St. Petersburg University
Master in Management Program

Determining Factors of Adoption of Digital Device Wallets by Russian Consumers

Master Thesis by the 2nd year student Concentration – Master in Management,
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АННОТАЦИЯ

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Название ВКР	Определение факторов перехода российских потребителей на использование мобильных платежных сервисов
Образовательная программа	Менеджмент
Направление подготовки	Менеджмент (Master in Management – MiM)
Год	2016-2018
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Описание цели, задач и основных результатов	Цель: определить факторы принятия технологии мобильных платежных сервисов российскими потребителями. Задачи: 1. Определить факторы, которые способствуют принятию технологии мобильных платежных сервисов российскими потребителями 2. Определить факторы, которые препятствуют принятию технологии мобильных платежных сервисов российскими потребителями 3. Оценить, какая доля вариации в принятии мобильных платежных сервисов может быть объяснена выделенными факторами 4. Определить, как такие характеристики потребителей как возраст, пол и опыт использования влияют на процесс принятия мобильных платежных сервисов Результаты: 1. Факторы «Ожидаемая Эффективность» и «Привычка» способствуют принятию технологии мобильных платежных сервисов российскими потребителями 2. «Воспринимаемый Риск» препятствует принятию технологии мобильных платежных сервисов российскими потребителями 3. Модель объясняет 72.6% вариации в намерении использовать мобильный платежный сервис

	4. Возраст, пол и опыт использования не оказывают значимого эффекта на процесс принятия мобильных платежных сервисов российскими потребителями
Ключевые слова	Мобильный платежный сервис, принятие технологий, Объединенная Теория Принятия и Использования Технологий 2, UTAUT2, поведение потребителей

ABSTRACT

Master Student's Name	Voronenko Dmitrii Olegovich
Master Thesis Title	Determining Factors of Adoption of Digital Device Wallets by Russian Consumers
Educational Program	Master in Management Program
Main field of study	Management
Year	2016-2018
Academic Advisor's Name	Alkanova Olga Nikolaevna, Senior Lecturer, Marketing Department
Description of the goal, tasks and main results	Goal: to determine the drivers of adoption of digital device wallets by Russian consumers Tasks: 1. Identify the antecedents of adoption of digital device wallets by Russian consumers 2. Identify the inhibitors of adoption of digital device wallets by Russian consumers 3. Assess how much of variance in adoption of digital device wallets can be explained with derived factors 4. Identify how such characteristics of consumers as age, gender, and usage experience affect the adoption process for digital device wallets Results: 1. Performance Expectancy and Habit are the main antecedents of adoption of digital device wallets by Russian consumers 2. Perceived Risk is the main inhibitor of adoption of digital device wallets by Russian consumers 3. A total 72.6% of variation in intention to use a digital device wallet is explained by the factors of adoption 4. Age, gender, and usage experience have no significant effect on the adoption process of digital device wallets by Russian consumers
Keywords	Digital device wallet, technology adoption, Unified Theory of Acceptance and Use of Technology 2, UTAUT2, consumer behavior

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Introduction

Defining a digital device wallet

Digitalization is reshaping the financial industry dramatically. Main drivers of changes in the market place are alteration of customer behavior and launches of new innovative products.

One of the latest advancements in the field of financial technologies is the emergence of digital device wallets. These are special mobile applications, which provide an opportunity for the consumers to store information about their debit/credit cards on a mobile phone for simplified card management. Experts call device wallets the next evolutionary step in the area of digital payments after Internet banking and mobile banking (McKinsey & Company, 2015).

The idea of a digital device wallet existed for a long period of time, but no company had been able to introduce the first service to the market and set a standard for the industry. The first launched digital device service Apple Pay set up by a technological corporation Apple in 2014 created paved the road for new players (Euromonitor International, 2015). Soon after that Google and Samsung launched their own applications called Google Pay and Samsung Pay respectively. All of these three services entered Russian market in the end of 2016. All of these services are similar to each other, as they contain the same general range of functions. All of them provide enhanced security of transactions, provide easy card management, opportunity to pay offline in shops through NFC contactless payments technology, and help storing information about special discounts.

While digital device wallets provide a set of very attractive features for the consumers, adoption of this innovation turned out to be much lower, than forecasted by the experts (PYMNTS, 2018). For example, very little proportion of iPhone owners in the US have even tried using Apple Pay during 3 years after its launch. All three major digital device wallet applications in US show flattened rates of growth.

The same situation can be observed in Russia. Many experts are skeptical about prospects of the technology in Russia criticizing overly positive forecasts of service providers (Anna Kholyavko, 2017). By the projections of some experts a maximum of 10% of smart phone owners in Russia were using a digital device wallet.

Identifying a research gap

Previous digital payment technologies such as Internet payments and mobile payments have got a wide coverage in academic literature over the last 10 years. However, the academic field of investigation of adoption of digital device wallets is only starting to develop. There has

been a much lower number of publications on this topic and they have emerged only in recent years.

Russian academics have paid very little attention to the issue of adoption of payment technologies. To the best of author's knowledge only two researches have been published on the topic of adoption of mobile banking in Russia at this time. No research on adoption of device wallets in the Russian market has been carried out yet. This fact creates a need for investigation of this issue in the Russian market and identifies an important research gap in academic literature.

This Master Thesis aims to cover the aforementioned research gap through a primary research on potential and active users of digital device wallets in Russia.

Research Questions

Posed research gap creates a research problem of identification of factors of adoption of digital device wallets by consumers in the Russian market. It will be important to find a suitable theoretical model to guide the data collection and empirical analysis stages to get insights on adoption of digital device wallets in Russia. This research problem can be split into following research questions.

Research questions:

1. What are the antecedents of adoption of digital device wallets by Russian consumers?
2. What are the inhibitors of adoption of digital device wallets by Russian consumers?
3. How much of variance in adoption of digital device wallets can be explained with derived factors?
4. How such characteristics of consumers as age, gender, and usage experience affect the adoption process for digital device wallets?

Goal of this research is to determine the factors of adoption of digital device wallets by Russian consumers. This goal is split into following objectives:

- Identify the antecedents of adoption of digital device wallets by Russian consumers.
- Identify the inhibitors of adoption of digital device wallets by Russian consumers.
- Assess how much of variance in adoption of digital device wallets can be explained with derived factors.
- Identify how such characteristics of consumers as age, gender, and usage experience affect the adoption process for digital device wallets.

Research characteristics:

The research method applied for the Master Thesis is going to be an empirical study. A theoretical model of adoption of technologies called UTAUT2 will be extended with constructs, which reflect peculiarities of Russian market of digital device wallets. A primary quantitative survey will be

carried out to collect data and then PLS-SEM statistical approach will be used to analyze the data in a special software.

Findings:

Research of this Master Thesis provided answers to all research questions posed.

1. Performance Expectancy and Habit of using a digital device wallet proved to be the main drivers of increase in frequency of use of digital device wallets.
2. Perceived Risk of losing private data or failing to conduct a payment is the only inhibitor of adoption of digital device wallets.
3. More than 70% of variation in intention to use and actual usage of digital device wallet is explained by the developed model.
4. Age, gender, and usage experience turned out to be insignificant in affecting the adoption of digital device wallets.

Chapter 1. Existing research in the field of digital device wallets adoption

Financial sector is undergoing a structural change with arrival of disruptive innovators from outside the industry. One of major innovations in the field is a digital device wallet, which provides a smart phone user with keeping information about his/her bank cards in mobile phone to conduct online and offline payments using only the device.

As with any innovation digital device wallets attract a lot of attention from experts and potential consumers. However, as it will be shown in this Chapter, adoption of digital device wallets has not been meeting optimistic forecasts.

At the same time research field devoted to scientific investigation of digital device wallets adoption is only beginning to develop. Chapter 1 will provide information on the latest research in this field and will identify research gap to be filled in this Master Thesis.

1.1 Description of current environment in the market of digital payments

Financial sector is undergoing radical changes with alteration of customer behavior and introduction of new disruptive technologies. Generally this sector is shaken up by digitalization, which affects the industry across different domains.

Currently world economists of the highest caliber are running a discussion about complete replacement of cash with digital money (PWC, 2015). In their opinion this structural transition will bring a range of positive outcomes for the economy, including absence of counterfeit money, limiting tax evasion, and more transparent financial transactions around the world. Moreover, some experts express an opinion that governments could execute more accurate monetary policies after death of cash.

However, introduction of solely digital transactions is accompanied by a number of obstacles both in developing, and developed countries (PWC, 2015). While developing countries lack required infrastructure and technological skills, in developed countries habit of using cash is also very hard to fight with, as it is deeply rooted in common behavior of people. Moreover, there is a concern that digitalization of financial transactions leads to a substantial loss of privacy, which disturbs many commentators on the matter. Therefore, it is too early to discuss the world without cash, but the right time to analyze the unfolding transition in the financial sector.

New advancements in technology dramatically change the distribution of power among major players in financial sector and their clients (PWC, 2015). Traditionally banks have been an indispensable part of financial infrastructure with an access to unique knowledge and resources, which have been used to exploit the highest level of control over their clients. New technologies

in financial sector are changing the strategies from product driven to customer driven. Now it becomes much easier for customers to switch a provider of financial services due to better access to information, more options, and more opportunities to affect other people's opinion through social networks. Traditional players, such as banks, are urged to adapt to the new environment in the sector through understanding their customers better and revolving their new strategies around customer needs.

While it took banks some time to realize the new rules of the game, now they are urgently seeking to advance their business (PWC, 2015). Other players in the market are also shifting gears in their strategy. Card issuers such as MasterCard and Visa are promoting new standards for digital payments to keep their cards as the base for digital transactions. Telephone operators provide new technological solutions to win over clients through advanced technological offerings, which support online mobile payments and contactless mobile payments offline. Mobile manufacturers are also focusing on new product designs, which integrate various financial functions into their smart phones (e.g. Apple Pay in iPhone). Retailers look for opportunities to align their loyalty programs with financial digital solutions to expand digital wallets with branded digital currencies (e.g. Starbucks in the US). Technological companies are shaping the new industry of FinTech (financial technology), which aims to tap into the changing financial sector to make it more secure, convenient, and transparent through innovations.

Experts of PWC outline a number of trends, which shape the canvas of radical transformation in financial sector (PWC, 2015). Increased mobility of people is caused by broad dissemination of smart phones, which create new ways for interaction with the surrounding offline and online infrastructure. Social media provide independent customers with ever increasing power, as their opinion can now be converted into valuable recommendations and content. Besides, social networks are entering the payment sector, when they introduce inner peer-to-peer payment services. Emergence of big data technologies brings to the digital transactions a value of their own. Big sets of data derived from patterns of financial behavior now can be used to make valuable marketing interferences about clients. Cloud computing technologies provide required infrastructure to support sophisticated financial operations through mobile phones with required speed and reliability. Newly emerged market of so-called wearables (e.g. smart watches) broadens the definition of mobile financial transactions, which was earlier limited only to smart phones. Retailers can extract a lot of value through reduction of cash transactions in-store through introduction of contactless mobile payments and promotion of e-commerce. Finally, customers are engaging in more diverse peer-to-peer transactions from peer-to-peer loans to peer-to-peer sales without traditional intermediaries.

All of the trends mentioned above show the multifaceted value, which is brought to the market by mobile payment solutions in general, and mobile digital wallets in particular. Experts reckon that mobile payments are valuable not because existing system of cards is broken or deeply obsolete, but because mobile payments are ready to provide new level of convenience and independence for the clients, and new invaluable data for merchants (Euromonitor International, 2015). Experts also note that mobile payments are much easier to comprehend for the customers, as they imbed financial transactions into a familiar environment of mobile apps and social networks (Varvara Fokeeva, 2016). With arrival of new generations, which were born in the world of gadgets and Internet, customer requirements for convenience and flexibility will be even more demanding.

New kinds of competition and clients are forcing traditional players to reassess their strategies and put client research into the core of their business models. This research should also be supplemented by academics, who can contribute to the sector by explaining customer behavior during transitional period in the sector.

Defining a digital device wallet

One of the final milestones of transformation in financial sector is the emergence of digital wallets. Digital wallets are special programs or applications, which are used to execute digital payments. Their main distinctive feature is to provide clients with an opportunity to store information about different payment tools they own (cards, accounts, etc.) in one place, namely their device or PC (McKinsey & Company, 2015). Digital wallets are the next step in digitalization of banking services after Internet banking and mobile banking applications provided by traditional players such as banks.

At the moment experts in the field are distinguishing three types of digital wallets: card network wallets, device wallets, and P2P wallets (The Boston Consulting Group, 2017). Card network wallets are applications promoted by large card networks (Visa, MasterCard, etc.) that aim at enhancing the experience of card management by storing information about them in one place. Technological giants such as Apple and Google support device wallets. These wallets are applications for mobile phones, which keep information about cards for online and offline payments. Moreover, these mobile wallets can potentially be used to store other types of value, such as targeted discounts and coupons. Finally, fintechs such as PayPal offer P2P wallets, which are based on sending money from one account in a social network to another without any additional connections with banks or other counterparts.

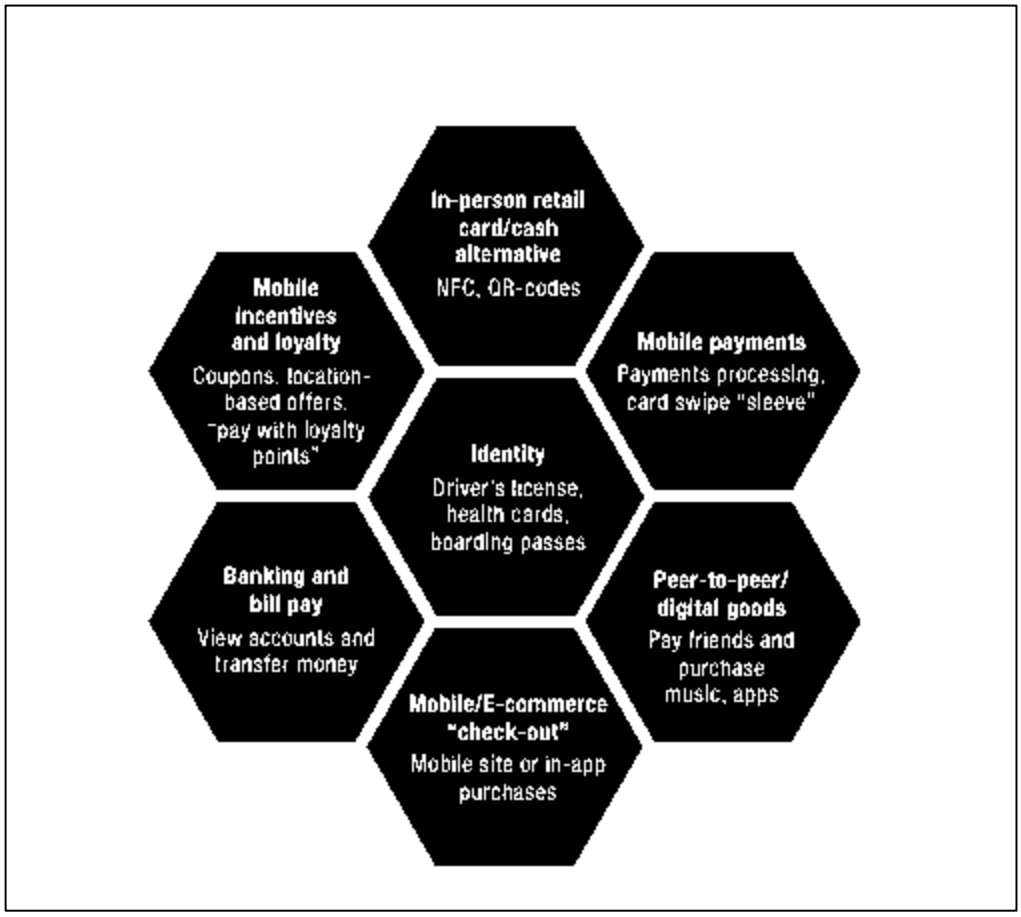

Figure 1. Digital wallet potential applications (adopted from McKinsey&Company, 2015, "Gauging the disruptive potential of digital wallets")

As it has been described earlier, digital device wallets are financial applications, which run on modern smart phones. All of them emerge from mobile payments, which have already been on the market for some time. Mobile payments provided customers with an opportunity to process online payments from a mobile device (e.g. making online purchases on e-commerce web-sites). While new features of device wallets constantly emerge, experts on consumer and merchant research in the sector highlight that device wallets should supplement mobile payments with at least the following 5 capabilities shown in *Picture 1*. Firstly, device wallets must serve as an alternative to the traditional card/cash-based POS experience through such technologies as NFC or bar codes. Secondly, device wallets should have a capability to be integrated with online stores with digital content, such as music or books. Thirdly, device wallets should streamline e-commerce transactions through integration with available payment methods on the web sites. Moreover, device wallets should support banking activities such as multiple card management or bills payment. Finally, device wallets can be integrated with incentive and loyalty programs of merchants to deploy special offers through mobile device.

In the opinion of experts an ideal device wallet will provide a seamless experience of managing debit or credit cards, of shopping online on biggest e-commerce platforms, and of

buying products offline in biggest retail chains with personalized loyalty offers promoted during the payment through the wallet application (McKinsey & Company, 2014). An ideal solution would help customers to manage their money and reach financial goals, while also making their shopping experience more convenient and secure (Bain & Company, 2014).

For a long time idea of device wallets was discussed but no company could create a common standard for such applications and, consequently, a market for such solutions. However, Apple launched its mobile wallet Apple Pay in 2014, thus facilitating development of the market for device wallets with two new major players entering the market (Euromonitor International, 2015). At the moment three major solutions in the market are provided by Apple (Apple Pay, which runs on iPhones), Google (Android Pay, which runs on any Android smart phone), and Samsung (Samsung Pay, which runs on Samsung smart phones). While these three solutions might have slightly different business models and back-end processes, they are very similar in the provided service. All of the three let their clients store information about a range of debit/credit cards in the applications with an ability to pay online or offline through NFC technology (supplemented by MST technology in Samsung Pay). All three applications use biometric fingerprint scanner, tokenization, and external storage of information as a means of securing the transactions. All these three players are actively promoting their applications and enter new countries with the product. At the moment all three players offer pretty similar value propositions. As finding the exact differences between these solutions is not a goal for this research, all of these products will be referred generally as device wallets further in this paper.

As it was mentioned above, users can pay offline with the help of mobile wallets. NFC-technology embedded into mobile phones provides this opportunity (Russian Higher School of Economics, 2016). In order to support NFC payments, smart phones should have an NFC-chip. A smart phone with this chip can be used as a contactless card for payments in retail at special POS-terminals, which support contactless payments. This technology provides device wallets with a capacity to serve as a card payment solution, a solution for exchange of payments between two people (P2P regime or direct payments from one mobile phone to another), a solution for emulating transport and other types of public cards, and, finally, NFC-chip can emulate special loyalty cards, which are digitally stored in a device wallet.

All of the mentioned device wallet solutions base their products on existing networks of card issuers and merchants, who are ready to receive card payments. Therefore, introduction of device wallets to the market relies heavily on the existing penetration of the card payments and online payments in a particular country. Moreover, this infrastructure is dependent on Internet usage and smart phone ownership in a particular country in line with disseminations of special

POS-terminals for contactless payments in retail stores. Therefore, latest international statistics on the development of infrastructure for device wallets are presented further.

Trends in the international market of digital payments

Global non-cash transactions reached 433.1 billion in 2015 after growth of 11,2%. This was an unprecedented growth for the last decade of analysis. More than 66% of all non-cash transactions were executed via debit and credit cards, making it the most important tool for digital payments at the moment (Capgemini, 2017).

It is forecasted that the world volume of non-cash transactions will see a healthy growth until 2020 (Capgemini, 2017). Fast development of new mobile technologies and digital innovation will be the main growth drivers around the world. However, every region will see different patterns of adoption due to local peculiarities such as payment culture and availability of required infrastructure. Analytics predict that non-cash transactions around the world will rise at a CAGR of 10,9% from 2018-2020 (Capgemini, 2017). At the moment two thirds of global non-cash transactions take place in mature markets. However, developing markets will see a threefold growth in comparison to developed economies in the following years with major growth stemming from China and India. Developing economies with show CAGR of 19,6% until 2020 (Capgemini, 2017).

Experts report that digital payments development will be in large part driven by the evolution of next-generation payments aside of traditional offline card payments (Capgemini, 2017). New technologies for mobile phones and wearable devices will increase the pace of adoption of non-cash payments. E- and m-payments now take a share of 32% among all non-cash payments and will grow to almost 50% of all non-cash transaction carried around the world. It is important to note that at the moment a small niche of customers, who are tech-savvy and are interested in trying new technologies, mainly drives adoption of new means of payment, while wider customer base is much slower to adopt new digital payments solutions (Bain & Company, 2016).

While observers can see strong growth of digital payments, experts still state that cash payments are continuing to be a mainstream means for purchases globally (Capgemini, 2017). Firstly, many people still find cash more convenient for low-value transactions. Secondly, the adoption of digital payments is strongly correlated with demographics, which vary significantly. Other factors are connected with lack of sufficient security in digital payments and lack of offline infrastructure to fully support usage of non-cash payments. At the moment it can reckoned that cash will be widespread for a longer period of time, than was expected several years ago.

Problems of slow adoption of cashless transactions directly relate to adoption of digital device wallets. One of the latest surveys on adoption of device wallets conducted by PYMNTS analytics stated that in December 2017, 40 months after launch, Apple Pay was showing signs of only little flattened growth in the US (Karen Webster, 2018). Around 70% of users of iPhone have not even tried Apple Pay yet through these three years and a half. Only one fifth of the rest 30% of iPhone owners are using Apple Pay on regular basis. This means that Apple Pay failed to become a booming innovation in the market place. According to the survey Samsung Pay is doing just a little bit better in the US. For both wallets small growth was not attributed to higher rates of adoption but to introduction of more payment terminals in shops around the US. Therefore, experts of PYMNTS state that Apple, Samsung, and Google should revise their strategy for device wallets, as growth does not meet previous optimistic forecasts.

Statistics on the world adoption of digital payments in general and device wallets in particular shows that there is a trend for switching towards new means of payment. However, this is a long-term process, which will take substantial amount of time and will face many challenges. Even countries with developed infrastructure do not see rapid and seamless process of adoption of new technologies. As it has been mentioned on reports on the problem, regional differences in adoption of device wallets also exist. Therefore, further statistics on Russia are presented separately.

Trends in the Russian market of digital payments

Russian adoption of cutting edge payment technologies is connected with development of supporting infrastructure and similar services in Russia. While penetration of Internet and smart phones in Russia is already pretty high, many people still do not use such services as Internet banking or mobile banking, or use them for a very limited range of financial operations. Comprehensive statistics and opinions of experts on the issue are presented further.

Ipsos Comcon research agency has conducted a wide-range research on desktop and mobile Internet usage in Russia in 2017 (Ipsos Comcon, 2017). It shows that active Internet users in Russia constitute 60% of the population in 18-54 years old group. However, only 17% of those people have made any purchases through the Internet in the latest 3 months. This data indicated that while many people use Internet regularly, purchasing things online is not very widespread in Russia yet.

At the same time this research shows that more than 60% of population in Russian cities with more than 100 000 dwellers already possess a smart phone viable for going online. It is projected that this number will increase to 86% by 2020. Moreover, 53% of people with a smart phone have made a purchase with it at least once. Thus, smart phones viable for running device

wallet applications are widely spread around Russia, but core functions of these wallets (e.g. online payments and purchases) are not yet embedded into everyday lifestyle of Russian users.

Results of a research conducted by Mediascope agency (Mediascope, 2017) show that respondents tend to use special mobile applications of service providers twice more often, than mobile versions of web sites of service providers. This might indicate that users find specially tailored applications more convenient, than oftentimes-complicated web sites. This uncovers a potential for device wallets, which will be multifunctional applications for a range of convenient mobile payments.

Research of Mediascope (Mediascope, 2017) additionally investigated how often respondents conduct cashless payments through Apple Pay or Samsung Pay device wallets. It showed that in the first half of 2017 penetration of mobile wallets was very low in the Russian market. Only 2,5% of respondents or less sometimes paid for various services via cashless payments through device wallets.

Based on the data above it can be concluded that Russian market of digital payments is rapidly developing. In some regions of the country most of Internet users are buying online from time to time. However, there is still big room for new clients in line with opportunity to increase frequency of online transactions. Of utter importance for the topic of this Master Thesis is the fact that digital device wallets are not widely used according to the surveys of Russian customers.

Trends in the Russian market of NFC contactless payments

NFC technology for cashless payments thoroughly described earlier is one of the main distinctive features of device wallets. It helps to significantly improve the experience of debit card management for clients, who now can store all their cards in one secure place with easy access everywhere. Therefore, it is important to understand, how NFC contactless payments via device wallets are developing in the Russian market, as it would be a reflection of adoption of device wallets by clients. Besides, it is also important to look at information associated with market penetration of debit and credit cards with NFC chip for contactless payments, as their usage is a prerequisite for adoption of device wallets, which serve as an electronic holder of information about already existing cards of a client.

Analytical center NAFI conducted an all-Russian representative research on the Russian market of financial services, including card usage, in the end of 2016 (NAFI, 2017). It showed that 73% of Russian population owns at least one debit card. This information shows that most of the population in Russia already owns a card, so device wallet might potentially enhance the client experience of using a card.

NAFI research uncovered that only 30% of Russians regularly pay for their daily purchases via offline cashless means of payment. Also it is more typical for highly educated part of the society (43%) and for young people of 24-35 years old (40%). At the same time 70% of Russians still casually rely on cash for everyday purchases. This information shows that there is huge untapped potential for switching clients to cashless means of payment for financial organizations.

Even less people are using cards with NFC contactless technology. Only 24% of cardholders are using this type of cards. At the same time 79% of Russians are aware that this type of cards exist. Therefore, the issue of switching clients to contactless payments revolves not around increasing awareness, but around adoption of this relatively new product offering.

Trends in the Russian market of digital device wallets

Apple Pay and Samsung Pay, device wallet services, were introduced in the Russian market in the autumn of 2016. Clients happily embraced the new service according to experts from BinBank (Anastasia Alekseevskikh, 2017). Representatives of the bank forecast that all payment terminals in Russia will support contactless payments in several years, and paying with a smart phone offline will become a common habit. According to the research conducted by the bank most active are users in the age group 26-35 years, where around 44% of smart phone users tried Apple Pay or Samsung Pay at least once. These figures are lower for other age groups: around 25% for 36-46 years and around 15% for 18-25 years. Representative of Samsung announced that number of registered users of Samsung Pay rises by 10% every month since its introductions to the Russian market (Valeriy Kodachigov, 2018). Moreover, 60% of registered clients are using the app on daily basis. Also during the year after launch Russia became a leader in Europe in terms of the number of people registered in Apple Pay application (Valeriy Kodachigov, 2018). While this penetration is already high for a new market offering, it is important to note that Apple and Samsung hold in total only about 40% of Russian market of mobile phones (Valeriy Kodachigov, 2018). Therefore, penetration in the segments of owners of other mobile brands may be much lower, as Samsung and Apple are high-end offerings bought by people, who oftentimes rapidly adopt newest technologies.

When it goes about aggregated increase in usage of device wallet payments, it has risen by 800% during 2017 stated a representative of National system of payment cards (Anna Fremina, 2017). It is important to note here that this growth is calculated according to almost zero base line.

Representative of Visa in Russia shared that Russia is now third country in the world after the US and Great Britain in terms of registered Android Pay users (Anna Fremina, 2017).

However, there is no reliable information that registered users always start to frequently engage into the application after their first registration in it.

All the information above shows very high initial interest in device wallets in Russia. However, as the time goes it seems that many people do not switch to using device wallets on daily basis. Based on the information of CEO of Telecom Daily only 10% of Russians owning a smart phone use device wallets as a major means of payment (Anna Kholyavko, 2017). Moreover, experts in the field are not sure about potential success of newcomers to the market such as Garmin Pay, a smart watch with device wallet application soon to be introduced in Russia (Anna Kholyavko, 2017). Another challenge in the Russian market is attributed to the payment system "Mir", which plans to launch its own digital device wallet system according to CEO of the company (Anna Shvirkova, 2018). CEO of the company already points out that this process is hard, because it requires extensive negotiations with providers of mobile software such as Apple and Google, which have their own digital device wallet solution.

In summary, Russian market of online and mobile payments is stably growing, but is still far from saturation, especially in certain demographic groups. Introduction of device wallets sparked a lot of interest in owners of smart phones. Some segments of users have already started to actively adopt this new tool for payment. However, while representatives of companies that distribute device wallet applications are very optimistic, many experts in the field do not share the same optimism yet. Device wallets keep huge potential to radically change the financial landscape in Russia, but this potential is still to be uncovered.

1.2 Existing research on digital device wallets adoption

Extensive overview of descriptive statistics of financial environment both in Russia and globally was presented in previous section. In the following section of the paper introduction of possible drivers of adoption of mobile device wallets will be presented. Moreover, existing academic international and Russian research on the topic will be described.

Implications of marketing research in the field of adoption of innovations

Experts in the field of innovation state that innovation is a much broader concept, than just a new technology in the market (Joe Tidd and John Bessant, 2009, p. 16). Innovation is rather seen as a complex process of development and further exploitation of new knowledge. A real innovation occurs, when a technology is viable for real life use and marketable for further selling to customers and bringing profit to its creators.

The main complication of introducing innovations is in understanding the consumers and their potential needs, requirements, and switching costs associated with adoption of innovations (Paul Trott, 2005, p. 465-466). People usually see switching costs, or costs of changing common

technology for a new one including educational effort, in a negative way. Therefore, prior research of the market and consumers is essential for success of an innovation, if a company aims at overcoming negative feelings and bringing value to the consumer.

However, success of innovation is not limited to its initial performance in the market, but is deeply dependent on the time to establish in the marketplace and to become widely adopted (Paul Trott, 2005, p. 370). Therefore, in modern competitive environment companies need to analyze reception of innovations by customers and give continuing attention to improvements in their product or service. This leads to the need for constant monitoring and analyzing of reactions of new adopting customers through marketing research. Often this post-launch iterative marketing research defines, whether an innovation will be accepted or rejected eventually. This need for continuous information from the market pushed experts to expand classical models of innovation development with the concept of feedback loops, as an indispensable part of successful product or service launch (Bernardo Llamas Moya, 2017, p. 15). This concept means that companies constantly reflect on changes in the market through primary research of customers to adjust their launching strategy, when product or service is already in the market.

As it was shown in previous section, digital device wallets are still in their initial phase of entering the market. This means that, based on current state of managerial knowledge about innovations, constant iterative approach to marketing research on adoption of mobile wallets is needed to assure its success in the market. It is especially important to understand, which factors drive or hinder the adoption of mobile device wallets after their launch in the market.

1.2.1 Existing international research on adoption of digital device wallets

In order to investigate drivers of adoption of digital device wallets in Russia, it is important to analyze global experience and research in this area. This analysis will create a framework for comparison of Russia's specific drivers of adoption with those typical for most countries in the world. Further in this section results of existing descriptive and empirical studies on adoption of digital device wallets in the world will be provided.

Descriptive studies of adoption of digital device wallets in the world

At the moment body of literature on the topic is mostly dominated by descriptive research conducted by consulting and marketing research companies. These companies collect primary data from consumers in the market, aggregate it, but do not build empirical models based on collected data. Many companies in recent years have been trying to identify opinion of consumers on factors, which are important for them, in order to switch to digital device wallets. Some of these researches have been already mentioned above in description of market trends. In order to provide a concise, holistic, and most up-do-date view on potential drivers of adoption of

digital device wallets in the world, the latest research of Visa and GfK conducted in 2017 across 16 countries with total 9200 respondents will be presented and analyzed here (Visa, 2017). This study also provides separated statistics for Russia. They will be provided in the next section dedicated to descriptive research in the Russian market.

Study of Visa ranks 18 different needs of consumers, in order to show the most significant drivers for adoption of digital device wallets around the globe. Besides, this study also separately discusses two major factors, which are essential as a baseline for adoption, even when all other features do not exists. Those two factors are security and trust. In their role of a financial service digital device wallets should guarantee maximal security. If consumers were not sure that using an app is safe, they would not engage with it. Moreover, almost 100% of respondents stated that trust to a company provider of digital device wallet is of utmost importance for their adoption of a solution. Eventually, security and trust are considered to be baseline requirements and are not included in the ranking of other important factors of adoption.

Each country in the research showed slightly differing ranks on its own, but researchers calculated average ranks for an average global respondent. It turned out that more control over spending ranked number one in all of the features of digital device wallets for people. It seems that integrated analytics of personal spending would significantly drive adoption. Second most important need is the convenience to have a device wallet with them. Therefore, common convenience of the product is very important. Third need of customers in the ranking is the fact that a device wallet payment solution is accepted everywhere. Therefore, perceived quality of infrastructure around an app is very important too. Forth most important need of customers is the desire of frictionless process of payments, which can be attributed to functional characteristics of a product. Fifth driver of adoption is the capacity of a device wallet app to work instantly, so responsiveness of technology is also of high importance. Sixth of most important needs is the notion that people around a user are impressed by his/her device wallet. Therefore, status features of a device wallet should also be considered, when launching a device wallet solution.

Research of Visa lists 12 other important needs of consumers, who are willing to adopt a digital device wallet. This level of specification is not needed in this section, as many more theoretical models for technology adoption will be provided later. At this moment one could see that adoption of digital device wallets is a complex process, which should incorporate serving a diverse range of needs of consumers.

One of famous experts in the field on financial technologies Chris Skinner, a Founder and Chairman of The Financial Services Club (research network for financial professionals), also notes in his recent book ValueWeb that changing a habit of paying with debit card is a big obstacle for adoption of digital device wallets (Chris Skinner, 2016, p. 64). This addition is

important, because as it will be show in Chapter 2, habit is an important construct in latest theoretical models on adoption of technologies.

Empirical studies on adoption of digital device wallets in the world

Except for purely descriptive studies, it has been discovered that empirical research grounded in strong theoretical background is also gradually developing in the field of digital device wallets adoption. However, analysis of the author of this Master Thesis shows that the number of researches on adoption of digital device wallets is still incomparable to that focused on adoption of mobile banking or Internet banking. While digital device wallets have been studies across several dozens of empirical studies in recent ten years, mobile banking and Internet banking adoption has been investigated across hundreds of papers. Results of several selected sound and up-to-date papers on adoption of digital device wallets will be discussed in following paragraphs. At the moment classical research models of adoption of technologies will be mentioned in the context of results gathered by other researchers. A comprehensive review of existing models and their comparison will be provided in the next section of this Master Thesis.

A recent study conducted in South Africa investigated potential drivers of adoption of WeChat mobile wallet (a P2P wallet provided by Chinese social network) by consumers (Elizabeth D. Matemba and Guoxin Li, Forthcoming 2018). This research found that except for functionality and convenience, which are major components of classical model of adoption called TAM (Technology Acceptance Model), such factors as trust, security, and privacy significantly increase explained variance in adoption of mobile wallet by citizens of South Africa. This finding is consistent with responses of consumers in descriptive survey conducted by Visa, which was mentioned above.

A different study focused on adoption of mobile NFC-payments associated with digital device wallets in the context of purchases of hotel services (Cristian Morosan and Agnes DeFranco, 2016). This paper employed another wide spread theoretical model of adoption of technologies called UTAUT2 (Unified Theory of Adoption and Use of Technology 2). This research showed that the most important driver of adoption of mobile NFC-payments was performance expectancy. At the same time such factors as joy of using a device wallet or social influence by peer groups did not play high role in adoption of device wallet. Once again such factor as functionality, which partially resembles expected performance, was mentioned in primary research of Visa.

Another research focused on adoption of mobile NFC-payments in the context of in-store purchases by consumers was based on a framework derived from several classical models of adoption of technologies (Gwarlann de Kerviler et al., 2016). This research split factors of adoption into three groups, which also correspond to specific dimensions in the research of Visa:

utilitarian, hedonic, and social benefits of using mobile NFC-payments. The model was extended with privacy and financial risks to embrace the need for secure and trustworthy solutions in the market. Besides, this research highlighted importance of experience in increasing frequency of usage of mobile NFC-payments.

Mobile NFC-payments adoption was also analyzed as a balance between perceived value and perceived risk of adoption (Mihail Cocosila and Houda Trabelsi, 2016). Perceived value consisted of utilitarian, enjoyment, and social value. Risks consisted of psychological, time, social, and privacy risks. This research concluded that utilitarian and enjoyment value drive adoption, while psychological and privacy risks hinder it.

A recent study of adoption of mobile wallets conducted in India analyzed adoption through a range of previously mentioned factors such as perceived usefulness, perceived risk and others (Pankaj Yadav, 2017). It provided pretty controversial results stating that perceived usefulness is the single factor, which affects intention to use a device wallet.

Research on adoption of mobile payment systems in Turkey found that ease of use and usefulness are the most important drivers of adoption of these systems in the country. At the same time security concerns played a minor role in adoption. In addition, users with previous experience of using a device wallet and users without the experience were affected by different sets of factors (Gokhan Aydin and Sebnem Burnaz, 2016).

Investigators of factors affecting intention to use mobile wallet in Singapore expanded TAM model with 9 additional constructs, including trust, flexibility, and others (A. Seetharaman et al., 2017). All of that constructs proved to affect intention to use a device wallet. Only some interactions between constructs were not proven in the research.

A research conducted in India aimed at comparing primary descriptive data among different demographic groups (Ruchi V. Dixit et al., 2017). It turned out that adoption of e-wallets differed significantly dependent of age, education level, and some other characteristics like payment plan for the application. An important insight was that it might be necessary to analyze adoption inside specific groups and not in population in general.

Important implication of another research was that format, in which a device wallet is provided, changes the set of factors, which affect the adoption (Francisco Liebana-Cabanillasa et al., 2017). Research extended TAM model with Perceived Security factor to compare adoption of mobile NFC-payments in device wallets and adoption of SMS mobile payment system. The study showed that different factors are statistically significant in explaining the adoption for these technologies.

In summary, it can be seen from analysis of literature on adoption of digital device wallets and related services that academics are showing increasing interest to this topic both in

developed and in developing countries. Most of researchers use classical theoretical models of adoption of technologies and expand them with new constructs to adjust to peculiarities of research context. While specific results vary among researches, all of investigated constructs are related to drivers of adoption identified in large-scale primary descriptive studies organized by practitioners in the field. Therefore, those scientific studies try to empirically prove relationships firstly identified in descriptive non-scientific research.

1.2.2 Existing research on adoption of digital device wallets in Russia

Research on adoption of digital wallets in Russia is supported by a similar number of prolific non-empirical descriptive studies carried out by practitioners. At the same time Russian academic research on adoption of digital device wallets is absent at the moment. Besides, scientific research on adoption of previous technologies, such as mobile banking, is also very scarce for the Russian market.

Descriptive studies of adoption of digital device wallets in Russia

Global research of Visa on drivers of adoption of digital device wallets, cited above, included separate ranking based on answers of Russian respondents (Visa, 2017). This ranking of drivers of adoption was slightly different from a global one.

The first priority of digital device wallets for Russians is its compatibility with current technology. It might be explained by the fact that not all of Russians own an expensive smart phone with NFC-function for contactless payments, as it was shown in the section on market trends in Russia. Therefore, people would like to see a solution, which can be used on their current middle range smart phones. Second rank is the same as a global one: convenience to have with oneself, which highlights the core value proposition of digital device wallets represented in flexible card management. Third service feature by importance is the ability to easily set up and start using an app. This might be so important due to language barriers (many set up instructions are in English) or technology knowledge barriers, which prevent Russians from engaging into an application. Fourth need of Russian consumers identified by Visa is a digital device wallet, which is accepted everywhere. This shows that, while POS-terminals with NFC-function are already pretty widely spread in Russia, people still do not think that infrastructure is developed enough. Therefore, they are looking for a solution, which could be used across various sales channels. Fifth need of Russians is the same as global one: an app should work instantly, in order not to hinder the payment process online or offline. Sixth driver by importance is frictionless process, which shows importance of functionality of device wallets for Russians.

In addition, as in the case with global research, Russian consumers consider trust and security to be baseline conditions for digital device wallets. This is further supported by large-scale representative study of Ipsos Comcon conducted in Russia in December 2017 (Ipsos Comcon, 2017). 82% of respondents shared a belief that "mobile payments need to guarantee security". Moreover, 59% of Russians see risks in using digital wallets, because they agree that "making purchases with a mobile is not safe". According to Russian experts from Skolkovo Research Institute trust to technological brands such as Apple is also very important for Russians (Anna Eremina, 2016). Similar solutions for device wallets have been in the market for several years. But only after introduction of offers from big trustworthy brands such as Apple and Samsung, Russian consumers started to switch to digital device wallets.

To sum up, descriptive research on Russian consumers shows that they generally pursue needs, which are similar to global average. Security, trust, and low risks are very important potential drivers of adoption. At the same time features connected to functionality and flexibility also might contribute to adoption of digital device wallets by Russians based on non-empirical surveys.

Empirical studies on adoption of digital device wallets in Russia

As it has already been stated in the beginning of this section, Russian academic field lacks research on the topic of adoption of digital device wallets. Search in scientific databases and Google Scholar service has not found any scientific papers connected to this field. To the best of author's knowledge only two research papers connected to a related field exist. These researches investigate factors, which affect adoption of mobile banking in Russia.

Academics from Higher School of Economics analyzed adoption of mobile banking by Russian consumers through factors affecting their intention to use a mobile banking service (Veronika Belousova and Nikolay Chichkanov, 2015). They introduced three constructs taken from classical models on technology adoption, which is in line with global practice described earlier. These factors were Expected efforts, Expected usefulness, and Perceived Risk. It was found that expected usefulness is the main driver of adoption for Russian consumers, so functionality of service plays a key role. Expected effort was second factor. Perceived risk was only third, which could show high trust of people into security of mobile banking applications provided by big Russian banks.

The same researchers extended their previous model with additional constructs and conducted a second scientific study on adoption of mobile banking (Veronika Belousova and Nikolay Chichkanov, 2015). They expanded their model with following constructs: Perceived financial costs and Social influence. Moreover, they introduced external variables (Self-efficacy and Compatibility with lifestyle), which were assumed to affect Perceived efforts factor. This

study proved previous findings of researchers. Additionally, it showed that perceived financial cost negatively affected intention to use. High levels of self-efficacy and compatibility with lifestyle were proven to decrease perceived efforts. Social influence was not significant in forecasting adoption of mobile banking.

These two researches highlighted future areas for scientific work. Firstly, new models and constructs should be employed in research in Russian market. Also research could be replicated among other target groups of consumers and in other geographical regions.

1.3 Identification of research gap in the field of adoption of digital device wallets in Russia

Previous sections of this chapter showed that introduction of digital device wallets is an evolving revolution in the world of payments. Incumbents of financial industry such as banks and newcomers from technological industry such as Apple are forming this new market trend. Practitioners are getting more engaged into understanding drivers of adoption of digital device wallets, as they are starting to introduce their heavily invested solutions to the marketplace. At the same time initial optimism about rapid adoption of digital device wallets turned out to be exaggerated, as previously mentioned analysis of Apple Pay ands Samsung Pay usage in the US shows (Karen Webster, 2018). Analysis in Russia provides ground for predicting the same scenario. After initial introduction to the market digital device wallets provoked a lot of attention and first time trials. However, there are no signs of stable growing adoption among broader range of consumers. Therefore, a scientific investigation on drivers of adoption of digital device wallets would provide practitioners in Russia with valuable insights for building competitive launch strategies for digital device wallets.

Academic world is only in the beginning of tapping into the research on adoption of digital device wallets. Research on this topic is much smaller, than that for mobile banking and Internet banking adoption. Most of research concentrates only on specific features of digital device wallets (e.g. only on mobile contactless NFC-payments). Researchers point out absence of empirical research on adoption of multifunctional mobile wallet platforms (Lai PC, 2017), which are in essence digital device wallets, which simultaneously allow users to conduct NFC-payments and online payments, to use special digital coupons, and to keep track of personal financial data. Problem of insufficient number of researches on adoption of digital device wallets is even more acute in Russia, where no empirical research exists at the moment. Academics point out the need to replicate studies among different geographical regions, because results vary significantly between countries and nations (Aijaz A. Shaikh and Heikki Karjaluoto, 2015). Therefore, scientific research on drivers of adoption of digital device wallets in Russia would

bring value for the global academic society, as it would show differences of Russian consumers from consumers in other regions.

Previous discussion leads to an existing research gap in academic literature in management. Research gap is absence of empirically proven antecedents and inhibitors of adoption (represented through intention to use or actual use) of digital device wallets by Russian consumers.

In order to close this research gap, several research questions should be answered in the paper:

1. What are the antecedents of adoption of digital device wallets by Russian consumers?
2. What are the inhibitors of adoption of digital device wallets by Russian consumers?
3. How much of variance in adoption of digital device wallets can be explained with derived factors?
4. How such characteristics of consumers as age, gender, and usage experience affect the adoption process for digital device wallets?

Analysis of literature provided above shows that academics have broad choice of specifically developed theoretical models to answer this set of questions in different contexts. Next section of this Master Thesis will concentrate on comparison of these theoretical models. Based on analysis a theoretical model for this Master Thesis will be chosen.

Choice of model for research on adoption of digital device wallets

At the moment researchers are mostly employing classical models of adoption of technologies borrowed from studies focused on mobile and Internet technologies. A big number of comparative studies of research designs and models for analyzing adoption of mobile financial technologies were found for the sake of choosing the correct method. However, all of these academic papers are focused on mobile banking solutions and not on device wallets in particular due to novelty of the technology. Nevertheless, following international practice and examples classical models can be implemented for the issue of acceptance of device wallets. Besides, taking into account that there is no body of research literature on the topic of adoption of device wallets in Russia and very limited number of research on adoption of mobile banking in Russia, consideration of empirically validated and reliable models seems like the best way for starting the research on adoption of digital device wallets in Russia.

There are many academic reviews of existing models for technology adoption. One of comparative studies of research on mobile banking adoption, a topic close to adoption of device wallets, identified that acceptance models represent a large and heterogeneous set (Aijaz A. Shaikh and Heikki Karjaluoto, 2015). This research identified 11 technological and social psychological theories. Analysis shows that this review has been the most comprehensive in

terms of listing all major theories for adoption research. Each of these theories was proposing a separate model or framework for empirical analysis of adoption of services by consumers. Moreover, this field of research provides some flexibility in terms of models. Many researchers decide to change parts of classical models or combine them with self-developed constructs. Therefore, one might say that except for a plead of classical models, there is also a large number of customized models of adoption. Further in this section most popular models will be listed one by one with important comments from academics on their advantages and disadvantages.

Moreover, it is important to understand that many different models include similar factors of adoption that correspond to the same definition (Boris Ovcˇjak et al., 2015). This is due to the fact that many models are actually extensions or developments upon already existing ones. Sometimes models are combined to make one factor of several other factors. Consequently, one can see a high level of flexibility in implication of models for quantitative studies in the field of adoption.

Further in this section an overview of existing models of individual acceptance of technology will be provided based on academic literature dedicated to this topic. As this Master Thesis concentrates on individual acceptance by individual users, theories of acceptance of technologies and innovations by organizations will not be described in this paper.

- *Theory of Reasoned Action (1980)*

Theory of Reasoned Action is one of the most important and influential models in the field of human behavior (Yaser Hasan Al-Mamary et al., 2016). It is used not only for predicting acceptance of technologies, but also for understanding a wide range of other human actions.

When a person assesses an opportunity to accept a new technology, she usually estimates the tradeoff between perceived benefits of the system and costs of learning to use a new system (Yaser Hasan Al-Mamary et al., 2016). This particular situation is analyzed through Theory of Reasoned Action. This model proposes that individual beliefs influence attitudes, which in turn affect intentions to make a specific action (generate a behavior).

The models states that two major factors affect the behavioral intention and later a real behavior. Based on the model attitude towards behavior and subjective norm are the only predictors of behavioral intention (Yaser Hasan Al-Mamary et al., 2016). Attitude towards behavior is reflected in negative or positive feelings of a person about conducting a particular action. Subjective norms are represented by perceived pressure to comply with opinions of other people, who are important references for a person under analysis.

While Theory of Reasoned Action was widely recognized in literature, many researchers point at serious limitations of the model and state that it is not sufficient for comprehensive analysis of technology adoption (Yaser Hasan Al-Mamary et al., 2016). Firstly, main assumption

underpinning the model is that a person acts totally under volitional control, in other words a person does not have any external constraints and acts fully on her own will, which is often not true in real life setting with limited resources and different kinds of interactions. Moreover, academics highlight that the model is very general; it does not specify particular beliefs for particular kinds of behavior. Therefore, this model often requires additional research for identification of underlying beliefs of a person.

In summary, Theory of Reasoned Action is a popular model for analyzing behavior of people. However, in the field of technology adoption it has proven not to be comprehensive enough. Therefore, this model is not going to be used for the understanding of adoption of digital device wallets in Russia.

- *Theory of Planned Behavior (1991)*

Theory of Planned Behavior was developed as an extension for Theory of Reasoned Action, in order to improve its alignment with real life behavior (Yaser Hasan Al-Mamary et al., 2016). It fought limitations of previous model, where a person was considered to be in full control of the situation of behavior.

Theory of Planned Behavior is one of the most applied theories of explaining human behavior in various contexts (Yaser Hasan Al-Mamary et al., 2016). It is a part of field of cognitive research models, which revolve around individual attitudes and beliefs. One of the main assumptions of this model is that intention to do something is a reliable predictor of actual behavior. Intention is seen in the model as an outcome of different mixed attitudes towards a behavior.

Theory of Planned Behavior expanded Theory of Reasoned Action with a third factor, which affects intention to do something (Yaser Hasan Al-Mamary et al., 2016). This factor is called perceived behavioral control. Behavioral control represents a person's belief about the effort needed to perform a particular action (Yaser Hasan Al-Mamary et al., 2016). Thus, a person usually has a perception about ease or difficulty she would face, if deciding to execute a certain set of actions. This idea is very similar to the notion of self-efficacy, which can be found in some other models of behavior explanation and prediction.

Generally, Theory of Planned behavior reckons that individuals make decisions by conducting a mental cost-benefit analysis of engaging into a particular behavior. This cost-benefit analysis includes reflections on perceived positive or negative returns of a behavior, potential opinion of reference group about this behavior, and perceived effort to engage into a behavior. This model is good in many different contexts, including adoption of a new technology. However, some other models exist, which were particularly tailored for the research on acceptance of new technologies, which will be also presented in this section of Master Thesis.

- *Social Cognitive Theory (1986)*

Social Cognitive Theory is an acknowledged theory that can be applied to a wide spectrum of fields of human functioning (Yaser Hasan Al-Mamary et al., 2016). This theory is grounded on the assumption that any human behavior fits in a triangular process of analysis and action. There is an interaction of cognitive/personal factors, external environment, and behavior. Each of these three factors affects each other during a person's action. Firstly, a person is using her cognitive abilities to assess the external environment and potential results of her actions. This mental evaluation leads to a specific behavior, which is also dependent on the external environment. Finally, results of a behavior are analyzed for the next time, when cognitive assessment of a similar behavior will take place in a person's life. This model consists of five core constructs. Outcome expectations performance means that a person foresees potential results of her actions. Outcome expectations personal relate to a person's expectations about effect of behavior on the life of a person. Self-efficacy represents a level of person's belief in her own ability to perform a behavior. Effect is the attitude of a person to a particular behavior; whether a person likes this kind of behavior or not. Anxiety shows person's fear of trying to do something.

While this theory serves as a ground for many other more practically oriented theories and models, academics state that it is too general on its own. It is not intended to be used in specific contexts, but to show a general model of human behavior based on generalized and broad contexts. Its complexity and general nature make it very difficult to use it in precisely defined research of adoption of technologies.

- *Diffusion of Innovation (DOI) Theory (1995)*

DOI theory was developed, in order to show the main stages of adoption or non-adoption of technologies in society (Yaser Hasan Al-Mamary et al., 2016). Diffusion in the context of the model is explained as distribution of knowledge about a new technology between people through different communication channels. Eventually, a person receives personal knowledge about a technology, if she decides to use it as other people in society.

Acquiring knowledge is the first step in the model (Yaser Hasan Al-Mamary et al., 2016). Then a person is persuaded to use a technology by some factors. Afterwards a person makes a decision to adopt or reject a new technology. On the next step a person implements technology. Finally, confirmation stage occurs, when a person evaluates her experience with a technology and makes a decision about future use. There are many personal and environmental factors, which might affect adoption on each of these steps.

Academics list a number of serious disadvantages of DOI models for research on individual adoption of technologies (Yaser Hasan Al-Mamary et al., 2016). Firstly, it is overly

dependent on the features of a new technology, and not on personal features of a potential consumer. Secondly, it has been proved to be unreliable in predicting individual adoption. Thirdly, it is also not well suited for understanding of collective adoption of technologies. The model is more valuable as a general model of understanding, how concepts spread inside cultures and societies, but not adoption of a particular innovation.

- *Technology Acceptance Models*

Increased pace of innovation and introduction of many new technologies urged researchers to develop a special model for investigating factors of individual adoption of technologies. Technology Acceptance Model (TAM) was developed for this reason and became the most widely applied model in this field of research (Nikola Marangunić and Andrina Granić, 2015). At first TAM was developed to analyze adoption on individual level, mostly in job-related organizational contexts, when employees' adoption of technology in the working place is in focus.

Initially TAM included two major variables, which predicted usage of a technology: perceived ease of use and perceived usefulness (Nikola Marangunić and Andrina Granić, 2015). These variables reflect perceptions about characteristics of a system and its potential usage by a person.

TAM model has been developing constantly through three decades of its existence. New variables and mediators were added to the model, in order to increase its predictive power of acceptance of technologies (Nikola Marangunić and Andrina Granić, 2015). Firstly, a simplified version of the model called parsimonious TAM emerged. More recently widely recognized extensions TAM2 and TAM3 were developed by academics.

TAM model rests upon an assumption that attitude towards usage of a system is a good predictor of actual use (Nikola Marangunić and Andrina Granić, 2015). Attitude is assumed to be a major determinant of intention to use a technology. Attitude, in turn, is affected by two beliefs of a person: perceived usefulness and perceived ease of use. In classical model perceived usefulness is defined as a degree to which a person thinks that a particular technology could enhance her job performance. Perceived ease of use is connected to a person's evaluation of required effort to use a technology. Both variables are affected by a system design characteristics, which usually are represented in a form of specific questionnaire scales.

Parsimonious TAM model eliminated attitude towards usage from TAM model, as it was excessive, because intention to use a system had already proved to be a better predictor of actual use (Nikola Marangunić and Andrina Granić, 2015). Therefore, in this development of TAM perceived usefulness and perceived ease of use are used to predict intention to use a particular innovation.

As TAM was developing over time many researchers included different additional external variables to increase its predictive power and reliability. Eventually, this model has become a dominating in research on technology adoption.

During existence of TAM it has been proved that perceived usefulness is the major predictor of intention to use a technology (Nikola Marangunić and Andrina Granić, 2015). Therefore, TAM2 was developed, in order to include additional variables, which affect perceived usefulness. These included, for example, job relevance (whether a technology was applicable in job context), or result demonstrability (production of tangible results). TAM3 was developed based on combination of many different previous researches aimed at extending the model. TAM3 includes four groups of variables: individual differences, system characteristics, social influence, and facilitating conditions.

In summary, TAM is the most influential theory for analyzing adoption in modern literature. However, academic literature is already saturated with research using TAM. Moreover, the original model has been enhanced many times to fit research needs of academics better. Finally, this model is initially focused on adoption of technologies in industrial context, when employees adopt technologies. This is not exactly the case of mobile device wallets, which might be attributed to consumer use of technology in private life. Therefore, another theory of adoption would be a better fit for the research of this Master Thesis.

- *Unified Theory of Acceptance and Use of Technology (2003)*

During many years of development of TAM model, so many extensions of it filled in the field of technology adoption research that a need for revision arose (Francisco Javier Rondan-Cataluña, 2015). Several academics (Venkatesh et al.) reviewed eight different models of adoption, including those listed below in this Chapter, and combined them to create a holistic and reliable model of adoption of technology. As a result they could formulate a new model called UTAUT. This model was validated to increase the predictive power of other models. UTAUT seriously advances research on adoption and at the same time keeps a parsimonious structure with moderate number of constructs. At the same time it is still focused on organizational context of technology adoption by employees keeping the main drawback of TAM.

UTAUT distinguishes four major constructs, which significantly determine user acceptance and usage behavior (Viswanath Venkatesh, 2003). Performance expectancy, in line with other previously described models, represents expectations of an individual about potential gains from using a technology in her job. Effort expectancy is connected to expected ease of using a technology. Social influence represents how an individual perceives expectations of other people about her usage of a technology. Fourth construct called “facilitating conditions”

reflects beliefs of an individual about existence of appropriate infrastructure for using a technology. These four constructs predict behavioral intention, which in turn, in accordance with other models, predicts actual use behavior. Moreover, facilitating conditions are also believed to affect use behavior directly.

UTAUT has been widely recognized as a new baseline for research on acceptance of technologies. However, it still aims at analyzing internal perspective of an organization. Consequently, constructs in UTAUT are only of utilitarian nature; they are all related to performance on the job (Francisco Javier Rondan-Cataluña, 2015). Therefore, this model is not perfectly tailored for research on adoption of mobile digital wallets by Russian consumers.

- *UTAUT2 (2012)*

Same authors, who developed UTAUT model, decided to tailor UTAUT for the context of consumer technologies. Thus, they developed a new model called UTAUT2, which aimed to expand existing UTAUT with constructs out of the scope of utilitarian context (Francisco Javier Rondan-Cataluña, 2015).

This new model was further validated by empirical research on adoption and use of mobile Internet by consumers, a similar service environment to device mobile wallets (Viswanath Venkatesh, 2012). This model helped to significantly increase explained variance in behavioral intention (56 percent versus 74 percent) and in actual use (40 percent to 52 percent). Eventually, this model has become a baseline model for research on adoption of new technologies by end consumers.

Analysis of research on phycology of consumers helped Venkatesh to add three constructs to UTAUT, which helped to expand a personal dimension of using a technology. Hedonic motivation means the pleasure and fun, which is felt by a person, while using a particular technology. Enjoying the experience is highly important in the context of consumer technologies. Second construct, price value, highlights important differences between organizational and consumer contexts of consumer adoption of technologies. While in organizational context companies invest in new technologies, in consumer context consumers are usually bearing the costs of a new technology on themselves. Therefore, perception of received value in comparison to incurred costs is a very important construct for consumer context. Final construct is “habit”, which is defined as a self-perceived repeated action, which is usually conducted automatically without need for extra effort due to its high frequency in a person’s life.

UTAUT2 also states that new constructs and facilitating conditions are mediated and affected by gender, age, and experience of a person (Viswanath Venkatesh, 2012). Experience here is defined as accumulated knowledge about using a particular technology. Therefore,

gender, age, and experience are usually also included in estimation of UTAUT2 model. Relationships between variables posed by UTAUT2 can be seen in *Picture 2* with path diagram.

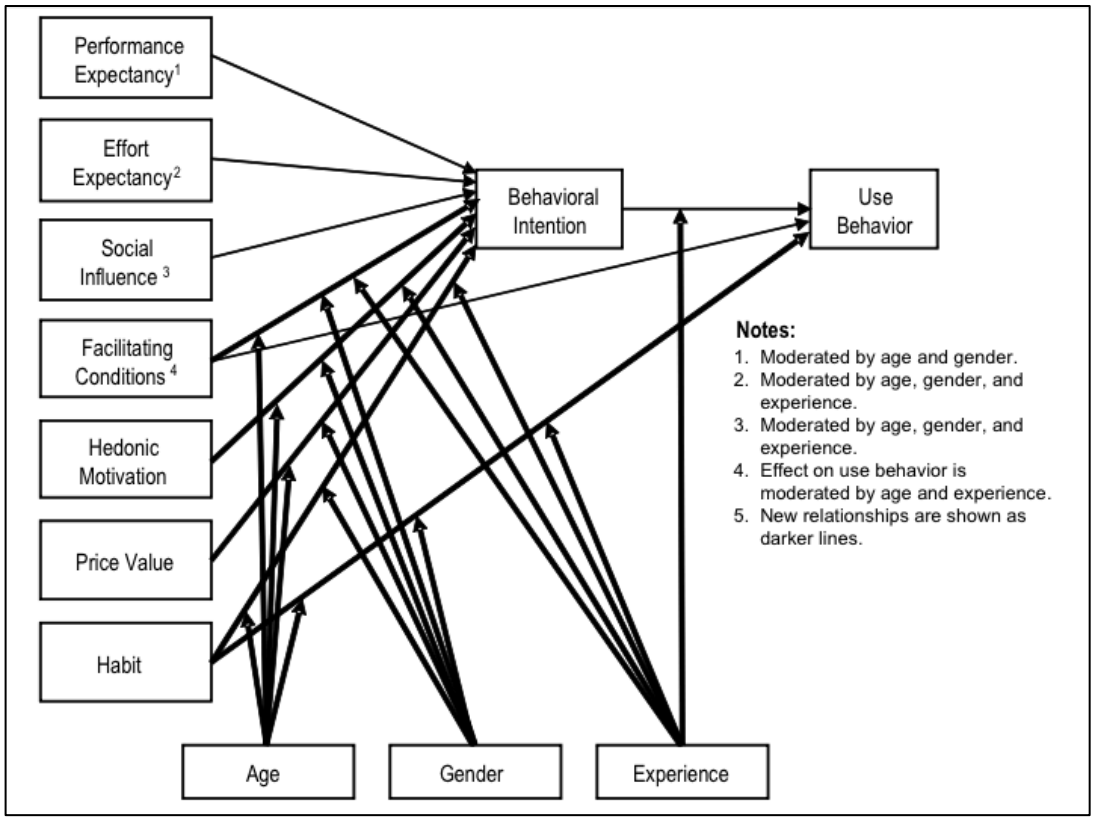

Figure 2. Path diagram for UTAUT2 (adopted from Venkatesh et al., 2012)

A recent study compared TAM and its extensions with UTAUT and UTAUT2 in the context of consumer adoption of mobile Internet services (Viswanath Venkatesh, 2012). It was proved that UTAUT2 has better performance of predicting consumer adoption in comparison with all other models, because UTAUT2 was originally developed for consumer context.

After analyzing major theoretical models in the field of adoption of technologies, UTAUT2 has proven to be the best fit for the research of adoption of digital device wallets. This model is one of the most recent ones among widely recognized models of adoption. It was specifically designed to account for peculiarities of consumer context. Besides, it has been empirically proven to have higher explanatory and predictive power in terms of adoption of new technologies by consumers. A summarizing table with comparison of all listed models is provided in *Appendix 1* for quick referral to major advantages of UTAUT2 versus other models. This model will be tailored to meet the peculiarities of context of the research on adoption of digital device wallets in Russia in Chapter 2.

Conclusion to Chapter 1

World is seeing growing interest in new financial technology called digital device wallets. These applications combine capabilities of online mobile payments, contactless payments offline, debit and credit card management tools, and management of personalized

loyalty programs. While these new solutions of famous technological companies seem to be very convenient and efficient, adoption of these services has not met expected levels yet. In Russia these solutions have existed for about a year. After rapid spike of in-app registrations across the market in the very beginning, many consumers did not turn into active frequent users, which is in line with cases from other countries.

Consultancy firms and marketing research agencies are investigating the problem of adoption of digital device wallets with prolific non-empirical descriptive research of consumers. However, academic literature on the topic is only beginning to evolve. Analysis of scientific literature showed that there has not been any empirical research on factors of adoption of digital device wallets in Russia yet.

This Master Thesis aims to cover this research gap. In order to do that the paper is going to analyze the adoption through a model called UTAUT2. This model accounts for consumer context of usage of digital device wallet and comprises the latest advances in research on adoption of new technologies and innovation.

In Chapter 2 of this Master Thesis we are going to choose the appropriate tools of primary research to investigate the adoption of digital device wallets through UTAUT2 model. After the proper tools will have been chosen, a research design will be developed including sampling and data collection plan.

Chapter 2. Development of research tools for analysis of digital device wallets adoption in Russia with extended UTAUT2 model

In order to prepare the methodology for analyzing the issue of this Master Thesis, best practices of research on adoption of mobile and Internet technologies will be analyzed further to derive the best suitable research design.

Comprehensive research design will ensure that Master Thesis research is conducted according to the common academic practices in the field of adoption of technologies. Thus, results of the study will reliably address the research questions of the study.

2.1 Extending UTAUT2 with trust and security constructs

As it was shown in Literature Review in Chapter 1 of this Master Thesis potential Russian consumers of digital device wallets have some concerns about switching to the technology, as it is stated in a plead of non-empirical descriptive research on the Russian market.

In particular, it was especially highlighted that many Russians are worried about security of their money and data, when using device wallets, whether for online payments, or for NFC contactless payments. In addition to security, Russians' trust in service providers might largely affect adoption. Therefore, such high-tech companies like Apple and Google might not receive high level of trust, when people are using their financial solutions including device wallets, because they are not associated with financial services. It is important to include security concerns and trust to the service in UTAUT2 model, in order to make it better reflect Russian environment. Expansion of classical models with additional constructs is a common practice in the field of research of adoption of technologies (Boris Ovcˇjak et al., 2015). It is important to note that models should be expanded with constructs previously validated by other academics.

A recent study conducted in USA was investigating factors, which drive consumer adoption of NFC payments from mobile phones in restaurants (Jalayer Khalilzadeh, 2017). This context is very close to the research scope of this Master Thesis, as it also involves analysis of antecedents and inhibitors for adoption of one of the most important features of device wallets, but in a narrower context of restaurants. Authors of the study expanded UTAUT2 with constructs of security, trust, and risk (Jalayer Khalilzadeh, 2017). Perceived security was defined, as an individual's belief that a particular procedure would be secure. It was proved to directly affect intentions to use a technology. Trust reflects people's belief that a provider of service will perform some activity in accordance with individual's expectations. Basically, it means that a person believes that mobile application or other kind of service would work as

intended. Trust is also hypothesized to predict intention to use a technology. Security concerns lead to emergence of perceived risk. Perceived risk means person's fear that usage of a service will lead to losses and to unexpected barriers for intended activity. Perceived risk was represented by two constructs, one for the potential losses and second for potential appearance of barriers towards the successful payment.

All together three new constructs (security, trust, and risk) for UTAUT2 will help to adjust the model to peculiarities of Russian consumers of device wallet applications. American researchers show that explanatory power of UTAUT2 increased after introduction of these additional constructs (Jalayer Khalilzadeh, 2017). Moreover, based on the research of literature it is recommended to include these three constructs in analysis of financial services, which are typically connected to elevated levels of concern in consumers.

Based on all previous analysis of models of adoption it was finally decided to employ UTAUT2 model expanded with three additional constructs, namely security, trust, and perceived risk. It was proven that this model will fit the research questions, provide maximal explanatory power, and will be tailored to peculiarities of the service and Russian environment. Approximate correspondence of constructs inside the chosen model with the needs of Russian adopters of digital device wallets stated in primary non-empirical research by Visa (Visa, 2017), described in Chapter 1, is demonstrated in *Appendix 2*. Moreover, final extended research model is visualized in *Appendix 3*.

2.2 Foundations for using empirical research

In order to choose the best-fitting approach for tackling the problem of this research, a number of studies summarizing body of research on technology adoption was analyzed. Obtained results were critically reviewed for selecting the most appropriate research design for investigating the antecedents and inhibitors of the adoption of device wallets in Russia based on UTAUT2 model.

Summarizing research on adoption of all possible electronic banking channels showed that there is a split of research between non-empirical and empirical research (Harmut Hoehle, 2012).

Non-empirical researches usually consist of subjective opinions of experts in the field sometimes underpinned by some descriptive statistics or literature reviews (Harmut Hoehle, 2012). For example, reports of many consulting firms with description of market trends can be attributed to non-empirical studies. These researches usually focus on compilation of information from secondary sources and do not aim at proving any hypotheses empirically. Authors of the study stated that existence of many non-empirical researches on the topic is in line with general

development of academic literature. Usually, emerging fields of research are firstly filled in with non-empirical research, and only then followed by empirically proven studies.

Empirical articles employ methodological research techniques, which are scientifically proved to have high validity of results (Harmut Hoehle, 2012). These researches are executed in accordance with well-developed procedures and assure high level of reliability of results. Moreover, they can usually be replicated later in other context or in other points of time.

Many non-empirical studies based on descriptive statistics and opinions of experts were presented in Literature Review section of this Master Thesis to prepare the reader for deeper analysis on empirical level. There have already been done many descriptive researches on the topic of device wallet adoption in Russia (consulting reports, reports of analytical agencies, interviews with experts in business magazines) and in the world. Therefore, this Master Thesis should bring additional knowledge to the field by employing rigorous scientific approach based on empirical research.

Except for split of research on non-empirical and empirical some researchers also distinguish literature on adoption of Internet banking, a field connected with device wallets, according to three themes: descriptive, relational, or comparative (Payam Hanafizadeh et al., 2014).

Descriptive studies describe a phenomenon using both primary and secondary research. They might identify certain attitudes towards adoption, barriers for adoption and appealing features of Internet banking products. Descriptive researches do not try to explain relationships between factors. They just describe summarized opinions of respondents about an issue. Descriptive studies are, for example, reports of consulting companies.

Relational studies focus on understanding how different factors of adoption relate to each other, in order to explain or predict a phenomenon. These studies employ theories and models from literature on adoption behavior.

Finally, comparative studies represent a recently emerged field of study, which aims to compare adoption process across different groups based on specific variables (Payam Hanafizadeh et al., 2014). Mostly groups are separated based on three kinds of variables: population, distribution channel, and methods of analysis. These researches are introduced by academics to further understand variations between groups based on classical theoretical models. This approach is useful, when a particular market has already been thoroughly analyzed with different methods, and some interference is to be made about differences in segments of the market.

This Master Thesis will concentrate on relational topic. It is important to uncover relations between factors and adoption of device wallets in the Russian market, as this issue has

not been covered by empirical research in Russia. Only after building a ground of research in Russian environment, academics will be able to employ comparative studies in the future.

Foundations for choosing quantitative methods of research

Comparative analysis of existing studies on adoption of electronic banking channels shows that researches under comparison can be split into qualitative, quantitative, and mixed methods of research (Payam Hanafizadeh et al., 2014). Qualitative methods are aiming to understand the context and environment, where electronic banking services operate. Quantitative studies try to estimate and assess relationships among factors connected to adoption or rejection of electronic banking channels. Mixed methods usually employ qualitative methods as the first step of research to build initial hypothesis and conceptualizations. Then these hypotheses are proved or disproved based on quantitative studies on large samples.

Qualitative research includes several widely spread techniques of analysis, which appear in many studies. Those are case studies, focus groups, grounded theory studies, and interview-based studies (Harmut Hoehle, 2012). Case studies focus on analysis of real-life context through observation of objects and their activity and extraction of scientifically important insights about business. Focus groups are a group of methods, where researchers drive a discussion with several representatives of a target group to uncover opinions and experiences of respondents. Grounded theory studies employ common academic frameworks and models and test their resemblance with real situation based on interviews with respondents, who share their opinion. Interview-based studies form the largest pool of qualitative research on the topic. They include face-to-face interviews, which are conducted with accordance with pre-developed methodologies.

Quantitative studies also include a range of popular research techniques, which help to build empirical models of relationships inside a phenomenon (Harmut Hoehle, 2012). Survey questionnaires help to gather information from a large sample of respondents in a structured and theoretically pre-defined way. Collected perceptions and attitudes are further analyzed with various statistical tools to derive important interferences about relationships in a model. Experiments represent another research technique, when a special environment is created, where some variables are manipulated for proving a particular hypothesis about potential relationships between variables.

Researchers share that quantitative studies constitute vast majority of all found studies in the field of adoption of electronic banking channels (79%) (Harmut Hoehle, 2012). Almost all of these studies employed survey questionnaires as the main tool for the primary research. Authors state that this is due to high validity and proven effectiveness of these models, which can be reapplied in different markets and contexts. At the same time they advise researchers to take into account other under-utilized methods of analysis. It is important to understand that authors are

talking about field of electronic banking channels. These are Internet and mobile banking in various forms. Device wallets have not been empirically investigated for a long time yet. Moreover, absence of sufficient research in Russian market supposes that well-understood and popular methods of research should be used as the first line of research to rapidly uncover general relationships in the market. Therefore, using survey questionnaire based on UTAUT2 theory of technology adoption for the research of this Master Thesis will help to mitigate risks of under-utilized methods, which sometimes cannot be valid in different markets.

In order to develop a survey questionnaire for UTAUT2 model, it is essential to develop a set of supporting statistical hypothesis, which will turn conceptual UTAU2 into a statistical measurement model.

2.3 Development of statistical hypotheses for extended UTAUT2 model

Research questions for the research of this Master Thesis have already been presented earlier in Chapter 1. However, UTAUT2 model requires development of statistical hypothesis, which will serve as a basis for inclusion of potential factors of adoption to the measurement model. Therefore a set of statistical hypothesis typical for the UTAUT2 model will be presented further based on classical paper on UTAUT2 development (Venkatesh et al., 2012). A brief explanation is provided before every stated hypothesis.

According to the theory clients, who expect that a technology will perform well, are more inclined to intend to use this technology. This leads to Hypothesis 1.

H1: Increase in level of performance expectancy increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who expect that a technology will be easy to use and will not require extensive effort from their side, are more inclined to intend to use this technology. This leads to Hypothesis 2.

H2: Decrease in level of effort expectancy increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who think that people from their social environment positively evaluate usage of a technology, are more inclined to intend to use this technology. This leads to Hypothesis 3.

H3: Increase in level of social influence increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who think that the environment around them (e.g. infrastructure) makes it easy to use a technology, are more inclined to intend to use this technology. This leads to Hypothesis 4.1.

H4.1: Increase in level of facilitating conditions increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who think that the environment around them (e.g. infrastructure) makes it easy to use a technology, are more inclined to use this technology. This leads to Hypothesis 4.2.

H4.2: Increase in level of facilitating conditions increases the use behavior for a digital device wallet application.

According to the theory clients, who think that using a technology is pleasurable, are more inclined to intend to use this technology. This leads to Hypothesis 5.

H5: Increase in level of hedonic motivation increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who are used to using a technology, are more inclined to intend to use this technology more frequently. This leads to Hypothesis 6.1.

H6.1: Increase in level of habit increases the behavioral intention to use a digital device wallet application.

According to the theory clients, who are used to using a technology, are more inclined to use this technology more frequently. This leads to Hypothesis 6.2.

H6.2: Increase in level of habit increases the use behavior for a digital device wallet application.

As it has been stated previously, for the objectives of this research author is going to extend the UTAUT2 model with additional constructs of trust, security, and perceived risk. Therefore a set of additional statistical hypothesis are also developed to introduce these constructs to the measurement model based on the academic article, where these constructs were introduced (Khalilzadeh et al., 2017).

According to the theory clients, who trust the provider of a technology, are more inclined to intend to use this technology more frequently. This leads to Hypothesis 7.

H7: Increase in level of trust increases the behavioral intention to use a digital device wallet application

According to the theory clients, who believe that a technology is safe, are more inclined to intend to use this technology more frequently. This leads to Hypothesis 8.

H8: Increase in level of security increases the behavioral intention to use a digital device wallet application

According to the theory clients, who believe that a technology is going to work as intended and will provide the expected results without failure, are more inclined to intend to use this technology more frequently. This leads to Hypothesis 9.

H9: Decrease in level of performance risk increases the behavioral intention to use a digital device wallet application

According to the theory clients, who believe that a technology protects their private information sufficiently, are more inclined to intend to use this technology more frequently. This leads to Hypothesis 10.

H10: Decrease in level of privacy risk increases the behavioral intention to use a digital device wallet application

Theory of UTAUT2 assumes that if a consumer intends to use a technology, then this intention will sooner or later lead to a real fact of use. This leads to Hypothesis 11.

H11: Increase in level of behavioral intention to use a digital device wallet application increases the use behavior for a digital device wallet application

Classical model UTAUT2 highlights the importance of taking demographic and behavioral features of respondents into account, when analyzing the adoption of technology. Therefore, the model states that age, gender, and previous accumulated experience of using a technology might affect and change the effects of factors on intention to use or actual use of a technology. Therefore, a set of additional hypothesis is added to the measurement model.

H12-H13: Age of respondents mediates the effect of facilitating conditions (H12), hedonic motivation (H13) on the intention to use a digital device wallet.

H14.1: Age of respondents mediates the effect of habit on the intention to use a digital device wallet.

H14.2: Age of respondents mediates the effect of habit on the use behavior for a digital device wallet.

H15-18: Age of respondents mediates the effect of trust (H15), security (H16), performance risk (H17), and privacy risk (H18) on the intention to use a digital device wallet.

H19-H20: Gender of respondents mediates the effect of facilitating conditions (H19), hedonic motivation (H20) on the intention to use a digital device wallet.

H21.1: Gender of respondents mediates the effect of habit on the intention to use a digital device wallet.

H21.2: Gender of respondents mediates the effect of habit on the use behavior for a digital device wallet.

H22-25: Gender of respondents mediates the effect of trust (H22), security (H23), performance risk (H24), and privacy risk (H25) on the intention to use a digital device wallet.

H26-H27: Experience of respondents mediates the effect of facilitating conditions (H26), hedonic motivation (H27) on the intention to use a digital device wallet.

H28.1: Experience of respondents mediates the effect of habit on the intention to use a digital device wallet.

H28.2: Experience of respondents mediates the effect of habit on the use behavior for a digital device wallet.

H29-32: Gender of respondents mediates the effect of trust (H29), security (H30), performance risk (H31), and privacy risk (H32) on the intention to use a digital device wallet.

A full list of statistical hypotheses can be found in *Appendix 4* for further reference.

2.4 Development of survey questionnaire for adoption of digital device wallets in Russia

As it was written earlier in the report quantitative methods of research rely on employment of survey questionnaires, which allow collecting data from a large sample of respondents efficiently and in a structured way. In order to collect primary data for this research it is important to develop a tailored questionnaire to be distributed among target population. It can be done in four stages. Firstly, scales from academic literature are collected to represent constructs in the sample. Secondly, these scales are adjusted to reflect on the experience of using a digital device wallet. Thirdly, scales should be translated into Russian, in order to fit Russian target audience and collect higher sample size. Fourthly, welcoming description and filtering questions will be added to the questionnaire, in order to facilitate the answering process and provide valuable descriptive statistics for future analysis.

It is important to note that all scales representing constructs of UTAUT2 are questions based on a 7-point Likert-scale (Venkatesh, 2012). In each question a specific statement about a technology is asked to the respondent, who has to subjectively choose his level of agreement between 1 (do not agree at all) and 7 (totally agree). This form of data collection is a standard for quantitative research on adoption of technologies, and is the best fit for statistical methods of data analysis, which will be described further.

On the first step author collected the scales associated with factors from UTAUT2 model and its extensions. Scales are specifically designed questions to be asked to the respondents. Afterwards answers to these questions will be analyzed through special statistical procedures described further, in order to derive constructs from them. It is important to note that academics use those scales, which have been statistically validated in different contexts and on large samples, so that they actually represent the derived construct. For the goals of this Master Thesis three sources of validated scales have been combined. Venkatesh et al. provided a range of

scales, which describe constructs of UTAUT2 (Venkatesh et al. 2012). Most of scales for Master Thesis were borrowed from the research of Venkatesh, because this paper was an original basis for the development of UTAUT2 model and includes the most reliable scales. However, scales relating to Performance Expectancy construct will be borrowed from previously mentioned research on adoption of NFC-payments in hotels (Cristian Morosan and Agnes DeFranco, 2016), because they better represent peculiarities of performance expectancy for digital device wallets based on analysis of the author of this Master Thesis. Moreover, scales for extensions of UTAUT2 (Trust, Security, Perceived Risk) were borrowed form a previously cited research on adoption of NFC-payments in restaurants (Jalayer Khalilzadeh et al., 2017), because these constructs and relating scales were not present in original paper of Venkatesh. Finally, the scale for Use Behavior construct from UTAUT2 was built according to the recommendations of Venkatesh (Venkatesh et al., 2012) and represents a question about frequency of usage of a technology. The questions about frequency were borrowed from an academic paper specifically dedicated to comparison of scales for frequency of usage (L.D. Rosen et al., 2013).

On the second step of questionnaire development questions are adjusted to reflect the peculiarities of using a digital device wallets. It is important, because validated scales usually are formulated to reflect a specific technology, therefore they are usually rephrased to keep the same meaning but describe a different technology. In this Master Thesis questions were transformed to represent the process of making a purchase online or offline with a digital device wallets to get valid responses focused on the topic under analysis.

On the third step questions were translated from English into Russian with the goal to keep maximum of initial meaning of the questions. This translation was important to overcome the language barrier of Russian users of digital device wallets and collect a larger sample.

Finally, author prepared a special welcoming window, which explained purposes of the research to invite people to take part in it. The goal of this text is to increase the proportion of people, who actually fill in the questionnaire after opening it. Moreover, for the same goal it was stated in the beginning that the survey is anonymous. In addition, a brief description of a term digital device wallet was presented. It stated the main features of technology to explain scope of the study to respondents. It was of particular importance, because respondents are not required to have actually used a technology to participate in the survey, as reasons for absence of technology use are also important in UTAUT2 model (Venkatesh et al., 2012). Nevertheless, description was brief and stated in neutral tones, in order not to create bias in respondents by trying to sell advantages or disadvantages of a technology. In the beginning of the questionnaire there is a filtering question about the fact of having a smart phone. This question will help to eliminate from further analysis those respondents, who cannot use a digital device wallet due to absence of

required device. After main body of questions there are several questions focused on demographic features of respondents (age, gender, education level, etc.). They are put in the end of the questionnaire, so people are engaged in the beginning by interesting questions, and only in the end answer standard demographic questions, which do not require high cognitive ability.

A table with the steps of development of final version of questionnaire is presented in *Appendix 5*.

Planning of a sample from Russian market of digital device wallets for primary data collection

In order to make valid conclusions after analysis, primary data should be collected according to a predefined plan of data collection. This plan can be built following the next steps recommended by experts in marketing research (S. M. Smith, 2005, p. 500):

- Determine the population

Population for the research depends on the research questions posed for the Master Thesis and on resource constraints of the researcher. For the purpose of this Master Thesis it was decided to concentrate on the population of Russian students of 18-25 years old owning a mart phone for several reasons. Firstly, as it was mentioned in Chapter 1, population of 18-25 year olds has the lowest adoption rate for digital device wallets at the moment (Valeriy Kodachigov, 2018). Therefore, uncovering insights about troubles associated with adoption by this group might provide a significant breakthrough in penetration of Russian market by digital device wallet services. Secondly, as smart phone is a threshold requirement for using a digital device wallet, it was decide to filter out people without a smart phone, because they cannot use it even potentially. Thirdly, this group of respondents is the easiest one for approaching by the author of this Master Thesis. Taking into account resource constraints for collecting a sample (no allocated budget, no access to research panels, etc.) it is justified to start investigation of topic of adoption of digital device wallets in Russia on the sample of 18-25 year olds. Initial results received during research might serve as guidance for future hypothesis formulation by other researchers. The research of this Master Thesis could successfully play a role of first move into the field in Russian academic literature. Professionals in the field of marketing research note that many universities rely on student samples for their academic research (Robert A. Peterson and Dwight R. Merunka, 2014). However, it is recommended to replicate primary researches, if they were conducted on student samples, to increase their validity. Thus, choice of a student sample for this research is in line with academic practice of starting exploration of a topic on student sample, and then replicating the research on other samples.

- Make a choice between census and sampling

Census requires surveying the whole population. It is impossible to survey all Russian students of 18-25 year olds. Therefore, choice was made to collect a sample of respondents with further assessment of representativeness of results for the population.

- Determine the sample design

Sample design includes method of data collection and channels of distribution of the questionnaire. Academics state that marketing research rarely relies on probabilistic methods of collecting a sample (S.M. Smith, 2005, P. 500). However, non-probabilistic (convenient) samples oftentimes provide representative results, especially if data collection follows rigorous filtering techniques.

For the purpose of this research it was also decided to concentrate on non-probabilistic data collection method called snowballing sampling. In this method chosen respondents are conducted directly and then asked to distribute the research further to the people they know. While this method is non-probabilistic, it has several advantages. Firstly, it is one of the fastest and resource-saving methods of data collection. Secondly, oftentimes respondents can invite the right people for the research. For example, in the case of research on device wallets adoption, a student might know that her friend is using a device wallet and can resend the questionnaire to that person to increase a sample with a target respondent.

It was decided to use online channels to distribute the questionnaire for several reasons. First of all, young people actively use Internet and it was easy to approach target respondents online. Secondly, online questionnaire tools provide high flexibility for designing an easy to use respondent-friendly questionnaires, which decreases respondent fatigue and consequently bias. Social network VK was used as the main channel of distributing link to the questionnaire among target sample. The questionnaire was developed in Google Forms online software.

- Determine required minimum sample size

In order to calculate the outputs of measurement model based on UTAUT2 conceptual model author will use statistical method called SEM-PLS. This method will be thoroughly described further in this Chapter. At the moment it is important to notice that the most common rule of thumb for the smallest possible sample size in PLS-SEM calculation is the ten times more, than the maximum number of paths aiming at any of the constructs in the model (Joe F. Hair et al., 2012). This means that a construct in the model should be chosen, which is conceptually affected by the biggest number of other factors in the model. In the case of this research Intention to Use construct has the biggest number of paths aimed at it with 9 constructs affecting it though paths. Therefore, based on the rule of thumb a minimum sample size to conduct the analysis should equal ten times nine or ninety respondents.

2.6 Choice of non-linear PLS-SEM approach to analysis of collected primary data

In order to find constructs of adoption of digital device wallets using UTAUT2, primary collected data using survey method should later be analyzed by specifically designed statistical techniques. A method widely employed by academics is structural equation modeling (SEM). Further on this section a choice of the appropriate SEM technique will be provided.

Structural equation modeling in marketing and management research

Structural equation modeling (SEM) approach is considered to be the standard for marketing and management research in the field of identification of cause-effect relationships between constructs (Rachel Ashman and Anthony Patterson, 2015). It is not only popular among academics, but is also acknowledged to be a highly advanced technique of analysis. This method has clear and precise guidelines, which lead to rigorous and reliable analysis of quantitative models.

SEM is a combination of path and confirmatory factor models (Rachel Ashman and Anthony Patterson, 2015). Thus, this method allows deriving factors out of several scales, and then finding interconnections between these factors to build a predictive or explanatory model. It has gained high popularity in marketing, because it enables researchers to conduct thorough and simultaneous analysis of relationships between several of constructs. This statistical method allows combining psychometric and econometric analyses, while keeping the best features of both approaches. Some academics call this method a gold standard of empirical testing. It is important to note that all quantitative models mentioned in previous sections were also developed and then put into practice with use of SEM approach to analysis.

SEM was used in all investigations with use of UTAUT2 model found by the author of this Master Thesis. As this method has proved to be the best choice for analysis of adoption of technologies with quantitative models, it will also be used for answering research questions of this paper.

Difference between CB-SEM and PLS-SEM

SEM is a constantly developing method of statistical analysis. Initial variation of SEM rested upon covariance-based approach (CB-SEM), and only later a partial least squares (PLS-SEM) technique was developed (Joe F. Hair Jr., 2014). CB-SEM focuses on proving theories by determining their power of estimating a covariance matrix for the sample data. PLS-SEM is closer to a multiple regression analysis in its nature. PLS-SEM is an iterative approach, which tries to maximize the explained variance of constructs inside a model.

CB-SEM approach to analysis is the most widely spread SEM technique, but lately PLS-SEM has been given more and more attention in marketing, strategic, and information systems

research due to its superior properties in the context of social sciences research (Joe F. Hair Jr., 2014).

PLS-SEM resolves important problems, which usually arise when dealing with social sciences research. Firstly, it can evaluate path models even with non-normal data. Data in social sciences rarely follows normal distribution, which affects the quality of CB-SEM output, while PLS-SEM method can transform non-normal data in accordance with the central limit theorem to minimize errors. Secondly, PLS-SEM can produce reliable and valid results with much smaller sample sizes, than CB-SEM, even if models are highly complex. It has been proved that PLS-SEM has better predictive power in such cases. This is especially relevant to the research of this Master Thesis taking into account student's resource constraints for gathering a large primary data set. Finally, PLS-SEM is a recommended method, when formative constructs are included in the model. Those are constructs affected by indicators outside a model, which is often the case in societal research.

Additionally, CB-SEM is usually attributed to confirmatory research, while PLS-SEM is traditionally used for explanatory research (Joe F. Hair Jr., 2014). Confirmatory research is used for proving hypothetical models with empirical data. Explanatory research is more flexible, as it is aimed at evaluating already developed models in different context. For example, a model developed for American market can be used in other geographical markets with help of explanatory research through PLS-SEM. This is exactly the case of research of this Master Thesis, when UTAUT2 is transferred to the Russian environment.

It is also important to note that PLS-SEM technique is underutilized not because of hidden flaws in this technique (Nicole Franziska Richter, 2016). A large analysis of literature on PLS-SEM has shown that many researchers choose CB-SEM approach without any additional justification, but just because it has been historically more widely applied. These researchers miss vivid advantages of PLS-SEM in their research. Moreover, PLS-SEM is not a static method. It is rapidly developing with new improvements in technique making it even more attractive for researchers (Nicole Franziska Richter, 2016).

In summary, PLS-SEM is a technique, which gradually becomes a first-line choice for academics, when analyzing adoption of technologies through quantitative models. Moreover, its peculiarities would improve the quality of research on adoption of mobile device wallets in Russia through being suited for potentially non-normal data, small sample sizes, and explanatory nature of the research.

Choosing non-linear PLS-SEM

As it was shown in previous section, PLS-SEM approach is constantly developing to better suit needs of academics. One of the latest advancements of PLS-SEM is introduction of an

opportunity to estimate non-linear relationships between constructs in a model (Francisco Javier Rondan-Cataluña, 2015).

One of the greatest drawbacks of SEM method up to date was its dependency on linear relationships between constructs in a model (Francisco Javier Rondan-Cataluña, 2015). However, in social sciences such as marketing and management behavior of individuals and relationships between constructs of a model are often non-linear. Many social variables, especially connected to adoption of technologies, have non-linear interactions in shapes such as U-curve or S-curve. Trying to estimate these relationships with models tailored for linear relationships leads to bias and extensive errors. However, recent developments on PLS-SEM allowed assuming non-linear relationships in the model. It has been empirically proven that estimating a model of technology adoption with non-linear PLS-SEM leads to higher explanatory power of the model (Francisco Javier Rondan-Cataluña, 2015).

In order to maximize validity of results of this Master Thesis, it was decided to use non-linear PLS-SEM technique for analyzing empirical data. This analysis will be conducted via special software, which will be described in Chapter 3.

2.7 Research plan for determination of drivers of adoption of digital device wallets in Russia

At the moment all methods of analysis have been chosen for the primary research of this Master Thesis. It is important to match chosen methods with action steps to execute the research successfully. Therefore, primary research will be conducted in steps described further.

1. Preparation of scales for quantitative research with UTAUT2: estimating constructs of UTAUT2 requires collection of primary data from respondents. They fill out a questionnaire assembled on the basis of specially developed scales. These scales are proved to empirically represent dimensions of constructs inside a model. Classic scales for UTAUT2 should be prepared for the research.
2. Preparation of scales for security, trusts, and risk constructs: security, trust, and risk are added to UTAUT2 with help of scales, which are proved to represent constructs of security, trust, and risk.
3. Adjustment of theoretical scales to the context of mobile device wallets: wording in all scales of classical models is very general, in order to be applicable for any context of adoption of technology. Academics adjust these general scales to investigate relationships in adoption of a particular technology to increase respondents' understanding of questions.

4. Determination of population and sample characteristics: scope of the research should be determined by choosing the right population for the research. This population could be all Russians or a particular group of people in Russia. Afterwards, characteristics of a sample should be determined, so that opinion of respondents from a sample would be representative for the whole population.
5. Choice of distribution channels for the survey questionnaire: channels of distribution of questionnaire are chosen based on understanding of sample characteristics and resource constraints of a researcher.
6. Preparation of questionnaire lay out: in order to cut effort for respondents and to consequently decrease respondents' fatigue and biased behavior, lay out of a questionnaire should be carefully designed to be easy to comprehend.
7. Collection of data: on the next step questionnaire will be distributed through chosen channels among respondents from a sample. Answers will be recorded for further analysis.
8. Cleaning of data: flawed responses (e.g. not fitting the filtering criteria for sample) will be deleted from collected questionnaires to reduce bias.
9. Analysis of data with PLS-SEM: special software will be used to estimate exploratory model based on primary data gathered from respondents. Relationships between constructs of adoption of digital device wallets will be determined.
10. Preparation of recommendations based on results of analysis: deducted relationships will help to identify antecedents and inhibitors of adoption of device wallets in Russia. Based on discovered relationships specific recommendations for practitioners and academics will be developed.

Conclusion to Chapter 2:

Second Chapter of this Master Thesis led to conclusions on the best research design for uncovering drivers of adoption of digital device wallets. Quantitative method in form of survey questionnaire was proved to comply with requirements of research questions from the First Chapter. UTAUT2 model was extended with several additional constructs Trust, Security and Perceived Risk to better reflect peculiarities of the Russian market. Then a questionnaire was developed through combining and adjusting scales from classical papers on the topic. Finally, non-linear SEM-PLS statistical technique was proposed for analyzing primary data collected on basis of scales for UTsAUT2.

Research plan described above will be followed, in order to answer research questions posed earlier. Realization of each step will be described and extensively commented in Chapter 3 of this Master Thesis.

Chapter 3. Identification of factors of digital device wallets adoption in Russia

This Chapter is dedicated to analysis of collected primary data. During the Chapter a range of outputs of special software for PLS-SEM analysis will be presented with explanations on their impact on the overall model.

After analysis of statistical outputs business implications of these outputs will be explained to eventually develop fact-based recommendations for practitioners.

3.1 Descriptive analysis of collected primary data

Sample characteristics and size

As it has been stated in Chapter 2 of this Master Thesis data collection took place in social network VK. Moreover, during the course of data collection some respondents spread the questionnaire in several group chats in Telegram network.

All and all, 168 responses were collected during data collection stage. However, not all of these 168 responses were added to the final sample for analysis. 3 responses have not been validated by filtering question about owning a smart phone. It was decided to delete answers of these three respondents from analysis, in order to reduce bias and take into account only responses of those people, who have a smart phone and can potentially start using or already use a digital device wallet. Therefore, size of the sample under analysis consisted of 165 responses.

Descriptive statistics show that more than 91% of collected answers came from an age group of 18-25 years old, which shows that it has a close fit with expected characteristics of the sample. Moreover, if the group of 26-35 is included, then cumulatively these two age groups constitute 98% of the collected sample. Therefore, generally sample consists of young people from the target group. Moreover, geographical distribution of answers shows that majority of respondents (around 75%) come from either Saint Petersburg or Moscow. Therefore, there is a skew in the sample towards residents of big cities. However, while this may be considered a slight limitation, it is important to mention that if residents of big cities would adopt a new technology, then a wave of adoption across the country might be expected.

Almost 68% of respondents were females versus 32% of males. This indicates a skew toward opinions of women about the service. Therefore, another sample with larger proportion of male respondents could have increase the representativeness of results in the future.

Almost 56% of respondents are only getting their higher education without working at the same time. Moreover, around 39% of respondents are working at the moment, either full-time or part-time along with studies. Therefore, 95% of sample constitutes people, who fit into the expected profile of a young student or a young specialist after graduation.

36% of household of respondents have an income of more than 50000 rubles per month. Three other groups of income (less than 20000, 20000-30000, 30000-50000) are split almost evenly with 20% in each group. It can be seen that sample is skewed towards households with income higher than average, which can be explained by the fact that survey was distributed among top universities of Russia, where students generally come from wealthier families.

55,5% of the sample has used a digital device wallet at least once (consequently, 44,5% have never used it). A little bit less, than half of the sample has no prior experience of using a digital device wallet application. This shows that sample consisted of both those, who have only perceptions about features of digital device wallets, and those, who have tried using it and have a formed opinion. According to the UTAUT2 methodology it is not necessary for the respondents to have prior experience in using a technology, but prior experience is also not prohibited. Use behavior construct in the model is represented by frequency of use scale, as it was mentioned in questionnaire development section of this Master Thesis, both cases of usage and non-usage are calculated to be affected by other factors in the model.

The use behavior was represented with a scale asking how frequently do respondents use a digital device wallet. 48,6% of respondents shared that they never use a digital device wallet. This figure is a little bit higher, than the number of people, who have never used a digital device wallet, which shows that not all respondents continued to use the applications after first trial. 28,3% of respondents stated to use a digital device wallet several times a day, which shows that they are constant heavy users of this technology. 3-8% of respondents formed each of the other categories for frequency of use (from several times per week to once per month).

The experience construct for the model was represented by the question about the length of using a digital device wallet, since the first trial. Except for those 48,5% of respondents, who never use a digital device wallet, 40,4% of respondents have been using a digital device wallet for more than half a year. Only around 20% of respondents have been using a device wallet for less than half a year.

Collected sample size allows for reliable calculation of the measurement model in special statistical software. Firstly, the sample size of 165 respondents is almost twice higher, than the minimal sample size required by the rule of thumb (minimum sample size equals 90 based on calculations from Chapter 2). Secondly, software used in calculation of the model called WarpPLS 6.0 also calculates minimum required sample sizes based on two more rigorous statistical procedures, than just a rule of thumb (Ned Kock, 2017). These methods are inverse square root method and gamma-exponential method, which calculate minimum sample size based on input of an expected absolute minimum path coefficient in the model. According to academics in the field of PLS-SEM these two approaches provide reliable estimations for the

minimal sample size required (Ned Kock, 2017). According to the software sample size of 165 respondents allows to reliably derive path coefficients of 0.165 and more. As it will be shown later in this Chapter the smallest absolute path coefficient used for the model will be 0.161, which is just a little bit less, than 0.165. Generally, it might be said that both identified thresholds of sample size (166 for inverse square root method; 155 for gamma-exponential method) are approximately met and sample size is sufficient for measuring the model. Therefore, the software can reliably calculate the measurement model and provide significant statistical information. Output for minimal sample size calculation can be found in *Appendix 6*.

Descriptive statistics for answers based on scales

As it was stated previously UTAUT2 model is an empirical method of research, which is based on sophisticated statistical techniques, which are used to calculate the model parameters. However, before getting to the PLS-SEM analysis it was decided to briefly present descriptive results of the primary research. It was show previously that each theoretical construct is reflected in the questionnaire by a set of 7-point Likert scales. We calculated average level of agreement with each question associated with a scale. Then average score was calculated for each set of scales to represent the level of agreement with overall statement about the importance of particular factors in opinion of respondents. A 7-point scale means that an average score of 4,0 lies exactly in the middle of the scale representing a neutral opinion. A summarizing table with average scores of agreement for each construct is presented below.

Table 1. Average scores collected for scales associated with constructs of extended UTAUT2

Performance Expectancy	4,7
Effort Expectancy	6,1
Social Influence	3,7
Facilitating Conditions	5,6
Hedonic Motivation	4,5
Habit	3,8
Trust	4,8
Security	4,3
Performance Risk	3,7
Privacy Risk	4,0
Behavioral Intention	4,9

Average agreement of respondents with the questions about Performance Expectancy is 4,7. Therefore, on average respondents are a little bit more than neutral about Performance Expectancy features of a digital device wallet.

Average agreement of respondents with the questions about Effort Expectancy is 6,1. Therefore, on average respondents indicate high level of agreement with questions about Effort Expectancy issues connected with a digital device wallet.

Average agreement of respondents with the questions about Social Influence is 3,7. Therefore, on average respondents indicate small level of agreement with questions about Social Influence issues connected with a digital device wallet.

Average agreement of respondents with the questions about Facilitating Conditions is 5,6. Therefore, on average respondents indicate a moderate level of agreement with questions about Facilitating Conditions issues connected with a digital device wallet.

Average agreement of respondents with the questions about Hedonic Motivation is 4,5. Therefore, on average respondents indicate moderate level of agreement with questions about Hedonic Motivation issues connected with a digital device wallet. It is important to mention here that during the data collection stage substantial number of respondents connected with the author to share their concerns about questions concerned with Hedonic Motivation. Many respondents could not understand, how to interpret questions about fun and pleasure associated with using such a utilitarian application as a digital device wallet. Majority of answers for Hedonic Motivation are neutral (4 points). It seems that respondents could not express a vivid opinion about this factors and just were choosing a middle point of the scale to express their confusion. Therefore, it was decided to delete Hedonic Motivation factor from the model before PLS-SEM analysis to reduce bias. Taking into account that digital device wallet is a utilitarian application, which does not intent to carry an entertaining function, it is believed that deleting this factor will not decrease value of managerial implications based on the resulting reduced model. Consequently, supporting statistical hypotheses connected with Hedonic Motivation factor (H5; H13: H20; H27) are *dropped* from the analysis.

Average agreement of respondents with the questions about Habit is 3,8. Therefore, on average respondents indicate a moderate level of agreement with questions about Habit issues connected with a digital device wallet. In questions relating to habit there was a vivid split of opinions. Those respondents, who do not habitually use digital device wallet showed high disagreement with the statements (around 45% of respondents chose 1-2 on the 7-point scale). At the same time around 25-35% of respondents, those using digital device wallets constantly were showing high level of agreement with the statements about Habit. Therefore, average score for the sample lies almost in the center at 4 points.

Average agreement of respondents with the questions about Trust is 4,8. Therefore, on average respondents are a little bit more than neutral about Trust features issues connected with a digital device wallet.

Average agreement of respondents with the questions about Security is 4,3. Therefore, on average respondents are a little bit more than neutral about Security issues connected with a digital device wallet.

Average agreement of respondents with the questions about Performance Risk is 3,7. Therefore, on average respondents are a little bit less than neutral about Performance Risk issues connected with a digital device wallet.

Average agreement of respondents with the questions about Privacy Risk is 4,0. Therefore, on average respondents are neutral about Performance Expectancy issues connected with a digital device wallet.

Average agreement of respondents with the questions about Behavioral Intention is 4,9. Therefore, on average respondents are a little bit more than neutral about potential usage of digital device wallet in the future.

In the next section results of the survey are analyzed with PLS-SEM techniques to uncover, how abovementioned scales can be used to derive factors affection adoption of digital device wallets.

3.2 PLS-SEM analysis of the model

The analysis of collected data was conducted in WarpPLS 6.0 program. This program is the only software specifically developed to suit all peculiarities of PLS-SEM approach including development of non-linear models (Ned Kock, 2017). As it was shown in Chapter 2, non-linear models show better explanatory power and are advised to be used in PLS-SEM approach.

This software provides a whole range of different types of calculation of the measurement model. A user can choose the method for calculation of the outer model (outer model is the calculation of constructs/factors based on scales), of the inner model (path coefficients, which represent the affect of constructs on each other), and of resampling method, which helps to increase the reliability and validity of the model. Based on recommendations of academics and practitioners it was decided to use Factor-Based PLS Type CFM3 method for calculation of outer model, Warp3 Basic method for calculation of inner model, and Stable3 method for resampling. These three methods are highlighted as the most advanced by developed of the software (Ned Kock, 2017). The software allows building a model in the software by adding data collected according to the scales for constructs. Then the model is automatically calculated.

At the first step of calculation of the model software calculates the collinearity between all constructs in the model. If this collinearity appears to be too high, the researcher is advised to recombine the scales to make the final model more reliable and valid. In the case of the research

conducted for this Master Thesis the warning about too high collinearity appeared twice. In order to delete these high collinearities author analyzed the correlations between constructs. If correlations were too high (>0,6), then constructs were combined into one. It turned out that constructs Trust and Security had a high correlation between them. Therefore, it was decided that scales for these constructs could be combined into Security&Trust construct. This is logical, because Trust and Security are tightly connected notions, and while in some researches they are separated, research of Russian consumers in this case shows that these two constructs are seen as similar. Moreover, two types of Perceived Risk (Perceived Performance Risk and Perceived Privacy Risk) also appeared to be highly correlated and were combined into one construct Risk. Model representation after adjustments (deleting the Hedonic Motivation; combining Security and Trust; combining two types of perceived risk into Risk) can be found in *Appendix 7*. After these adjustments the software successfully calculated the model.

Model fit and quality indices

Before digging deeper into analysis of constructs and their interactions it is essential to understand that the measurement model could have been calculated properly and has no flaws in resulting findings. WarpPLS software provides 10 different indices, which describe statistical quality of the calculated model. Those indices are average path coefficient (APC), Average R-squared (ARS), Average adjusted R-squared (AARS), Average block VIF (AVIF), Average full collinearity VIF (AFVIF), Tenenhaus GoF (GoF), Sympson's paradox ration (SPR), R-squared contribution ratio (RSCR), Statistical suppression ratio (SSR), and Nonlinear bivariate causality direction ration (NLBCDR). The software automatically calculates all of these indices based on primary data inserted into the software. Moreover, WarpPLS provides recommended values for listed indices. Generally, all of these indices show the degree to which collected data fits with the proposed model.

WarpPLS recommends that P-values associated with APC, ARS, and AARS are less than 0,05 to be significant (Ned Kock, 2017). In the case of this research P-value for APC is 0,038 (<0,05); for ARS is less than 0,001 (<0,05); for AARS is less than 0,001 (<0,05). As it can be seen all three P-values associated with quality indices are less than recommended 0,05. This indicates that on average coefficients of internal model are significant.

WarpPLS states that AVIF index is acceptable, if its value is less or equal than 5, and is ideal, if it is less of equal to 3.3 (Ned Cock, 2017). In the case of this research the resulting AVIF equals 2,448, which falls into the ideal range. This index shows that the model has good overall predictive and explanatory power due to acceptable level of collinearity in the model. It means that different hypothesized constructs in the model do not overlap in their meaning and reflect different factors. This index is sensitive to non-linear estimations.

According to WarpPLS AFVIF index is acceptable, if its value is less or equal than 5, and is ideal, if it is less of equal to 3.3 (Ned Cock, 2017). AFVIF calculated for the extended UTAUT2 model based on primary data collected by the author equals 2,537, which falls into ideal range of values. This index shows that the model has good overall predictive and explanatory power due to acceptable level of collinearity in the model. This index is not sensitive to non-linear estimations.

The next index GoF is recommended to be as high as possible, with small GoF > 0.1; medium >= 0.25; and large >= 0.36 (Ned Kock, 2017). GoF calculated based on primary data equals 0.674, which is much higher, than the cutoff for large GoF. This index is a measure of model's explanatory power, which is high in this case.

According to the software SPR index should be at least higher, than 0.7 and ideally should equal 1 (Ned Kock, 2017). In this research SPR equals 0.800, which is higher, than accepted cutoff value. This index measures to which extent a model is free of Simpson's paradox instances, when a path coefficient and a correlation associated with a pair of linked variables have different signs. Acceptable SPR shows that there are no casualty problems in the model, and hypothesized paths truly reflect effects in the direction proposed by a researcher.

RSCR should be acceptable, if higher, than 0.9, and ideal, if equal to 1 (Ned Kock, 2017). In this case RSCR equals 0.954, which is enough for being acceptable. RSCR is another index, which proves absence of instances of Simpson's paradox described earlier.

According to WarpPLS SSR index is acceptable, if higher or equal to 0.7 (Ned Kock, 2017). SSR calculated based on primary data on adoption of digital device wallets in Russia equals 1.000, which is much higher, than required minimum. This index is a measure of the extent to which a model is free from statistical suppression indexes. Statistical suppression occurs, when a path coefficient is greater, in absolute terms, than the corresponding correlation associated with a pair of linked variables. Therefore, acceptable SSR proves that a model does not have casualty problems.

NLBCDR index is acceptable, when higher or equal to 0.7 (Ned Kock, 2017). In the calculated model NLBCDR equals 0.940, which is higher, than required value. NLBCDR is an index, which proves that non-linear paths reflect effects in the direction proposed by a researcher.

In summary, all of 10 indices of quality of the model show acceptable or ideal values. No indices out of 10 indicate any problems with the calculated model, which proves high reliability of received results, which will be described further. A screenshot of WarpPLS 6.0 output with calculated model fit and quality indices is in *Appendix 8*.

Confirmatory Factor Analysis

Confirmatory Factor Analysis is aimed at evaluating the results of calculation of outer model in SEM-analysis. The program calculates according to statistical procedures, whether separate constructs may be derived based on several underlying scales. The program provides four type of output to check reliability of derived constructs/factors of the model. The first one is a classical coefficient called Cronbach's alpha, which should be equal or greater than 0.7 for a construct to be reliable. WarpPLS 6.0 supplements Cronbach's alpha with another more recent coefficient called composite reliability, which also should be equal or greater than 0.7 for a construct to be reliable. Another important indicator is Average Variance Extracted (AVE) for each construct. This indicator proves validity of a construct and is recommended to be 0.5 and higher for each reflective construct (reflective constructs are constructs, which are derived based on a set of scales close in meaning; formative constructs are constructs, which are derived based on a set of scales with potentially not overlapping meaning). Last indicator recommended for analysis of results of Factor Analysis is Full collinearity VIF, which is used for common method bias tests to check for the absence of multicollinearity. According to the developer of WarpPLS (Kock, 2017) VIF should ideally be lower, than 3.3. However, VIFs lower than 5 are also acceptable. Eventually, WarpPLS 6.0 manual states that a more relaxed criterion of 10 is also an acceptable, while not an ideal, threshold for VIF. Further a table with results of these four tests for each construct in the extended UTAUT2 model is presented.

Table 2. Reliability and Validity Indicators for Confirmatory Factor Analysis

	Composite reliability	Cronbach's alpha	Avg. Variance extracted	Full collin. VIF
Performance Expectancy	0.894	0.917	0.405	2.392
Effort Expectancy	0.938	0.936	0.794	2.061
Social Influence	0.939	0.938	0.838	1.715
Facilitating Conditions	0.681	0.674	0.386	2.100
Habit	0.945	0.940	0.813	6.134
Security&Trust	0.929	0.928	0.623	2.539
Risk	0.840	0.854	0.484	1.935
Behavioral Intention	0.938	0.937	0.790	3.663

It can be seen from the table that Facilitating Condition construct does not meet thresholds for Composite reliability (0,681<0,7), Cronbach's alpha (0,674<0,7), and AVE (0,386<0,5). This construct proves to be not reliable and not valid in the contexts of this research. Therefore, it is deleted from the analysis and associated hypotheses (H4.1; H4.2; H12; H19; H26) are dropped from further analysis.

All other constructs are proved to be reliable based on Cronbach's alpha and Composite Reliability coefficients. However, two constructs have too low level of AVE. Those are Performance Expectancy and Risk. Therefore, validity of Performance Expectancy is questionable in this research, which is a limitation. As other indicators associated with the construct are in expected range, it was decided not to remove Performance Expectancy from further analysis. Risk is a formative construct, which makes AVE coefficient irrelevant, because AVE is relevant only for reflective constructs, as it was stated earlier. All constructs have VIFs lower, than maximum acceptable value of 10. Moreover, only Habit has a VIF higher, than recommended 5. All other constructs have VIFs either lower or approximately equal to ideal 3.3.

Another important part of Confirmatory Factor Analysis is the output for factor loadings. Each construct is derived based on a range of scales or questions, which are proposed in classic literature on the issue. However, in real life surveys some of the scales may not add up to the derived construct. In order to eliminate irrelevant scales, as it might facilitate future replications of a research, loadings for each of them are analyzed. It is recommended to delete scales with loadings lower than 0.5 from a construct (Kock, 2017). Analysis of loadings for scales and resulting matches of derived constructs with scales can be found in *Appendix 9*.

Analysis of resulting structural model

As it was shown previously the structural model was successfully developed based on primary data form the questionnaire. Processed model provided the calculations for path coefficients, associated p-values, and effect sizes. A certain path coefficient value means that if a certain independent variable (factors of adoption in UTAUT2) changes by 1 standard deviation, then a dependent variable (Behavioral Intention of Use in the context of this study) changes by the portion of its standard deviation equal to the path coefficient. Path coefficients are statistically significant and show a real dependency relationship in a model, if p-values associated with them are lower, than 0.05. Effect size shows the strength of effect of an independent/predictor variable on dependent/endogenous variable. Based on commonly accepted thresholds (Kock, 2017) effect size can be too weak to indicate any real effect (<0.02); small ($0.02<x<0.15$); medium ($0.15<x<0.35$); or large (>0.35). Based on the model outputs following hypothesis are supported: H1, H6.1, H6.2, H9-10.

H1: Increase in level of performance expectancy increases the behavioral intention to use a digital device wallet application. This hypothesis is supported, because of significant effect (p-value<0.001). Path coefficient equals 0.277 and effect size for path coefficient is 0.181, which is a medium effect size (>0.15). When reported performance expectancy of a digital device wallet increases by 1 standard deviation, behavioral intention increases by 0.277 of its standard deviation.

H6.1: Increase in level of habit increases the behavioral intention to use a digital device wallet application. This hypothesis is supported. P-value is less than 0.001, path coefficient equals 0.454 with medium effect size of 0.15<0.323>0.35. When reported habit of using of a digital device wallet increases by 1 standard deviation, behavioral intention increases by 0.454 of its standard deviation.

H6.2: Increase in level of habit increases the use behavior for a digital device wallet application. P-value is less than 0.001, path coefficient is 0.694 with large effect size of 0.588>0.35. When reported habit of using a digital device wallet increases by 1 standard deviation, actual use behavior for a digital device wallet increases by 0.694 of its standard deviation.

H9-10: Decrease in level of risk increases the behavioral intention to use a digital device wallet application. This hypothesis is supported. P-value for path coefficient is 0.016<0.05. Path coefficient equals -0.161 with small effect size of 0.02<0.077<0.15. When reported perceived risk of using a digital device wallet decreases by 1 standard deviation, behavioral intention increases by 0.161 of its standard deviation.

All other supporting statistical hypotheses for this study were not supported by the results of PLS-SEM based on collected primary data. A summary of outputs for each hypothesis can be found in *Appendix 10*.

All calculated path coefficients and p-values are presented on the model graph further.

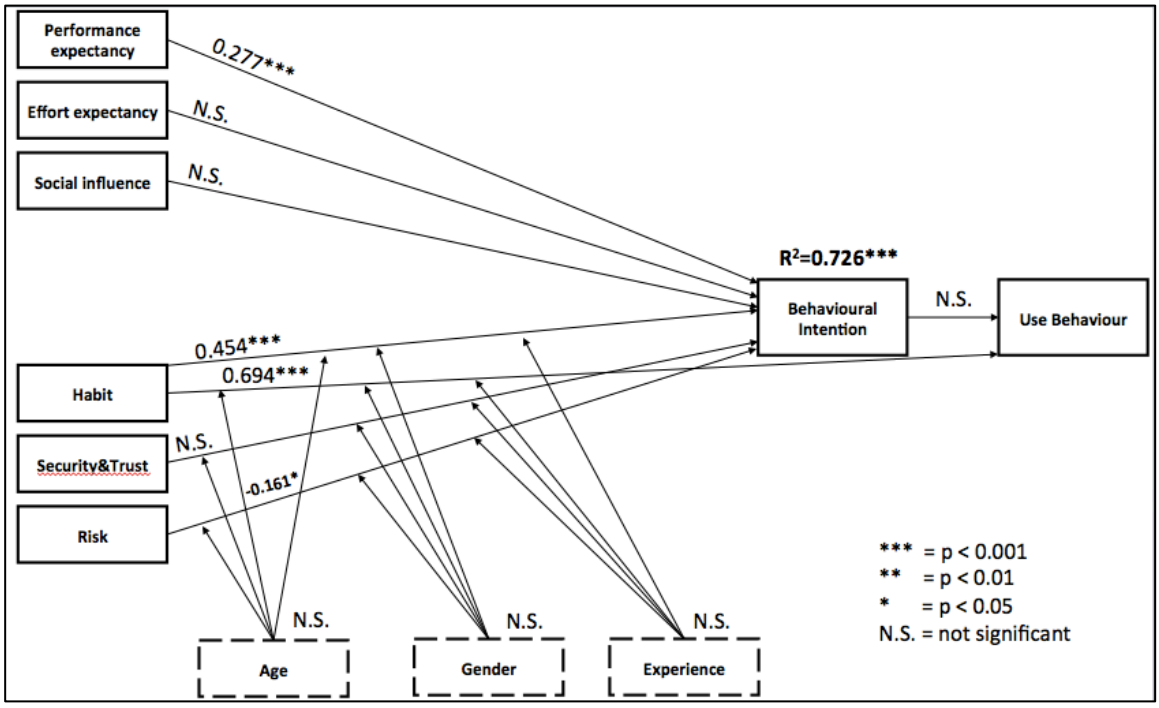

Figure 3. Resulting structural model

3.3 Interpretation of results

Average R-squared of 0.726 means that the model explains 72.6% of total variance in consumer's intention to adopt a digital device wallet. This is a strong upward correlation > 0.7. The value is significant, which indicates that model is reliable and can be used for practical implementation.

Results of analysis show that 3 factors affect the behavioral intention to use a digital device wallet. 2 of them drive the adoption in the role of antecedents, while 1 decreases the likelihood of adoption in the role of an inhibitor. Performance expectancy and Habit affect the adoption positively. At the same time Perceived Risk negatively affects the adoption. Habit also straightly affects the Use Behavior for a digital device wallet and explains 69,4% of its total variance, which is slightly below the threshold for strong upward correlation equal to 0.7.

There are two main surprising results from the analysis. Firsthand, Habit accounts for a large part of variation in actual Use Behavior. This means that, if consumers get used to paying with a digital device wallet, there is a very high probability that they will continue to use it in the future. At the same time another important finding is that in the case of digital device wallets in the Russian market Behavioral Intention does not lead to actual Use Behavior. This is a rare occasion for technology acceptance models.

Habit also is the main factor positively affecting the Behavioral Intention. The more people use a device wallet, the more they are inclined to intend to use a device wallet again in the future.

Performance Expectancy is another factor, which positively affects the intention to use digital device wallet. If consumers believe that a digital device wallet will perform as intended and will help them to achieve their goals during payment, then they will intend to use a digital device wallet in the future.

The only construct that negatively affects the Behavioral Intention is Perceived Risk. If consumers believe that device wallet might collect their data, which they would not like to disclose, or that a device wallet might fail during the payment process, then it would decrease their intention to use a device wallet in the future.

Another important conclusion is that age, gender, and previous experience of using a digital device wallet do not mediate any relationships between variables in the model. This might be due to the fact of high utilitarian purpose of the application that age and gender do not affect the model. Experience might be of no relevance, because of relative simplicity of digital device wallet applications and consumer's general familiarity with contactless payments via debit cards and online payments via Internet banking or mobile banking applications.

All and all, research shows that there is a range of factors, which can be manipulated by practitioners to facilitate the penetration of digital device wallets in the Russian market.

Managerial Applications

Based on the previous analysis several specific recommendations are proposed to the management of companies, which provide the service of digital device wallets. These recommendations will help to the companies to tailor their promotion strategies for the Russian market.

Firstly, main driver of adoption of digital device wallets is a habit of using a device wallet. Therefore, it is of particular importance to make people try using a device wallet at least once, so they can start to build a habit of using it. After paying with a device wallet several times consumers are highly likely to continue using device wallets in the future. Marketers should create motivational systems, which would invite people to return to the application. A gamefication system with points, which could be further exchanged for particular discounts or special offers, could create the needed drive for the people to engage with the application more often.

Second recommendation is to understand that intention to use a device wallet most probably is not enough for a person to start using it. This finding corresponds with the statistics described earlier. While there is high awareness about device wallets and many people express a will to use them someday, not so many people actually start using it. Therefore, marketers should tailor their campaigns to account for that fact. Promotion needs either focus solely on calls to action for the trials of using an application, or strengthen the behavioral connection between intention to use and actual usage. For example, if a device wallet was pre-downloaded to a smart phone and would remind a consumer about its opportunities with push-messages and potential bonuses, a person might actually turn into a frequent user of digital device wallet application. Moreover, joint marketing campaigns with leading Russian banks might help to make people use the application right after receiving a freshly issued card. This could help to leap over the intention to use stage right into actual usage and building a habit.

Product managers should realize that performance of a device wallet is very important for the initial consideration about its future use. Utilitarian value and performance features of digital device wallets should be at the core of marketing communication. All claims about technical features of applications should be very close to real-life performance of digital device wallets. Then expected performance would match the real performance, which could increase the pace of adoption of device wallets. This is especially true of functions connected with loyalty programs of B2B partners of service providers in the ecosystem. While these features are promoted widely,

for example, personalized retail discounts, providers of device wallet services have not yet created a strong ecosystem of partners to actually provide diverse loyalty programs.

While it might seem counterintuitive, consumers are not so conscious about security features of the offering. However, they are worried that a digital device wallet might fail during a payment process or it might lose their private information. Service providers should cautiously protect user data and communicate their risk-hedging strategies for the service.

Finally, as age and gender do not play a major role in adoption of digital device wallet applications, these consumer characteristics should not serve as a basis for targeting of promotional marketing campaigns for digital device wallets.

Limitations:

Major limitation of this study is the collected sample. Firstly, it is important to replicate the study on a bigger sample to make model estimations more reliable and valid. Moreover, increase in the sample size would lead to higher representativeness of results for a larger population. Moreover, a new sample should be more diverse in terms of characteristics of respondents, including occupation, age, gender, etc. In addition, more sophisticated types of sampling strategy beyond convenience and snowball would also help in reducing bias in the collected data.

Another limitation of the study is the fact that UTAUT2 was extended with only several new constructs such as Trust, Security, and Perceived Risk. The results of this Master Thesis might be expanded in the future by inclusion of other relevant theoretical variables, which could increase the explanatory power of the model and provide more insights into the process of adoption of digital device wallets.

Finally, this research focused solely on quantitative methods of analysis. As it was mentioned in Chapter 2, academics advise to supplement quantitative research with qualitative techniques to uncover opinions on the matter. For example, it would be useful to understand, what is the difference in consumers' perception of security and risk, and why security does not affect adoption of digital device wallets, while risk does affect it. This could be discovered through a number of interviews or focus groups with users of digital device wallets.

Conclusion to Chapter 3:

The results of this Master Thesis provide an answer to all research questions, which have been posed in Chapter 1. Performance Expectancy and Habit turned out to be the only antecedents of adoption of digital device wallets. Perceived Risk, including performance risk and privacy risk, is the only inhibitor of adoption of digital device wallets. Analysis of these factors helps to predict behavioral intention to use a digital device wallet and actual use with a high level of explanatory power (more than 70% of variance explained). Finally, it turned out that

characteristics of consumers such as age, gender, and previous experience of using a technology do not play an important role in adoption process.

Results of this Master Thesis have helped to identify a range of important insights about adoption of digital device wallets in Russia, which have not been uncovered in descriptive studies yet. Several actionable managerial recommendations were developed based on these uncovered peculiarities of consumer behavior in the context of payment technologies in Russia.

The research of this Master Thesis has a number of limitations, which could be eliminated by replication of the study. Firstly, a bigger sample might provide results, which would be more generalizable for the whole population of Russia. This is particularly true of distribution of respondents between cities. Secondly, another target groups could be surveyed to get representative results for older demographic groups. Finally, adjustments of models of adoption of technologies form a never-ending process. Therefore, academics are encouraged to expand UTAUT2 with new relevant constructs to gain insight about other potential factors of adoption of digital device wallets in Russia.

Conclusion

The research of this Master Thesis has answered all posed research questions in three major stages. On the first stage, we analyzed existing non-empirical and empirical research on the issue of adoption of digital device wallets internationally and in Russia. This analysis helped to identify UTAUT2 model as the best fit for closing the posed research gap through answering research questions. On the second stage, theoretical model UTAUT2 was extended with additional constructs and a questionnaire for primary data collection was developed based on the classical scales attributed to the model. A sampling strategy was developed to collect primary data for further analysis. On the third stage, UTAUT2 model was analyzed with non-linear PLS-SEM statistical techniques. Resulting model turned out to be reliable and helped to answer research questions.

1. What are the antecedents of adoption of digital device wallets by Russian consumers?

Performance Expectancy and Habit are the major antecedents of adoption of digital device wallets by Russian consumers. Habit turned out to play the most significant role both in intention to use and in actual usage of a digital device wallet. Therefore, the more a consumers uses a digital device wallet, the more likely it is that she will continue to use it more frequently.

2. What are the inhibitors of adoption of digital device wallets by Russian consumers?

Perceived Risk of using a digital device wallet is the only statistically significant barrier for adoption of a digital device wallet. Consumers are anxious about loosing private data during a transaction. Also they are concerned that a digital device wallet might fail to work properly during a transaction, which might undermine a purchase. These concerns prevent consumers from adoption.

3. How much of variance in adoption of digital device wallets can be explained with derived factors?

Model has a high explanatory power with 72,6% explained in the variation of intention to use a digital device wallet. Moreover, factor of Habit explains 69,4% of variance in actual use for a digital device wallet. An unexpected finding showed that intention to use does not lead to actual use of a digital device wallet.

4. How such characteristics of consumers as age, gender, and usage experience affect the adoption process for digital device wallets?

It was found that these characteristics do not affect adoption of digital device wallets based on the collected sample.

Major limitations of the research are rooted in the sample size and data collection techniques employed. It is recommended to replicate the study later on new samples, which is in line with research practices in the field of technology adoption.

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Appendix 1. Comparison of theoretical models of adoption of technologies

Table 1.1. Comparison of main theoretical models of adoption of technologies (Source: Shaikh and Karjaluoto, 2015)[1]

Model name	Year of development	Was it specifically developed for research on technology adoption? (Yes/No)	Organizational or consumer context of the model? Practical orientation/not practical orientation	Included variables
Theory of Reasoned Action (1980)	1980	No	Consumer context Not practical orientation	Perceived benefits Perceived costs Behavior
Theory of Planned Behavior (1991)	1991	No	Consumer context Practical orientation	Perceived benefits Perceived costs Behavioral intention Behavior
Social Cognitive Theory	1968	No	Consumer context Not practical orientation	Cognitive/personal factors Environmental factors Action
Diffusion of Innovation Theory	1995	Yes	Consumer context Not practical orientation	Environmental factors affect 5 stags of adoption
Technology Acceptance Models (TAM, TAM2, TAM3)	1986	Yes	Organizational context Practical orientation	Perceived usefulness Perceived ease of use Intention to use Actual usage
Unified Theory of Acceptance and Use of Technology (UTAUT)	2003	Yes	Organizational context Practical orientation	Performance expectancy Effort expectancy Social influence Facilitating conditions Behavioral intention Use behavior

[1] Aijaz A. Shaikh and Heikki Karjaluoto, "Mobile banking adoption: A literature review", Telematics and Informatics, no. 32 (2015): 129-142, Elsevier, accessed February 2018

				Age Gender Experience Voluntariness of use
Model name	Year of development	Was it specifically developed for research on technology adoption? Yes/No	Organizational or consumer context of the model? Practical orientation/not practical orientation	Included variables
UTAUT2	2012	Yes	Consumer context Practical orientation	Performance expectancy Effort expectancy Social influence Facilitating conditions Hedonic motivation Price value Habit Behavioral intention Use behavior Age Gender Experience

UTAUT2 model is chosen, because:

- It is the latest and most complete theoretical model
- It has been developed specifically for adoption of technologies
- It has been developed specifically for consumer context of adoption

Appendix 2. Correspondence between factors of extended UTAUT2 and needs of Russian adopters of digital device wallets

Table 2.1. UTAUT2 constructs with corresponding needs (Sources: UTAUT2 model[2], Visa research[3], analysis of the author)

UTAUT2 Construct	Expressed need	Ranking of need in Visa research
Performance expectancy	Works instantly	5
	Frictionless process	6
	More control over spending	7
	Knows my behavior and habits	8
	Limits currency exchange issues	16
Effort expectancy	Convenient to have with me	2
	Easy to set up and get started	3
	Simple to use after it is set up	9
Social influence	Others are impressed	12
	I am intrigued when others use it	18
Facilitating conditions	Compatible with current tech	1
	Accepted everywhere	4
Hedonic motivation	NA	NA
Price Value	Value-added services/perks	11
Habit	Customizable to meet my needs	10
	Personalized rewards/benefits	15
Perceived security (baseline condition)	Keeps purchase into private	13
	Protects identity/personal data	14
Trust (baseline condition)	NA	NA
Perceived risks (baseline condition)	Limits liability for data breaches	17

[2] Viswanath Venkatesh, James Y. L. Thong, and Xin Xu, «Consumer Acceptance and Use of Information Technology: Extending Unified Theory of Acceptance and Use of Technology», *MIS Quarterly* 36, no. 1 (2012): 157-178

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Appendix 3. Final research model UTAUT2 extended with Trust, Security, and Perceived Risk

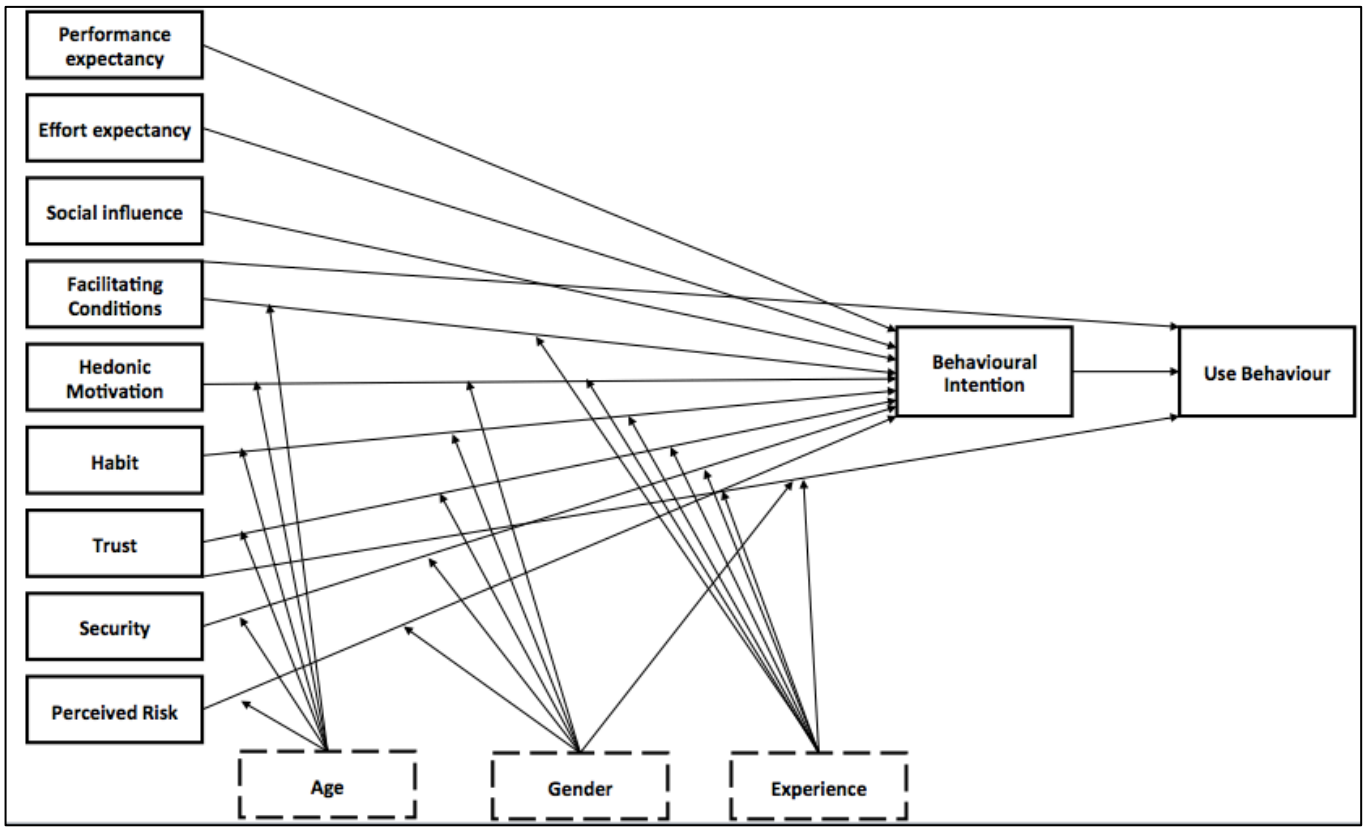

Figure 3.1. UTAUT2 extended with Trust, Security, and Perceived Risk constructs

Appendix 4. Full list of supporting statistical hypotheses

Table 4.1. List of supporting statistical hypotheses

H1: Increase in level of performance expectancy increases the behavioral intention to use a digital device wallet application
H2: Decrease in level of effort expectancy increases the behavioral intention to use a digital device wallet application
H3: Increase in level of social influence increases the behavioral intention to use a digital device wallet application
H4.1: Increase in level of facilitating conditions increases the behavioral intention to use a digital device wallet application
H4.2: Increase in level of facilitating conditions increases the use behavior for a digital device wallet application
H5: Increase in level of hedonic motivation increases the behavioral intention to use a digital device wallet application
H6.1: Increase in level of habit increases the behavioral intention to use a digital device wallet application
H6.2: Increase in level of habit increases the use behavior for a digital device wallet application
H7: Increase in level of trust increases the behavioral intention to use a digital device wallet application
H8: Increase in level of security increases the behavioral intention to use a digital device wallet application
H9: Decrease in level of performance risk increases the behavioral intention to use a digital device wallet application
H10: Decrease in level of privacy risk increases the behavioral intention to use a digital device wallet application
H11: Increase in level of behavioral intention to use a digital device wallet application increases the use behavior for a digital device wallet application
H12: Age of respondents mediates the effect of facilitating conditions on the behavioral intention to use a digital device wallet
H13: Age of respondents mediates the effect of hedonic motivation on the behavioral intention to use a digital device wallet
H14.1: Age of respondents mediates the effect of habit on the behavioral intention to use a digital device wallet
H14.2: Age of respondents mediates the effect of habit on the use behavior for a digital device wallet
H15: Age of respondents mediates the effect of trust on the behavioral intention to use a digital device wallet
H16: Age of respondents mediates the effect of security on the behavioral intention to use a digital device wallet
H17: Age of respondents mediates the effect of performance risk on the behavioral intention to use a digital device wallet
H18: Age of respondents mediates the effect of privacy risk on the behavioral intention to use a digital device wallet
H19: Gender of respondents mediates the effect of facilitating conditions on the behavioral intention to use a digital device wallet
H20: Gender of respondents mediates the effect of hedonic motivation on the behavioral intention to use a digital device wallet
H21.1: Gender of respondents mediates the effect of habit on the behavioral intention to use a digital device wallet
H21.2: Gender of respondents mediates the effect of habit on the use behavior for a digital device wallet
H22: Gender of respondents mediates the effect of trust on the behavioral intention to use a digital device wallet
H23: Gender of respondents mediates the effect of security on the behavioral intention to use a digital device wallet
H24: Gender of respondents mediates the effect of performance risk on the behavioral intention to use a digital device wallet
H25: Gender of respondents mediates the effect of privacy risk on the behavioral intention to use a digital device wallet
H26: Experience of respondents mediates the effect of facilitating conditions on the behavioral intention to use a digital device wallet

H27: Experience of respondents mediates the effect of hedonic motivation on the behavioral intention to use a digital device wallet
H28.1: Experience of respondents mediates the effect of habit on the behavioral intention to use a digital device wallet
H28.2: Experience of respondents mediates the effect of habit on the use behavior for a digital device wallet
H29: Experience of respondents mediates the effect of trust on the behavioral intention to use a digital device wallet
H30: Experience of respondents mediates the effect of security on the behavioral intention to use a digital device wallet
H31: Experience of respondents mediates the effect of performance risk on the behavioral intention to use a digital device wallet
H32: Experience of respondents mediates the effect of privacy risk on the behavioral intention to use a digital device wallet

Appendix 5. Questionnaire development process

Comments of the author are in italics

Welcoming screen text. This text is supplemented by a photo of a process of using an Apple Pay device wallet to help the respondents recall the experience of using a digital device wallet.

Уважаемый респондент,

приглашаем Вас поучаствовать в исследовании об использовании сервисов мобильных платежей. Опрос полностью анонимный.

Сервисы мобильных платежей (например, Apple Pay, Google Pay и Samsung Pay) позволяют производить бесконтактную оплату через терминал в магазинах и оплату онлайн в Интернете с помощью бесплатного приложения на Вашем смарт фоне. Приложение хранит информацию о всех Ваших дебетовых/кредитных карточках для совершения оплаты с Ваших счетов.

Ваш ответ важен для нас вне зависимости от того, пользовались Вы ранее сервисом мобильных платежей или нет.

Спасибо за Ваше участие!

У вас есть смарт фон? да/нет *(filtering question for deleting those, who do not own a smart phon and cannot potentially use a digital device wallet)*

Как давно Вы пользуетесь сервисом мобильных платежей? *(those are standard time frames from descriptive studies of marketing research agencies from Chapter 1. This question represents the Experience construct in UTAUT2)*

Не пользуюсь

Последний месяц

Последние три месяца

Последние пол года

Последний год

С момента появления сервисов мобильных платежей (около полутора лет)

Как часто Вы пользуетесь сервисом мобильных платежей? *(this reflects the Use Behavior construct from UTAUT2)*

Frequency of use (Adapted from Rosen et al., 2013)		
Never	Never	Никогда
Once a month	Once a month	Раз в месяц
Several times a month	Several times a month	Несколько раз в месяц

Once a week	Once a week	Раз в неделю
Several times a week	Several times a week	Несколько раз в неделю
Once a day	Once a day	Раз в день
Several times a day	Several times a day	Несколько раз в день

Далее мы просим Вас ответить на вопросы о Вашем потенциальном опыте использования сервиса мобильных платежей. Пожалуйста, отметьте, насколько Вы согласны с каждым из перечисленных утверждений (1 – полностью не согласны, 7 – полностью согласны)

Original scale	**Adjusted scale**	**Adjusted scale translated**
Performance Expectancy (Adapted from Cristian Morosan and Agnes DeFranco, 2016)		
PE1. Using NFC mobile payments in hotels would enhance the effectiveness of my interactions with the hotel (for example, purchasing products/services, making reservations)	Using digital device wallet payments during purchasing products or services would enhance the effectiveness of my interactions with the seller (for example, offline or online)	Использование сервиса мобильных платежей во время покупки продуктов или услуг улучшит эффективность моего взаимодействия с продавцом (например, при покупках онлайн или офлайн)
PE2. Using NFC mobile payments would increase the efficiency of my hotel stay	Using digital device wallet payments would increase the efficiency of my purchasing process	Использование сервиса мобильных платежей увеличит эффективность процесса моей покупки
PE3. Using NFC mobile payments in hotels would improve the quality of my hotel stay	Using digital device wallet payments during purchasing would improve the quality of my purchasing process	Использование сервиса мобильных платежей во время моей покупки улучшит качество процесса покупки
PE4. Using NFC mobile payments would allow me to access products/reservations faster in hotels	Using digital device wallet payments would allow me to access products/services faster during the purchase	Использование сервиса мобильных платежей позволит мне быстрее получать доступ к продуктам/услугам во время покупки
PE5. Using NFC mobile payments would allow me to make more accurate purchases/reservations in hotels	Using digital device wallet payments would allow me to track the purchasing process more accurately	Использование сервиса мобильных платежей позволит мне более точно отслеживать процесс моей покупки
PE6. Using NFC mobile payments would allow me to purchase/reserve products with an overall better value in hotels	Using digital device wallet payments would allow me to purchase products/services with an overall	Использование сервиса мобильных платежей позволит мне увеличить общую

	better value	получаемую мной ценность от приобретения продуктов/услуг
PE7. Using NFC mobile payments would allow me to better manage my money when staying in hotels	Using digital device wallet payments would allow me to better manage my money when purchasing things	Использование сервиса мобильных платежей позволит мне лучше управлять моими денежными средствами во время покупок
PE8. Using NFC mobile payments would allow me to have better control over my expenses in hotels	Using digital device wallet payments would allow me to have better control over my expenses during purchasing things	Использование сервиса мобильных платежей позволит мне лучше контролировать мои расходы во время покупок
PE9. Using NFC mobile payments would allow me to have a better view of my purchasing history in hotels	Using digital device wallet payments would allow me to have a better view of my purchasing history	Использование сервиса мобильных платежей даст мне улучшенное представление о моей истории покупок
PE10. Using NFC mobile payments would provide me with a more secure method of payment in hotels	Using digital device wallet payments would provide me with a more secure method of payment	Использование сервиса мобильных платежей предоставит мне более защищенный способ оплаты покупок
PE11. Using NFC mobile payments would lower the need to carry multiple methods of payment with me when staying in hotels	Using digital device wallet payments would lower the need to carry multiple methods of payment with me when purchasing things	Использование сервиса мобильных платежей уменьшит для меня необходимость брать с собой различные средства оплаты покупок
PE12. Using NFC mobile payments would allow me to choose more effectively among my methods of payment	Using digital device wallet payments would allow me to choose more effectively among my methods of payment	Использование сервиса мобильных платежей позволит мне более эффективно выбирать между способами оплаты
PE13. Using NFC mobile payments would allow me to obtain benefits beyond the hotel stay (for example, using a preferred credit card)	Using digital device wallet payments would allow me to obtain benefits beyond the purchasing (for example, using a digital loyalty card)	Использование сервиса мобильных платежей позволит мне получить другие преимущества, помимо оплаты (например, использование электронной карты лояльности)
PE14. Overall, I believe that NFC mobile payments are useful when staying in hotels	Overall, I believe that digital device wallet mobile payments are useful when purchasing things	В целом я считаю, что сервис мобильных платежей полезен во время совершения покупок
Effort Expectancy (Adapted from Venkatesh et al., 2012)		
EE1. Learning how to use mobile Internet is easy for me	Learning how to use digital device wallet is easy for me	Мне легко научиться пользоваться сервисом мобильных платежей

EE2. My interaction with mobile Internet is clear and understandable	My interaction with digital device wallet would be clear and understandable	Мое взаимодействие с сервисом мобильных платежей будет ясным и понятным
EE3. I find mobile Internet easy to use	I find digital device wallet easy to use	Я считаю, что сервис мобильных платежей легко использовать
EE4. It is easy for me to become skillful at using mobile Internet	It is easy for me to become skillful at using digital device wallet	Мне будет легко развить навыки уверенного использования сервиса мобильных платежей
Social Influence (Adapted from Venkatesh et al., 2012)		
SI1. People who are important to me think that I should use mobile Internet	People who are important to me think that I should use digital device wallet	Люди, которые важны для меня, считают, что мне следует использовать сервис мобильных платежей
SI2. People who influence my behavior think that I should use mobile Internet	People who influence my behavior think that I should use digital wallet	Люди, которые влияют на мое поведение, думают, что мне следует пользоваться сервисом мобильных платежей
SI3. People whose opinions that I value prefer that I use mobile Internet	People whose opinions that I value prefer that I use digital wallet	Люди, мнение которых я ценю, предпочли бы, чтобы я пользовался сервисом мобильных платежей
Facilitating Conditions (Adapted from Venkatesh et al., 2012)		
FC1. I have the resources necessary to use mobile Internet	I have the resources necessary to use digital device wallet	У меня есть все необходимые средства для использования сервиса мобильных платежей
FC2. I have the knowledge necessary to use mobile Internet	I have the knowledge necessary to use digital device wallet	У меня есть необходимые знания для использования сервиса мобильных платежей
FC3. Mobile Internet is compatible with other technologies I use	Digital device wallet is compatible with other technologies I use	Сервис мобильных платежей совместим с другими технологиями, которые я использую
FC4. I can get help from others when I have difficulties using mobile Internet.	I can get help from others when I have difficulties using digital device wallet	Я смогу получить помощь от других людей, если у меня возникнут проблемы с использованием сервиса мобильных платежей
Hedonic Motivation (Adapted from Venkatesh et al., 2012)		
HM1. Using mobile Internet is fun	Using digital device wallet would is fun	Пользоваться сервисом мобильных платежей весело
HM2. Using mobile Internet is enjoyable	Using digital device wallet would is	Пользоваться сервисом

	enjoyable	мобильных платежей приятно
HM3. Using mobile Internet is very entertaining	Using digital device wallet is very entertaining	Пользоваться сервисом мобильных платежей очень увлекательно
Price Value **(dropped** based on Cristian Morosan and Agnes DeFranco, 2016**)**		
PV1. Mobile Internet is reasonably priced	NA	NA
PV2. Mobile Internet is a good value for the money	NA	NA
PV3. At the current price, mobile Internet provides a good value	NA	NA
Habit (Adapted from Venkatesh et al., 2012)		
HT1. The use of mobile Internet has become a habit for me	The use of digital device wallet has become a habit for me	Использование сервиса мобильных платежей стало для меня привычным
T2. I am addicted to using mobile Internet	I am addicted to using digital device wallet	Я пристрастился к использованию сервиса мобильных платежей
HT3. I must use mobile Internet	I must use digital device wallet	Мне необходимо использовать сервис мобильных платежей
HT4. Using mobile Internet has become natural to me (dropped)	Using digital device wallet has become natural to me	Использование сервиса мобильных платежей стало для меня естественным
Trust (Adapted from Khalilzadeh et al., 2017)		
Tr1. I believe NFC MP service providers keep their promise	I believe digital device wallet service providers keep their promise	Я верю, что поставщики сервиса мобильных платежей сдерживают свои обещания
Tr2. I believe NFC MP service providers keep customers' interests in mind	I believe digital device wallet service providers keep customers' interests in mind	Я верю, что поставщики сервиса мобильных платежей держат в уме интересы своих клиентов
Tr3. I believe NFC MP service providers are trustworthy	I believe digital device wallet service providers are trustworthy	Я верю, что поставщикам сервиса мобильных платежей можно доверять
Tr4. I believe NFC MP service providers will do everything to secure the transactions for users	I believe digital device wallet service providers will do everything to secure the transactions for users	Я верю, что поставщики сервиса мобильных платежей сделают все возможное для защиты транзакций пользователей
Security (Adapted from Jalayer Khalilzadeh et al., 2017)		
Sec1. I would feel secure using my credit/debit card information through NFC MP systems	I would feel secure using my credit/debit card information through digital device wallet systems	Я бы чувствовал себя спокойно при использовании информации о моей дебетовой/кредитной карте в сервисе мобильных платежей
Sec2. NFC MP systems are secure means through which to send/use sensitive information	Digital device wallet systems are secure means through which to	Сервисы мобильных платежей – это безопасные системы для

	send/use sensitive information	отправки/использования конфиденциальной информации
Sec3. I would feel totally safe providing sensitive information about myself over the NFC MP systems	I would feel totally safe providing sensitive information about myself over the digital device wallet systems	Я бы чувствовал себя в полной безопасности, если бы предоставил конфиденциальную информацию о себе сервису мобильных платежей
Sec4. Overall, the NFC MPs are safe systems to transmit sensitive information	Overall, the digital device wallet are safe systems to transmit sensitive information	В целом сервисы мобильных платежей – это безопасные системы для передачи конфиденциальной информации
Performance Risk (Adapted from Khalilzadeh et al., 2017)		
PR1. The probability that something will go wrong with the performance of NFC MP is high	The probability that something will go wrong with the performance of digital device wallet is high	Высока вероятность того, что что-то пойдет не так во время работы сервиса мобильных платежей
PR2. NFC MP might not perform well and create problems with my payment process in restaurants	Digital device wallet might not perform well and create problems with my payment process during purchasing	Сервис мобильных платежей может начать неправильно работать и создать проблемы во время оплаты моих покупок
PR3. Considering the expected level of service performance of NFC MP, for me to sign up and use it would be risky	Considering the expected level of service performance of digital device wallet, for me to sign up and use it would be risky	Учитывая ожидаемый мной уровень работы сервиса мобильных платежей, для меня будет рискованно в нем зарегистрироваться и использовать его
Privacy Risk (Adapted from Khalilzadeh et al., 2017)		
PrR1. The chances of using the NFC MP and losing control over my personal information privacy is high	The chances of using the digital device wallet and losing control over my personal information privacy is high	Существует высокая вероятность потерять контроль над конфиденциальной личной информацией из-за использования сервиса мобильных платежей
PrR2. My signing up and using NFC MP would lead me to a loss of privacy because my personal information would be used without my knowledge	My signing up and using digital device wallet would lead me to a loss of privacy because my personal information would be used without my knowledge	Регистрация в сервисе мобильных платежей и его дальнейшее использование негативно повлияют на неприкосновенность моей частной жизни, так как моя личная информация будет использоваться без моего ведома
PrR3. I think using NFC MP could not keep my personal sensitive information from exposure	I think using digital device wallet could not keep my personal sensitive information from exposure	Я думаю, что использование сервиса мобильных платежей не поможет сохранить мою

		конфиденциальную информацию от разглашения
Behavioral Intention (Adapted from Morosan and DeFranco, 2016)		
BI1. I intend to use NFC mobile payments in hotels in the future	I intend to use digital device wallets for my payments in the future	Я собираюсь использовать сервис мобильных платежей для оплаты в будушем
BI2. I will always try to use NFC mobile payments in my hotel stays	I will always try to use digital device wallet payments during purchasing things	Я буду пытаться всегда использовать сервис мобильных платежей для оплаты моих покупок
BI3. I will recommend to others using NFC mobile payments in hotels	I will recommend to others using digital device wallet payments for purchasing things	Я буду рекомендовать другим людям использовать сервис мобильных платежей для оплаты покупок
BI4. NFC mobile payments would be one of my favorite technologies for payment	Digital device wallet payments would be one of my favorite technologies for payment	Сервис мобильных платежей станет одной из главных технологий оплаты для меня

Пол: м/ж

Возраст:

меньше 18 лет

18-25 лет

26-35 лет

36-46 лет

больше 46 лет

Город Вашего постоянного проживания: *ответ вводится респондентом самостоятельно*

В данный момент Вы:

Получаете среднее образование

Получаете Высшее образование

Работаете

Безработный

На пенсии

Оцените свой ежемесячный доход:

до 20 000 рублей

от 20 000 до 30 000 рублей

от 30 000 до 50 000 рублей

более 50 000 рублей

Appendix 6. Required minimal sample size based on WarpPLS 6.0 calculations

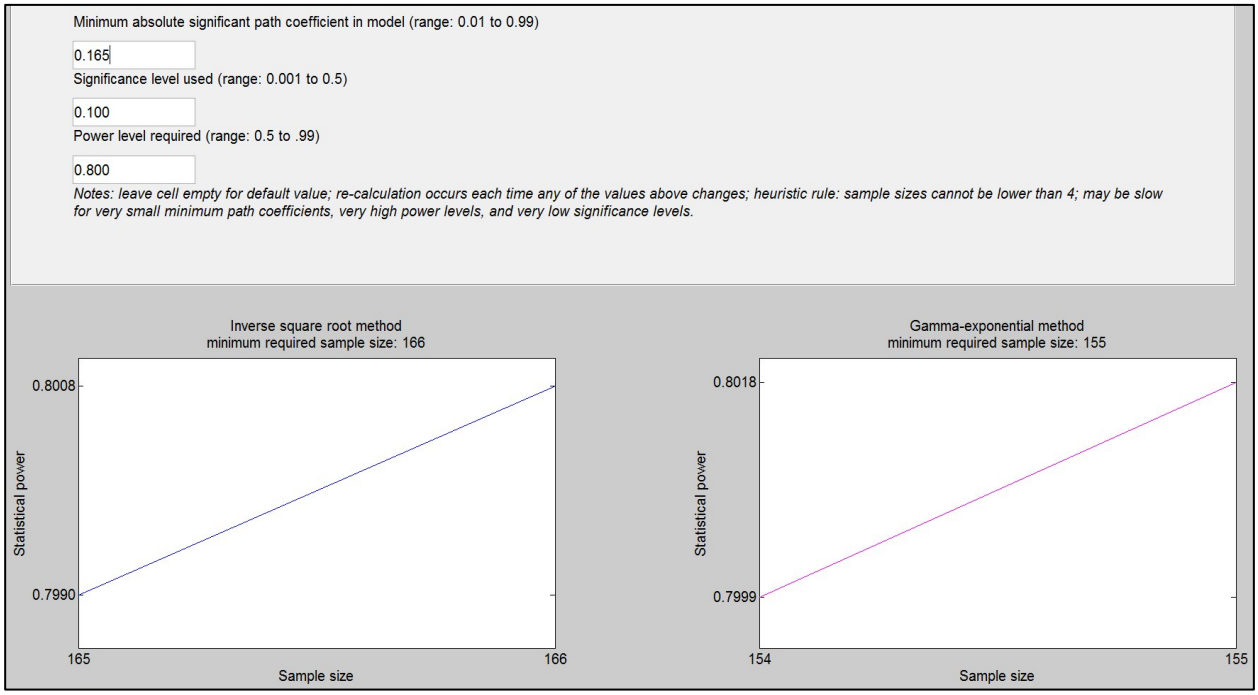

Figure 6.1. Sample size requirements based on two calculation methods

Appendix 7. Model adjusted to account for high collinearity between constructs and removal of Hedonic Motivation

Trust and Security are combined into one construct. Perceived Risk is one construct instead of two types of perceived risk. Hedonic Motivation is deleted due to bias concerns after descriptive analysis.

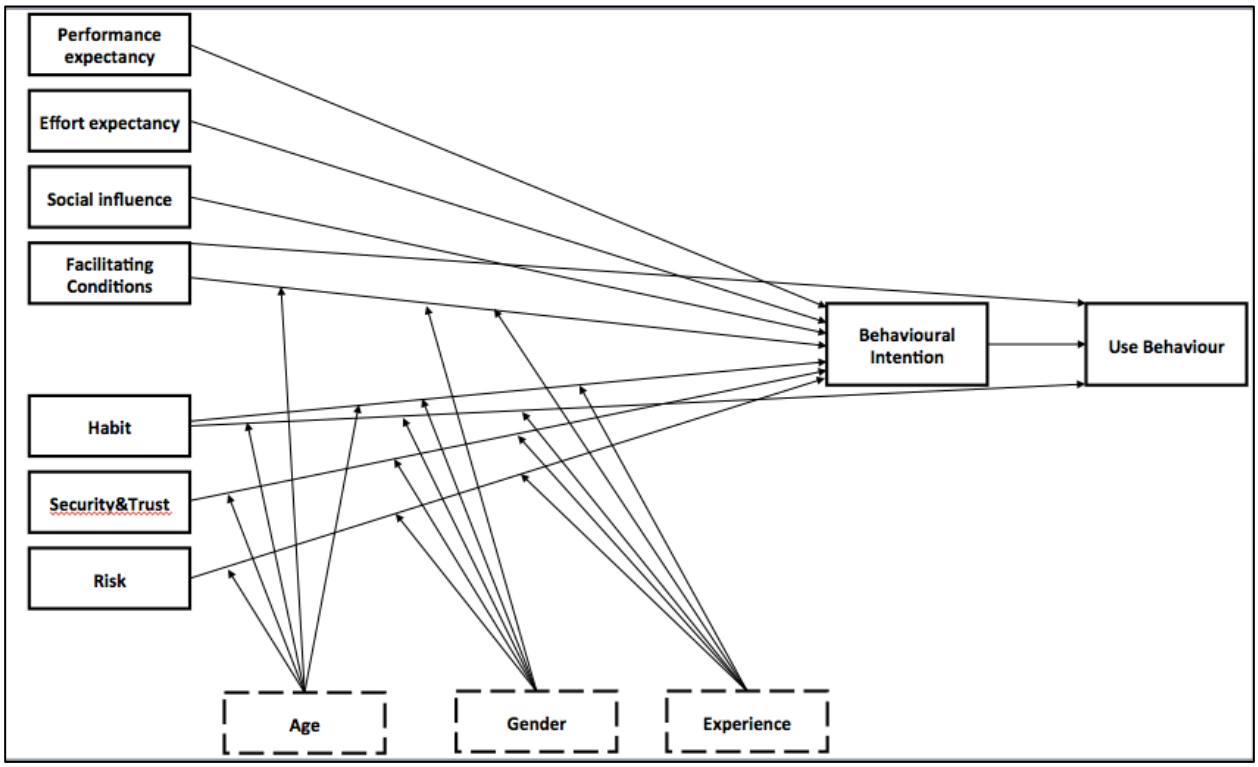

Figure 7.1. Adjusted UTAUT2 in PLS-SEM analysis

Appendix 8. Model fit and quality indices output from WarpPLS 6.0

Average path coefficient (APC)=0.108, P=0.038
Average R-squared (ARS)=0.726, P<0.001
Average adjusted R-squared (AARS)=0.703, P<0.001
Average block VIF (AVIF)=2.448, acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=2.537, acceptable if <= 5, ideally <= 3.3
Tenenhaus GoF (GoF)=0.674, small >= 0.1, medium >= 0.25, large >= 0.36
Sympson's paradox ratio (SPR)=0.800, acceptable if >= 0.7, ideally = 1
R-squared contribution ratio (RSCR)=0.954, acceptable if >= 0.9, ideally = 1
Statistical suppression ratio (SSR)=1.000, acceptable if >= 0.7
Nonlinear bivariate causality direction ratio (NLBCDR)=0.940, acceptable if >= 0.7

Figure 8.1. Outputs for model fit and quality

Appendix 9. Confirmatory Factor Analysis outputs: factor loadings

Scales with loadings lower than 0.5 are italics. They are deleted from constructs.

Table 9.1. Factor loadings

Factor/Loadings	ii1	ii2	ii3	ii4	ii5	ii6	ii7	ii8	ii9	ii10	ii11	ii12	ii13	ii14
PE	(0.658)	(0.803)	(0.836)	(0.683)	*(0.421)*	(0.542)	*(0.399)*	*(0.284)*	*(0.200)*	(0.713)	(0.666)	(0.708)	*(0.478)*	(1.000)
P-values of PE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001
EE	(0.796)	(0.985)	(0.969)	(0.795)										
P-values of EE	<0.001	<0.001	<0.001	<0.001										
SI	(0.849)	(0.920)	(0.974)											
P-values of SI	<0.001	<0.001	<0.001											
FC	(0.719)	(0.799)	(0.596)	*(0.179)*										
P-values of FC	<0.001	<0.001	<0.001	0.009										
Habit	(0.976)	(0.944)	(0.700)	(0.957)										
P-values of Habit	<0.001	<0.001	<0.001	<0.001										
Security&Trust	(0.845)	(0.906)	(0.714)	(0.786)	(0.843)	(0.646)	(0.745)	(0.798)						
P-values of S&T	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001						
Risk	(0.690)	(0.559)	(1.000)	*(0.410)*	(0.699)	(0.677)								
P-values of Risk	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001								
BI	(0.854)	(0.868)	(0.900)	(0.931)										
P-values of BI	<0.001	<0.001	<0.001	<0.001										

Table 9.2. Match of constructs with remaining scales

Construct Name	Item Name	Items/scales	Loadings
Performance Expectancy (PE)	PE1	Using digital device wallet payments during purchasing products or services would enhance the effectiveness of my interactions with the seller (for example, offline or online)	(0.658)
	PE2	Using digital device wallet payments would increase the efficiency of my purchasing process	(0.803)
	PE3	Using digital device wallet payments during purchasing would improve the quality of my purchasing process	(0.836)
	PE4	Using digital device wallet payments would allow me to access products/services faster during the purchase	(0.683)
	PE6	Using digital device wallet payments would allow me to purchase products/services with an overall better value	(0.542)
	PE10	Using digital device wallet payments would provide me with a more secure method of payment	(0.713)
	PE11	Using digital device wallet payments would lower the need to carry multiple methods of payment with me when purchasing things	(0.666)
	PE12	Using digital device wallet payments would allow me to choose more effectively among my methods of payment	(0.708)
	PE14	Overall, I believe that digital device wallet mobile payments are useful when purchasing things	(1.000)
Effort Expectancy (EE)	EE1	Learning how to use digital device wallet is easy for me	(0.796)
	EE2	My interaction with digital device wallet would be clear and understandable	(0.985)
	EE3	I find digital device wallet easy to use	(0.969)
	EE4	It is easy for me to become skillful at using digital device wallet	(0.795)
Social Influence (SI)	SI1	People who are important to me think that I should use digital device wallet	(0.849)
	SI2	People who influence my behavior think that I should use digital wallet	(0.920)
	SI3	People whose opinions that I value prefer that I use digital wallet	(0.974)
Habit	Habit1	The use of digital device wallet has become a habit for me	(0.976)
	Habit2	I am addicted to using digital device wallet	(0.944)
	Habit3	I must use digital device wallet	(0.700)
	Habit4	Using digital device wallet has become natural to me	(0.957)
Security&Trust	Sec1	I would feel secure using my credit/debit card information through digital device wallet systems	(0.845)
	Sec2	Digital device wallet systems are secure means through which to send/use sensitive information	(0.906)
	Sec3	I would feel totally safe providing sensitive information about myself over the digital device wallet systems	(0.714)
	Sec4	Overall, the digital device wallet are safe systems to transmit sensitive information	(0.786)
	Trust1	I believe digital device wallet service providers keep their promise	(0.843)
	Trust2	I believe digital device wallet service providers keep customers' interests in mind	(0.646)
	Trust3	I believe digital device wallet service providers are trustworthy	(0.745)
	Trust4	I believe digital device wallet service providers will do everything to secure the transactions for users	(0.798)
Risk	PerfRisk1	The probability that something will go wrong with the performance of digital device wallet is high	(0.690)
	PerfRisk2	Digital device wallet might not perform well and create problems with my payment process during purchasing	(0.559)
	PerfRisk3	Considering the expected level of service performance of digital device wallet, for me to sign up and use it would be risky	(1.000)

	PrivRisk2	My signing up and using digital device wallet would lead me to a loss of privacy because my personal information would be used without my knowledge	(0.699)
	PrivRisk3	I think using digital device wallet could not keep my personal sensitive information from exposure	(0.677)
Behavioral Intention (BI)	BI1	I intend to use digital device wallets for my payments in the future	(0.854)
	BI2	I will always try to use digital device wallet payments during purchasing things	(0.868)
	BI3	I will recommend to others using digital device wallet payments for purchasing things	(0.900)
	BI4	Digital device wallet payments would be one of my favorite technologies for payment	(0.931)

Appendix 10. Path coefficients, effect sizes, and p-values for structural model

Table 10.1. Outputs for main variables of internal model

Path	Path coefficients	p-value	Effect size for path coefficients	Hypothesis
PE -> BI	0.277	<0.001	0.181 (medium)	H1: Supported
EE -> BI	0.059	0.222	0.029 (small)	H2: Not Supported
SI -> BI	0.097	0.101	0.051 (small)	H3: Not Supported
FC -> BI	-0.040	0.299	0.014 (too weak)	H4.1: *Dropped*
FC -> Use	0.062	0.208	0.026 (small)	H4.2: *Dropped*
HM -> BI	NA	NA	NA	H5: *Dropped*
Habit -> BI	0.454	<0.001	0.323 (moderate)	H6.1: Supported
Habit -> Use	0.694	<0.001	0.588 (large)	H6.2: Supported
Security&Trust -> BI	0.051	0.250	0.029 (small)	H7-8: Not Supported
Risk (PerfRisk&PrivRisk) -> BI	-0.161	0.016	0.077 (small)	H9-10: Supported
BI -> Use	0.088	0.124	0.058 (small)	H11: Not Supported

Table 10.2. Outputs for mediating variables of internal model

Age*FC -> BI	-0.025	0.374	0.009 (too weak)	H12: *Dropped*
Age*HM -> BI	NA	NA	NA	H13: *Dropped*
Age*Habit -> BI	-0.004	0.478	0.001 (too weak)	H14.1: Not Supported
Age*Habit -> Use	-0.006	0.470	0.001 (too weak)	H14.2:Not Supported
Age*Security&Trust -> BI	-0.039	0.305	0.006 (too weak)	H15-16: Not Supported
Age*Risk -> BI	0.010	0.447	0.002 (too weak)	H17-18: Not Supported
Gender*FC -> BI	-0.125	0.050	0.025 (small)	H19: *Dropped*
Gender*HM -> BI	NA	NA	NA	H20: *Dropped*
Gender*Habit -> BI	-0.111	0.071	0.051 (small)	H21.1: Not Supported
Gender*Habit -> Use	0.063	0.204	0.040 (small)	H21.2: Not Supported
Gender*Security&Trust -> BI	0.040	0.300	0.009 (too weak)	H22-23: Not Supported
Gender*Risk (PerfRisk&PrivRisk) -> BI	-0.007	0.464	0.001 (too weak)	H24-25: Not Supported
Experience*FC -> BI	0.044	0.284	0.014 (too weak)	H26: *Dropped*
Experience*HM -> BI	NA	NA	NA	H27: *Dropped*
Experience*Habit -> BI	-0.042	0.293	0.014 (too weak)	H28.1: Not Supported
Experience*Habit -> Use	0.049	0.262	0.018 (too weak)	H28.2: Not Supported
Experience*Security&Trust -> BI	-0.097	0.100	0.024 (small)	H29-30: Not Supported
Experience*Risk (PerfRisk&PrivRisk) -> BI	0.057	0.228	0.009 (too weak)	H31-32: Not Supported