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## CYBERSECURITY POLICY DEVELOPMENT IN KAZAKHSTAN: ANALYSIS OF M-COMMERCE USER ACCEPTANCE

УДК 351.82

**Abstract.** Identifying the key cybersecurity aspects for Mobile commerce (M-commerce) adoption factors is crucially important and can increase the trust of users. Thus, the paper has focused on the key M-commerce cybersecurity adoption factors and analysis of the technology infrastructure, which have an impact on Kazakhstan's cybersecurity policy development. In order to achieve these goals, the "Technology Acceptance Model" (TAM) was extended, which included variables as "personal innovativeness, public awareness, perceived risks, intention to use and demographic indicators" such as gender, age and education level (occupation). These variables were used to create a questionnaire for general users and experts in M-commerce.

This project will attempt to provide possible solutions in order to encourage the successful adaptation of M-commerce in Kazakhstan.

**Key words:** Mobile commerce adoption (M-commerce), Kazakhstan, Technology Acceptance Model (TAM), Cybersecurity, Digital technology.

**Аңдатпа.** Мобильді коммерцияның (М-коммерция) киберқауіпсіздік факторларының негізгі аспектілерін анықтау өте маңызды және пайдаланушылардың сенімділігін арттыруы мүмкін. Осылайша, аталмыш зерттеуде Қазақстандағы киберқауіпсіздік саясатының дамуына ықпал ететін М-коммерция киберқауіпсіздігінің негізгі факторларын енгізуге және технологиялық инфрақұрылымды сараптауға аса мән берілген. Осы мақсаттарға қол жеткізу үшін «жеке инновациялылық, қоғамның хабардар болуы, болжанған тәуекелдер, пайдалану ниеті мен демографиялық көрсеткіштер» жынысы, жасы және білім деңгейі (кәсіби) сияқты айнымалылар, «Технологияларды қабылдау моделі» (ТҚМ) кеңейтіле қолданылған. Бұл айнымалылар М-коммерция саласындағы қарапайым пайдаланушылар мен сарапшылар үшін сауалнама жасау үшін қолданылды.

Аталмыш жоба Қазақстандағы М-коммерцияны сәтті бейімделуін ынталандыру үшін ықтимал шешімдерді ұсынады.

**Тірек сөздер:** мобильді коммерцияны қабылдау (М-коммерция), Қазақстан, технологияларды қабылдау моделі (ТҚМ), киберқауіпсіздік, сандық технологиялар.

**Аннотация.** Определение ключевых аспектов кибербезопасности Мобильной коммерции (М-коммерция) является чрезвычайно важным и может повысить доверие пользователей. Таким образом, в данном исследовании основное внимание было уделено ключевым факторам внедрения кибербезопасности в М-коммерции и анализу технологической инфраструктуры, которые оказывают влияние на развитие политики кибербезопасности Казахстана. Для достижения этих целей была использована «Модель принятия технологий» (МПТ), которая включала такие переменные: «личная инновационность, осведомленность общественности, предполагаемые риски, намерение использовать и демографические показатели», пол, возраст и уровень образования (занятость). Эти переменные использовались для создания вопросника для обычных пользователей и экспертов в области М-коммерции.

Данный проект попытается обеспечить возможные решения чтобы стимулировать успешную адаптацию М-коммерции в Казахстане.

**Ключевые слова:** принятие мобильной коммерции (М-коммерция), Казахстан, модель принятия технологий (МПТ), кибербезопасность, цифровые технологии.

**JEL code:** C80, O33, O38, Z28

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Introduction. Mobile commerce (M-commerce) is one of the innovative and modern ways of communicating, making money and doing business. However, cyber

security has an impact on M-commerce adoption and development. Cybersecurity includes data and computer security (Niranjanmurthy & Dharmendra, 2013, p.2885). It is known fact, that M-commerce has been used in developed as well as in developing countries (Pham et al. 2011, p.46). Nonetheless, this type of innovation has not been fully utilised in Kazakhstan if compare to other developed nations. Easy accessible information and sharing it with your contact groups is the quickest way to have impact as well as feedback from the Internet users.

What is more, investigating consumers' willingness to use and accept M-commerce is relatively a new study area for Kazakhstan whereas many academics from other nations' have already examined it.

This study pays attention to the latest problems of M-commerce cyber security and technology infrastructure in Kazakhstan. What is more, it will analyse young Kazakh mobile device users' behaviours and attitudes of using handheld devices. Thus, the research determines some crucial issues, which are needed attention of entrepreneurs, academics and legal authorities that they can support implementation and usability of M-commerce successfully. Cyber security has been investigated by many institutions, but, unfortunately, not all of them were successful.

Mobility is a new phenomenal paradigm that appeared in the computer-based technology industry. Hameed et al. (2010, p.6) has defined the mobility as a service that can be reach anywhere and anytime by using portable electronic devices. More importantly, mobility has change people's attitude to handle daily activates (Barnes, 2002, p.91; Wooder & Baker, 2012, p.14). Amato-McCoy (2011, p.58) highlighted the fact that handheld users use their devices for everyday routine. For instance, consumers often search information about store, compare the price of products, purchase goods and write feedbacks/comments about services and goods. There is a dramatic increase of various portable devices due to they are extremely useful.

According to the World Trade organisation's (2013, n.p.), analyses indicated that the number of mobile users have increased considerably "in last ten years from 1 in 2000 to 6 billion in 2012."

Consequently, increase of handheld gadget users leads to mobile application developers to build more mobile 'apps' (Amato-McCoy, 2011, p.58). This fact also supported by Tarasewich, Nickerson & Warkentin (2001, p.435) who pointed out that many application developers have paid attention to mobile computing.

M-commerce is a business related system that let people easily transfer money through wireless network by using mobile devices (Barnes, 2002; Coursaris & Hassanein, 2002; Gunsakaran & Ngai, 2003 cited in Kenneth & Yang 2005, p.258). There are some thoughts that M-commerce is one of the key methods of obtaining income in ongoing business industry. Chung (2012) pointed out that due to M-commerce's flexibility and personalization it can benefit businesses considerably. According to Hung et al. (2003) M-commerce has been played an important role in the business world (cited in Kenneth & Yang, 2005, p.258). Meyer's (2001) survey among 1000 wireless users illustrated that more than 50% of them had an interest of using new M-commerce services (cited in Kenneth & Yang 2005, p.258).

Forrester Research Inc. has an expectation that sales from M-commerce can increase up to 40% in the future, and by 2016 online sales could be around \$31 billion (Amato-McCoy, 2011, p.58). Moreover, the most recent report of Ericsson Mobility (2014, n.p.) illustrated that the number of mobile subscribers can increase in the world more than 9 billion by 2020. This prediction illustrates that M-commerce can be one of the profitable and attractive methods of building business for developing country as Kazakhstan. However, Kazakhstan needs to have well-examined market, so academics can make more detailed recommendations to business makers and application developers as well as prospective consumers in order to have successful M-commerce adoption in the country. Consequently, enterprises can develop M-commerce strategy for own businesses.

According to the Global Competitiveness Index 2013-2014 rankings Kazakhstan took 50th place, and it is one of the developing nations in the world which has more than 17 000 000 population with a large territory (9th place in the world). In addition, it is highlighted that the major challenges for

Kazakhstan is the “business sophistication - 94th and lack of innovation - 84th sectors” (the Global Competitiveness Index 2013-2014 rankings, 2013, p.30). Thus, it shows and alarms Kazakhstan’s politicians and entrepreneurs that they need to pay precise attention to the technological innovation sector.

What is more, the world’s business industry is changing dramatically in both developed and developing countries. Ongoing the world’s situation has been showed that quality of the services and innovation technology infrastructures have a significant impact on economy development. It is believed that modernisation of existing services by using new business models and advanced technology can improve consumers’ satisfaction as well as providers (ibid.).

It should be highlighted that not many academics have studied Kazakhstan’s M-commerce industry, so there are a number of unopened questions such as how users accept M-commerce?, and what M-commerce factors and aspects can influence on user acceptance? To answer these questions, this project is going to examine mobile device users’ attitude and their requirements among Kazakh’s young generation. The research in particular will focus on aspects as cost of provided services, security, privacy, enjoyment and usefulness of services and personal innovativeness of using mobile technology. Also, demographic parts such as gender, age and level of education will be taken into consideration.

The aim of the project is to identify the core M-commerce aspects and adoption factors in order to implement mobile technology acceptance model (infrastructure) for Kazakhstan and their effects of enabling M-commerce. Thus, enterprises and other governmental and nongovernmental institutions can understand the main factors enabling M-commerce. Avoiding negative factors during the implementation phase of M-commerce adoption can improve the quality of mobile services. In fact, Kazakhstan’s M-commerce system is in a developing stage, and not many academics have paid attention to it while independent business analysts and dealmakers predicted that M-commerce is one of the sufficient ways of online trading (Garkavenko et al. n.d. p.4).

The paper is divided into five main sections. The first section gives a general overview about M-commerce Cybersecurity and importance of it for Kazakhstan. The following chapter looks at background and the ongoing M-commerce and E-commerce situation in the world as well as in Kazakhstan by taking into count different countries’ acceptance model and factors that effected on M-commerce adoption. The third section describes what different methods are used for the research and theories that support constructing M-commerce technology acceptance model for Kazakhstan and prototype of the model will be designed. In the fourth chapter, survey (questionnaire) result will be presented. The last fifth section is about implementation and conclusion of the study.

Research methodology. To meet the study objects the author of the article developed a structured sample questionnaire methodology in order to test of hypotheses of the project and suggested M-commerce acceptance model for Kazakhstan. All collected data will be analysed by using SPSS. *The detailed techniques for data collection and analysis will be explained in the following section.* The research proposed model will be built based on TAM. TAM was developed by Davis in 1989. TAM is a “theory of information system helps to model in order to recognise and use modern technology” (Pham, 2011, p.25). Originally, TAM has main variables such as Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Actual System Use (ASU). However, researches in order to have precise outcome from their study they extended TAM depends on the area of study. For example, Wu & Wang (2005, pp.720-721) in their research had combined “TAM with the TRA by adding variables such as compatibility, cost and perceived risks”. Additionally, Kenneth & Yang (2005, p.257) used TAM on order to analyse and determine key M-commerce adoption factors in Singapore.

The model will help to understand M-commerce user’s intention to use mobile devices and their attitude in terms of adoption mobile services. Importantly the data will be collected among young mobile device users and experts in M-commerce. Thus, their opinions, comments and results will be analysed and compared.

The aim of the proposed model is to investigate and examine M-commerce users' behaviour and distinguish M-commerce acceptance factors in order to make the right decision when and how to implement M-commerce for Kazakhstan. Also, it helps to predict the users' attitude of using M-commerce, so an expedient action can be done to eliminate negative factors. All young participants were questioned among M-commerce's different aspects such as safety, reliability, quality, and accessibility.

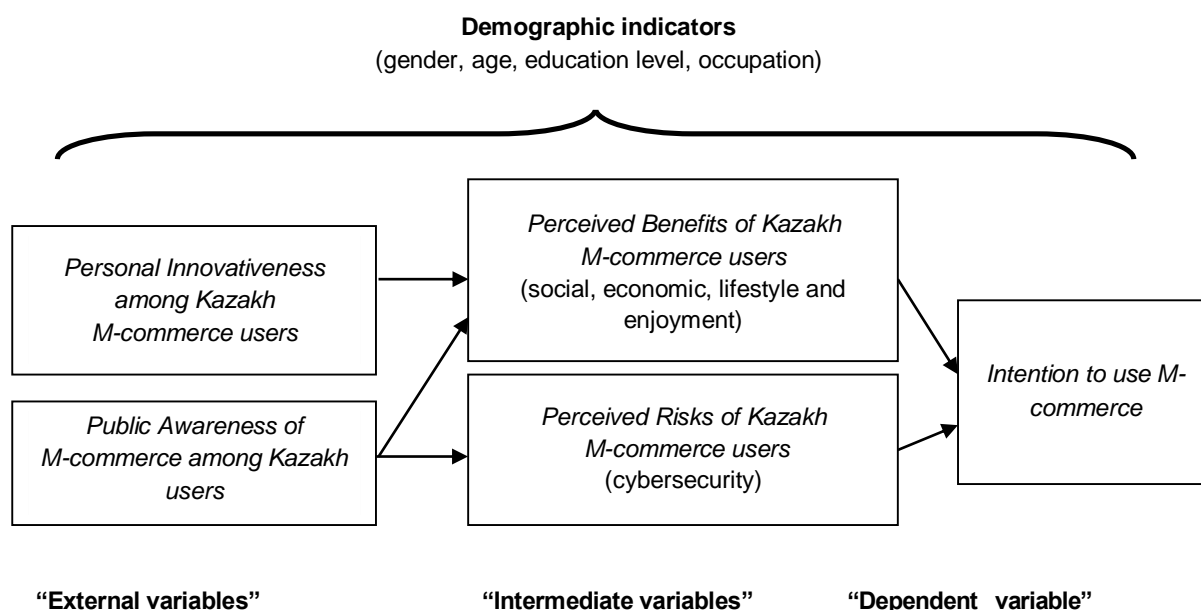
Many academics claimed that TAM is robust and appropriate methodology to identify user's acceptance of M-commerce (O'Cass & Fenench, 2003; Heijden, 2003 cited in Yang, 2005, p.262). M-commerce is closely related to computer-based technology, and this was the reason of implementing TAM as a core model in the present research. Thus, proposed framework was developed based on TAM. Extended TAM also helps our understanding of M-commerce.

As it mentioned above many academics have examined and criticised TAM. As a

result the second stage of TAM2 was developed by Venkatesh & Davis in 2000 (cited in Chong, 2013, p.524). They expanded TAM by adding a number of explanation factors to "Perceived Usefulness (PU) such as cognitive instrumental (e.g. output quality, relevance of job etc.) and social influence processes (e.g. image, subjective norm)" (ibid. p.524). The research results point out that such a particular group of processes have a powerful effect on user acceptance of the technology/system.

Additionally, in order to determine information about the cost and advantages of new mobile services TAM also used by Lopez-Nicolas, Molina-Castillo and Bouwman (2008, p.360).

This illustrates that TAM is more likely to be useful, reliable and appropriate for this project. Importantly, it has been used by many academics who have succeeded in their studies. Thus, the following M-commerce acceptance model prototype is designed for the percent research (Figure 1).



**Figure 1** is developed by the author of the paper. Proposed M-commerce Technology acceptance model for Kazakhstan

The proposed model was developed considering social and technological factors. Technical factors include "perceived risks" variables and social factors include the "perceived benefits" and "public awareness" variables.

*"Personal Innovativeness among Kazakhstan M-commerce users" (PI):* PI identifies the level of interest in using modern technologies and intention to use M-commerce platforms.



*"Public Awareness of M-commerce among Kazakh users" (PA):* PA determines consumers' understanding and knowledge of M-commerce.

*"Perceived Benefits of Kazakh M-commerce users" (PB):* PB variables define participants' level of satisfaction considering the benefits that offered by M-commerce providers (applications & services).

*"Perceived Risks of Kazakh M-commerce users" (PR):* PR analyses consumers' behaviour unease with security using the M-commerce platforms. Users' data and privacy have utter importance in the higher acceptance of any consumer technologies. PR is included to the proposed model because it is believed that it can determine the consumers' ways of interacting with mobile technologies. The survey results were analysed in terms of customers' satisfaction to obtain statistical data on PR.

All these variables were integrated to enhance existing TAM model. What is more, participants' response were analysed to check feasibility to implement M-commerce in Kazakhstan.

*Techniques for data collection.* Online survey (questionnaire) is the main data collection and testing the proposed M-commerce acceptance model for Kazakhstan. The *Google Form* was used in order to create an online questionnaire. The reason of choosing online questionnaire is that it has a number of benefits such as accessibility, safety (data stored in Google cloud automatically) and it does not need extra effort to submit it. What is more, one participant cannot answer to the same questionnaire twice. Before sending online questionnaire, it was tested.

What is more, the collected data was analysed by using the *IBM SPSS Statistics (Statistical Package for the Social Sciences)* and *MS Excel*. The IBM SPSS the first time was written by academics in 1968 (About SPSS Inc., n.d.). Using the SPSS provides clear outcome for the future prediction and helps to avoid possible negative impacts on M-commerce acceptance for Kazakhstan. During the analyses, the researcher paid attention to demographic characteristics and education level of the respondents. Thus, the participants' personal characteristics helped to predict M-commerce users' adoption attitude robustly.

The questionnaires were developed for two groups of people: providers of M-commerce and general users.

The first survey for the general audience contained twenty questions which were posted on social networking sites such as Facebook, \*Contact and \*My world in a particular group where young Kazakh people have studied in a different Kazakh universities. (\*Contact and \*My world are SNS that Kazakh civilians use them actively).

Second survey was built especially for the experts in M-commerce, and it included twenty-one questions. This online questionnaire was sent by email to particularly experts who have already had experience in dealing with E-commerce and M-commerce services. There are a number of big and medium Kazakh companies' experts who were surveyed. For example, companies as Beeline, Chocoline.me, Kcell and Homebank (Kazkommertsbank).

*The study beneficiaries.* The project has diverse impact on the country development as a whole. It is beneficial for entrepreneurs, other academic researchers as well as consumers. It can increase mobile device users' satisfaction, which also can lead economic and social growth in Kazakhstan.

Kazakhstan is one of the large countries in the world, so there are many villages that are far from cities. M-commerce has a number of advantages. For instance, mobile banking one of the popular mobile services. A cellular owner can check their account, make payment and transfer money at any time and everywhere. This service saves time and money for travelling if compare to traditional banking service. More importantly, transferring money through cell phone is much faster and inexpensive. This convenient way of sending and receiving money system was created by Dr. Nick Hughes (an executive of Vodafone) and it was used in Kenya in 2007 (Wooder & Baker, 2011, p.13).

In addition, it is pointed out that until now there are more than 14 million users have been registered on money transaction websites (ibid.).

3. Literature review and hypothesis.  
*Significance of the study for Kazakhstan.* Significance of the project is that the dynamic development of the national economy is directly related not only selling raw materials or minerals of Kazakhstan but also creating

and implementing innovative technologies. However, Kazakhstan is far from creating new technologies if compare to other Asian countries such as Singapore, Japan and Korea.

Popularity of using mobile devices and a tremendous number of applications cannot be ignored researchers' attention. Thus, M-commerce has been examined, analysed and published by many academic researchers. For example, according to Zhang, Zhu and Liu (2012, p.1902), M-commerce is a modernised version of E-commerce, which has a number of advantages compare to E-commerce.

It is believed that identifying and implementing M-commerce adoption factors might have an influence of user acceptance attitude in Kazakhstan. As a result, this project will attempt to implement M-commerce technology acceptance model by extending "Technology Acceptance Model" (TAM). Consequently, it is thought that this framework can help to predict and eliminate negative impacts and make right decision to be successful in M-commerce industry in the country.

M-commerce has personalised, customised and local track functions. Investigating M-commerce adoption factors have a crucial impact on M-commerce development (ibid). Other studies such as Yang (2005), Park & Cheong (2005), Wu & Wang (2005), Ku, Hung, & Chang (2003), Rossi & Mallat (2009) have agreed with this opinion (cited in Zhang, Zhu & Liu (2012, p.1902).

These academics during their study they have used different well-known theories such as "Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), Theory of Planned Behaviour (TPB) and Theory of Reasoned Action (TRA)" (ibid.). For instance, Zhang, Zhu and Liu (2012, p.1902) used the TPB and TAM whereas Lopez-Nicolas, Molina-Castillo and Bouwman (2008, p.359) used IDT model and TAM.

What is more, Kourouthanassis et al. (2012, p.10) study illustrated that the publication of M-commerce articles have increased from 64% in 2000 to more than 80% in 2011. It is believed that the number of academics have had an interest in studying M-commerce in depth (ibid.). For instance, Ngai & Gunasekaren analysis showed that

149 articles from various journals were published during the three years 2000-2003 (cited in Kourouthanassis et al. 2012, p.7). Also, the similar analysis of the literature made by Fouskas (2005), (cited in Kourouthanassis, 2012, pp.7-8). As a result, he created "M-commerce's road map and divided it into four different groups such as technology which includes infrastructure and devices, services (payments, applications etc.), value (users and business model), and fourth is enablers (regulation, risks as privacy and security)". Overall 1.031 articles analysed by Kourouthanassis et al. (2012, p.8), and 41% of research papers were related to application development, behaviour, business model and adoption of M-commerce etc. (ibid. p.11). He also highlighted that research areas such as 'diffusion and adoption' are popular in M-commerce if compare to others.

In addition, Hameed et al. (2010, p. 7) has identified four key levels of an enterprise architecture framework for M-commerce such as "M-commerce Business Models, M-commerce Supply Chain, M-commerce applications, M-commerce Technology Infrastructure".

According to research paper, it can be realised that TAM have used and extended by many research academics. What is more, Rui & Lu (2009, n.p.) highlighted the same fact. For example, Kim, Mirusmonov & Lee (2010, p.310) implemented TAM in order to find out effecting factors on mobile payment acceptance system. Examining these academic papers leads to the next hypotheses which are presented in the following way.

*H1. "Personal Innovativeness among Kazakh M-commerce users" (PI) has a positive impact to "Perceived Benefits of Kazakh M-commerce users" (PB).*

*H2. "Public Awareness of M-commerce among Kazakh users" (PA) has direct positive impact to "Perceived Benefits of Kazakh M-commerce users" (PB).*

*H2. "Public Awareness of M-commerce among Kazakh users" (PA) has a direct impact to "Perceived Risks of Kazakh M-commerce users" (PR).*

*H3. "Perceived Benefits of Kazakh M-commerce users" (PB) such as social, economic, lifestyle and enjoyment has a*

positive impact to "Intention to use M-commerce".

H4. "Perceived Risks of Kazakh M-commerce users" (PR) has an adverse impact to "Intention to use M-commerce".

The number of academics such as Wood & Swait (2002), Hirschman (1980), Venkatraman & Price (1990), Citrin et al. (2000) determined that PI has positive effect to EU (cited Yang, 2005, p.263).

Kim, Mirusmonov & Lee (2010, p.310) pointed out that EU has effect on PB among more mature users, and it was explained that late adopters have enough knowledge about mobile payment system. In addition, they claimed that PI has a tremendous encouraging influence on online shopping.

Data collection, analysis and findings. Two different questionnaires were created for M-commerce service providers and general users. The questionnaire for the general users was posted on Social Networking Websites (SNS) such as Facebook and Russian SNS 'My world' and 'Contact'. The reason for posting the questionnaire on Russian SNS is that people from Kazakhstan use them often than other SNS. On Facebook the questionnaire was only posted on particular Kazakh groups such as "London Kazakh Masters", "Bolashak students in the UK", JSC "Centre for International programs"

administrator of the Bolashak International Scholarship of the President of the Republic of Kazakhstan, "Kazakh society in Manchester", "Kazakh society in City London University", "Astana Alumni Association", and "Conversation about Business in Kazakhstan". Young Kazakh people answered the questionnaires. Both questionnaires were created by using Google forms (docs). The questionnaires were available in both languages: Russian and English. The questionnaires were provided in both languages because not all respondents from Kazakhstan know the English.

Overall, the total number of respondents was 63. Of the total respondents, 46 responded to the first questionnaire, which was generated for the general users. The data for the second questionnaire was collected from 17 experts in M-commerce/E-commerce.

*Questionnaire result from the general M-commerce users. Demographic analysis.* Q1. Surprisingly, the results illustrate that there was a higher number of women who answered compared to men. More than 55% of the respondents are women whereas the number of men is just over 40%, so we can clearly see a significant gender difference (Table 1.).

Gender	Frequency	%	Valid %	Cumulative % %
Female	26	56,5	56,5	56,5
Male	20	43,5	43,5	43.5
Total	46	100,0	100,0	100,0

Table 1. The survey result among gender category (Question 1).

Q2. Additionally, it can be highlighted that 76% of the respondents were between the ages of 20-30, and 17% of them are between the ages of 31-40, the number of answers received from people who are younger than 20 is just 2%, and those older than 41, 4%. This might be because people in this age category use SNS less, as well as

other online services such as M-commerce/E-commerce.

Thus, from Table 2, it can be seen that male and female from 20 to 30 ages are more active when compared to other age categories. Interestingly, woman between the ages of 31-40 are more active than men at the same category.

Gender. Age Cross tabulation

Gender	Age					Count /Unit
	20 and younger	20-30	31-40	41-50	51 and older	Total
Female	1	17	6	1	1	26
Male	0	18	2	0	0	20
Total	1	35	8	1	1	46

Table 2. Cross tabulation among gender and age groups

Q3. Another interesting fact is that 43% of respondents are full-time students and the same number are professionals, while there are no part-time students (0%). 7% of respondents are self-employed and the same number chose the “other” category.

According to the results, it appears that educated young people between 20-30 ages

are more willing to use mobile devices, as they were more actively involved in the questionnaire than users of other age groups. The cross tabulation (**Table 3.**) for gender, age and occupation was created using SPSS and clearly illustrates the differences between the categories.

Gender \* Age \* Occupation Cross tabulation

Level of education / Occupation			Age					Total
			20 and younger	20-30	31-40	41-50	51 and older	
Other	Gender	Female	-	1	1	-	1	3
Total			-	1	1	-	1	3
Professional	Gender	Female	-	2	4	1	-	7
		Male	-	11	2	0	-	13
Total			-	13	6	1	-	20
Self-employed	Gender	Female	-	2	-	-	-	2
		Male	-	1	-	-	-	1
Total			-	3	-	-	-	3
Student (full-time)	Gender	Female	1	12	1	-	-	14
		Male	0	6	0	-	-	6
Total			1	18	1	-	-	20
Total	Gender	Female	1	17	6	1	1	26
		Male	0	18	2	0	0	20
Total			1	35	8	1	1	46

Table 3. Cross tabulation among gender, age and occupation. (Question 1, 2 and 3)

Q4. According to the results only 33% of respondents claimed that mobile websites have a sufficient and applicable search engine whereas 46% of them reported that not all searching engines are appropriate. More than 15% of people do not know about

it and 20% showed their dissatisfaction with this mobile website feature.

Q5. It also should be mentioned that not all mobile websites are personalised and customised. According to the results, 25 people had this opinion whereas only 5 of them replied positively, 10 of them negatively



and 6 of respondents do not know about this feature of mobile websites.

Q6. More than 60% of participants think that mobile websites are not always comprehensible, while just over 25% of them find websites clear and understandable. However, 4% of respondents reported that they had difficulties using mobile websites and 9% of them are unsure about this.

Q7. According to one of the respondent's comments, there is less emphasis on mobile websites on usability, user interaction and modular plug-in support issues. Mobile websites mostly offer poorly structured Information. Furthermore, they do not contain clear item information and options, which usually appear on PC websites. Often mobile applications require large memory capacity, which takes up considerable time and space. The larger the application (large memory capacity), the more bugs it has. It is also inconvenient when it gets cracked during downloading the apps.

Additionally, some websites cannot be properly displayed on handheld gadgets, so it is uncomfortable to use mobile websites services. However, other respondents cannot see any problems and barriers to using mobile websites.

**4.2 Perceived benefits.** Q1. 20 users reported average satisfaction when using mobile websites, 15 respondents were very satisfied, whereas the number of participants who were extremely satisfied was only 4 (9%). 5 people were unsatisfied, and 2 respondents said they dislike the mobile websites they use.

From **Table 4** it can be seen that people who are willing to use new technology and services have gained more benefits and know about it when compared to unwilling users of modern technology/services. In addition, Lopez-Nicolas, Molina-Castillo and Bouwman (2008, p.361) supported this idea by highlighting that mobile users with high PI have positive thoughts about advanced technology than people who have low PI level.

\* Perceived Benefits. Personal innovativeness. / Cross tabulation

Personal innovativeness	Perceived Benefits					Total
	Above average	Dissatisfied	Extremely satisfied	Somewhat unsatisfied	Very satisfied	
Bad user (30% and below)	0	1	1	0	0	2
Expert user (100-60%)	10	1	2	0	9	22
Moderate user (59-30%)	10	0	1	5	6	22
<b>Total</b>	<b>20</b>	<b>2</b>	<b>4</b>	<b>5</b>	<b>15</b>	<b>46</b>

**Table 4.** Cross tabulation between Personal innovativeness and perceived benefits categories.

Q2. When answering the question 'If not satisfied with some of the websites, could you describe the reason why?', respondents commented on the reasons they were dissatisfied with mobile websites. The fact that information on mobile websites is often not renewed was one reason. Others claim that some websites do not respond (load) instantly on mobile devices with smaller screen, since they may be built for a PC, which has a bigger screen. As a result, of this, using mobile websites is time-consuming, and they are difficult to use. Moreover, users can also be inconvenienced by server provider errors and a poor network connection as well.

**Perceived Risks of Kazakh M-commerce users.** Q1. The results show that 40% of respondents believe that security risks

exist, then 20% of respondents selected privacy risks and only 2% said there are no risks. Additionally, more than 25% of participants pointed out usability problems such as browsing difficulties, and the small size of mobile devices and 7% of them highlighted technical problems. The same number of people (7%) complained about WAP drawbacks such as speed and accessibility.

**Personal Innovativeness among Kazakh M-commerce users.** Q1. For the question "How keen are you in using modern technology?", approximately 50% of participants responded that they are expert users and the same number of participants see themselves as moderate users of new technology. Only 4% of them defined

themselves as bad users. The PI difference level among the ages can be seen in **Table 5**.

Thus, from the result it can be understood that young generation are more

willing to use up-to-date technologies and they might be open-minded in such areas.

Personal Innovativeness among Kazakh M-commerce users. \* Age / Cros tabulation

Count /Unit

Personal innovativeness.	Age					Total
	20 and younger	20-30	31-40	41-50	51 and older	
Bad user (30% and below)	0	0	2	0	0	2
Expert user (100-60%)	0	18	2	1	1	22
Moderate user (59-30%)	1	17	4	0	0	22
<b>Total</b>	<b>1</b>	<b>35</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>46</b>

**Table 5.** Cross tabulation between personal innovativeness and age (Question 2 with Question 1)

**Respondents' comments and recommendations.** Q1. In response to the question 'What can be done in order to improve M-commerce in Kazakhstan?', the following recommendations were given by the respondents.

Firstly, if network providers reduced the prices for using Kazakh online services, then it could be an additional incentive for the development of the mobile industry.

Secondly, it is believed that if stakeholders such as government authorities and entrepreneurs listen to and understands consumers' needs; this will boost M-commerce. The government could provide particular services, which are desirable for society and private companies would be able to implement and commercialize the ideas.

There should be a rule which defines the responsibilities of each part of M-commerce deals. The rule should define when a mobile deal is completed, and what should be in the description and item return policy. Generally, online deals should be clarified by legal policies that identify the terms and conditions between dealers and consumers. In addition, it is vital that the cost of online services is reduced and the content of mobile websites is improved.

Also, it would be very motivational for prospective consumers if M-commerce would enable the free delivery of goods and services in Kazakhstan. Recently, a law on E-commerce was discussed in Kazakhstan, but the law has not been developed yet and as a result, this area is still in need of improvement

and experts' attention in order to develop Kazakhstan's M-commerce market. What is more, there is a need free of charge Wi-Fi public zones with high-speed accessibility, as suggested by many of the respondents. Overall, these are systematic elements and enablers of M-commerce and without them, all the rest are useless. More importantly real-time update information is needed, as there is a great deal of outdated data and it is not controlled. Services should be reliable and proper advertisements are needed to notify users.

1) Having good Internet access.

2) Security. For example, confidentiality and safety in terms of payment, registration (private information).

3) Providing multi-lingual websites. When looking at other countries it appears, it is useful to provide information in several languages (eng., rus., kz.).

Thus, paying attention to these factors might be very useful for Kazakhstan in order to boost M-commerce usability.

**Intention to use M-commerce.** Q1. According to the survey results, almost 40% of participants are definitely going to use M-commerce in the future and 35% of them have already used it and will use it in the future as well. A little over 20% of respondents are planning to use M-commerce and 4% of them are not sure whether to use it or not.

Thus, from the results it can be understood that education has an influence on the awareness of M-commerce because more than half of participants are full-time students and professionals. Moreover, it

should be pointed out that public awareness of M-commerce does have impact on intention to use M-commerce. The analysed

results can be seen in a cross tabulation (Table 5.).

Intention to use M-commerce.  
\* Public Awareness of M-commerce / Crosstab

Count /Unit

Intention to use M-commerce	Public Awareness of M-commerce.				Total
	I know about it very well	I have an idea what it is	I am having difficulties to answer	I do not know	
Definitely I will	2	14	2	0	18
I am not sure	0	0	0	2	2
I am planning to use it	0	3	6	1	10
I have used it and I will	7	7	2	0	16
<b>Total</b>	<b>9</b>	<b>24</b>	<b>10</b>	<b>3</b>	<b>46</b>

Table 5. Cross tabulation between intention to use M-commerce (Question 1) and public awareness of M-commerce.

**Questionnaire result from M-commerce experts.** Q1. This questionnaire was organised for M-commerce providers who have worked in different parts information and communication technologies such as:

- ✓ An engineer communicator;
- ✓ Owner of online advertising shop “Chocolife.me” (<http://www.chocolife.me>);
- ✓ A director of Internet (digital) projects;
- ✓ PR manager;
- ✓ Online store developer (<http://altescom.kz>);
- ✓ CEO owner (<http://simcard.kz>);
- ✓ A consultant in the IT department;
- ✓ A business analyst, developer of websites and mobile applications, director of “WAKE UP” ([www.iwakeup.kz](http://www.iwakeup.kz), company for developing web sites and mobile applications);
- ✓ A department of IT - associate Professor;
- ✓ A lead engineer telecommunications;
- ✓ Support for IT infrastructure;
- ✓ The head of the department of general disciplines in the college of innovative technologies in Astana;
- ✓ An expert in the operation and maintenance of satellite equipment;
- ✓ Part-time student and a chief executive officer of online store;
- ✓ MSc student in IT and cyber security.

**Perceived Risks of Kazakh M-commerce users.** Q1. Mobile online services have a

number of risks and drawbacks, which can discourage the public from adopting them.

**Security risks.** More than 50% of respondents believe that security risks exist, while 35% reported that the risk is very high. Interestingly, 12% of the experts think that there is no reason to worry about the risk.

**Privacy.** Over 40% of respondents decided that privacy issue in Kazakhstan's is very high, while the same numbers of people were concerned about it. Less than 20% of them believed that the privacy problem is low.

**Usability problems.** The results were almost the same as with the privacy issues, but in this case, 6% of them said there was no problem with the usability of mobile devices and 12 of them believed that the usability of portable gadgets is in a low level.

**Technical limitations** of mobile gadgets. The survey results illustrate that mobile devices do not have many technical limitations - 70% of participants thought this, while only 12% of them disagreed. Almost 20% of respondents said there are no technical limitations at all.

**Network issues.** More than 70% of participants had concerns about networking problems while almost 30% of them had some worries about it.

These results show that Kazakhstan's mobile network operators need to pay attention to their provided services by protecting consumers from the number of security risks that exist. It is believed that

these changes could make their mobile services more valuable and reliable.

Q2. According to participants' comments, Kazakhstan's mobile market has a number of challenges. One of the problems is population's lack of awareness about M-commerce. Also, poor infrastructure of mobile payment system, as well as the high percentage of commission for transaction (for example, high percent commission of transaction - 3%). There are risks of a breach of confidentiality. What is more, there is distrust of the Internet services, substandard work on the delivery of goods and services. For example, the majority of Kazakh people in order to top-up mobile account they have paid by cash. In addition, Kazakhstan mobile hamper the development of M-commerce while others thought that this system contribute to the development, as well as

Q5. According to the survey results, there is a possibility of cyber threats to security. Also, one of the experts pointed out that the content structure of M-commerce is not of high quality. A lack of mechanisms for the protection of property rights, inadequate government policies and a weak legal framework are slowing down the development of M-commerce in Kazakhstan. Additionally, absence of qualified professionals with extensive experience in implementation of mobile projects. However, some of respondents highlighted that the

devices have not been used as an electronic wallet. What is more, the legal framework is not developed sufficiently, and due to this issue distrust can accrue to mobile services.

Q3. Many experts in M-commerce mentioned that they offer some privacy systems such as SSL (Secure Sockets Layer), encryption of user data and PCI DSS (Payment Card Industry Data Security Standard) and others. Also, transactional data encryption and authentication through digital signatures (standard RSA).

Q4. Some of the participants believed that the implementation of cryptography for authentication encryption in Kazakhstan has an inefficient quality, in this context, it may

improve the safety and privacy aspects of M-commerce.

Kazakhstan's M-commerce is moving slowly but surely into the future, and can only continue to grow.

**Intention to use and develop M-commerce in Kazakhstan.** More than 75% of respondents said that they and their company would like to develop M-commerce in the future while 12% of them have not decided yet. The same number of them (12%) do not want to develop it. Generally, according to the experts' comments it is clear that companies are more willing to develop M-commerce in the future (Figure 1)

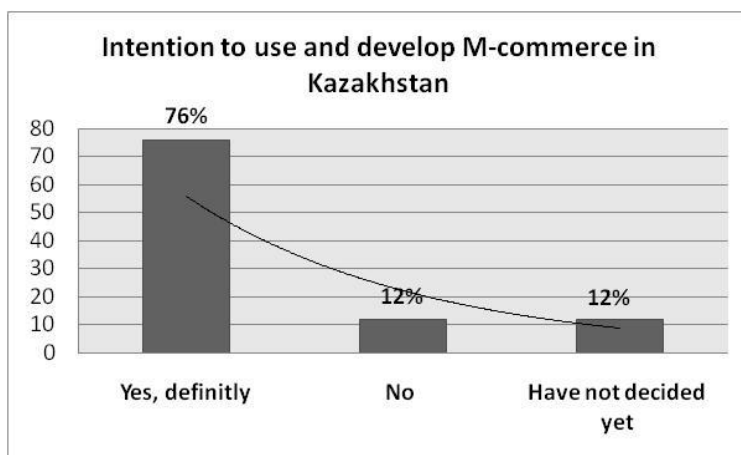


Figure 1. Does your company want to develop the mobile website in the future?

**Future success.** Q1. Unfortunately, many websites have not been optimized for mobile devices. There is also a lack of qualified mobile application developers in the market. Major mobile services have been

offered by mobile operators and many of the services are for entertainment purposes. M-commerce providers think that many small and medium-sized companies cannot overpower the implementation of M-

commerce, as it requires financial investment and specific labour forces. However, it should be noted that M-commerce is a very promising direction for building profitable businesses. Companies need to look at this direction and learn from developed countries with regards to the successful introduction of M-commerce. Mobile applications need to be developed for users' convenience, not just for profit. However, it is necessary to constantly analyse and improve the services which have been provided. If Kazakhstan's mobile service providers had more competitors in the market the mobile services would be automatically improved.

Another issue is that most of Kazakhstan's enterprises have not implemented M-commerce strategies in their working activities, which is one of the negative impacts of adopting successful M-commerce. For instance, in the UK, 50% of survey participants are willing to implement M-commerce strategies (Bailey & Collins, 2009, n.p.).

It should be pointed out that survey result show that the younger Kazakh generation have a tremendous interest in using mobile devices for entertainment (downloading music, movies, games, photos and videos) and information (checking the weather, news, tickets, maps and so on). Chung and Holdworth (2012, p.233) had the same finding in their study among Kazakh students. Furthermore, Kim, Mirusmonov & Lee (2010, p.314) highlighted that young people are extremely keen to learn about modern technologies and their usability benefits.

According to M-commerce providers' suggestions, Kazakhstan's government should support and invest in M-commerce. They also pointed out that Kazakhstan does not have any legal policies to regulate the mobile market. As Zhu & Thatcher (2010), and Javalgi & Ramsey (2001) highlighted the fact that a government should have effective legislation, which will support online commerce adoption (cited in Peixin & Wei, 2011, n.p.). What is more, mobile service providers need to pay attention to the perceived risks, providing security and confidentiality in order to have consumer's trust.

Gregory et al. (2007) and Chen (2006) highlighted that globalisation and online

commerce adoption have a positive effect on one another (cited in Peixin & Wei, 2011, n.p.). What is more, Veijalainen & Rehmat (2010 p.314) pointed out that often developing nations' mobile gadgets are simply used to have a connection to the digital global world. Thus, according to the results the proposed M-commerce acceptance model prototype for Kazakhstan is determined as useful, workable and reliable.

**Possible recommendations for Kazakhstan's M-commerce adoption in perspective.** Kazakhstan's M-commerce system has been developed to a certain extent; however, there are many aspects, which still need attention.

According to the problematic features found during the study, M-commerce infrastructure needs more investment in order to improve the current Kazakhstan' M-commerce market situation.

Thus, the following important actions should be taken in order to adopt M-commerce in Kazakhstan.

1. Implementing a number of M-commerce projects in the private and government sectors (Logistics projects aimed at M-commerce.);
2. Establishing and modernising the existing legal framework which regulates online services (E-commerce, M-commerce);
3. Creating a favourable environment for M-commerce;
4. Making 4G networks available in all parts of Kazakhstan;
5. Maintaining real time updates of M-commerce content;
6. Developing search engines;
7. Providing security and confidentiality of personal information.

Implementing these recommendations would enhance the quality of M-commerce, which in turn would lead to a higher usage of new technology. This would have a significant impact on the country's market not only in the economic sector but also in the social and technological sectors. In addition, this idea is supported by Hameed, Ahsan, & Yang, (2010, p.114) who state that M-commerce has an impact on "economic, social and personal aspects of daily life".

Network providers should think about cost because it has been pointed out by many M-commerce service providers and academics that the cost has a negative



impact of M-commerce adoption (We & Wang cited in Qingfei, Shaobo, & Gang, 2008, p.257). Furthermore, establishing a number of M-commerce projects creates competition in the market and this will create a higher quality service, which leads to a satisfied customer. "A satisfied customer is the best business strategy of all" – Michael Leboeuf.

**Conclusions and Implications.** The author of this article conducted analysis showed generally positive trends in the use of M-commerce in Kazakhstan. However, in the future, attention should be paid to ensuring and developing cybersecurity due to mobile device users have concerns about their personal data safeties.

Thus, the objective of this work was to determine the essential factors, which encourage people to use M-commerce. In order to achieve the project's objectives, the M-commerce acceptance model was performed based on TAM. The model includes ***dependent variables such as the intention to use M-commerce (IU)***, and ***three other intermediate variables: such as "Perceived Benefits of Kazakh M-commerce users" (PB), and "Perceived Risks of Kazakh M-commerce users" (PR)***.

In addition, there were ***three external variables: "Personal Innovativeness among Kazakh M-commerce users" (PI) and "Public Awareness of M-commerce among Kazakh users"***. In addition, this project looked at demographic features, which included age, gender and occupation. The proposed hypotheses were tested in respect of the determined variables, as listed above. The research performed a cross analysis among gender, occupation, age, PI, and PB in order to understand the dimensions of differentiation among the groups (M-commerce providers and general users).

The key achievement of this project was the successful development of M-commerce acceptance model for Kazakhstan. The research result illustrated a number of factors that have a significant impact on the adoption of M-commerce in Kazakhstan. Thus, the successful implementation of M-commerce adoption in Kazakhstan is directly dependent on factors such as the quality of network provider services, security of transactions, confidentiality, infrastructure content, customized and personalised services and

the development of M-commerce/E-commerce legislation in the country.

These results illustrated that currently Kazakhstan's younger generation uses M-commerce and are willing to use M-commerce in the future. They are also highly interested in new technologies. However, some factors such as perceived risks, perceived cost are a barrier to the adoption of M-commerce. In addition, the results of the survey illustrated that PR and PC have a negative impact on the intention to use M-commerce while PB have motivational and encouraging effect of using M-commerce.

This study has also made a prediction of future growth for M-commerce in Kazakhstan. There is no doubt that technology such as 3G, 4G, GPRS and WAP will boost M-commerce, but it is difficult to imagine that there will be significant changes in technologies. As a result, a fresh look at wireless connectivity is needed in order to break down technological barriers and old stereotypes about M-commerce that are holding it back. In order to provide high quality M-commerce services changes are needed, particularly in the standard and technological development aspects.

The Involvement of Kazakhstan in the global market would improve competitiveness in the market and Kazakhstan as a whole. Also, educating people not only in accordance with the demand of the local labour market but also according to the requirement of the international standards of the labour market is fundamental investment for the future success of the country.

Mobile website developers and entrepreneurs need to pay better attention to consumers' needs and build websites with personalised and customised features that will be user-friendly. Also, mobile websites' information architecture should be comprehensible and not complicated. This would make customers' use of mobile websites much easier and more enjoyable.

Furthermore, the findings from the research have enabled a better understanding of M-commerce adoption factors in detail, so there is a high possibility of being able to predict significantly negative impacts and risks in advance, and avoid them in order to have sustainable M-commerce acceptance in the country.

The results of research are useful for wireless and M-commerce service providers in order for them to establish their own M-commerce (online business) strategy. The providers should pay attention to their application and think about how they offer their services, and who to. For example, Chong et al. (2011) pointed out that users of mobile devices will not download applications that are not useful and attractive in terms of usability and cost. Thus, the cost of the application can be inexpensive (cited in Chong, 2013, p. 529). What is more, according to the results, it can be seen that demographic differences have a significant impact on M-commerce acceptance.

Analysing M-commerce adoption results is also helpful for academics and M-commerce service providers in order for them to predict and understand prospective consumers' attitudes and behaviour. Thus, it can be understood that implementing M-commerce successfully can lead economic, social and technological development in the country.

There is, however, a need to improve the integration of Kazakhstan into the world's information and economic processes due to globalisation in order to compete among other developed and developing countries. Being one of the successful countries in the world Kazakhstan needs to pay attention to the changes that are happening globally. Consequently, further research is needed to achieve this.

For example, successful adoption of M-commerce needs support and effort among governments, investors and operators of networks, as specified by Tarasewich, Nickerson, Warkentin, (2004, p.265). Thus, Kazakhstan's government should support and encourage M-commerce and its safety in order to be adopted successfully. One example of this is the government of Singapore, which helped develop M-commerce and launch over 30 mobile-based projects (Kenneth & Yang, 2005, p. 259).

If these findings are taken into consideration and the proposed suggestions are implemented, this will make a significant

difference to the M-commerce sector in Kazakhstan. It would improve the adoption new technology, the social satisfaction of people (consumers, users of M-commerce) specifically the large number of people who live far from urban places, and create growth in the economic environment of Kazakhstan.

**Limitations and Future research.** It is crucial to highlight that data collection from users and providers of M-commerce need to continue internally as well as externally, since this study used only a small data sample. The present study was only among the limited number of users, thus if the project research were analysed data from lots of users, the research result would be different.

It would be also necessary in the future to take individuals' interest using online banking systems into consideration because the present study determined that mobile users were concerned about the high cyber attract to their account. This may be due to the fact that Kazakh civilians do not have enough awareness of safety and confidentiality policy an Internet connection.

Currently, there are number of M-commerce factors, which have been determined for Kazakhstan's market. The determined factors have a crucial impact on the acceptance and development of the M-commerce cyber security. However, it is assumed that identified factors may not be enough to guarantee successful cyber security policy adoption of M-commerce in Kazakhstan. As a result, further studies needs to be carried out regarding other aspects of M-commerce. These would provide a deeper understanding of M-commerce users' intention to be cautions of using different suspicious mobile applications, online services and technologies.

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