of high value. The study has practical significance for the mobile internet service providers as it provides them an understanding of how to customize their service and tells them whether they have to focus on specific segments of markets or not. This decreases the chance of encountering low adoption of service

internet and mobile phones in their target market.

in each specific market. The authors suggest that studying latent reasons for different responses in different cultures towards mobile internet is of high importance. Other external variables may also be explored and investigated to determine whether they have different impacts in different cultural contexts.

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