Juris BINDE
Madara FUKSA

Mobile Technologies and Services Development Impact on Mobile Internet Usage in Latvia

Technology development and internet have overall changed communication processes. Mobile internet by combining two most actual nowadays innovations – internet and mobile telephone – has become one of the most popular mobile services for customers worldwide. In Latvian mobile services market mobile internet is still new service. There have been no studies about tendency of mobile internet prevalence and about factors that impacts mobile internet acceptance and usage in Latvia. This paper discusses possibilities to determine instant level of mobile internet use and acceptance.

Keywords: mobile internet, technology use and acceptance, UTAUT, UTAUT2.

Technologinė pažamnga ir internetas ženkliai pakeitė komunikacijų procesą. Mobilusis internetas, naudojant dvi aktualiausias šių dienų inovacijas – internetą ir mobiliųjų telefoną, tapo populiariausia mobiliąja paslauga viso pasaulio vartotojams. Latvijoje ši paslauga yra vis dar nauja. Pasigendama tyrimų, kuriuose būtų analizuojamos mobiliojo interneto paplitimo tendencijos ir veiksniai lemiantys šios paslaugos pripažinimą ir vartojimą Latvijoje. Šiame straipsnyje aptariamos galimybės apibrėžti dabartinį mobiliojo interneto pripažinimo ir naudojimo lygmenį.

Raktiniai žodžiai: mobilusis internetas, technologijų naudojimas ir priimtinumas, UTAUT, UTAUT2.

Introduction

Number of mobile internet users continues to grow by smartphone position strengthening into the world mobile phone market and development of mobile data services. It is predicted that in 2014, mobile internet usage worldwide will overtake desktop internet usage (Infographic: Mobile Statistics, Stats & Facts, 2011).

Due to mobile internet functionality and ease of use, mobile internet is becoming an important communication tool for individuals and organizations. Knowledge about factors that impacts adoption and use of mobile internet provides an opportunity to influence tendency of mobile internet prevalence, promoting mobile internet faster acceptance and initiating usage.

Technology adoption among users is one of the preconditions for development of new technology. There are number of theories explaining user acceptance of

Juris BINDE – Dr. oec., Latvijas Mobilais Telefons, Ltd. Addess: Ropazu str. 6, Riga, LV1039, Latvia. E-mail: juris.binde@lmt.lv.

Madara FUKSA – Mg. sc. comp., Faculty of Engineering, Vidzeme University of Applied Sciences. Address: Cesu Str. 4, Valmiera, LV-4200, Latvia. E-mail: madara.fuksa@gmail.com.

technologies and intention to use new technologies. Theories, depending on their purposes, enable technology creators to assess user attitude towards technology before its introduction in the market or when technology is already in market.

Object of the research is mobile internet prevalence modeling and imitation.

Objective of the research is to develop mobile internet prevalence model that would let determine levels of mobile internet acceptance and use, and their impacting factors.

To reach the objective theories of technology use and acceptance have been researched and analyzed, theoretical model have been developed and adapted in *Stella* modeling environment, Latvian internet user survey and expert interview have been done. Verification and validation of developed mobile internet prevalence model have been done and economical factors analyzed. By using model and standardized questionnaire it is possible to find out level of mobile internet use and acceptance, and to make conclusions about mobile internet prevalence and it impacting factors.

Mobile internet role in mobile services market

Mobile internet is perhaps one of the few technologies that come close to emulating the success of the fixed internet. Backed by the entire telecommunication industry, coupled with the fact that it combines two of the hottest innovations in recent times (mobile phone and the internet), mobile internet is poised to succeed the fixed internet as the next big thing (Jiang, 2009). The global mobile industry is the most vibrant and fastest growing industry. It

is expected that the total revenue in the industry will touch approximately $1.5 Trillion in 2012 with mobile data representing 28 % of the mix (Global Mobile Market Update, 2012).

In 2013, there are almost as many mobile-cellular subscriptions as people in the world, with more than half in the Asia-Pacific region (3.5 billion out of 6.8 billion total subscriptions). Over 2.7 billion people in 2013 are using the Internet, which corresponds to 39 % of the world's population. In the developing world, 31 % of the population is online, compared with 77 % in the developed world. Mobile-broadband subscriptions have climbed from 268 million in 2007 to 2.1 billion in 2013. This reflects an average annual growth rate of 40 %, making mobile broadband the most dynamic Information and Communication Technology (ICT) market (International Telecommunication Union, 2013). Although developing countries are catching up in terms of 3G coverage, huge disparities remain between mobile broadband penetration in the developing (8 %) and the developed world (51 %) (International Telecommunication Union, 2012).

The percentage of individuals in the EU who used the internet in 2012 was 73 %. About one third of individuals used the internet on mobile devices away from home or work. Individuals in the EU27 aged 16-74 years made slightly more use of handheld devices, including mobile or smart phones and other small internet enabling devices, than of portable computers (including laptops, notebooks, and tablets). The proportion of young people aged 16-24 using handheld devices (47 %) for internet access was 7 percentage points higher than for those using portable computers (40 %) (Seybert, 2012).

MicrosofTag has created infographic that shows for what people have used mobile phones and mobile internet most recent. Trends show that mobile internet is used most active in socialization process – 91 % of cases. Approximately one-third of *Facebook's* 600 million users are using the mobile version of *Facebook* and over 50 % of the 165 million *Twitter* users are using mobile version of this social network. People also use their mobile phones to play games (61 %), find out the latest weather forecast (55 %), use maps / search features (50 %), listening music (42 %) or read the news (36 %) (Infographic: Mobile Statistics, Stats & Facts, 2011).

Number of mobile data services users is also increasing because variety of external factors – mobile data services technology development, emergence of new mobile devices such as Smartphones or tablet computers, internet environment adoption to mobile platform. Mobile internet development is changing communication processes worldwide, society and organizations has to be ready for changes that mobile internet will bring.

Mobile internet usage in Latvia

Along with rapid development into mobile services markets worldwide, mobile internet has also entered in Latvia mobile services market. In the beginning of 2012 92 % of Latvian population had mobile phone and almost one-fifth or 18 % of the total number of mobile phones were smartphones. The percentage of individuals in the Latvia who used the mobile internet in 2012 was 25 %. Mobile internet is relatively new service in Latvia and mobile operators are actively working to attract customers to use mobile internet (GfK Custom Research Baltic, 2012).

Despite the fact that mobile internet is becoming popular in mobile services markets worldwide, people in Latvia still see a lot of barriers to use mobile internet. 57 % of population think that internet in mobile phone is not necessary, because it is possible to access internet by computer. 36 % of population thinks that mobile internet is too expensive and 16 % believe that it is difficult to learn how to use mobile internet. As other barriers to use mobile internet people have mentioned – lack of information about mobile internet (9 %), mobile internet limits internet usage, not all web pages have mobile version (8 %), it is necessary to make configurations in mobile phone before start to use mobile internet (7 %), actual mobile phone do not support mobile internet usage (7 %) (GfK Custom Research Baltic, 2012).

Currently relatively large part of smartphone owners (33 %) in Latvia does not use mobile internet and doubts if they will use it in future (GfK Custom Research Baltic 2012). Actual tendency and opinion about mobile internet do not support mobile internet faster acceptance and number of users increase in Latvia. Technology adoption among users is one of the preconditions for development of new technology. Ability to understand factors that now impacts users desire to start use technology or service, can help to improve technology or service development in future. Research will focus on analyzing factors that impact mobile internet acceptance and usage in Latvia.

Technology use and acceptance

Technology development in 21st century is rapid and dynamic. Technology acceptance research is a constantly developing field, as new technologies keep evolving all the time. Two major disciplines have contributed to the development of models and theories addressing technology acceptance, adoption and usage. Psychology and sociology focus on technology acceptance behavior, whereas Information Systems focuses on system's characteristics in relation to technology acceptance (Al-Qeisi, 2009).

Information System research has long studied *how* and *why* individuals adopt new information technologies. Within this broad area of inquiry, there have been several streams of research. One stream of research focuses on individual acceptance of technology by using intention or usage as a dependent variable. Other streams have focused on implementation success at the organizational level and task-technology fit, among others (Venkatesh et al., 2003). Theories, depending on their purposes, let technology creators assess consumers' attitude towards technology before it is introduced into market or when technology is already in the market. Although each theory and model has a different investigative thrust towards the acceptance process, there are some common threads and themes among these models (Al-Qeisi, 2009). Many of the models are developed by supplementing an existing model or combining multiple models.

V. Venkatesh (2003) noticed that IS or IT researchers were confronted with a choice among a multitude of models and were bound to choose constructs across models or choose a favored model, thus ignoring the contribution from alternative

ones. They felt the need for a synthesis in order to reach a unified view of users' technology acceptance (Al-Qeisi, 2009).

V. Venkatesh (2003) reviewed and compared the eight dominant models that have been used to explain technology acceptance behavior. These models included *Theory of Reasoned Action* (TRA), *Theory of Planned Behavior* (TPB), *Technology Acceptance Model* (TAM), *Combined TAM – TPB*, *Diffusion of Innovation Theory* (DIT), *Social Cognitive Theory* (SCT), *Motivational Model* (MM) and *Model of PC Utilization*. The researcher then empirically compared the eight models in longitudinal field studies conducted in four different organizations among individuals that were introduced to a new technology in the workplace. The measurement was carried out at three different points in time: post training, one month after implementation and three months after implementation; while actual usage behavior was measured over the six-month post training period. The data was divided into two samples for the eight models according to the mandatory and voluntary settings. The authors also studied the affect of some moderating variables that have been reported in previous research to effect the usage decision. These were experience, voluntariness, age, and gender. Results showed that, with exception to MM and SCT, the predictive validity of the models increased after including the moderators (Al-Qeisi, 2009).

The authors then examined commonalities among models and found seven constructs to be significant direct determinants of intention or usage in one or more of the individual models. They hypothesized that four of them play a significant role as direct determinants of user acceptance and usage behavior. Based on user

acceptance literature and results of models' comparison, attitude, computer self-efficacy, and anxiety were hypothesized not to have a direct effect on behavioral intention. The constructs that do have a direct effect on behavioral intentions and usage are: performance expectancy, effort expectancy, social influences, and facilitating conditions (Al-Qeisi, 2009).

Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by using those four constructs and moderators (age, gender, experience, voluntariness of use). V. Venkatesh continued researches in technology use and acceptance field and in 2012 developed Extended *Unified Theory of Acceptance and Use of Technology* (UTAUT2). If UTAUT analyzed technology use and acceptance in organization context, then UTAUT2 analyzes technology use and acceptance in consumer use context. UTAUT2 included all elements from UTAUT and three new elements – hedonic motivation, price value and habit. Also technology use and acceptance was analyzed in voluntary context, moderator voluntariness of use was excluded from model,

because consumers have no pressure to use technology as it is for employees in organizations (Venkatesh, 2012). Currently UTAUT and UTAUT2 are one of the most widely used technology use and acceptance theories in the world.

Mobile internet prevalence model

To develop *Mobile Internet Prevalence Model* (MIPM) different theories of technology use and acceptance have been reviewed and analyzed. MIPM was created by using elements from UTAUT and UTAUT2, two elements made by research authors were added to model.

Totally model consists of seven core determinants of intention and usage, and up to three moderators of key relationships (See Figure 1).

Seven core determinants of intention and usage are:

Performance expectancy. Element is taken from UTAUT and UTAUT2. Performance expectancy reflects the perceived utility associated with using mobile Internet. Mobile Internet frees users from temporal and spatial limitations,
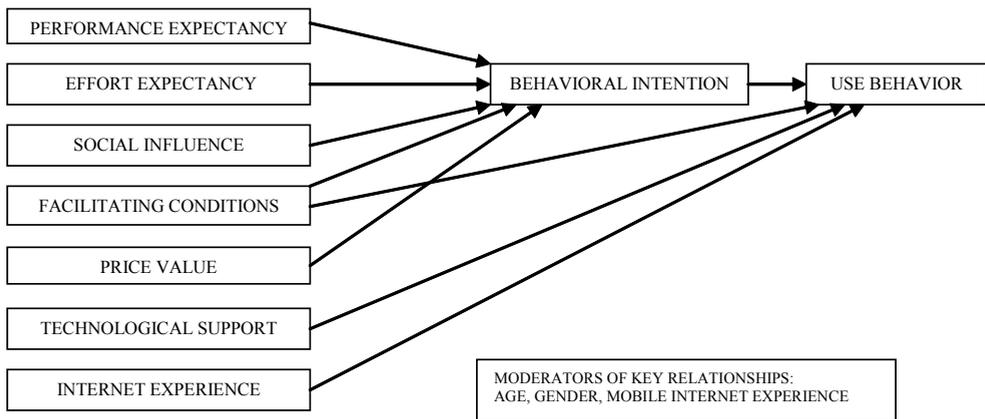

Fig. 1. **Mobile internet prevalence model**

and enables them to acquire information or services at anytime from anywhere. This can improve user's living and working performance and efficiency. According to the expectation confirmation theory, when user's expectation is confirmed, they will be satisfied. Thus performance expectancy will affect user satisfaction. Extant research has also noted the effect of perceived usefulness (similar to performance expectancy) on satisfaction. In addition, performance expectancy will also affect continuance intention. When users form positive expectation towards mobile Internet utility, they may continue their usage. The effect of perceived usefulness on continuance usage has been verified in previous research (Zhou, 2011). Performance expectancy directly impacts behavioral intention, relationship between these elements influence two moderators – gender, age.

Effort expectancy. Element from UTAUT and UTAUT2. Effort expectancy reflects the perceived difficulty of using mobile Internet. The constraints of mobile terminals such as small screens and inconvenient input have made it relatively difficult for users to search for information on mobile Internet. If users need to invest great effort on learning to use or skillfully using mobile Internet, they cannot feel satisfied. Thus effort expectancy will affect user satisfaction. In addition, users may discontinue their usage if mobile service providers cannot present an easy-to-use interface to them. Prior research has revealed the effect of perceived ease of use (similar to effort expectancy) on user satisfaction and continuance usage (Zhou, 2011). Effort expectancy directly impacts behavioral intention, relationship between these elements influence three moderators – gender, age, experience.

Social influence. Element from UTAUT and UTAUT2. Social influence reflects the effect of referees' opinion on individual user behavior. According to social influence theory, users tend to comply with other important referee's opinions. Thus when others who are important to a user recommend him or her to use mobile Internet, he or she may follow their suggestions. Social influence has a significant effect on the continuance intention of mobile data services (Zhou, 2011). Social influence directly impacts behavioral intention, relationship between these elements influence three moderators – gender, age, experience.

Facilitating conditions. Element from UTAUT and UTAUT2. Facilitating conditions mean that users have the resources and knowledge necessary to use mobile Internet. Users need to bear the costs of using mobile Internet, such as communication fees and service fees. In addition, they need to be equipped with necessary knowledge to operate mobile Internet, which represents an emerging technology. If users do not own these resources and knowledge, they may not continue their usage of mobile Internet (Zhou, 2011). Facilitating conditions directly impacts behavioral intention and use behavior, relationship between facilitating conditions and behavioral intention influence three moderators – gender, age, and experience. Relationship between facilitating conditions and use behavior is influenced by moderator's age and experience.

Price value. Element from UTAUT2. An important difference between a consumer use setting and the organizational use setting, where UTAUT was developed, is that consumers usually bear the monetary cost of such use whereas employees do not. The cost and pricing structure may have a significant impact

on consumers' technology use. *Price value* is consumers' cognitive trade off between the perceived benefits of the applications and the monetary cost for using them. The price value is positive when the benefits of using a technology are perceived to be greater than the monetary cost and such price value has a positive impact on intention (Venkatesh, 2012). Price value directly impacts behavioral intention, relationship between these elements influence two moderators – gender, age.

Technological support. Element created by research author. Mobile phone has significant impact on mobile internet using experience. User can't use mobile internet if mobile phone doesn't provides such function, or provides it partly (is not suitable for using mobile internet). Mobile phone functionality, screen size and other technical factors have a significant impact on mobile internet using experience. Opportunities offered by Smartphones give user maximally positive experience comparing with older mobile phone models. Research author believes that technological support is essential when making decision to use mobile internet. Technological support directly impacts use of technology, relationship between these elements influence two other moderators – gender and age.

Internet experience. Element created by research authors. Mobile internet is developed by merging two technologies – internet and mobile phone, therefore previous internet experience may affect user's decision to use internet in different way – by mobile phone. Users who use internet every day and are more experienced more often will choose to use mobile internet. Users who have not previously used the internet and do not have experience rather will choose to start own internet experience on a computer than on mobile phone. Technological support directly impacts use of technology, relationship between these elements influence two other moderators – gender and age.

Moderators of key relationships:

Gender – affects all seven core determinants of intention and usage. Importance of some determinants can differ between genders. For example, importance of determinants effort expectancy, social influence, facilitating conditions and price value are stronger for women, performance expectancy for men.

Age – affects all seven core determinants of intention and usage. Importance of some determinants can differ between age groups. For example, importance of determinant performance expectancy is stronger for young users, importance of determinants effort expectancy, social influence and facilitating conditions are stronger for older users.

Experience – defined as previous mobile internet usage experience. Affect three core determinants - effort expectancy, social influence, facilitating conditions. Importance of some determinants can differ between experience groups. For example, importance of determinant effort expectancy are more important for users with small mobile internet experience, but importance of determinant facilitating conditions for users with grater mobile internet experience.

Behavioral intention and use of technology describing elements:

Behavioral intention – combines value of five core determinants – performance expectancy, effort expectancy, social influence, facilitating conditions and price value. Show users behavioral intention to use mobile internet.

Use of technology – combines value of three core determinants – facilitating

conditions, internet experience, and technological support – and behavioral intention element. Show level of mobile internet acceptance and usage.

By using *Mobile Internet Prevalence Model* it is possible to find out user behavioral intention about using mobile internet and level of mobile internet use and acceptance. MIPM results let make conclusions about mobile internet prevalence and it impacting factors.

Method

To reach information about user behavioral intention to use mobile internet and level of mobile internet use and acceptance in Latvia questionnaire was used. In UTAUT creation process theory V. Venkatesh developed standardized questionnaire for UTAUT model that can be adapted and used in researches about different technology use and acceptance together with UTAUT model (Venkatesh et al., 2003). In UTAUT2 creation process V. Venkatesh developed questionnaire for analyzing mobile internet use and acceptance, based on an original UTAUT model questionnaire (Venkatesh, 2012).

UTAUT and UTAUT2 questionnaires consists of 3-4 statements about each core determinant, to evaluate each statement seven point scales were used for all of the constructs' measurement, with 1 being the negative end of the scale and 7 being the positive end of the scale. UTAUT questionnaire have to be made at three different points in time of technology acceptance: post-training (T1), one month after implementation (T2), and three months after implementation (T3).

Actual usage behavior was measured over the six month post-training

period. There can be some modifications of UTAUT use, for example questionnaire can be made in one point in time, surveying users in different technology use and acceptance phases to get general idea of technology use and acceptance (Venkatesh et al., 2003). Developed MIPM questionnaire is based on UTAUT2 model questionnaire.

Measurement. All of the scales were adapted from V. Venkatesh prior researches, two scales (technological support, internet experience) were developed by research authors. Questionnaire consists of 4 statements about each core determinant. The scales for the UTAUT and UTAUT2 constructs (i.e., performance expectancy, effort expectancy, social influence, facilitating conditions, price value and behavioral intention) were adapted from V. Venkatesh (2012). All items were measured using a seven-point Likert scale, with the anchors being "strongly disagree" and "strongly agree." Age was measured in years. Gender was coded using a 1 or 2 variable where 1 represented men. Experience was measured in months.

The questionnaire was adapted for research in Latvia by translating it into Latvian and Russian languages. Decision to translate questionnaire into two languages was made because by Latvian Central Statistical Agency information 34 % of Latvian population as an everyday spoken language use Russian (Latvian Central Statistical Bureau, 2012 a). Questionnaire creation into two languages provides an opportunity to reach maximally correct data about mobile internet use and adaption into different audiences.

Participants and Data Collection Procedure. Information about user behavioral intention to use mobile internet and level of mobile internet use and

acceptance in Latvia was collected surveying users with different mobile internet experience once. Research method was internet survey or CAWI (Computer Assisted Web Interview). Research objective was to clarify factors that influence mobile internet adoption and usage in Latvia.

It was decided to survey Latvian internet users in age group 15-60. Such a limitation based on assumption that users who already have internet experience more often will choose to use mobile internet, users who have not previously used the internet and do not have experience rather will choose to start own internet experience on computer than on mobile phone. Age group selected based on Latvian Central Statistics Agency data about internet use in Latvia, after 60 years proportion of internet users is rapidly shrinking (Latvian Central Statistical Bureau, 2012 b).

The survey was conducted throughout Latvia from October 5th till October 12th, 2012 by research agency GfK Custom Research Baltic. From all completed electronic questionnaires 2000 were identified as valid. Questionnaires which were filled partially were removed.

An electronic questionnaire was completed by 972 men (49 %) and 1028 women (51 %). Distribution of respondents by age groups were accordingly 15-24 years (29 %), 25-34 years (25 %), 35-44 years (23 %), 45-60 years (23 %). 60 % of respondents were Latvians and 40 % other nationalities living in Latvia.

Results

Results of survey showed that only 30 % of Latvian internet users use mobile internet, most of them using it already more than one year, relatively smaller number of respondents has begun to use mobile internet in the last year.

Examining the relationship between the mobile Internet user experience and the user's age, the author concludes that the mobile Internet is used most active in age group 15-34 years, users in this age group are often also with grater experience. Mobile internet is used less frequently among respondents in the age group 35-60 years. This trend can be explained by the fact that any new technology more easily and quickly spreading among younger users. Analyzing differences in technology use between genders in Latvian, authors conclude that mobile internet is used for both sexes equally active.

Mobile internet use and acceptance are affected by seven elements – performance expectancy, effort expectancy, social influence, facilitating conditions, price value, technological support, and internet experience. Each of elements is affected by different moderators – age, gender or previous mobile internet using experience. By using results of questionnaire and calculations it is possible to make conclusions about differences in element impacts on mobile internet use and acceptance between genders, different age and experience groups.

Both genders are most strongly affected by elements – effort expectancy, facilitating conditions, internet experience. Authors conclude that it is important for both genders that use of mobile internet is understandable and easy. Users easier adopt technology which operating principles are clear and understandable for them. Previous internet using experience will also positively impact use of mobile internet. To reach positive mobile internet using experience, both genders

are looking for mobile operator who provide high quality service and support customers.

Both genders are less affected by elements social influence and price value. Authors conclude that society and media have relatively small effect on choice to use mobile internet, decision to use mobile internet people take based on other factors. Latvian society overall still think that mobile internet relatively expensive. There is lack of information, because mobile internet is currently popular in certain age groups (young people) and people out of these age groups do not have enough information about service, it is reason for stereotypes appearing.

Difference in element impact between age groups is stronger than between genders. People in age group from 15-24 years are most strongly affected by elements effort expectancy, internet experience and performance expectancy. Authors concludes, that young people more assess benefits that they get by using mobile internet, because they have grater internet and mobile internet using experience and it is easier for them to see mobile internet everyday usefulness and benefits of its use. Other element that strongly influences mobile internet use in this age group is technological support. Young people pay more attention on fact how suitable their mobile phone is for using mobile internet (support of mobile internet function, screen size etc.), because of grater experience it is easier for them to evaluate it.

In age group from 25-60 years people are most strongly affected by elements – effort expectancy, facilitating conditions, internet experience. People in this age group are less affected by elements social influence and price value.

Author concludes, that people after 25 years rather will start to use mobile internet if they will have previous internet using experience, also this age group pay attention to service quality and mobile operator support. They expect that mobile internet will be easy understandable and they will quickly learn how to use it. There is lack of information about mobile internet around older people. This affects formation of opinion that mobile internet is expensive and does not justify its costs.

There is also difference in element impact on different experience groups. People that use mobile internet more than one year are most strongly affected by element effort expectancy. Authors conclude, that by users experience increasing opinion mobile internet is difficult to use or its use requires special knowledge decrease.

Social influence element equally affects all experience groups, it less affect people who still do not use mobile internet. Authors concludes, when people start to use mobile internet they also start to pay more attention on information about mobile internet in media and listen in society opinion about mobile internet around them.

Facilitating conditions element most strongly affects people that use mobile internet more than one year, element influence increase by experience increasing, because when people using mobile internet for longer time they start to looking for higher service quality and operator support.

To make calculation processes of mobile internet acceptance and usage levels easier MIPM has been adapted in *Stella* modeling environment. All results of mobile internet acceptance and use were calculated in seven point scales, where 1 – totally not accepting mobile internet and

never will want to use it, 7 – totally accept mobile internet and wants to use it.

Calculated behavioral intention coefficient is 4.70, therefore can be concluded that Latvian internet users have a positive attitude regard mobile internet usage and they are willing to try mobile internet. The trend generally shows that a large proportion of internet users could start using the mobile Internet.

Behavioral intention is most strongly affected by the elements – performance expectancy, effort expectancy, and facilitating conditions. Internet user knows benefits and options that mobile internet usage gives. Internet users have the necessary knowledge for using mobile internet; they also assess the support provided by the mobile operator. Behavioral intention is less affected by elements social influence and price value. Mobile internet services are seen as relatively expensive and users do not clearly see benefits they will get by paying for mobile internet. Media and society have neutral impact on the users' decision to use the mobile internet.

Calculated mobile internet use and acceptance coefficient is 4.96. Latvian internet users accepts mobile internet partly and they could start to use it. Mobile internet use and acceptance is most strongly affected by elements – facilitating conditions, internet experience and technological support. For actual and potential mobile internet users it is essential that mobile operators provide an adequate quality of service and support for mobile internet use. Mobile internet is more easily accepted if users have previous internet experience. This correlation is consistent with the author's previously expressed view that users who already have internet experience more often will choose to use mobile internet, users who

have not previously used the internet and do not have experience rather will choose to start own internet experience on a computer than on mobile phone. The authors concludes that the main prerequisites for mobile internet adoption and usage are previous internet usage experience, quality of mobile internet service and mobile operator support, mobile phone suitability for using mobile internet, as well as a desire to use mobile internet.

Analyzing model results, we can see an interesting connection – mobile internet adoption and use is slightly higher than the behavioral intention to use the mobile internet. Any technology adoption among users is positive, but user's behavioral intention or desire to try the same technology is also important. Actual situation and results can be explained by the fact that many internet users are not yet mobile internet users. Mobile internet is accepted among internet users, because they already use internet, but they are not intend to use mobile internet services provides by mobile operators. Also increasingly mobile phones are equipped with Wi-Fi technology, with the result that the vast majority of such phone users connect to internet by using Wi-Fi technology, but it should be noted that the Wi-Fi capabilities compared to the mobile internet is limited, so over time Wi-Fi users can start use mobile internet, or they may need to do so.

Overall, Latvian internet users have partly accepted mobile internet. While most of them would like use mobile internet, mobile internet usage still makes doubt. It can be explained by social influence and price value low impact on behavioral intention. Internet users think that actual cost of mobile internet is greater than benefits of mobile internet usage.

Also majority of people make decisions based on other people's recommendations and information in the media. Mobile internet is a new technology for Latvian mobile services users, society and media have not yet formed a unified view of mobile internet.

Verification and validation. Simulation models are increasingly being used to solve problems and to support the decision making. The developers and users of these models, the decision makers using information obtained from the results of these models, and the individuals affected by decisions based on such models are all rightly concerned with whether a model and its results are "correct". This concern is addressed through model verification and validation (Sargent, 2007). The aim of verification and validation is not to prove that a model is correct, since this is not possible. Indeed, the aim is to try and prove that a model is in fact incorrect. If it cannot be proved that a model is incorrect, then verification and validation has served to increase confidence in the model and its results (Robinson, 1997). Mobile internet prevalence model verification and validation process included conceptual model validation, computerized model verification, data validation and operational validation.

Conceptual model validation. Within conceptual model validation authors analyzed UTAUT and UTAUT2 theories, theory suitability for current research, theory use in previous researches. In conceptual model validation process research author concluded that model should be complemented by two new elements which will directly affect mobile internet use and acceptance. Elements technological support and internet experience were added to model on assumption that people who have previous internet using experience and mobile phone that support mobile internet service will rather choose to use mobile internet. Research results proved that both elements have significant impact on mobile internet use and acceptance. To determine if all *Mobile Internet Prevalence Model* elements are linked and model work properly correlation analyze in program *IBM SPSS Statistics 19* was made. Correlation analyze showed that statistically significant positive correlation between all model elements.

Computerized model verification. Mobile internet prevalence model has been adapted in *Stella* modeling environment, to make calculation processes of mobile internet acceptance and usage levels easier. Within computerized model verification process authors assessed if chosen modeling program is suitable for system being modeled. Developed computerized model was tested and some element like age and experience group distribution was changed to make modelation process and result analyzing easier.

Data validation. Data validation was carried out in two stages by analyzing questionnaire results (model input data) and computerized model results. To analyze model input data Cronbach alpha (α) method was used. The alpha formula is one of several analyses that may be used to gauge the reliability (i.e., accuracy) of psychological and educational measurements (Cronbach et al., 2004). Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the

internal consistency of the items in the scale (Gliem et al., 2003). Input data analyze by Cronbach alpha (α) method was carried out into two stages, first data reliability test was made to data that contain information about user answers on twenty eight statements, and then data reliability test was made for calculated seven arithmetic averages of each element. Results showed that data reliability coefficient of twenty eight statements is α = 0,918, which means that data reliability is excellent. Data reliability coefficient of calculated seven arithmetic averages of each element is α = 0,815, which means data reliability is good.

Computerized model results analyze was made by using *Wilcoxon Signed Ranks Test i*n program *IBM SPSS Statistics 19.*The obtained computerized model data validation test results showed that model is designed correctly and its calculation results are reliable.

Operational validation. To analyze operational validation of Mobile internet prevalence model industry expert opinion about model results and model overall usability for the industry was used. This method was chosen because developed model is unique, it is no impossible to compare model and its results about mobile internet use and acceptance in Latvia with previous researches.

Expert opinion was provided by *Latvian Mobile Telephone Ltd.* Business administration department, Business information division Director Dr.oec. Vita Zvirbule.

Industry expert opinion was that developed model is unique tool for analy-zing Latvian mobile internet market trends, calculated behavioral intention and mobile internet use and acceptance coefficients conform with current mobile services market situation in Latvia, developed model correctly shows main mobile internet use and adoption influencing factors in Latvia.

Conclusions

Comparing the number of mobile internet users in Latvia with world developed countries, where mobile internet is used by 51 % of the internet users and development countries where mobile internet is used by 8 % of internet users, authors concludes that mobile internet development process in Latvia has begun and current figures marks a positive trend for the future. In Latvia mobile internet is still relatively new service and the mobile operators are actively working on mobile Internet network infrastructure development and user involvement. *Mobile Internet Prevalence Model* gives knowledge about factors that impacts adoption and use of mobile internet and provides an opportunity to influence tendency of mobile internet prevalence, promoting mobile internet faster acceptance and initiating usage. By using model and standardized questionnaire it is possible to find out level of mobile internet use and acceptance, and to make conclusions about mobile internet prevalence and it impacting factors. Model can be practically used by research agencies and mobile operators in mobile internet prevalence studies.

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Juris BINDE, Madara FUKSA

MOBILIŲJŲ TECHNOLOGIJŲ IR PASLAUGŲ VYSTYMO POVEIKIS MOBILIOJO INTERNETO NAUDOJIMUI LATVIJOJE

S a n t r a u k a

Technologinė pažanga ir internetas ženkliai pakeitė komunikacijų procesą. Išmaniųjų telefonų ir planšetinių kompiuterių žengimas į rinką, atvėrė naujas mobilių duomenų paslaugų raidos galimybes – mobilųjį internetą. Mobilusis internetas, naudojant dvi aktualiausias šių dienų inovacijas – internetą ir mobilųjį telefoną, tapo populiariausia mobiliąja paslauga viso pasaulio vartotojams. Nepaisant spartaus mobiliojo interneto plitimo, tai vis dar nauja paslauga. Iki šiol, aptinkama mažai standartizuotus modelius ir teorijas taikančių tyrimų, siejamų su mobiliojo interneto pripažinimu ir naudojimu. Pasigendama tyrimų, kuriuose būtų kuriami ir taikomi mobiliojo interneto paplitimo, pripažinimo ir veiksnių darančių įtaką jo vartojimui, modeliai.

Technologijos adaptacija vartotojų tarpe yra viena pirminių sąlygų naujos technologijos vystyme. Egzistuoja nemažai teorijų aiškinančių vartotojišką technologijų pripažinimą ir pasiryžimą jomis naudotis. Tokios teorijos, įgalina kūrėjus vertinti vartotojų požiūrį į technologiją dar prieš jai patenkant arba jau patekus į rinką. Šio tyrimo tikslas yra sukurti mobiliojo interneto paplitimo modelį, kuris leistų apibrėžti mobiliojo interneto pripažinimo ir naudojimo lygmenis ir juos lemiančius veiksnius. Siekiant išsikelto tikslo, buvo analizuojamos skirtingos technologijų naudojimo ir pripažinimo teorijos. Mobiliojo interneto paplitimo modelis buvo kurtas remiantis „Bendrosios technologijų pripažinimo ir naudojimo" (angl. Unified Theory of Acceptance and Use of Technology) ir „Išplėstinės bendrosios technologijų pripažinimo ir naudojimo" teorijų (angl. Extended Unified Theory of Acceptance and Use of Technology) pagrindus, prie jų prijungiant du papildomus elementus. Bendrai, modelį sudaro septyni pagrindiniai sąlyginiai pasiryžimo naudotis veiksniai ir trys tarpiniai sąryšiai. Modelis buvo pritaikytas Stella modeliavimo aplinkoje tam, kad interneto pripažinimo ir naudojimo lygmens skaičiavimai taptų paprastesni.

Naudojant modelį ir standartizuotą klausimyną, išsiaiškinti interneto pripažinimo ir naudojimo lygmenys bei padarytos išvados apie mobiliojo interneto paplitimą ir jį lemiančius veiksnius. Modelio patvirtinimui naudotas internetinis Latvijos vartotojų tyrimas, ekspertinė apklausa ir statistinis testas. Sukurtas modelis yra konkurencingas ir suteikia naudingą informaciją apie veiksnius, kurie lemia mobiliojo interneto pripažinimą ir naudojimą. Remiantis modeliu, buvo išsiaiškinta, kad interneto naudojimas ir pripažinimas Latvijoje yra nuoseklus ir atitinka rinkos situaciją.

Mobiliojo interneto vartotojų skaičius auga kartu su išmaniųjų telefonų paplitimu ir mobiliųjų duomenų paslaugos vystymu. Spėjama, kad 2014 metais, mobiliojo interneto vartojimas pasauliniu lygmeniu peraugs stacionaraus interneto vartojimo mastą. Dėl mobiliojo interneto funkcionalumo ir lengvo naudojimo, pastarasis tampa svarbia susisiekimo priemone ne tik pavienių individų, tačiau ir organizacijų kontekste. Žinios apie veiksnius, lemiančius mobiliojo interneto pritaikomumą ir naudojimą suteikia galimybes nulemti mobiliojo interneto paplitimo tendencijas, skatinant šio priimtinumą ir vartojimą.