



NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

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MOBILE BANKING ADOPTION IN RUSSIA: WHAT INCENTIVES MATTER?

BASIC RESEARCH PROGRAM
WORKING PAPERS SERIES: SCIENCE, TECHNOLOGY,
INNOVATION ECONOMY
WP BRP 48/STI/2015

This Working Paper is an output of a research project implemented within NRU HSE's Annual Thematic Plan for Basic and Applied Research. Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE.

MOBILE BANKING ADOPTION IN RUSSIA: WHAT INCENTIVES MATTER?¹

Mobile banking has followed the appearance of high tech mobile devices. However, rates of payments made through mobile banking apps are still much lower than through other channels. This paper observes the main incentives to use mobile banking in Russia by users of smartphones and tablets. The empirical model modifies authors' previous one [Belousova & Chichkanov, 2015] to find the relationship between the intention to use mobile banking and new factors, such as the perceived financial costs and social influence and the indirect influences of self-efficacy and compatibility with lifestyle. Following the baseline study, Partial Least Squares Structural Equation Modelling (PLS-SEM) is used to check the existence of such relations. The paper finds that the most powerful chain of incentives is "self-efficacy"-“perceived efforts”-“perceived usefulness”-“intention to use”. The influence of perceived financial costs are also meaningful. However, the perceived risks, compatibility with lifestyle and social influence do not have any significant relationship with the intention to use mobile banking. The lack of generalizability may be driven by the chosen focus groups. In addition, the distinction between the dependent variable “intention to use” and real usage might also be considered as a limitation of the study. However, these results can be used by financial institutions that develop a strategy for improving mobile banking services.

Keywords: remote banking services; innovations; mobile banking; PLS-SEM; acceptance of technology; user adoption and behavioural intention; perceived usefulness.

JEL codes: D12, G21, L86.

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The authors wish to express their gratitude to Yuliya Lezhina (NRU HSE) and Yuliya Markova for their recommendations regarding the approval and design of the questionnaire as well as Dr Dirk Meissner (NRU HSE) for his suggestions which helped us to target our paper to the field of science, technology and innovation economy. This paper was prepared based on research "Monitoring the status and dynamics of the Knowledge Intensive Business Services in Russia" carried out in 2015 as part of the Basic Research Programme of the National Research University Higher School of Economics (NRU HSE) and was supported by a state subsidy granted to the NRU HSE to help leading universities in the Russian Federation become more competitive global scientific research centres.

1. Introduction

In the modern world, knowledge and technology intensive industries have become extremely important and contributed significantly to economic development, for example, 40% of GDP was concentrated in such industries in the US in 2012, and 29–30% in both the European Union and Japan. In particular, the role that Knowledge Intensive Business Services (KIBS) play, has been recognized. For instance, in the US they had a 32% share of the global market in 2012, and in the EU they occupied the second position, that is 23% (National Science Board, 2014:5–6).

The expansion of information-communication technologies provides great opportunities for innovations (Prause & Thurner, 2014), for instance, the implementation of the mobile money system M-Pesa has dramatically changed the financial market in Kenya. Implemented in 2007, by 2009 about 50% of money transfers were done through this system, while the percentage of bank remittances halved (Mbiti & Weil, 2011).

“An innovation is an idea, practice, or project that is perceived as new by an individual”, (Rogers, 2003:12). It may still be considered innovative even if it was invented a long time ago. However, when companies invest huge amount of money and provide innovative services, they do not want to wait. A key problem is innovation diffusion. In other words, it is important to understand which incentives encourage users to adopt innovations.

A particular feature of KIBS is its consumption. Such services require the ability to use it; if the client cannot use it, the service is ineffective, further this restricts the demand for such services (Doroshenko, 2011). On the other hand, KIBS users can be considered co-producers, as they can act as an information resource (Doroshenko, 2007). Companies involve their customers more and more actively in the process of service development. Information about the consumer behaviour is extremely important to ensure service success (Prause & Thurner, 2014).

This study analyses the mobile banking market as an example of service innovation and in particular the incentives which encourage customers to use mobile banking and the barriers which prevent them. Mobile banking, as a part of retail banking services, is considered one of the most important technological innovations (Lin, 2011; Oliveira & von Hippel, 2011; van der Boor et al., 2014). Its innovative nature lies in the transfer of Internet banking services to mobile platforms.

Shifting customers from online to mobile banking does not reduce bank costs in the same way as shifting from traditional banking to online banking. This means that the development of mobile banking was driven by customers. Moreover, according to Oliveira & von Hippel (2011), many retail banking services were developed by users. In their sample, 44% of computerized versions of retail services were developed by customers before banks or other financial

institutions. Mobile banking, as a channel to access banking services, was also developed as a self-service by bank customers and it was probably the first channel to access banking services developed by customers (Oliveira & von Hippel, 2011). However, users found it difficult to use existing Internet-banking via cell phones, until banks started to adapt their web pages and develop mobile apps.

The main reason for banks to invest money in mobile apps is that customers perceive mobile banking as a competitive advantage (Koenig-Lewis et al., 2010). AlixPartners (2014) showed that “60% of smartphone or tablet owners who switched primary banks reported mobile banking capabilities ‘important’ or ‘extremely important’ in their decision to switch”. However, the US mobile banking market is not the most developed. Bain & Company (2013) reported that the highest rate of mobile banking adoption in 2013 was in Asia: 60% in China, 56% in South Korea, 55% in India, 54% in Singapore, 53% in Hong Kong, 52% in Indonesia.

We explore the Russian mobile banking market. In 2014, more than a half of active Internet users in Russia also used Internet banking services (NAFI, 2014). At the same time, the rate of mobile banking growth is even higher in 2014 (58%), while Internet-banking growth was only 51% (Marksw Webb Rank & Report, 2015). Moreover, for the first time in 2014, such services were offered by all of the 30 biggest banks (Marksw Webb Rank & Report, 2015). Deloitte (2014b) reported that the result of the growing demand for the high quality mobile banking apps was bank willingness to invest money and human resources in developing such apps. While mobile banking is not a popular way of making payments (Marksw Webb Rank & Report, 2015), it can still be considered an independent channel of retail banking (Deloitte, 2014b).

We explore mobile banking from the consumer side. We extend the model from our previous research (Belousova & Chichkanov, 2015) by adding 4 new factors which have not been explored in Russia. All the factors from our list were significant in empirical studies in different countries. They are also connected with economic motivation from a benefit-cost point of view. Even sociological and psychological (self-efficacy) factors have a strong economic basis. Although the factor of risk was insignificant in our previous research (Belousova & Chichkanov, 2015), we retain it in the current model. It allows us not only to explore mobile banking in Russia in more detail, but also to re-examine the relationship between previously assessed factors when taking into account the newly added factors. This paper contributes both to the banks, which develop and distribute mobile banking services, and to researchers, who explore such services.

The rest of the paper is organized as follows. Section 2 gives a brief overview of the theoretical background. Section 3 presents the model and hypothesis. Section 4 describes the

methodology and data collection process. Section 5 presents and discusses the results. Section 6 concludes and highlights directions for further research.

2. Theoretical background

Remote banking services have been developing very rapidly since the late 1970s when banks started to offer telephone banking. Since then, with the growth of computer use, most banking operations have become computerized “for reasons of speed, accuracy and economy” (Oliveira & von Hippel, 2011:806). For the same reasons, banks have exploited computers as a channel for interaction with clients. As a result, many bank customers have moved from traditional banking to online banking. Nowadays, mobile devices have become extremely popular, according to International Telecommunication Union, in 2011 mobile phone subscribers were about 96% of the global population, but only a half of them had access to traditional banking services (Shaikh & Karjaluo, 2015). Opportunities to keep existing customers and attract new ones encourage banks to use these devices to build relationships with customers.

The term “mobile banking” is multivalued. It is often used to describe different kinds of interaction between banks and customers via mobile phones. The oldest type of mobile banking, known as SMS-banking, allows customers a limited number of services. The development of technology has allowed mobile banking to develop special applications for smartphones and tablets (Shaikh & Karjaluo, 2015). These provide a wide range of services, such as account management, making a variety of payments.

Mobile banking studies focus on its adoption mechanisms. Researchers have examined different factors, affecting mobile banking adoption, commonly IT adoption theories. Some of them are very popular and have been used in a large number of papers. On the contrary, some theories like the Information System Success Model or the Theory of Planned Behaviour are rarely used as a theoretical basis (Shaikh & Karjaluo, 2015).

The three main IT adoption theories are the Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT) and the Unified Theory of the Acceptance and Use of Technology (UTAUT). In TAM, there are two key factors “perceived usefulness” and “perceived ease of use”, which influence the intention to use mobile banking, another intermediary variable is “attitude” (Davis, 1989, Davis et al., 1989). According to IDT, the intention to use mobile banking arises mainly from the impact, caused by five innovation attributes: relative advantage, compatibility, complexity, observability and trialability (Rogers, 2003). UTAUT was developed in 2003 as an attempt to create the most powerful IT adoption model by the integration of 8 models, including TAM and IDT. This model operates 4 factors:

performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003).

Despite the difference in the number of factors, there are 2 core factors, common to these studies: perceived usefulness and perceived efforts (Zhou et al., 2010, Venkatesh et al., 2003), although they are referred to differently. Unlike IDT and UTAUT, TAM consists of these two factors and this is probably the main reason that TAM is the most popular mobile banking acceptance theory. The intermediary variable “attitude” is often dropped from TAM for simplification.

TAM can be considered the underlying framework for most papers, however, in empirical surveys these models are often modified as mobile banking differs from other information technologies. There are two modifications (Gu et al., 2009). The former is that the existing factors can be redefined, although this method is rarely used. If the significance of the existing factors is confirmed by the empirical results, there is no need to redefine it. The latter is to combine factors from different models or to include additional factors. For example, in 2000 TAM was extended by adding a social factor “subjective norms” from the Theory of Planned Behaviour (Venkatesh & Davis, 2000). The main idea is to extend the model with relevant factors while studying a specific case (Shierz et al., 2010). The most relevant papers on mobile banking are presented in a Table 1.

Table 1. Empirical surveys of mobile banking adoption

| Author(s) | Theories | Country | Important significant relationships |
|---------------------------|------------|-----------|--|
| Chen (2013) | IDT | Taiwan | Perceived Risk -> Intention to Use (-0,59 for frequent users and -0,25 for infrequent users) |
| Gu et al. (2009) | TAM | Korea | Perceived Usefulness -> Behavioral Intention (0,38) Perceived Ease of Use -> Behavioral Intention (0,213) Trust -> Behavioral Intention (0,352) Perceived Ease of Use -> Perceived Usefulness (0,533) Situational Normality -> Perceived Ease of Use (0,284) Self-efficacy -> Perceived Ease of Use (0,414) |
| Hanafizadeh et al. (2014) | TAM | Iran | Perceived Usefulness -> Intention to Use (0,54) Perceived Ease of Use -> Intention to Use (0,33) Perceived Risk -> Intention to Use (-0,12) Perceived Cost – Intention to Use (-0,1) |
| Riquelme & Rios (2010) | TAM IDT | Singapore | Ease of Use -> Usefulness (0,51) Social Norms -> Adoption (0,31) Risk -> Adoption (-0,39) |

| Author(s) | Theories | Country | Important significant relationships |
|----------------------------|------------|---------|--|
| | | | Usefulness -> Adoption (0,46) |
| Wang et al. (2006) | TAM | Taiwan | Perceived Usefulness -> Behavioral Intention (0,41) Perceived Ease of Use -> Behavioral Intention (0,2) Perceived Ease of Use -> Perceived Usefulness (0,29) Self-efficacy -> Perceived Ease of Use (0,47) Perceived Financial Resource -> Behavioral Intention (0,26) |
| Zhou et al. (2010) | UTAUT | China | Social Influence -> User Adoption (0,22) Performance expectancy -> User Adoption (0,37) Effort expectancy -> Performance expectancy (0,3) |
| Luarn & Lin (2005) | TAM | Taiwan | Perceived Usefulness -> Behavioral Intention (0,31) Perceived Ease of Use -> Behavioral Intention (0,33) Perceived Ease of Use -> Perceived Usefulness (0,69) Perceived Self-efficacy -> Perceived Ease of Use (0,46) Perceived Financial Cost -> Behavioral Intention (-0,19) |
| Koenig-Lewis et al. (2010) | TAM IDT | Germany | Perceived Usefulness -> Intention (0,394) Perceived Ease of Use -> Perceived Usefulness (0,285) Risk -> Intention (- 0,185) Compatibility -> Perceived Ease of Use (0,293) |

Luarn and Lin (2005) extended TAM by adding 3 new factors. “Perceived credibility” reflected the risk-side view of the motivation. Two other factors “perceived self-efficacy” and “perceived financial costs” were the measures of the resources that the customer needed in order to use mobile banking. They found these factors significant and reported a higher explanatory power of the extended model.

Wang, Luarn and Lin (2006) re-specified and validated Luarn and Lin’s model. The results supported the findings of the basic model, in addition, they also tested new relationships between the existing chains. They reported the significance of security and privacy for mobile banking, and found that knowledge and financial resources were also important.

Gu et al. (2009) added new variables to their integrated model, such as determinants of the two core factors of TAM, and trust as a third core construct. Most of the new factors were significant in the model, for example, the relationship between self-efficacy and perceived ease of use. The importance of the risk-side factor or trust as an incentive to use mobile banking was also confirmed.

In Iran, Hanafizadeh et al. (2014) tested a model with 6 factors not covered in TAM. The empirical data supported all their hypothesis. The authors not only showed the influence of core factors (perceived usefulness and perceived ease of use), but also the importance of other factors, such as social factors (compatibility with lifestyle or need for personal interactions), and also economic factors (perceived risk and perceived cost).

Another popular theoretical framework is an IDT. Chen (2013) added the intermediary variable of attitude which is connected with brand, as well as determinants of risk. All of these relations were found significant for frequent users. For infrequent users, some hypothesis were not supported by data — there was no relation between brand image and intention to use. However, the risk factor was found important for both types of users.

Some researchers combine TAM and IDT as a theoretical framework. A strong negative relationship between risk and intention to use mobile banking was found in Riquelme and Rios, (2010) and Koenig-Lewis et al. (2010). Riquelme and Rios also reported the significance of social norms, while the results of Koenig-Lewis et al. strongly supported the compatibility of lifestyle influences on the intention to use.

UTAUT was also extended by the researchers. Zhou et al. (2010) integrated UTAUT and Task Technology Fit (TTF). They found that the integrated model had more power in predicting consumer behaviour than either model separately. Another important finding was the relationship between social influence and intention to use.

In most models, the main dependent variable is the intention to use mobile banking rather than real usage. It is one of the biggest problems of such models, because even high intention to use does not guarantee usage. However, such a simplification is widely-used because of the difficulties with measuring real usage.

We consider integrated and extended models to be more powerful than basic models. The additional factors can be divided into two groups; the first group includes risk factors, especially trust-based constructs; the second includes “resource” factors, such as financial costs or self-efficacy. These economic factors make the link between intention to use and costs which are measured not only as money spent but also as required skills and knowledge.

3. Research model and hypothesis

Our previous model was based on two key factors — perceived usefulness and perceived efforts (Belousova & Chichkanov, 2015). We found that perceived usefulness has a significant positive impact (0,441) on intention to use, while perceived efforts influence intention to use negatively (-0,215). We also showed the relationship between these two factors (-0,349). The model was supplemented with the factor of risk because mobile transactions need a higher level

of trust than face-to-face transactions (Lin, 2011). Moreover, “lack of trust is one of the most frequently cited reasons for customers not using mobile banking” (Lin, 2011: 254). Our results showed a positive relation between perceived efforts and perceived risk (0,496). However, the relation between perceived risk and intention to use was insignificant.

Our previous model was restricted by the use of only 1 extra factor — perceived risk. In this paper, we extend our model by adding new factors. The extended version consists of 7 factors influencing each other and the intention to use mobile banking. We explore the costs of mobile banking usage in more detail. We add 3 factors as measures of costs. “Perceived financial cost” reflects all financial expenses, while “compatibility with lifestyle” measures extra costs from the inconsistency between the needs of the customer and mobile banking opportunities. “Self-efficacy” reflects the resources (e.g. skills or knowledge) that the customer needs to use mobile banking. We also add “social influence” from sociological and psychological theories. The extra factors are “perceived financial costs”, “social influence”, “compatibility with lifestyle” and “self-efficacy”. All of them are also widely used in mobile banking adoption studies.

Mobile banking is the shift of services from computers (Internet banking) to mobile devices. This retains the advantages of Internet banking and provides a higher level of mobility and flexibility. With the development of the wireless Internet, mobile banking users do not have the same spatial and temporal restrictions. Although banks have decreased the maximum time spent in branches from 3 hours in 2011 to 20 minutes in 2014, the problem of queues still exists: in 2014 nearly 43% of customers worried about queues in the banks and 42% of respondents found service speed crucial (NAFI, 2014). Quick and easy access to banking services is also very important for Russian customers and less than a half of them have it now (Plaksenkov & Korovkin, 2015). Mobile users are described as the group with the highest capacity for banking services (Plaksenkov & Korovkin, 2015).

The factor of perceived usefulness reflects the benefits gained from mobile banking usage, such as saving time and a decrease in transaction costs. We have already found this factor to be high-valued in our previous research (Belousova & Chichkanov, 2015). The significance of this factor is well supported (Shaikh & Karjaluoto, 2015; Luarn & Lin, 2005; Gu et al., 2009; Hanafizadeh et al., 2014) Since mobile banking has a set of unique advantages we hypothesize:

H1: Perceived Usefulness positively affects Intention to Use mobile banking.

Although mobile banking provides an opportunity to save time and money, it also generates some extra costs. Modern technologies are developing very quickly, and new devices with new features constantly arise. For example, some banks offer mobile services, that use fingerprints instead of passwords, but only a few models of smartphones have this feature. With

the development of contactless payments, customers may use smartphones instead of payment cards but smartphones with this feature are also limited. If the customer wants to use all bank's services, smartphones need to be regularly upgraded. Customers also pay for the Internet traffic, which increases with the use of mobile applications. However, both of these expenditures are offset to a certain extent by the high speed of technological development, which reduces smartphone and Internet traffic prices.

Nevertheless, extra expenses still exist. Banks can charge fees for using mobile apps. If these fees are too high, customers will have less intention to use mobile banking (Zhou et al., 2010; Wang et al., 2006). On the contrary, the low cost of using remote banking services may be a reason for switching to mobile apps. This factor is important in this area because of its economic origin (Luarn & Lin, 2005; Hanafizadeh et al., 2014). Thus, we assume the following hypothesis:

H2: Perceived Financial Costs negatively affect Intention to Use mobile banking.

In our previous study (Belousova & Chichkanov, 2015), we found the influence of perceived efforts on perceived usefulness, perceived risks and intention to use mobile banking to be significant. When a customer tries new services, it takes some time and knowledge to become a skilful user. If it is easy for a consumer, the intention to use mobile banking will increase. The first problem, caused by difficulty of use, is connected with the main mobile banking advantage. If the mobile application is not user-friendly, it makes the whole process slower and the advantage of fast access to bank accounts becomes neutralized. Mobile banking is not a face-to-face service, so customers may not understand how they interact with their bank. In that case, they need higher level of trust as the potential risks increase.

The screen size of an ordinary mobile device might cause extra difficulties for new users and require extra mental effort (Riquelme & Rios, 2010). If the application is not adapted for small screens and keypads, it will be uncomfortable to navigate. Apps that are too complicated may scare new customers. Another problem is the low level of financial literacy, particularly, in Russia. In 2015 only 20% of the population estimated their financial skills and knowledge as excellent or good, while 34% found their skills and knowledge poor (NAFI, 2015). Such customers require more informational support because they may have difficulties in understanding the product lines of mobile banking.

Many researchers use the factor of efforts or ease of use as a basic factor and its significance has been confirmed (Shaikh & Karjaluoto, 2015; Riquelme & Rios, 2010; Hanafizadeh et al., 2014). Thus, we assume the following hypotheses:

H3: Perceived Efforts negatively affect Intention to Use mobile banking.

H4: Perceived Efforts negatively affect Perceived Usefulness.

H5: Perceived Efforts positively affect Perceived Risks.

When customers try a new service, they face two important problems. The first is lack of experience. A customer decides if he or she needs to learn to use the app. If a consumer can do it on his or her own, it takes less effort than if someone's help is needed. In other words, the service which can be easily used independently, causes fewer difficulties. The visual appearance of the mobile banking app is also important. If it is too complicated, it requires more mental effort. There is also image barrier or anxiety towards computers (Laukkanen & Kiviniemi, 2010). Some customers, finding mobile devices too complex to use, will conflate difficulties with devices and difficulties with mobile banking apps. This factor is found to be significant in the literature (Luo et al., 2010; Gu et al., 2009).

The second problem is the problem of switching. A user will have formed banking habits. If the process of using mobile banking hurts the usual routine, the customer will avoid using it. It is also important how it correlates with consumer's lifestyle and cultural values. Since mobile banking is not a face-to-face service, it does not require meeting bank staff, affecting the relationship between the customer and the bank. It means that the customer may feel that mobile banking services are impersonal. Some customers even evaluate face-to-face interactions as valuable (Hanafizadeh et al., 2014; Laukkanen & Kiviniemi, 2010). Thus, we assume the following hypotheses:

H6: Self-efficacy negatively affects Perceived Efforts

H7: Compatibility with lifestyle negatively affects Perceived Efforts

Social values have a great impact on consumer decision making. In other words, the social influence may encourage, or otherwise, the use of new technologies. The popularity of mobile banking will increase the motivation to try it. When a user gets recommendations to use mobile banking from colleagues, friends and family members, they will be more likely to do so. Mobile banking can be perceived as an attribute of successful social groups. It is also may be considered as a good way to improve a consumer's image. Some researchers found this factor significant (Riquelme & Rios, 2010; Gu et al., 2009). Thus, we assume the following hypothesis:

H8: Social Influence positively affects Intention to Use mobile banking

The advantage of mobility causes extra risks. Although we did not find a significant relationship between perceived risks and intention to use mobile banking in our previous study (Belousova & Chichkanov, 2015), we believe that this relationship still exists. Since mobile banking does not require interaction with bank staff, performance risk occurs. The customer may not reach the goal because of technical errors, the consumer's own mistakes, the end of battery life or an unstable Internet connection and the user may suffer financial loss. Personal and financial information sent through an Internet connection is vulnerable to hackers. Finally,

mobile devices themselves can be lost or be stolen along with personal and financial data (Riquelme & Rios, 2010; Hanafizadeh et al., 2014). Such risks are the perception of future costs, so we hypothesize:

H9: Perceived Risk negatively affects Intention to Use mobile banking.

Our empirical model is presented in Figure 1. To test it, 7 factors are used. They are: Perceived Usefulness, Perceived Financial Costs, Perceived Efforts, Self-efficacy, Compatibility with lifestyle, Social Influence and Perceived Risk.

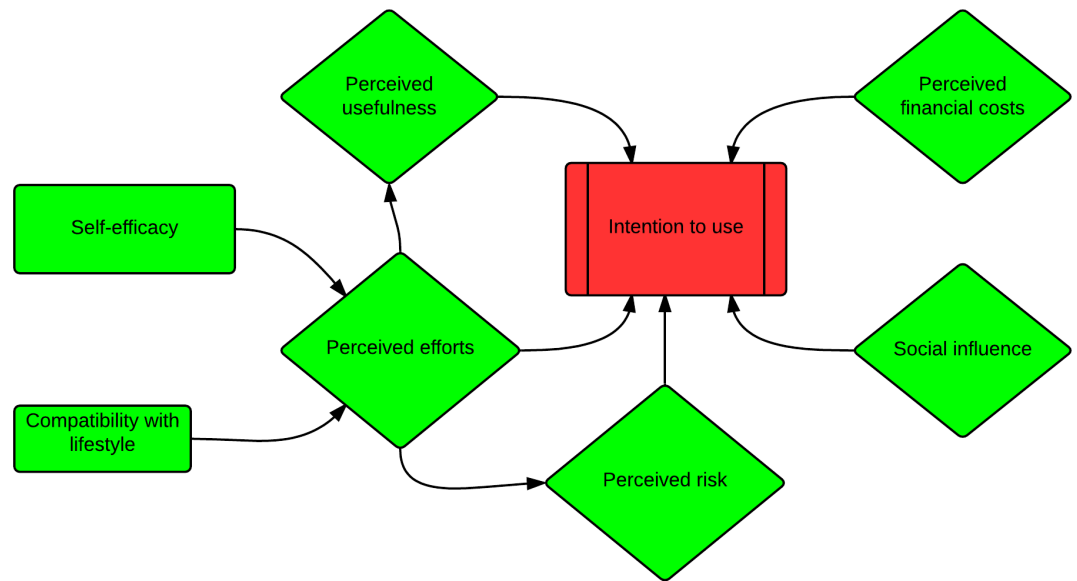


Fig. 1. The model

4. Methodology and data collection

Our empirical model is consistent with that used in Belousova & Chichkanov (2015), but contains 8 constructs. For each construct, a set of multiple items was developed. To ensure the content validity, all the items were developed from recent empirical studies, however, institutional differences of innovation policies and banking are not considered. All the items were translated into Russian and modified in order to make them more understandable for Russian respondents. We also check the clarity of the questionnaire on a small sample of 7 respondents, including experts in sociology and economic sociology. According to their recommendations, we made some corrections to the questionnaire. Each construct was measured by three items and each item was measured with a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). However, three items was measured conversely from strongly agree (1) to strongly disagree (5). The list of final items and their sources are presented in Appendix 1.

The survey also includes two other parts. The first part identifies respondents from the focus group. The focus group includes users of mobile Internet through smartphones and tablets.

Applications for smartphones and tablets are the most technology advanced for mobile banking. These are the most common way of using mobile banking in Russia (Marksw Webb Rank & Report, 2014). The second part collects demographic characteristics, such as gender, age, education, and income.

To test the model, we collected data via an online survey in March 2015. The questionnaire was distributed through special free services “Webanketa” and “Anketolog”. We used a modified snowball approach (Koenig-Lewis et al., 2010) and sent invitations through a social network website. We also sent emails with invitations to students of campuses of the HSE located in four cities (Moscow, Saint-Petersburg, Perm and Nizhniy Novgorod). We received a total of 206 questionnaires but only 160 of them were usable. Respondent demographic profiles are comparable with the regular study run by NewMR and OMI companies called “Mobile Russia” (NewMR, 2015), focused on the consumption of mobile Internet in Russia (see Table 2 in Belousova & Chichkanov (2015)).

Table 2. Our sample demographic questions and «Mobile Russia» sample

| | Option | Our sample (%) | «Mobile Russia» summer 2014 (%) |
|---|-------------------------------|----------------|---------------------------------|
| Sex | Male | 49% | 50% |
| | Female | 51% | 50% |
| Age (y.o.) | Up to 24 | 47% | 34% |
| | 25-34 | 34% | 29% |
| | 35-44 | 14% | 19% |
| | 45-54 | 5% | 12% |
| | 55+ | 1% | 6% |
| Education | Secondary general | 6% | 35% |
| | Secondary specialist | 4% | 36% |
| | Higher (including incomplete) | 91% | n/a |
| | Higher (including a degree) | n/a | 29% |
| Region of residence (by federal district) | Central | 37% | 29% |
| | Southern + North Caucasian | 9% | 15% |
| | Northwestern | 15% | 11% |
| | Far Eastern | 3% | 4% |
| | Siberian | 6% | 12% |
| | Ural | 5% | 10% |
| | Volga | 26% | 19% |
| Settlement size | Moscow / Saint-Petersburg | 14% | 15% |
| | > 1 million citizens | 21% | 11% |
| | 500 000 – 1 million citizens | 13% | 12% |
| | 100 000 - 500 000 citizens | 28% | 21% |
| | < 100 000 citizens | 24% | 41% |
| Monthly income | Less than 10 000 Rub | 22% | x |

| | Option | Our sample (%) | «Mobile Russia» summer 2014 (%) |
|------------|---|----------------|---------------------------------|
| | 10 001 - 20 000 Rub | 31% | x |
| | 20 001 - 30 000 Rub | 22% | x |
| | 30 000 - 50 000 Rub | 14% | x |
| | 50 000 - 75 000 Rub | 8% | x |
| | 75 000 - 100 000 Rub | 2% | x |
| | More than 100 000 Rub | 1% | x |
| Employment | Non-working students | 26% | x |
| | Unemployed | 8% | x |
| | Full-time employment | 38% | x |
| | Part-time employment | 26% | x |
| | Other | 1% | x |
| Occupation | Unemployed | 34% | x |
| | Wholesale and retail trade / services | 13% | x |
| | Financial activity | 10% | x |
| | Other | 26% | x |
| | Education / health care / state administration / military service | 8% | x |
| | Agriculture / fishery | 4% | x |
| | Mineral extraction / manufacturing / industry | 4% | x |

Table 3, in Belousova & Chichkanov (2015), presents some information about our respondents' remote banking service usage. Mobile banking applications are the most popular remote service among active users. A decrease in remote banking usage corresponds to a fall in application usage.

Table 3. The frequency of remote banking services usage by respondents

| | Several times a week | Once a week | Once a month | Semiannually | Rare than semiannually | Do not use |
|---|----------------------|-------------|--------------|--------------|------------------------|------------|
| Internet banking on PC / laptop | 12% | 27% | 26% | 8% | 3% | 24% |
| Internet banking through web-browser on mobile device | 8% | 6% | 15% | 5% | 3% | 63% |
| SMS-banking | 19% | 14% | 13% | 3% | 4% | 47% |
| Special app on smartphone / tablet | 26% | 12% | 5% | 2% | 0% | 55% |

5. Results

To make estimations, we used Structural Equation Modelling (SEM), a second-generation multivariate analysis (Hair et al., 2014). We used Partial Least Squares (PLS) due to its advantages, such as the lack of restrictions on data or measurement scale (Reinartz et al., 2009). Following Hair et al., (2014), we first tested the measurement model, then we did structural model analysis and hypothesis testing. We also used a set of standard options recommended for such empirical studies (Hair et al., 2014; Wong, 2013). Our estimation was made using SmartPLS 2.0.M3.

First, the outer model loadings are assessed. The algorithm needs only six iterations instead of the possible 300 ones that demonstrate the high quality of our model (Wong, 2013). All the coefficients are above 0,4 and most of them are above 0,7, which indicates an acceptable level of reliability (Hair et al., 2014). Moreover, all of the loadings are significant at 1%. A suitable level of internal consistency is also reached because all the composite reliability coefficients are between 0,7 and 0,9. We checked the convergent validity with the average variance extracted (AVE) coefficients which are higher than 0,5. We also used the Fornell-Larcker criteria to check the discriminant validity (Table 4). All the results are summarized in Appendix 1.

Table 4. Fornell-Larcker criteria checking

| | Eff | Fin | Int | Life | Risk | Self | Soc | Use |
|------|--------|--------|--------|--------|--------|-------|-------|-------|
| Eff | 0,791 | | | | | | | |
| Fin | 0,414 | 0,765 | | | | | | |
| Int | -0,416 | -0,449 | 0,856 | | | | | |
| Life | -0,369 | -0,456 | 0,555 | 0,779 | | | | |
| Risk | 0,489 | 0,321 | -0,351 | -0,275 | 0,805 | | | |
| Self | -0,588 | -0,475 | 0,377 | 0,489 | -0,293 | 0,733 | | |
| Soc | -0,184 | -0,367 | 0,365 | 0,415 | -0,149 | 0,262 | 0,813 | |
| Use | -0,351 | -0,492 | 0,548 | 0,629 | -0,333 | 0,422 | 0,483 | 0,810 |

Next, we analysed the structural model and tested the hypotheses. We checked VIF-coefficients and found that there is no multicollinearity problem in the model. Using bootstrapping, we checked the significance of the structural coefficients. The results support 6 hypothesis (structural model loadings are significant to least at 5%), while 3 hypotheses are not accepted. We present these results in Table 5 and Figure 2.

Table 5. Hypothesis testing

| | Hypothesis | T-value | Acceptance |
|----|--|---------|------------|
| H1 | Perceived Usefulness positively affects Intention to Use mobile banking. | 3,752 | Yes* |
| H2 | Perceived Financial Costs negatively affect Intention to Use mobile banking. | 2,122 | Yes** |
| H3 | Perceived Efforts negatively affect Intention to Use mobile banking. | 2,568 | Yes** |
| H4 | Perceived Efforts negatively affect Perceived Usefulness. | 4,542 | Yes* |
| H5 | Perceived Efforts positively affect Perceived Risks. | 8,657 | Yes* |
| H6 | Self-efficacy negatively affects Perceived Efforts | 7,093 | Yes* |
| H7 | Compatibility with lifestyle negatively affects Perceived Efforts | 1,259 | No |
| H8 | Social Influence positively affects Intention to Use mobile banking | 1,538 | No |
| H9 | Perceived Risk negatively affects Intention to Use mobile banking. | 1,245 | No |

* significant at 1% ** significant at 5%

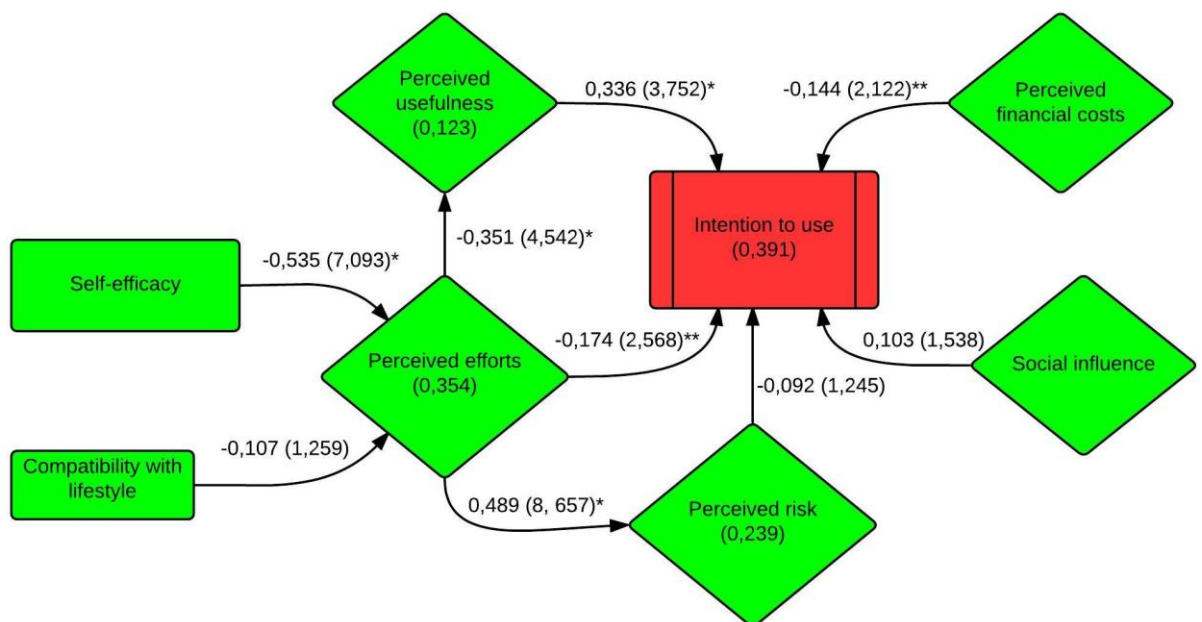


Fig 2. The model results

The most significant factor (0,336) in our model is perceived usefulness, a result similar to our previous model (0,441) (Belousova & Chichkanov, 2015) and corresponding to other

studies (Shaikh & Karjaluoto, 2015; Koenig-Lewis et al., 2010; Luo et al., 2010; Gu et al., 2009; Kim et al., 2009; Wang et al. 2006; Hanafizadeh et al., 2014; Zhou, 2011). It is not surprising that customers choose mobile banking only if they perceive its advantages. The main advantage is speed. Mobile banking also retains the benefits Internet banking offers. In the digital era, banking services are become more closely connected to mobile devices, for instance, some smartphones can be used instead of payment cards as a part of contactless payment services or using fingerprints rather than passwords. Mobile devices allow customers to get personalized services, offering different ways for individual to connect, for example, savings amount and a customer's sport and fitness activities.

The second factor in the model (-0,174) is the perceived effort that negatively influences the intention to use mobile banking. It is also similar to the results of our previous research (Belousova & Chichkanov, 2015). The size of screens and keypads of the mobile device require customers to concentrate, while using mobile apps, lowering the ease of use. Mobile banking helps banks to offer many new services, however, this also makes mobile apps more complex. The easier an app is to use, the more likely the customer will be to use the app. Similar results are found in other studies (Shaikh & Karjaluoto, 2015; Luarn & Lin, 2005; Gu et al., 2009; Hanfizadeh et al., 2014).

The next factor is perceived financial costs (-0,144). The same results are obtained in Taiwan (Luarn & Lin, 2005) and Iran (Hanafizadeh et al., 2014). All they showed that this factor was important in different countries. Extra costs have a strong negative impact on the intention to use mobile banking. However, consumers are ready to pay some fees for the benefits that mobile banking generates, so the effect of this factor is not as significant.

Contrary to previous studies, the significance of social influence (Zhou et al., 2010; Riquelme & Rios, 2010) and perceived risk (Koenig-Lewis et al., 2010; Riquelme & Rios, 2010; Hanafizadeh et al., 2014) are insignificant in our model. The influence of the risk factor is even lower (-0,092 vs -0,099) than in our baseline model (Belousova & Chichkanov, 2015). We suppose that these results may reflect trends in the Russian mobile banking market or cultural characteristics of Russian customers. Social influence usually comes from a high level of awareness and financial literacy. However, according to the National Agency for Financial Studies, in Russia in 2013 only 33% of respondents were informed about remote banking services (NAFI, 2013). Moreover, about a quarter of them reported that they had never heard of such services before. In such conditions, there is no social pressure towards customers who use or do not use mobile banking.

Although some risks exist, we suppose that customers just do not perceive them. Very often Russian mobile banking users reported the surplus of security procedures, moreover, the

high quantity of such procedures was sometimes reported as a weakness of mobile banking (Deloitte, 2014a). Nevertheless, mobile banking may be less risky than other distance services in Russia. Fraudsters prefer Internet banking, because the transaction amounts are higher. Second, legal entities, which rarely use mobile apps, are targeted (Kostylev, 2013).

We also found some indirect effects. Self-efficacy has a significant negative impact on perceived efforts (-0,535). The main item of self-efficacy was interface unattractiveness. If a customer finds it user-unfriendly, their efforts will be much lower. Ease of use was also an important factor in empirical studies (Luarn & Lin, 2005; Gu et al., 2009).

Perceived efforts also have two significant relationships, as in our previous study (Belousova & Chichkanov, 2015). First, this factor has a negative impact on perceived usefulness (-0,351). When a customer finds it difficult to use mobile banking, it means that the user will perform operations slower than assumed and will perceive the time saved as being less. According to Deloitte (2014a), some market leaders offer mobile apps that are not easy to use and do not have a user-friendly interface. Even if mobile banking fits the customer needs, it does not lead to a decrease in their perceived efforts. Second, high perceived efforts turn into fear of fraud or technical error, and customer perception of risk will change. Too many difficulties in use cause an increase of potential risks (0,489) and, as a result, the rise of potential financial losses.

We did not find a relationship between lifestyle compatibility and perceived efforts, although some researchers reported this relationship as significant (Koenig-Lewis et al., 2010; Gu et al., 2009; Hanafizadeh et al., 2014). We suppose that this is because most Russian banks do not use modern technologies demanded by customers (Deloitte, 2014a).

6. Conclusion

This paper focuses on the adoption of mobile banking by Russian consumers. We use widespread IT adoption theories, TAM, IDT and UTAUT, and modified them for the most relevant factors. We also developed a list of items for measuring these factors and adapted it for Russian-language speakers. Based on PLS-SEM, we tested 9 hypotheses. Three factors (perceived usefulness, perceived efforts and perceived risks) had been tested in earlier research (Belousova & Chichkanov, 2015). In this paper, we extended our model by adding 4 new factors reflecting the resources that a customer needs in order to use mobile banking. Perceived financial costs are connected with direct financial expenditures; self-efficacy describes required skills and knowledge; compatibility with lifestyle is a measure of switching costs. Social influence

provides a link between social pressure and motivation and can also be presented as a benefit of high-value social behaviour.

First, we found that the results are similar in the baseline model tested in Belousova & Chichkanov (2015) and this extended one. The most important positive factor is perceived usefulness, while the most significant negative factor is perceived efforts. This result also confirms the theoretical foundations of the basic theories, because either these factors or their equivalents are used in all three theories (TAM, IDT, UTAUT). Empirical explorations in different countries also found these factors the most powerful (Shaikh & Karjaluoto, 2015).

Second, our results support the negative relationship between perceived financial costs and the intention to use. The customers avoid extra fees and do not want to pay a lot for additional Internet traffic.

Third, there is also an important chain “self-efficacy”-“perceived efforts”-“perceived usefulness”. A high level of confidence highly decreases the volume of difficulties which increases the value of perceived usefulness. It is an important result for banks, who are now turning from just adding new services to improving the interface of their mobile applications (Deloitte, 2014b).

This strategy may also reduce the potential risks because in our model there is a strong connection between perceived efforts and perceived risks. Although our model does not confirm the relationship between risks and intentions to use, banks should try to make the process of authorization easier and more comfortable. Some other relationships in our model were also not proved by the empirical data. For instance, such factors as social influence and compatibility with lifestyle are insignificant. We suppose this may be the result of the cultural and economic differences because in some other countries these factors were found to be important (Shaikh & Karjaluoto, 2015; Hanafizadeh et al., 2014; Riquelme & Rios, 2010; Gu et al., 2009).

In general, mobile banking might be considered as an innovative service. It is important for banks to involve as many clients as possible and to increase profits based on economies of scale, attract new customers and increase the loyalty of existing customers. However, the development of such services is very knowledge-intensive (Doroshenko, 2011). This process requires the accurate and detailed identification of consumer preferences, tastes, and needs to create a verified and robust model of a representative client in terms of behaviour patterns. This process also helps to diversify banking services and build loyalty. The adoption rates of mobile banking in Russia show that it cannot be considered an innovation. It means that the importance of consumer-side explorations in this area is up to date. Users are an important part of the service innovation process. Every year users spend a lot of money to modify products according to their

needs (Prause & Thurner, 2014). Without information about user behaviour, it will be impossible to turn mobile banking into a standardized service.

Regarding the practical implications of our study, we show the importance of marketing policy, and that it is important for banks to develop methods of involving customers in mobile services (Deloitte, 2014b). If a consumer finds mobile banking useful, he or she will probably use it. While benefits like the speed of transactions and ease of access seem to be incontestable, mobile banking is still not very popular. The main reason is a low rate of awareness. It is also crucial to improve the interface of mobile banking apps. The incentives to use mobile banking increase when it is easy to use it. Customers also feel more comfortable, while working with an attractive-looking service. A user-friendly interface makes the relationship with the bank more understandable for customers. It helps to cope with psychological barriers like the fear of error or fraud.

There are some limitations of this study. First, our sample consists only of smartphone and tablet users — the results may change if updated sample or other criteria for sampling are used. Second, as a target variable we used intention to use, not real usage. Although such simplification is widely used (Shaikh & Karjaluoto, 2015), some longitudinal studies should be done in this area.

According to Shaikh and Karjaluoto (2015), there are some key directions for future research. It is very important to implement new methods because nowadays most papers are based on survey instruments. However, other methods, such as semi-structured interviews or combinations of qualitative and quantitative approaches, should be also used (Shaikh & Karjaluoto, 2015). Another important point is to organize transnational explorations to investigate the influence of cultural differences or legal restrictions. Most researches examine models from the consumer point of view, explorations from bank or IT company points of view may provide new information in this area and make the whole process of mobile banking adoption clearer.

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Appendix 1

| Factor | Items | Outer model loading | Composite Reliability | AVE | Sources |
|------------------------------|---|---------------------|-----------------------|--------|---|
| Perceived Effort | The interface of mobile banking apps is complicated and makes it difficult to navigate | 0,84 | 0,833 | 0,6255 | Lin (2011) Luarn & Lin (2005) |
| | Tiny screen of mobile device requires a high level of concentration while m-banking using | 0,728 | | | |
| | Mobile banking users do not get enough technical and information support by the bank | 0,801 | | | |
| Perceived Financial Costs | Mobile banking reduces the costs of getting banking services* | 0,642 | 0,807 | 0,5858 | Hanafizadeh et. al (2014) Luarn & Lin (2005) Wang et. al (2006) |
| | Mobile banking usage causes additional fees | 0,815 | | | |
| | Mobile banking usages requires higher expenses on mobile Internet and mobile phone | 0,826 | | | |
| Intention to Use | I am an active user of mobile banking | 0,823 | 0,891 | 0,7321 | ChauShen Chen (2013) Gu et. al (2009) Lin (2011) Wang et. al (2006) |
| | I plan to use mobile banking in the future | 0,86 | | | |
| | I will not only use mobile banking, but also recommend it to my friends, relatives etc. | 0,885 | | | |
| Compatibility with Lifestyle | Mobile banking totally fits my lifestyle | 0,845 | 0,821 | 0,6061 | Hanafizadeh et. al (2014) Koenig-Lewis et. al (2010) Lin (2011) |
| | Mobile banking using destroy my relationships with the bank* | 0,813 | | | |
| | Mobile banking is a good service for everyday payments | 0,666 | | | |
| Perceived Risk | Sending information through the Internet is unsafe because it may be stolen by hackers | 0,8 | 0,846 | 0,6479 | Hanafizadeh et. al (2014) ChauShen Chen (2013) Koenig-Lewis et. al (2010) Luarn & Lin (2005) Riquelme & Rios (2010) |
| | Technical errors of m-banking app will lead to financial losses | 0,732 | | | |
| | Mobile device may be stolen with the whole personal and financial data so m-banking is not safe | 0,876 | | | |
| Self-efficacy | I do not need any special knowledge and skills to use mobile banking | 0,639 | 0,774 | 0,5374 | Gu et. al (2009) Lee & Chung (2009) Luarn & Lin (2005) Wang et. al (2006) Zhou (2012) |
| | I do not need any help while using mobile banking | 0,68 | | | |
| | The interface of m-banking apps is unattractive* | 0,862 | | | |
| Social Influence | Many successful people use mobile banking | 0,759 | 0,853 | 0,6609 | Gu et. al (2009) Riquelme & Rios (2010) |
| | Mobile banking usage is positively connected with my image | 0,861 | | | |
| | If you want to taste the achievements of technical progress you must use mobile banking | 0,814 | | | |
| Perceived Usefulness | I find mobile banking to be a useful service | 0,827 | 0,851 | 0,6554 | ChauShen Chen (2013) Gu et. al (2009) Hanafizadeh et. al (2014) Riquelme & Rios (2010) Lin (2011) Wang et. al (2006) Zhou et. al (2010) |
| | Mobile banking increases the speed of banking | 0,771 | | | |
| | Mobile banking makes it easier to get access to bank account | 0,83 | | | |
| Valid values | | 0,4+ | 0,7 – 0,9 | 0,5+ | |

* these items were measured with an opposite scale (1 – strongly agree, 5 – strongly disagree)