



LUT School of Business and Management

Mobile payment usage in the Nordic countries

Janina Relander, 2019

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ABSTRACT

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The aim of this thesis was to recognize the factors that affect whether the Nordic consumers use mobile payments or not. In the interest of this thesis is also to reflect the empirical examination to existing literature about technology acceptance. In the theoretical part of this thesis, previous research is reviewed and reflected. Theoretical part also consists of the examination and closer review of the traditional theories of technology acceptance.

The empirical part of this thesis is executed as a mixed method study, mixing quantitative and qualitative research methods. Data for the empirical part was gathered by an online survey to Nordic consumers. The sample of the empirical examination is small and highly skewed and so the results mainly present the factors within the sample and are not generalizable. Regression analysis showed that facilitating conditions, behavioral intention and social influence are the significant factors affecting the mobile payment usage and results of qualitative examination showed that performance expectancy, effort expectancy and privacy and overall risk affect the mobile payment acceptance.

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Tämän tutkielman tavoitteena on tunnistaa tekijöitä, jotka vaikuttavat siihen ottavatko Pohjoismaiset kuluttajat mobiilimaksamisen käyttöön, vai eivät. Kiinnostuksen kohteena on myös se, kuinka tutkimuksen tulokset vastaavat aiempien tutkimusten tuloksia. Tutkimuksen teoriaosuus koostuu aiempien tutkimusten ja teoreettisten mallien tarkastelusta.

Tutkimuksen empiirinen osio on toteutettu yhdistelmämenetelmällä, jossa on piirteitä sekä kvantitatiivisista, että kvalitatiivisista tutkimusmenetelmistä. Aineisto empiiristä osiota varten on kerätty kyselylomakkeella, joka oli avoinna kaikille pohjoismaalaisille kuluttajille. Tutkimuksen otanta on vääristynyt ja täten edustaa ainoastaan kyselyyn vastanneiden mielipiteitä. Tutkimuksen kvalitatiivinen osuus osoitti, että fyysiset edellytykset, aiomukset ja sosiaalinen vaikutus ovat merkittäviä tekijöitä mobiilimaksamisen käyttöönotossa. Kvalitatiivinen osuus osoitti, että suorituskyvyn ja vaivannäön odotukset sekä yksityisyys- ja kokonaisriskit ovat merkittäviä tekijöitä mobiilimaksamisen käyttöönotossa.

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In Espoo, 2.3.2019

Janina Relander

1. Introduction & Motivation

Since the introduction of first credit cards in 1950 that enabled customers to pay without having cash with them, the evolution of payment methods has been fast. In 60 years we have moved from using cash and checks to paying contactlessly. Step by step paying for goods and services have become easier and faster. New technological innovations are key to this development, but new technologies require time to be adopted by people in order to succeed. The adaptation of new technological innovations that enable people to pay for goods and services is in the focus of this thesis. During the past few years mobile payments have become increasingly common way of paying for goods and services, sharing bills, transferring money and checking for account balance. Most of the consumers that could use mobile payments on their smartphones, are still not utilizing the applications that enables fast and easy way of paying. The focus of the thesis is narrowed to examine the acceptance of mobile payment technologies in the Nordic countries and further narrowed to search for the main factors that affect the adaptation of the new technology.

Globally, smartphone penetration is expected to grow up to 40% by 2021 and according to the same research 34,7 percent of the global population used smartphones in 2018 (Statista 2018a). And according to Deloitte's study in 2017 smartphone penetration is as high as 88% in the Nordic countries (Sweden 72%, Norway 82%, Denmark 75% and Finland 67%). According to Deloitte's research still only 26 percent of the Swedish users, 10 percent of the Norwegian, 30 percent of the Danish and only 6 percent of the Finnish consumers use their smartphones to pay in-store at least once in a month. (Deloitte, 2017) High smartphone penetration but low usage of mobile payments in the Nordic countries addresses high potential in using mobile payments.

This thesis focuses geographically to the Nordic countries. The subject is starting to be well known and there is literature and research done regarding the topic, Nordic countries, as an area of research has not been studied widely. Because of the high potential and smartphone penetration, the Nordic countries (Sweden, Norway,

Denmark and Finland) were chosen to be the target area of this thesis. The Nordic banking system is globally advanced and brave when it comes to new payment solutions. Using smartphones or mobile phones as payment devices is relatively new invention and because of that it is justifiable and interesting to search for variables and correlations between factors that result in consumer decisions. The speed of new inventions and the entry of new players in the field offer interesting set up for this thesis. New applications are always risky business and launching a new application might be very expensive. This is why it is interesting to investigate the factors that affect how and why the consumers adopt new technological innovations. Mobile payments have already been in use for a while now, but new players and new extensions are coming to market all the time. Acknowledging these factors and focusing on them might be advantageous when entering the market.

1.1 Research problem & questions

The aim of this study is to find significant factors (variables), which result in consumer decision to use or not to use mobile payment as a payment method when making in-store payments and money transfers. Since the smartphone penetration in the Nordic countries seems to be remarkably high, it is crucial to think of the reasons why the smartphone (or other mobile device) owners have not adopted those devices as payment methods.

In this thesis, there are three main research questions:

RQ1: What are the most important factors affecting mobile payments found in earlier research?

RQ2: What are the most important factors that affect in mobile payment usage among Nordic consumers?

RQ3: What are the most important reasons that lead consumers to start using mobile payments?

RQ4: What are the most important reasons why consumers have not started using mobile payments (yet)?

This thesis will seek to find answers to these four research questions. These questions will be reviewed and answered in the discussion part of this thesis, in chapter 6.3. Also possible limitations and distortions of the results will be pointed out.

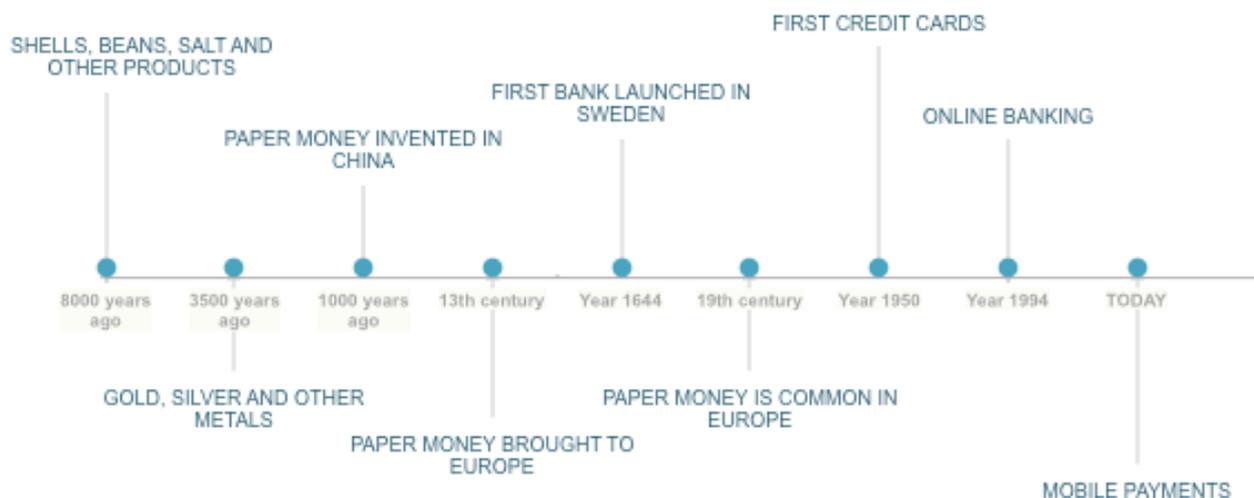
1.2 History of payment methods

Payment technologies have developed tremendously during the last two decades due to the development of mobile technologies. It all goes back 8000 years, to the time of bartering system, in which people exchanged rare and valuable items such as shells or coconuts. Then, about 3500 years back, people started to use gold, silver and other metals in form of bars or other pieces in the mean of exchange. Then 1000 years ago, in China, paper money was invented and this was the beginning of money as we know it today. From China, Marco Polo brought paper money to Europe in the 13th century. In Sweden, in 1644 for the first time in Europe, copper plates could be swapped using a bank exchange rate. By the 19th century, paper money had become a common payment method in Europe. In the beginning of 20th century, charge cards were introduced and taken into use. By these charge cards, customers did not have to physically travel to their bank. In the 1950s the first credit cards were taken into use. After the launch of the Diners Club card in 1950 the revolution of credit cards began. It continued by the introduction of the BankAmericard in 1958 and the Visa in 1977. Online banking was launched already in 1994 for private customers. (Wirecard, 2016; Rampton, 2016) Then in 1997, Nokia, Ericsson, Motorola and Unwired Planet cooperated to create Wireless Applications Protocol (WAP) to enable everyone to use Internet connected devices and Merita-Nordbanken was the first bank in Scandinavia to provide WAP service to their customers (Powers, 2017).

The first form of mobile payment appeared in 1997, when Coca Cola launched vending machines that enabled customers to pay by sending a text message. The first mobile banking form was introduced during the same year by a bank that

allowed customers to make bank account transactions by text messages. (NFC, 2018)

Figure 1. Evolution of payment methods



Today we have a wide variety of payment methods available in addition to traditional methods such as cash, debit and credit cards. Debit cards can be used contactless, without having to insert the card in a reader and typing a pin-number every time, which makes paying easier and faster. In addition to these, we have started to use mobile payment methods, not only by our mobile phones, but also by our wearable devices, such as smart watches. A variety of different types of mobile payment forms are available. Mobile payments might be just paying bills with mobile bank or transferring money using apps meant for that. There are also applications that offering a possibility of paying a purchase at the cashier without having to use credit cards at all. There are a wide variety of mobile payment application providers in the Nordics. Aktia Wallet, Apple Pay and Wallet, Fitbit Pay, Garmin Pay, Google Pay, Klarna, Masterpass, Mobiilimaksu, Nordea Wallet, Pivo, S-mobiili, Samsung Pay and Siirto are mobile payment providers that are in use in Finland and other Nordic counties have their own selection of service providers (Qvik, 2018).

1.3 Research methodology

“Research methodology is a systematic way to solve a problem. It is a science of studying how research is to be carried out. Essentially, the procedures by which researchers go about their work of describing, explaining and predicting phenomena are called research methodology. It is also defined as the study of methods by which knowledge is gained. Its aim is to give the work plan of research.”

(Rajasekar, Philominathan and Chinnathambi, 2013)

This research consists of a theoretical part and an empirical part. In the theoretical part of this thesis, there are two sections; a previous research and an academic literature regarding the topic. The most important purpose of the theoretical part of this thesis is to provide a solid ground for the empirical analysis. A previous research and an academic literature are presented in order to gain understanding of the overall topic and the theoretical models related to it. Further on, the aim of examining the previous research is to review the results of those to find out what are the main factors that affect the usage of mobile payments in different areas.

In the empirical part, the opinions of the consumers are gathered using an online survey and the answers are reviewed and analyzed. The empirical part of the research is based on the theoretical part. Aim of the empirical part is to execute an online survey to as many Nordic consumers as possible. The survey is shared via social media channels, mainly via Facebook and LinkedIn. The results are then analyzed mainly using quantitative research methods, but also mixing some qualitative analysis to fulfill the statistical analysis.

1.4 Structure of the thesis

The first chapter of this thesis is an introduction chapter. In the introduction chapter of this thesis, the motivation, the background and the history of the research and the topic are introduced. Finally, the research methodology and the structure of this thesis are introduced in the introduction chapter.

The second chapter of this thesis gives a foundation to the empirical research. In the second chapter, previous research is being reviewed and presented. After the literature review, the most important terminology used in this thesis is defined. Based on the literature review, eight of the most relevant theoretical models are introduced in the third chapter.

The empirical part of this thesis begins from the fourth chapter. Research methods, credibility and the data collection process are taken into closer examination in the fourth chapter. The fifth chapter introduces the results of the survey and an analysis of the results. Finally, the sixth chapter of this thesis discusses about the findings of this research and includes suggestions for future research. In the last part of this thesis, the conclusions and lessons learned from the research process of this thesis are reviewed.

2. Literature review

The literature review in this thesis aims to find out what kind of studies have been done about the topic before, how the studies have been conducted and what are the most important findings of the research. As a result of the process of investigating the research with a similar focus, framework and problems, many articles suitable for this purpose were found. After finding the most suitable articles, the articles were read carefully and the contents, especially results of each study, were recognized and analyzed.

In the literature review of this thesis, the main source of articles were LutFinna academic library search service, which enables searching from multiple international e-materials such as ProQuest, Elsevier, Science Direct, Scopus and Emerald Insight. In addition to these electronic libraries Google Scholar was also used. To find as suitable articles as possible, the search was narrowed to find only articles that were fully accessible and peer reviewed. Some articles were found as a reference from another article.

Keywords used in the process:

- Mobile payment
- Mobile payment adoption
- Mobile payment acceptance

2.1 Previous research

Quasim and Abu-Shanab (2016) studied what are the key factors that affect consumers to accept mobile payments as a payment method. According to the empirical study, they found five factors of the acceptance: “the network externality”, “the performance expectancy”, “the effort expectancy”, “the social influence” and trust. As a result of their study, they concluded that the most important factor affecting the acceptance of the mobile payments is the “network externalities” factor. The results of their analysis did not support the “effort expectancy” factor. (Qasim & Abu-Shanab 2016)

Oliviera, Thomas, Baptista and Campos (2016) also studied the success factors of the mobile payment acceptance. Additionally, they studied the factors that make consumers recommend the mobile payments as a payment method. In their study, they use the combination of two methodologies, the extended unified theory of acceptance and the use of technology and the innovation characteristics of the diffusion of innovations. To test their theory, they conducted an online survey in Portugal. As a result of their study, they concluded that the compatibility, the perceived technology security, performance expectations, innovativeness and social influence are the factors that make people use and recommend mobile payment technology. (Oliveira et al., 2016)

One year earlier Oliviera and Baptista (2015) executed similar adoption factor research in an African country. In their research they found that the most significant factors affecting the behavioral intention were performance expectancy, hedonic motivation and habit, while the most significant cultural moderators of the adoption were collectivism, certainty avoidance, short term and power distance. (Baptista and Oliveira, 2015)

In their study, Kim, Mirusmonov and Lee (2010) also searched for the factors influencing the usage of the mobile payments. Their research took place in Korea and it was executed by e-mail surveys and interviews. In their research, they found that there are two clear user groups with different affecting factors. For the early adopters, mobility and reachability are the most important factors, while for the late adopters, reachability and convenience are the most important factors. Kim et al. also make an important notice of the continuance of the mobile payment usage. They found that m-payment services should be designed and developed to create and deliver value to users to keep them using the services. (Kim, Mirusmonov and Lee, 2010)

Similar study was conducted by Maduku in 2017. Like Oliviera et al. (2016), he applied the unified theory of acceptance and use of technology in his study. He also applied the social cognition and institution-based trust theories in his research. Likewise Oliviera et al., Maduku also gathered empirical proof of the validity of his

theory by conducting a survey in South Africa. He concluded that the performance expectancy, effort expectancy, self-efficacy and structural assurance are the most significant factors of the behavioral intention to use mobile banking services. (Maduku, 2017)

In their research Liébana-Cabanillas and Lara-Rubio, studied similar things as Quasim and Abu-Shanab, but their focus was on the merchant's acceptance factors instead of the consumers. In their research the most important finding was that merchants should be better aware of the different mobile payment options. They concluded also that the main reason for merchants to adopt a mobile payment system is that they should benefit from it somehow and this is why it is important to let merchants try new methods and familiarize them with it. (Liébana-Cabanillas and Lara-Rubio, 2017)

Aloysius, Hoehle and Venkatesh (2016) studied the opportunities of how to take advantage of big-data so that both the retail party and the customer could benefit from it. For the purpose of this thesis, the relevant finding in the research was that the customers prefer stable location for the use of mobile payment. This provides valuable insights on customers' willingness to use mobile payments for in-store purchases. (Aloysius et al. 2016)

Most of the research done and presented above are quantitative studies that are based on some acceptance theories and presumed factors. Mallat (2007) unlike many of the others executed a qualitative research of consumer adoption of mobile payments. Mallat executed focus group interviews to explore the adoption of mobile payments. She found that the adoption of the mobile payments is dynamic and it depends on certain situational factors. In addition, Mallat found that there are many more barriers like premium pricing, complexity, lack of critical mass and perceived risks. (Mallat, 2007)

A lot of research has been done related to the factors affecting the acceptance of the mobile payments and mobile banking systems enabling customers to transfer money or pay for goods and services. Factors presented above, geographical area and the year and the researchers are gathered to table 1.

Table 1. Factors found to affect the acceptance of mobile payment

Authors	Year	Sample area	Factors found
Quasim & Abu-Shanab	2016	Jordan (Middle East)	Performance expectancy Social influence Trust Network externalities
Oliviera, Thomas, Baptista & Campos	2016	Portugal (Europe)	Compatibility Perceived security Performance expectations Innovativeness Social influence
Maduku	2017	South Africa	Performance expectancy Effort expectancy Self-efficacy Structural assurance
Kim, Mirusmonov & Lee	2010	Korea (Asia)	Ease of use Perceived usefulness Individual differences Convenience Reachability M-payment knowledge

2.2 Definitions

As the literature review show, there has been a lot of research done related to mobile payments and mobile banking. Due to the fact that there are no universal definitions for these terms, it is crucial to carefully define what is meant by these terms in this

thesis. In this section we will take a look at the definitions that has been used earlier in literature. After that, the most important terms used in this thesis are defined.

To be able to identify the factors affecting the acceptance of mobile payments as a payment method, we need to define what is meant by mobile payment in this thesis. A mobile payment can be seen as an alternative to “traditional” payment methods, such as cash, debit and credit cards and checks.

2.2.1 Mobile payment

Ghezzi, Renga, Balocco and Pescetto (2010) define mobile payment as any *“process where at least one phase of the transaction is conducted using a mobile device capable of securely processing a financial transaction over a mobile network or via various wireless technologies.”*

According to a definition by Dahlberg, Mallat, Ondrus, and Zmijewska (2008), mobile payments are *“payments for goods, services and bills with a mobile device by taking advantage of wireless and other telecommunication technologies”*. This definition is extended by Liu, Kauffman & Ma (2015) with addition of other forms of economic exchange among the exchange of goods and services.

In their research, Donner and Tellez (2008) combine the terms m-payments, m-transfers and m-finance to refer the common features of the three. In this thesis this point of view is very advantageous and the definition used in this thesis is similar to this one, because of the services we are willing to study.

Mobile payment can also be identified as “any payment where a mobile device is used to initiate, authorize and confirm an exchange of financial value in return for goods and services” or as any transaction where at least the payer uses mobile device to make the payment. (Au & Kauffman, 2008)

Mallat (2007) define the mobile payments to be a use of mobile device to execute a payment transaction, where money or funds are transferred from payer to receiver in exchange of something.

Cruz, Lineu Barretto, Muñoz-Gallego and Laukkanen (2010) state that if a bank is not directly connected to the execution of the service offered then, in general, that service is called a mobile payment instead of mobile banking.

In this thesis mobile payment is defined as *a transaction or transfer of financial value in exchange of something using mobile device.*

2.2.2 Mobile banking

Slade, Williamd and Dwivdei (2013) state that some of the characteristics of mobile payment and mobile banking overlap, even though they are two different forms of mobile financial services.

Donner and Tellez (2008) note that there is no universal form of mobile banking. They suggest that it rather varies from country to country due to the different kinds of institutions offering it and also due to differing regulations when it comes to baking and mobile banking.

Mobile banking can be seen as implementation of financial services so that a customer can take advantage of the combination of mobile communication techniques and the mobile devices (Pouttchi & Schurig, 2004). Anderson (2010) defines mobile banking as a way for customer to execute financial transactions linked to his account using a mobile phone or other device.

In general, mobile banking is referred in the literature as an application that enables customers to review bank accounts, transfer money, making payment, checking bank balances etc. using their mobile device. (Shaikh and Karjaluto, 2015; Alafeef, Singh and Ahmad, 2012)

In this thesis mobile banking is defined as *any banking service executed remotely using mobile device.*

2.2.3 Mobile device

Since many of the definitions of mobile payments and mobile banking include the term “mobile device”, we need to define that too. Mobile devices have developed rapidly and today a mobile device is much more than just a mobile phone. We also need to include tablets and smart watches. Using an online dictionary search for mobile devices gives a definition “a portable, wireless computing device that is small enough to be used while held in the hand”.

Au and Kauffman (2008) refer to mobile device as mobile phones, personal digital assistants (PDA), wireless tablets or “any other device that can connect to mobile telecommunications network and make it possible for payments to be made”.

Mobile device can be any smartphone, PDA or wireless enabled device that can use mobile network or other technologies to securely process financial transaction (Ghezzi et al. 2010). Also Baptista and Oliveira (2015) define mobile device to be “*mobile phone, smartphone or tablet with mobile internet access*”. Shaikh and Karjaluoto (2015) state that a laptop should not be considered as a mobile device, since the user interface is so similar to a desktop PC’s user interface.

Mobile device in this thesis is defined as *any wireless, handheld device that can be connected to Internet, for example smartphone, tablet, smart watch or a music player.*

3. Technology acceptance theories

This chapter presents the theories of acceptance. During the years of rapid technological development, various models have been established to explain the user acceptance and the adaptation of these new technologies. Research presented in chapter 2.1 give us understanding of what kind of theories have been utilized in similar research processes. In this thesis, few of them will be combined together to form the best possible survey questions for data collection in order to get the broadest possible understanding of the adoption factors.

3.1 Theory of reasoned action (TRA)

In 1980 Ajzen and Fishbein established the theory of reasoned action (TRA) to explain and predict human behavior. (Ajzen & Fishbein 2002) The theory is based on the assumption that humans' behavior can accurately be predicted by determining their individual **behavioral intention** (BI) to perform that behavior. In the TRA there are two factors of behavioral intention. First determinant is individual's **attitude** toward the behavior (A) and the second is **subjective norm** (SN). (Chang 1998)

The attitude towards the behavior is defined as "*a person's general feeling of favorableness or unfavorableness for that behavior*". Attitude towards behavior can be further defined as a function of the product of individual's remarkable belief (B) of what outcomes performing the behavior might have and his or hers evaluation (E) of the desirableness of the outcome. Attitude toward the behavior can be presented as (Chang 1998):

$$A = \sum B_i E_i \quad (1)$$

The second determinant of behavioral intention is the subjective norm (SN), which is defined as "*person's perception that most people who are important to him think he should or should not perform the behavior in question*". Subjective norm can be again presented as a function of the product of individual's normative belief (NB) and one's motivation to comply (MC) with that belief. By normative belief in TRA means an

individuals belief of what someone remarkable thinks of performing the behavior. Subjective norm can be presented as follows (Chang 1998):

$$SN = \sum NB_i MC_i \quad (2)$$

Any external variables affecting the behavioral intention in the theory is seen to affect it indirectly. The external variables are seen to affect first either attitude or subjective norm and by that, change the behavioral intention of an individual. (Chang 1998)

Due to its simplicity, TRA has gained a lot of critic about its usability and validity. Dillard and Pfau (2002) state that because of the simplicity of the TRA, it dismisses the human behavior that is socially meaningful. According to Liska (1984) the TRA also does not take into consideration behavior that is habitual and it also excludes behavior that is habitual or requires special skills, resources, opportunities or cooperation with others, which limits the usability of the theory to simple behaviors. Ajzen (2011) gathers common criticism and tries to clarify misunderstandings. In his article, Ajzen (2011) mentions that the model has gained a lot of criticism because of the ignorance of human irrationality, affect and emotions, past behaviors and habits. Due to the simplicity, many of the following models have used TRA model as a basis to build and add on to improve the parts that have received a lot of attention and criticism.

3.2 Technology acceptance model (TAM)

Technology acceptance model (TAM) was created by Davis (1989) to fill in the research gap of “high-quality measures for key determinants of user acceptance”. TAM is created based on theory of reasoned action (TRA), which is a general model that was created by Fishbein and Ajzen (2002) to explain any human behavior. TAM was created to explain the computer usage behavior. And today the TAM is the most commonly used model to explain the technology acceptance (Venkatesh, Davis & Morris 2007).

The basis of the theory is that the acceptance is mainly formed of two variables; perceived usefulness and perceived ease of use. In TAM perceived usefulness is defined, as *“the degree to which a person believes that using a particular system would enhance his or her job performance”*. Perceived ease of use is defined as *“the degree to which a person believes that using a particular system would be free of effort”*. (Davis 1989)

U = Perceived usefulness

EOU = Perceived ease of use

A = User attitude

(SN = Subjective norm)

The TAM presumes that behavioral intentions (BI) determine the computer usage. Behavioral intentions are determined by the user attitude (A) and towards using the system and by the perceived usefulness (U):

$$BI = A + U \quad (3)$$

Figure 2 is a graphical presentation of the relationship between the variables and outcomes of the TAM. From the presentation can be noticed that external variables are divided in two variables. Perceived ease of use affect in perceived usefulness and in attitude towards using the system. Attitude is formed by the two main variables in the model; perceived ease of use and then perceived usefulness. Attitude and perceived usefulness together result in behavioral intention to use the system, which again results in the actual system use. (Davis et al. 1989)

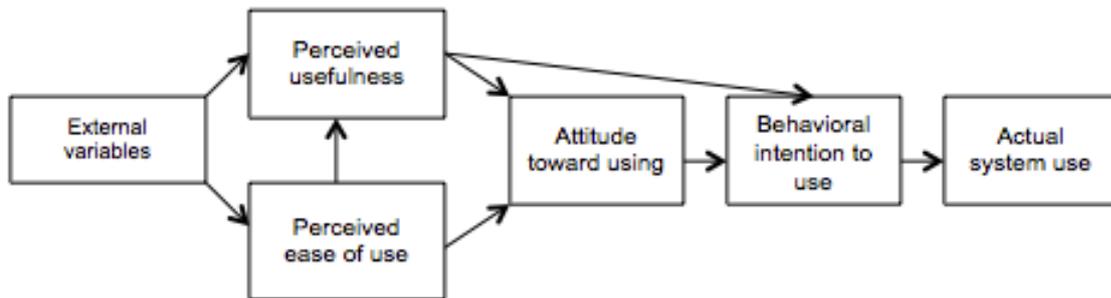


Figure 2. Technology acceptance model (Davis et al. 1989)

Even the TAM is widely used model, it has also been criticized by many researchers because of its broad generalization of human behavior. In their research Legris, Ingham and Colletette (2003) conclude that the TAM is a useful model, but the problem is that even with additional variables, model hardly succeeds to explain 40% of the actual system usage, which means that some critical variables are missing from the model. Bagozzi (2007) states that the models relying on the assumption that intention is followed by behavior (TAM, TRA, TPB) have major issues because of the basic assumption. He claim that behavior is too often seen as a final goal instead of a mean of getting to an end result, for example improving productivity by accepting and using new technology. Also the difficulty of identifying the determinants of the perceived usefulness and the perceived ease of use are brought onto table in addition to ignorance of group, social and cultural affect of making the decision. (Bagozzi 2007)

3.3 Technology acceptance model 2 (TAM2)

In 2000, Venkatesh and Davis extended the original TAM by adding some lacking factors to improve accuracy to predict the actual system use of the original model. Aim of the extended technology acceptance model 2 (TAM2) is to include additional determinants of perceived usefulness and usage intention and to better understand how the determinants change with increasing user experience of systems. (Venkatesh & Davis 2000) In figure 3 the TAM2 model is presented graphically as it

was originally presented by Venkatesh and Davis (2000). In figure 3, framed part of the model is the original TAM.

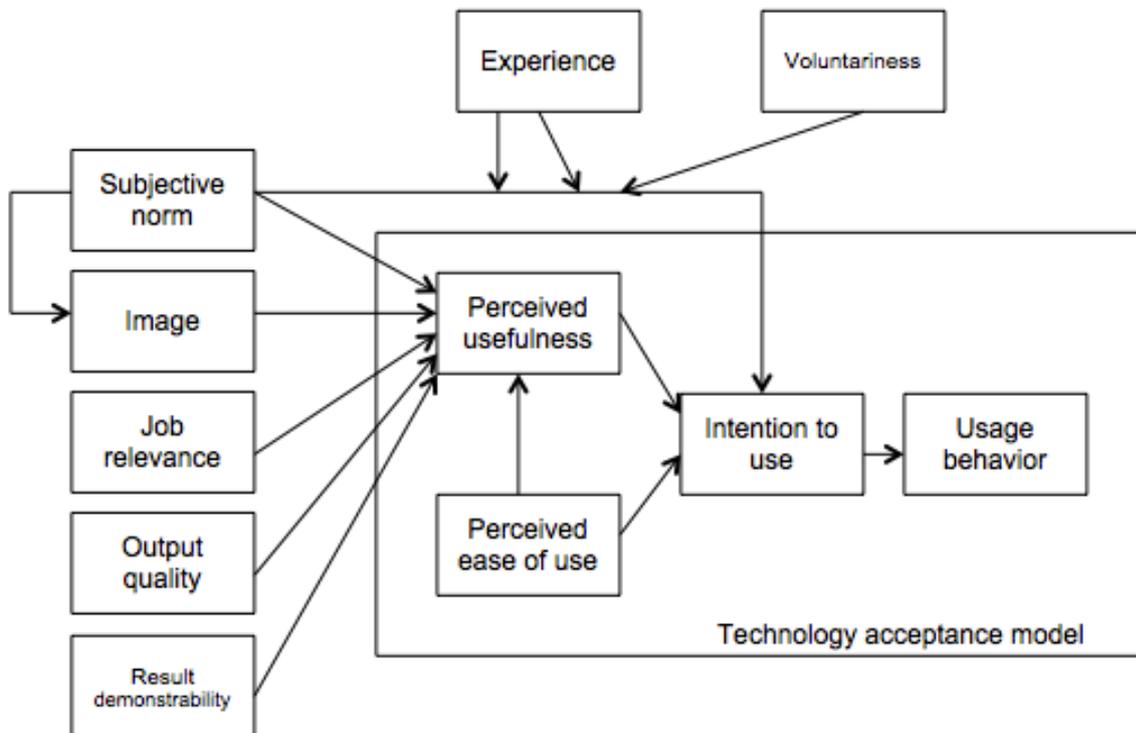


Figure 3. Technology acceptance model 2 (Venkatesh et al. 2000)

The group of subjective norm, image and job relevance in the TAM2 is recognized as a social influence process. In the TAM2 **subjective norm** is defined as a “*person’s perception of that most people who are important to him think he should or should not perform the behavior in question*”. **Image** is defined, as a degree to which someone thinks that using a certain system will affect his or her social status. **Job relevance** is the users perception of to what degree the system is applicable to his or her job or a task. Regardless of what the tasks are, **output quality** is defined user perception of “what tasks system is capable of performing and the degree to which those tasks match their job goals” and using this perception to consider how well the system performs these tasks. **Results demonstrability** refers to a degree to which user is able to attribute the benefits of the system to their job performance. In the model, **voluntariness** is used to make a difference between mandatory and voluntary usage of a technological invention. **Experience** in the model comes after

implementation of the system through direct experience of using the system. (Venkantesh et al. 2000)

In summary, TAM2 recognizes social influence process that includes subjective norm, voluntariness and image and cognitive instrumental processes that include job relevance, output quality, result demonstrability and perceived ease of use as determinants of perceived usefulness and usage intentions. (Venkatesh et al. 2000)

3.4 Innovation diffusion theory (IDT)

One of the widely used theories related to user adoption of new (technological) innovations is the Innovation diffusion theory (IDT) originally established by Rogers in 1995. The theory is used to predict and to explain how innovations spread in different channels and in social systems. In the innovation diffusion theory, the analysis is done by characterizing adopters and innovations. In the IDT, diffusion is defined as *“the process by which an innovation is communicated through certain channels over time among the members of a social system”*. (Rogers 2010)

There are four main elements in the innovation diffusion theory; the innovation, communication channels, time and the social system. **The innovation** in the theory is defined as an *“idea, practice or object that is perceived as new by an individual or other unit of adoption”*. Second main element is the communication channels. Communication can be seen as a process in which participants share information with each other with a goal to reach mutual understanding. **Communication channels** are the means of information to get from one individual to another. **A social system** is defined as a *“set of interrelated units that are engaged in joint problem-solving to accomplish a common goal”*. (Rogers 2010)

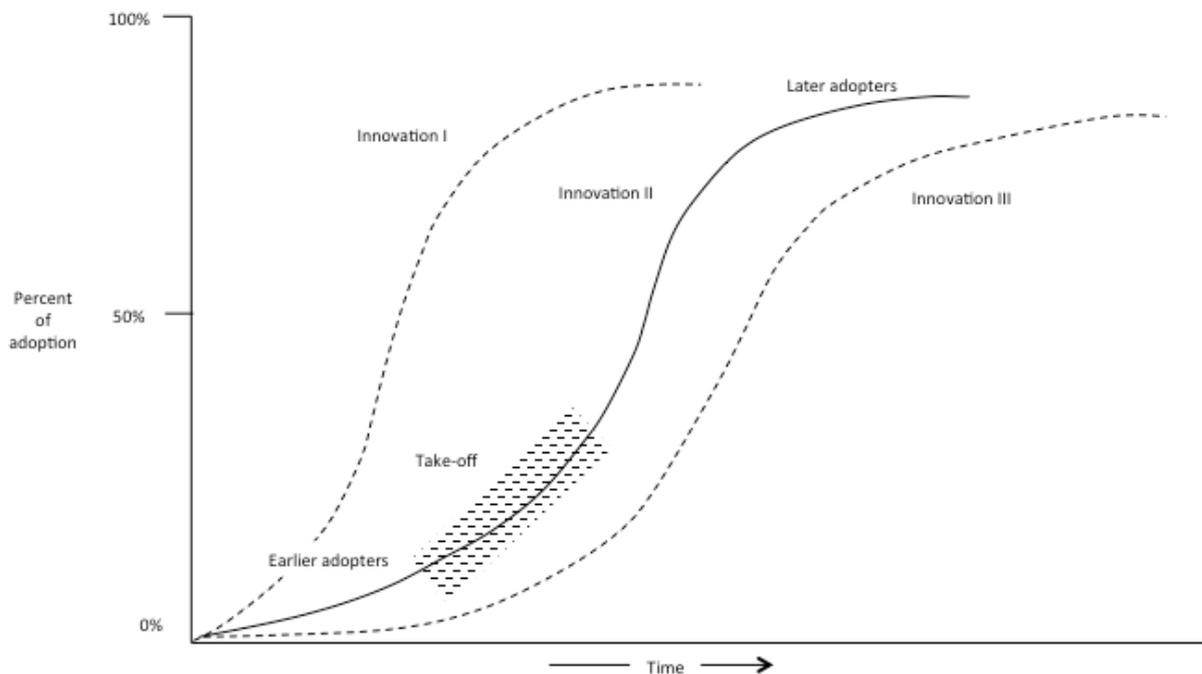


Figure 4. Diffusion process (Rogers 2010)

In the IDT, innovations are characterized using 5 categories that are: relative advantage, compatibility, complexity, trial ability and observability. The characteristics are used to help in understanding and explaining the different rates of adoption.

Beside the categorization of innovation characteristics, the innovation diffusion model takes into consideration that not all the individuals in social system adopt new innovations in the same way. In the model, adopters are divided into five “adopter categories”. **Innovators** are eager to try new ideas and are almost obsessively venturesome. Innovators are the first ones to adopt new innovations and one of the most important characteristics of them is their desire of hazardous and risky innovations even with the risk of setbacks. Innovators are usually not very integrated into local social system and their contacts are less geographically limited. **Early adopters** are the second ones to adopt new innovations. They are more locally connected than innovators. Early adopters act as opinion leaders in most of the social systems. They are looked up to and later adopters trust them. (Rogers 2002)

Next adopter group is the **early majority**, whose innovation-decision period is relatively longer than earlier adopters. Early majority adopt the new innovation just

before the average member of social system. The **late majority** adopts the innovation after the average member of social system. They are skeptical about new innovations and some of the late majority adopts innovations when most of others in their social system have done it. The last group to adopt new innovations is the **laggards**. The laggards make decisions based on what has been done in the past and they are usually suspicious toward new innovations. Laggards adopt the new innovation at the point where they can be sure that the new innovation does not fail. (Rogers 2010)

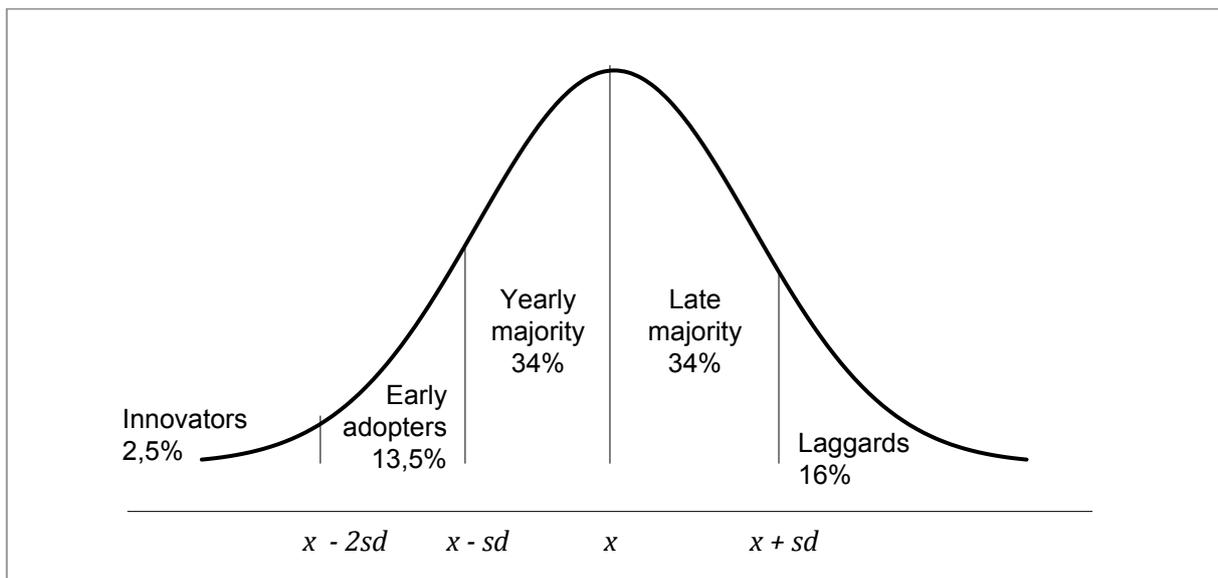


Figure 5. Adopter categorization. (Rogers 2010)

In the innovation diffusion theory, it is assumed that the adopter distribution is closely approaching normality and gives figure 5 its bell shape. In the adoption theory, the normally distributed adoption is divided into 5 adopter groups using the mean (\bar{x}) and the standard deviation (sd). In the figure 5 there are percentages of each group of all the adopters. (Rogers 2010)

3.5 Theory of planned behavior (TPB)

Similar to the technology acceptance model (TAM), theory of planned behavior (TPB) is an extension of the theory of reasoned action (TRA). Ajzen first introduced it in 1991. Both theories assume that humans are rational decision-makers and actors,

but the difference between these theories lies in the determinants of the variables. Two steps were added into the TPB compared to TRA. First, control beliefs were added, and then perceived behavioral control was added. Control beliefs affect the perceived behavioral control, which affect the behavioral intention. (Chang 1998)

In the theory of planned behavior, behavior of a human is basically directed by three main determinants: behavioral beliefs, normative beliefs and control beliefs. **Behavioral beliefs** are human perception about the likely consequences or other characteristics of the behavior. Behavioral beliefs result as a favorable or unfavorable attitude toward the behavior. **Normative beliefs** are defined as “beliefs about the normative expectations of other people” and these beliefs result in perceived social pressure or subjective norm. **Control beliefs** are “*beliefs about the factors that may further or hinder performance of the behavior*”. Perceived behavioral control affect to the actual behavioral intention. The TPB assumes that when “the sufficient degree of actual control over the behavior” is given to humans and the opportunity rises, they will carry out their intentions. (Ajzen 2002)

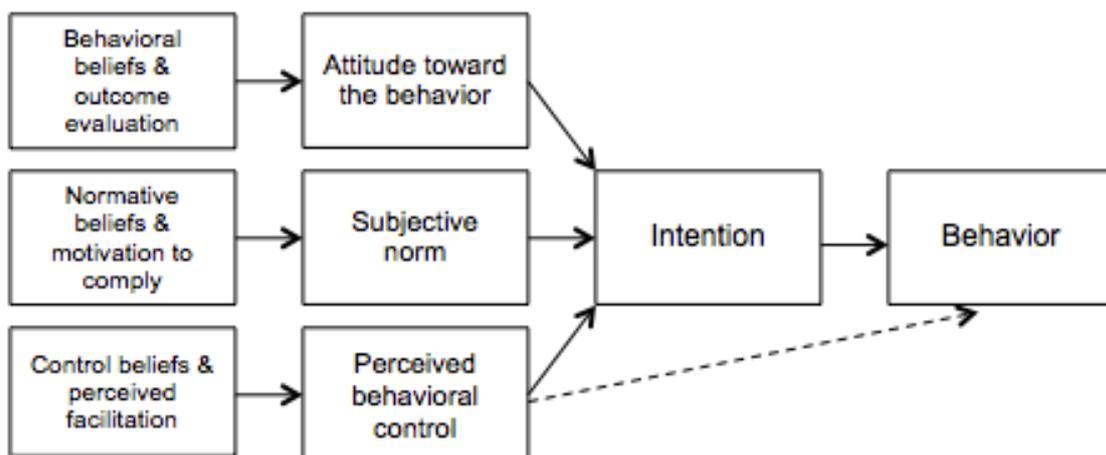


Figure 6. Theory of planned behavior (Chang 1998)

3.6 Unified theory of acceptance and use of technology (UTAUT)

As we can see from the models presented above, many of the acceptance theories are based on similar assumptions and determinants. In 2003, Venkatesh, Morris, Davis and Davis established their unified model to avoid overlapping constructs of the eight models. By combining the models, Venkatesh et al succeeded to explain about 70 percent of the adoption of technology. The eight models unified into UTAUT are the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behavior, a model combining TAM and TPB, the model of PC utilization, the innovation diffusion theory and the social cognitive theory. (Venkatesh et al. 2003)

By comparing these eight models, seven constructs were found to explain the intention or usage. Of the seven determinants, four was found to be significant in explaining the user acceptance and usage behavior. The four main determinants in the UTAUT are performance expectancy, effort expectancy, social influence and facilitating conditions. In addition to these four main determinants, four moderating determinants were found to explain differences in behavior for different people. Self-efficacy and anxiety were found to be indirect determinants of intention. (Venkatesh et al. 2003)

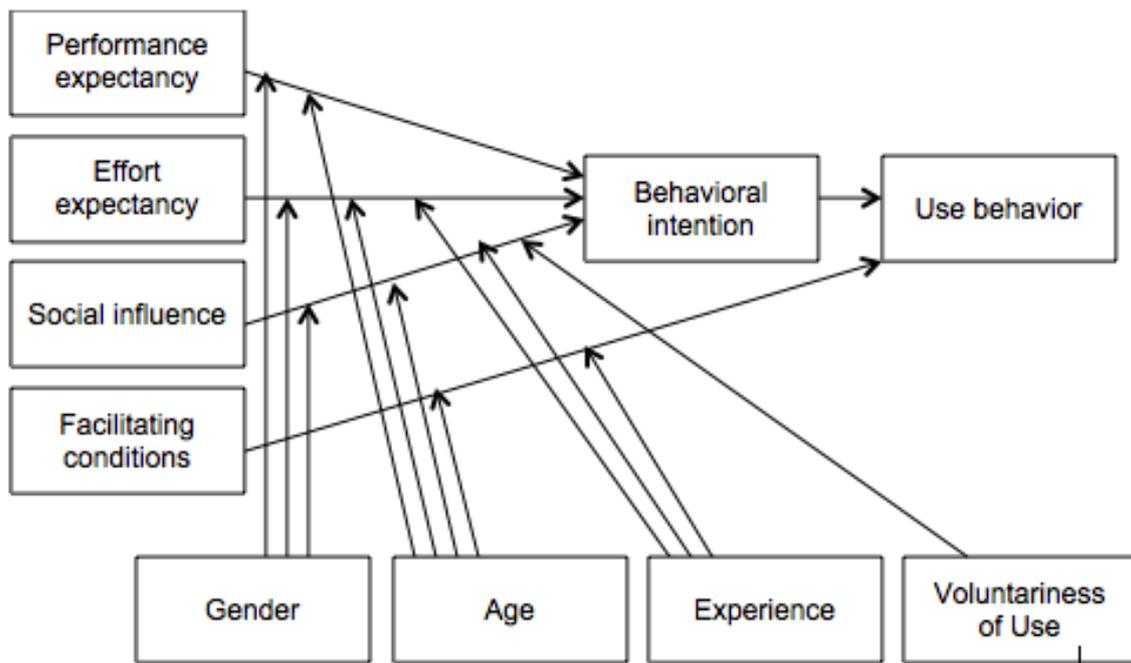


Figure 7. UTAUT model

Key determinants of UTAUT and their relationships can be seen from figure 7. **Performance expectancy** is defined as “*the degree to which an individual believes that using the system will help him or her to attain gains in job performance*”. Figure shows that gender and age are moderating the performance expectancy. **Effort expectancy** is “*the degree of ease associated with the use of the system*” and it is moderated by gender, age and experience. **Social influence** is defined as “*the degree to which an individual perceives that important other believe he or she should use the new system*”. Social influence is moderated by all of the four moderating factors, gender, age, experience and voluntariness of use. **Facilitating conditions** mean “*the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system*”. (Venkatesh et al. 2003)

Four moderating determinants are gender, age, experience and voluntariness of use. These moderating determinants are seen as a very important aspect of the model since they had previously received modest attention in the behavioral intention literature, but still strongly affect the main determinants. Of the moderating determinants, age was found to affect all of the four main determinants and it was

also found to correlate with gender. As can be seen from figure 7, facilitating conditions is the only main determinant to affect the use behavior directly. All the other three determinants affect the use behavior by affecting behavioral intention. The UTAUT model has proved to explain 70 percent of the variance in the intention of use, which is remarkably higher percentage than other models have. (Venkatesh et al. 2003)

3.7 Theory of perceived risk

During the years of consumer behavior research, many researchers have included perceived risk to explain the intention to use. One of the first ones to introduce the theory of perceived risk was Bauer in 1967. Bauer (1967) defined perceived risk as “a combination of uncertainty plus seriousness of outcome involved”. Peter and Ryan (1976) defined perceived risk as “expectation of losses associated with purchase and acts as an inhibitor to purchase behavior”. Featherman and Pavlou (2003) note that perceived risk (PR) is usually referred as “felt uncertainty regarding possible negative consequences of using a product or service” and further define perceived risk to be “the potential for loss in the pursuit of a desired outcome of using an e-service”. Perceived risk can be measured with Likert scales or by using expectancy * value methodology.

Featherman and Pavlou (2003) gathered seven risk categories of perceived risk; performance risk, financial risk, time risk, psychological risk, social risk, privacy risk and overall risk. Cunningham (1967) divided perceived risk into two dimensions; performance and psychosocial. Cunningham further divided performance risk into three categories; economic, temporal and effort and he also divided psychosocial risk into psychological and social risk. Featherman and Pavlou (2003) note that for electronic services, there are no physical safety risk, but they acknowledged privacy risk as a replacing facet. Based on Bauer’s (1967) study, Jacoby and Kaplan (1972) introduced the “overall risk”, because of the fact that some dimensions might reduce the overall risk and some increase it, giving an example of a large car increasing the financial risk but reducing the physical safety risk.

Bellman, Lohse and Johnson (1999) found that time considerations are a significant predictor of the user behavior. As a result of their research, Bellman et al. found that people with less time are more likely to shop online to save time. Featherman and Pavlou (2003) further proposed, that consumers are busy and concerned of “wasting time” and thereby time consideration is an important dimension of perceived risk. These facets of perceived risk are gathered in table 2 according to Featherman and Pavlou (2003).

Table 2. The seven facets of perceived risk (Featherman & Pavlou 2003)

Perceived risk Facet	Description / Definition
Performance risk	The possibility of the product malfunctioning and not performing as it was designed and advertised and therefore failing to deliver the desired benefits.” (Grewal et al. 1994)
Financial risk	“The potential monetary outlay associated with the initial purchase price as well as the subsequent maintenance cost of the product” (Grewal et al. 1994). The financial risk can be further described to be included in the possibility of loss caused by fraud.
Time risk	Time risk is the risk that a consumer uses time researching and learning to use an application or service and then might have to replace it if it does not fulfill its purpose.
Psychological risk	The risk of consumer to lose or decrease his self-confidence if the desired outcome is not reached by the purchase.
Social risk	Risk of loosing status in a group or society due to adopting an application or service.

Privacy risk	A risk of identity theft or use of personal information without permission.
Overall risk	“A general measure of perceived risk when all criteria are evaluated together” (Featherman & Pavlou 2003)

3.8 Lazy User Model (LUM)

Theories presented above have mainly focused on the characteristics of the technology being accepted/adapted. Collan (2007) found that the traditional acceptance models failed remarkably in explaining the user acceptance of new technologies. He started breaking down the issue of acceptance and came up with two main components: the user himself and the cost of using. In addition, he noted that most of the adaption theories focus only on one technology, not taking into account that there might be options to satisfy the need of the customer. A new theory is conceptualized as a Lazy User Model (LUM) or a Lazy User Theory for Solution Selection. (Collan 2007)

The basis of the Lazy User Model (LUM) is that the selection or adaption starts with a need or a problem that needs to be solved. When an individual (user) has a need, he or she fulfills it by selecting a possible solution that will satisfy the need from the set of solutions. The set of solutions is limited by *the user state*, which is defined as circumstances that surround the user when the user need arises. The lazy user model assumes that the user will select the solution that requires the least effort. In the theory, *the user need* is defined as “an explicitly specifiable want that can be completely fulfilled. Going further into theory, *effort* needs to be defined. Because of the use of the theory, the effort can be defined as time, money or energy used, or a combination of the three. In the LUM, the less effort is needed, the better the solution is. When talking about individuals, the effort is harder to measure and each individual has their own transformation function that can vary depending on the circumstances.

In the case of companies, effort can usually be measured, because i.e. working hours have a measurable, monetary cost. (Collan 2007)

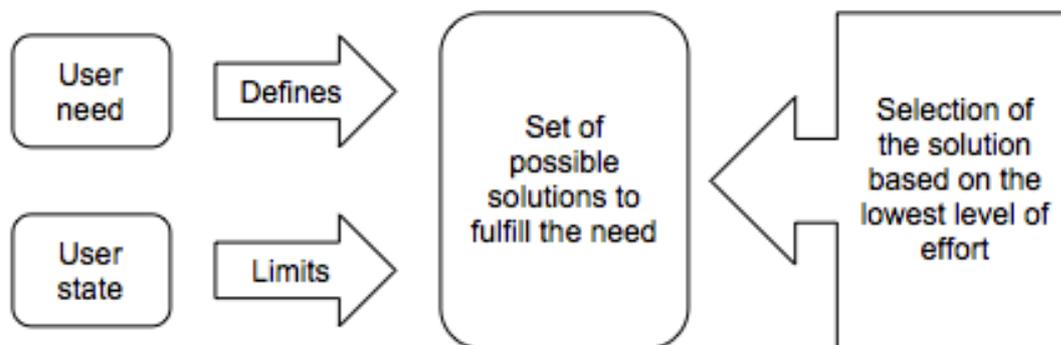


Figure 8. The Lazy User Theory of solution selection (Collan 2007)

Figure 8 represents the Lazy User Theory in graphical presentation. From the figure we can note that the user need defines the options the user has to satisfy his or her need and the user state is the limiting factor of the set of solutions. Going further in the selection process, the final set of possible solutions is formed by the two factors. According to the theory, the user will select the solution that requires the least effort to satisfy his or her need. (Collan 2007)

As an example of this theory, the solution selection theory can be put into real life. A busy businesswoman is in a hurry at the cashier of a coffee shop. She is about to pay her purchase of a latte. She has four payment methods in use; cash, a credit card, a mobile phone and a smart watch. In this case, the user need is to pay for the coffee. Circumstances that limit the solution selection are the hurry she is in and the payment methods she has available. The payment methods in use are her solution selection. According to the theory, the businesswoman chooses the solution that requires the least effort. When she is at the cashier, the easiest solution is to pay by her smart watch that is already on her wrist and she can pay with just showing her watch to a reader. With phone, she would have to read her fingerprint first and with cash or credit card she would have to grab a wallet and open it first. In figure 8 this case has been shown as a graphical presentation.

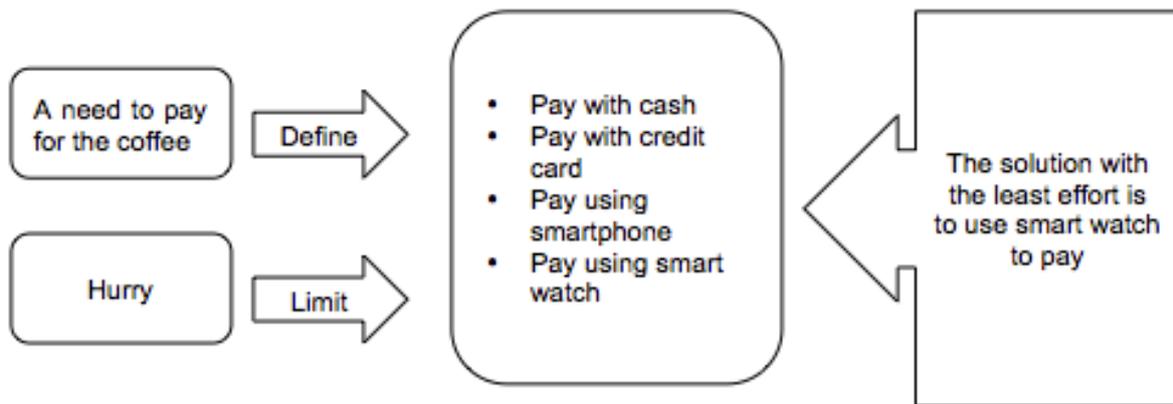


Figure 8. The solution problem of a businesswoman

The Lazy User model was first established related to mobile technologies, but later it has been used related to other issues as well. For example, Peak (2009) suggests that the Lazy User Theory could be used to improve the technology usage in a classroom in universities and to motivate professors to stay current with technologies used in classrooms.

Merschbrock, Tollnes and Nordahl-Rolfen (2015) use the Lazy User Theory as a theoretical approach to support their research on Norwegian construction project. They found out that similarly to the LUM, constructors selected the design system that was locally and circumstantially easier, not the one that would have been the best for the project. In their research, they picked up three example situations; installation of photovoltaic rooftop, design of fire protection and acoustics design. In all of the three situations, like the Lazy User Theory suggests, the contractors chose the solution that was the easiest, fastest or cheapest for them. (Merschbrock, Tollnes and Nordahl-Rolfen, 2015)

4. Research method and data

The empirical part of this thesis aims to explain the most important factors that affect the adaptation of mobile payments in the Nordic countries. Based on the theories presented earlier and the previous research regarding the technology adaptation, a survey was executed to Nordic consumers as an open link, online survey. The results of the survey were analyzed using regression analysis to find patterns in the results. This chapter introduces the survey, data statistics and analysis methods more deeply. Reliability and validity are also defined in this chapter.

4.1 Research method

In this chapter, the research method of this thesis is introduced. Rajasekar et al. (2013) define that research methods are “*all the methods used by a researcher during a research study*”, including all the tests, statistical and theoretical approaches. They also acknowledge that research methods are “*essentially planned, scientific and value-neutral*”. As a conclusion, research methods are the procedures that help us to analyze, find patterns, measures and explanations for collected data. (Rajasekar et al. 2013)

Newman and Benz (2006) state that the debate between the qualitative and quantitative research have been developed through the years from clear dichotomy between the two and switched to be seen more as “*interactive places on a methodological and philosophical continuum based on the philosophy of science*”. Similar to this point of view, in this thesis, both quantitative and qualitative are used to analyze the results of the research.

Quantitative analysis is based on an idea of positivism and relies on an assumption that there is a common truth or reality that everyone agrees. The other side of positivism in research is a belief that a phenomenon can be explained by empirically observable data. More traditionally a quantitative analysis is usually described as a research that is based on quantity, count or amount and that is numerical and the

results are often presented graphically, in tables or graphs. The most frequently used form of quantitative research is statistics that can be used in many different fields of science. (Newman & Benz 2006; Rajasejar et al. 2013; Guo 2016)

Roughly said qualitative research differs from quantitative research by the results of the research. Qualitative research is described as non-numerical, descriptive research that seeks to find answers to questions like why and how in addition to aiming to explain and describe the situation by words, feelings and meanings. Data used in qualitative research is usually in form of text, pictures, video, audio or other multimedia that allows the research going more into depth in the topic. Qualitative research concentrates on things that cannot be measured, while quantitative analysis is used to measure the phenomenon. Qualitative research is used when researcher needs to understand the participants point of view, for example in this research, we want to know how consumers in the Nordic countries feel and what they think about mobile payment usage. (Hennink, Hutter & Bailey 2010; Rjasejar et al. 2013; Newman & Benz 2006; McLaughlin, Bush and Zeeman, 2016)

Table 3. Characteristics of research methods (McLaughlin et al. 2016)

	Quantitative research method	Qualitative research method	Mixed methods research
Purpose	Determine relationships and describe variables; test hypotheses	Understand a specific population or phenomenon	Examine a question from a quantitative and qualitative perspective
Data characteristics	Numeric/reduced to numeric quantities for purposes of analysis	Text, pictures, audio or other multimedia	Both quantitative and qualitative data types
Data sources	Surveys, records, learning	Observations, interviews, focus	Uses a mix of qualitative and

	assessments and measurements	groups and documents	quantitative data sources
Data analysis	Statistical and numerical analysis	Coding and document analysis	Triangulation; integrating data analysis methods
Quality criteria	Validity, reliability, objectivity	Credibility, dependability, conformability, transferability	Some combination of quantitative and qualitative criteria
Common applications	Description, generalization	Theme identification, theory development, case analysis	Triangulation, complementary, development initiation, expansion
Limitations	Reduces power for small sample sizes, difficulty of measuring complex constructs, lack of deep description	Lack of statistical power and generalizability, time intensive, potentially misunderstood by audience due to lack of training	Lack of resources, requires skills in both approaches, publication word limitations hindering through method and results descriptions

Besides a traditional quantitative and qualitative analysis, there is also mixed-method that combines the two to go get even better understanding of the issue. The basis of mixed method is to be able to minimize the weaknesses of each method and maximize the advantages of both. Mixed research method provides a solution to researching complicate topics that are not easily converted to measurable form, but require statistical examination. Mixed method can be useful for multiple reasons, small sample size usually decreases the validity of quantitative research, but when supported with qualitative characteristics, validity holds. (McLaughlin et al. 2016) The basic characteristics the methods are presented in table 3 above.

The mixed method approach is utilized in this thesis. The quantitative examination gives an understanding of the dependencies between the variables and understanding of the significance of the model. Adding qualitative examination into empirical part of this thesis provides more depth to the research. Our sample size is relatively small and that causes trouble with quantitative examination and this is why it is important to support it with deeper qualitative methods. Methods are presented more closely in the following sections.

4.1.2 Logistic regression model

The purpose of this thesis is to examine the factors that affect whether consumers use or do not use mobile payments. As mentioned earlier, in the interest of this thesis, is to find the factors that affect the answer to the question “do you use mobile payments”, which therefore will be the dependent variable. Because the collected data is either in ordinal or nominal scale, a model designed for that type of data is needed. Logistic regression is a model that can be applied for predicting nominal or ordinal scale data. It is an extension of a simple linear regression model. For a regression examining the factors that affect whether consumers use or don't use mobile payments, a binary logistic regression is used. The binary logistic regression is a model that basically predicts the probability of observation to fall into either of the dichotomous dependent variable.

This thesis aims to identify the factors affecting to the user's intention to use mobile payments and a second regression is going to be created for that. For the second regression, the dependent variable is ordinal scaled, and it can only get values from 1-10. Logistic regression model can be applied for cases where the dependent variable is on ordinal scale.

4.2 Data collection

Data was collected by an online survey to all the Nordic consumers. The survey was meant for anyone. The target group was not limited to get as broad image as

possible about the actual usage in the Nordic countries in every demographical group. The survey was executed as an online, open-link survey and forwarded via Facebook, LinkedIn and word of mouth by asking everyone to forward the survey to their own network to get answers also from outside the author's own network.

To keep the survey as simple as possible and as reliable as possible, the survey concentrated on the dimensions that UTAUT model provides since it already combines TRA, TAM, TPB, combination of TAM and TPB, IDT of the models presented earlier in this thesis. The questionnaire used by Martins, Oliveira and Popovic (2014) was used as a foundation of the survey. The original survey aimed to understand Internet banking adoption, but the questions were modified to relate to mobile payment. Martins et al. (2014) included questions based on UTAUT and the theory of perceived risk. In the survey tailored for the purposes of this thesis, a couple more questions were added to present the lazy user theory.

The original survey was given to 10 pilot survey respondents selected from different age groups, both gender and users and non-users of mobile payments to get the widest possible demographic range of respondents. Seven of the ten pilot survey respondents took the survey and gave feedback about it. The original survey included 42 questions and the questions were the same for all the respondents. The final survey was modified based on the feedback from the pilot survey. Most of the feedback regarded the experience of taking the survey and based on those feedback comments, the survey was divided into two pages and smaller sections. Also numbering of the questions was deleted and the progress line was added. To make the questions as valid as possible, the questions were rephrased to be targeted either a person that already uses mobile payments and other group of questions to a person who don't use mobile payments. The survey was built to show the correct form of question based on the response to the question "do you use mobile payments?".

The final survey is presented in appendix 1. Data was collected in December 2018 during a 10-day period. Survey gathered answers from 158 respondents from all the Nordic countries. Survey resulted answers from respondents from all the age groups except the group under 15 years old. Answers were received from both genders and

from users who do and do not use mobile payments. Data statistics are presented more closely in chapter 5.1.

4.3 Validity and reliability

The basis of doing a research is that it gives more accurate and believable results than just overall, everyday observations (Easterby-Smith et al. 2012 p. 70). Validity and reliability of a research are measures of credibility of the research findings. When conducting a research, it must be kept in mind that we cannot be completely sure if the research present the correct reality and we can only “reduce the possibility of getting the wrong answer” to our research question. To be able to reduce the possibility of not getting the correct answer, attention must be paid into two dimensions of credibility, validity and reliability. (Saunders, Lewis & Thornhill 2009) And it must be kept in mind that if the measure is not reliable, the measure cannot be valid, but reliable measure is not necessarily also valid (Robson & McCartan 2015; Briggs, Coleman & Morrison 2012). In this chapter, the characteristics and definition of validity and reliability are gone through.

4.3.1 Reliability

Reliability of the research refers to the extent to which the data collection or analysis processes will provide consistent results (Saunders et al. 2009). Or in other words, reliability can be referred as the probability that repeating the research would give the same or similar results (Briggs, et al 2012). Easterby-Smith, Jackson and Thorpe (2012 p. 109-110) state that the reliability of the research can be assessed by three questions:

1. Will the measures provide the same results regardless of the occasions?
2. Will the results be similar if researched by others?
3. Is there transparency in how conclusions were drawn from the raw data?

According to Robson and McCartan (2015 p. 105-106), there are various causes of unreliability. Participant error, participant bias, observer error and observer bias are

some of the causes of unreliability. **Participant error** refers to a fact that the participant's answers and performance can fluctuate in different occasion due to personal reasons. **Participant bias** means that participant might try to answer according to what they think the researcher wants to know. Like the participant error also the **observer error** (the fluctuation of observer performance) can be affected by personal reasons and can lead to unreliability. **Observer bias** means that the researcher might consciously or unconsciously bias some test results according to their favor. (Robson & McCartan 2015 p. 105-106)

4.3.2 Validity

Validity of the research refers to whether the research results actually present what they appear to present. In other words, validity can be evaluated by questioning whether the relationship between two variables is a causal relationship and/or do the measures represent the reality and/or whether the research succeed to describe the phenomena that is meant to describe. (Saunders et al. 2009; Easterby-Smith et al. 2012 p. 70-73; Briggs et al. 2012 p. 81-82) According to previous research Briggs et al. (2012) conclude that validity can be divided in two forms: internal validity and external validity. **Internal validity** refers to the extent to which the results of the research present the phenomenon that is being investigated. **External validity** of the research refers to the extent to which the results can be generalized to a wider population. (Briggs et al. 2012)

5. Mobile payment usage in the Nordic countries

In this chapter, the empirical part of this thesis is presented in detail. The statistical models and results of the tests used in the quantitative analysis are presented first. The analyses and conclusions of the results are presented after the results. When the quantitative analysis is presented the qualitative part of this thesis is presented. Analysis of the results is followed by summarizing part and the discussion part of the research. After the analysis and the discussion are done, the conclusions of the thesis are drawn.

Various earlier theories and research have been presented previously in this thesis. One of them was the Deloitte's 2017 study on Nordic mobile consumer behavior introduced in the introduction chapter. In 2018, Deloitte estimated, that about 50 percent of the Nordic consumers have paid for a product or service in a store using their mobile phone. According to Deloitte's (2018) research, the two most important reasons for consumers not to use mobile payments are the lack of perceived benefits and the idea of paying mobile to be unsecure. (Deloitte 2018) In the interest of empirical part of this thesis is to reflect the findings of this thesis to earlier findings.

5.1 Data statistics

During the 10-day period in December 2018, overall 158 respondents took the survey that was shared via social media channels, mainly Facebook and LinkedIn by the author of this thesis. The participants of the survey were asked to answer the questions according to their own thoughts, feelings and experiences about mobile payments. The instructions advised the respondent to leave the answer empty in case they could not answer the question or did not want to answer it. Not surprisingly, respondents from other Nordic countries were harder to reach than respondents from Finland. Half of the respondents are from the same age group. The statistics of the data is presented in charts and tables in this chapter.

There were three demographic questions in the survey (appendix 1). First demographic question was about gender, second about age and the third about nationality or the country of residency. After the demographic questions, the aim was to find out whether the respondents use mobile payments or not. Below, in table 4 the distribution among the gender, nationality and age of the respondents are presented. From 158 respondents, 59 were male and 98 female and one reported as other. This means that 62 percent of the respondents were women and 37,3 percent were men. The most remarkable age group (50,6 percent of the respondents) that participated in the survey was the respondents between 26 and 35 years old. The age distribution is also presented in figure 9. The aim of this survey was to investigate the opinions towards mobile payments in the Nordic countries. As expected, majority of the respondents were from Finland, but getting respondents from other Nordic countries appeared more difficult than expected. As a result of many contacts to other countries, only one response from Norway, two from Denmark and seven from Sweden were collected. One respondent did not report her home country and the rest 147 respondents came from Finland.

Table 4. Demographic statistics of the respondents

Gender	N	Percent
Male	59	37,34%
Female	98	62,03%
Other	1	0,63%
Total	158	100,00%

Nationality	N	Percent
Finnish	147	93,63%
Swedish	7	4,46%
Norwegian	1	0,64%
Danish	2	1,27%
Total	157	100,00%

Age	N	Percent
0-15	0	0,00%
16-25	26	16,46%
26-35	80	50,63%
36-45	15	9,49%
46-55	13	8,23%
56-65	20	12,66%
66-75	3	1,90%
75-	1	0,63%
Total	158	100,00%

Graphics of the demographical information can be seen from figures 9 and 10. Graphical presentation clearly emphasizes that there are major differences between the different groupings. This must be kept in mind when drawing conclusions from statistical tests.

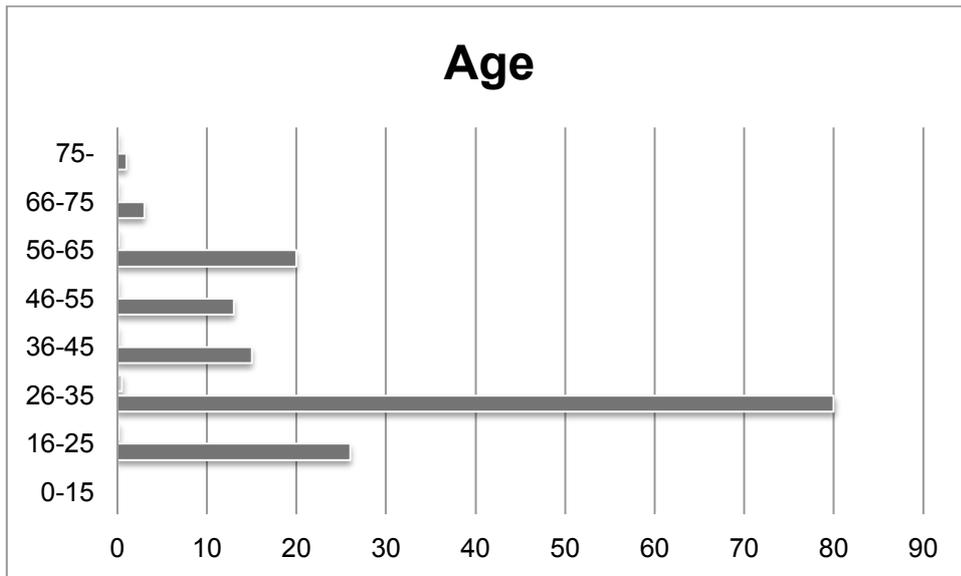


Figure 9. Age of the respondents

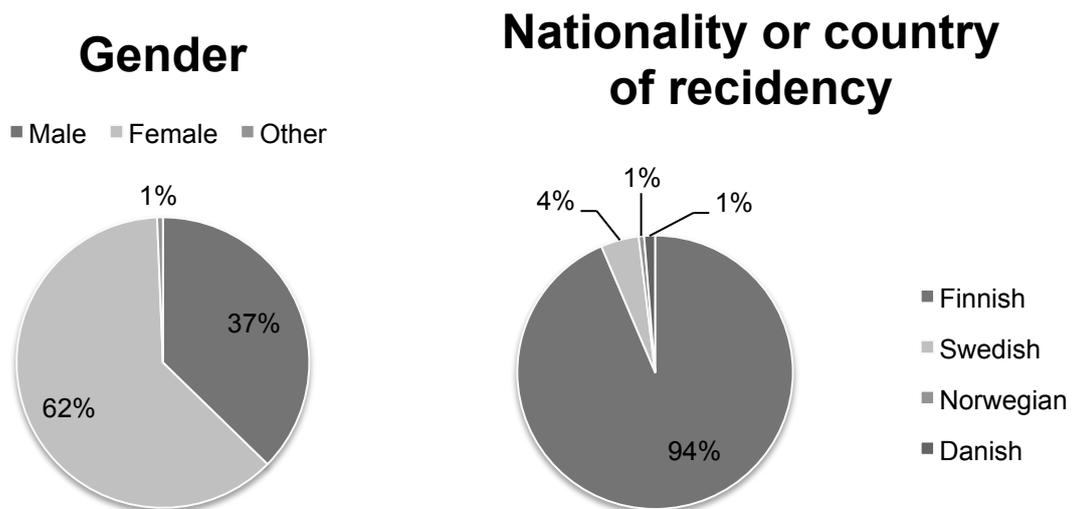


Figure 10. Nationality and gender distributions

Demographic categorization is important for analyzing the results and being able to identify and compare different groups of people and their behavior. The most important factor in this research is the question “do you use mobile payments” which is the dependent variable that is being explained here. Other questions are used as the independent or explaining variables in the analyses. Below, in table 5 it can be seen that 133 of the 158 respondents used mobile payments and only 25 reported that they are not using mobile payments. This means that 84 percent of the

respondents use mobile payments and reported their thoughts and experiences based on that.

Table 5. Distribution of “Do you use mobile payments?” answers

	N	Percent
Yes	133	84,18%
No	25	15,82%
Total	158	100,00%

From table 5 the distribution of the users and non-users of mobile payments among the 158 respondents of the survey is presented. Majority of the respondents, 84 percent to be exact, reported that they use mobile payments and only 15,8 percent are not using mobile payments at all. These two groups are being examined both separately and by comparing the results.

5.2 Results of the testing

Results of the survey were imported to an excel file and analyzed statistically. First, all the results were analyzed and the mean, median and standard deviation of a single question were calculated. After examining single questions, the author of this thesis combined the questions regarding the same theoretical factor. The means, medians and standard deviation were compared between the users and the non-users who took the survey. The significance of the difference of the mean need to be tested because of the difference in sample size. The t-test assuming unequal variances is used to test whether the differences between the means of the factors are significant.

As can be seen from table 6, there are significant differences in all of the factors between the users and non-users of mobile payments. The null hypothesis for t-test is that there is no significant difference between the means and it was rejected for all factors. The greatest differences were found in the means of performance expectancy, privacy and overall risk and behavioral intention and lazy user behavior. What is important to note and can be seen from table 6, is that users of mobile payments agreed more with the statements regarding performance expectancy than

those who do not use performance expectancy likewise they also agreed more with statements regarding the behavioral intention and lazy user behavior. And third remarkable difference in mean values was found from privacy and overall risk. Those respondents who did not use mobile payments felt it riskier (agreed with the statements) more often than those who are using mobile payments.

Table 6. Mean, median and standard deviation of factors

Factor	Do you use mobile payments?	Mean	Median	Standard Deviation	T-test of significance	Difference of mean
Performance expectancy	Yes	8,47	9,00	1,85	p-value: 0,0002 H0: rejected	2,63
	No	5,85	7,00	3,00		
Effort expectancy	Yes	8,98	9,00	1,16	p-value: 0,0121 H0: rejected	1,36
	No	7,62	9,00	2,60		
Social influence	Yes	5,75	6,00	2,98	p-value: 0,0010 H0: rejected	1,82
	No	3,93	3,00	2,93		
Facilitating conditions	Yes	9,55	10,00	0,85	p-value: 0,0005 H0: rejected	1,85
	No	7,70	9,00	2,76		
Performance risk	Yes	3,18	3,00	2,14	p-value: 0,0057 H0: rejected	-1,39
	No	4,57	5,00	2,42		
Financial risk	Yes	2,43	2,00	1,66	p-value: 0,0022 H0: rejected	-1,57
	No	4,00	3,00	2,58		
Time risk	Yes	1,91	1,00	1,47	p-value: 0,0028 H0: rejected	-1,21
	No	3,12	3,00	1,90		
Psychological and social risk	Yes	1,45	1,00	1,20	p-value: 0,0008 H0: rejected	-1,27
	No	2,72	2,00	2,41		
Privacy and overall risk	Yes	2,38	2,00	1,76	p-value <0,0000 H0: rejected	-2,19
	No	4,57	5,00	2,87		
Behavioral	Yes	7,96	9,00	2,52		3,84

intention and lazy user behavior	No	4,12	3	2,99	p-value <0,0000 H0: rejected	
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The individual questions regarding these factors are presented in the appendix 1. According to these results, it seems that the people who believe that using mobile payments is easy and usable use it more often than those who do not and people who believe that paying mobile is risky do not use mobile payments. Next we will go through the logistic regression executed.

5.4 Regression analysis

Regression analysis was executed in excel using the real-statistics add-in. Regression analysis was executed in two different models. In the first version the dummy variable for mobile payment usage was used as a dependent variable to measure how well the model explained whether respondents use or do not use mobile payments. Other analysis was conducted using the behavioral intention as the dependent variable. The first version is presented first and the second one after that. At first, both regressions were run for the whole sample. Because the sample size of non-users appeared very small and so forth does not represent the non-users well, both regressions were run for the part of the sample that reported to be already using mobile payment apps. The results of the regressions are presented below.

5.4.1 Mobile payment usage as dependent variable

Aim of the first regression model was to understand what are the significant factors that affect whether consumers use or do not use mobile payments. Dependent variable is a dummy variable of mobile payment usage where yes=1 and no=0.

Table 8. Goodness of fit of the model

R-squared (L)	0,56
R-squared (CS)	0,39
R-squared (N)	0,66
Chi-Sq	77,10
p-value	3,86e-11
sig	Yes

From table 8 we can see that the R-squared values for the model. R-squared values are used to measure the goodness of fit of the model, which means how well the independent variables used in the model explain the variation in the dependent variable. In logistic regression, R-squared values are defined by the maximum likelihood method. In this case, we had an output of three different values of R-squared values. These three are Cox & Snell R-squared, Nagelkerke's R-squared and McFadden's R-squared. R-squared values in this case differ from 39 percent to 66 percent. R-squared values for logistic regression need to be interpreted with caution because these measures were designed to compare the adjusted R-squared value in OLS logistic regression, but are not completely equivalent. Other way of measuring the goodness of fit of the model is to view the chi-squared value in the output. Output is presented in table 8. Like the R-squared values above, Chi-square test suggests that the model is significant and explain the choice of usage of mobile payments in our sample.

Table 9. Regression coefficients

	coeff b	s.e.	Wald	p-value	exp(b)	lower	upper
Intercept	-4,857	3,883	1,564	0,211	0,008		
Gender	-1,799	0,988	3,320	0,068	0,165	0,024	1,146
Age	0,019	0,295	0,004	0,950	1,019	0,571	1,818
Performance expectancy	0,282	0,267	1,112	0,292	1,325	0,785	2,238
Effort expectancy	-0,528	0,409	1,673	0,196	0,590	0,265	1,313
Social influence	0,348	0,238	2,130	0,144	1,416	0,888	2,259
Facilitating conditions	1,125	0,359	9,827	0,002	3,080	1,524	6,222
Performance risk	0,077	0,311	0,060	0,806	1,080	0,586	1,988
Financial risk	-0,105	0,470	0,050	0,823	0,900	0,359	2,261
Time risk	-0,178	0,291	0,374	0,541	0,837	0,473	1,480

Psychological and social risk	-0,115	0,220	0,274	0,601	0,891	0,579	1,373
Privacy and overall risk	-0,325	0,319	1,039	0,308	0,722	0,386	1,350
Behavioral intention	0,399	0,168	5,646	0,017	1,490	1,072	2,070
Lazy user behavior	-0,118	0,207	0,326	0,568	0,888	0,592	1,333

Rest of the output results of the regression analysis is presented in table 9. Table shows that two of the independent variables resulted p-value under the significance level of 5%. P-value under the 95 percent confidence level means that those two factors are statistically significant explanatory variables and thus explain the usage of mobile payments in this model. Then we move on to examining the coefficients, the slopes of residuals. Analysis shows that an increase in behavioral intention and facilitating conditions tend to increase the probability of using mobile payment apps. It can be noted that the p-value of gender is near our confidence level, which indicates that the gender of a respondent seem to affect the choice of usage, but not statistically significantly.

As mentioned above, most of the respondents reported to use mobile payment applications and it is interesting to see what are the most important reasons resulting their usage and the aim of the next regression is to find those factors. For the next regression, the sample included only the 133 respondents, who reported to be using mobile payments.

Table. 10 Goodness of fit of the model

R-Square (L)	0,0089
R-Square (CS)	0,0065
R-Square (N)	0,0126
Chi-Square	7,3325
P-value	0,8348
Sig	No

According to the goodness of fit test statistics, the model for our sample is not statistically significant and our explanatory variables succeed to explain only around one percent of the variation in the dependent variable. Next we will examine the regression coefficients in table 11.

Table 11. Regression coefficients

	coeff b	s.e.	Wald	p-value	exp(b)	lower	upper
Intercept	0,740	1,669	0,196	0,658	2,095		
Gender	0,008	0,203	0,001	0,970	1,008	0,677	1,500
Age	0,031	0,076	0,164	0,686	1,031	0,888	1,197
Performance expectancy	0,026	0,090	0,083	0,773	1,026	0,861	1,224
Effort expectancy	0,052	0,131	0,160	0,690	1,054	0,815	1,362
Social influence	0,037	0,048	0,599	0,439	1,038	0,945	1,139
Facilitating conditions	-0,092	0,153	0,364	0,546	0,912	0,675	1,231
Performance risk	-0,030	0,086	0,122	0,727	0,970	0,819	1,149
Financial risk	0,018	0,112	0,024	0,876	1,018	0,816	1,269
Time risk	0,016	0,108	0,022	0,883	1,016	0,822	1,256
Psychological and social risk	0,031	0,097	0,100	0,752	1,031	0,853	1,247
Privacy and overall risk	0,013	0,084	0,023	0,880	1,013	0,859	1,194
Behavioral intention	0,116	0,059	3,840	0,050	1,123	1,000	1,262

The p-values of the independent variables show that one statistically significant explanatory variable was found. Behavioral intention seems to be positively affecting the usage of mobile payments.

According to the regression analysis with dependent variable of mobile payment usage for the whole sample, statistically significant factors found are behavioral intention and facilitating conditions and for reduced sample, the behavioral intention was the only statistically significant factor. The explanatory variables used in the regression were: performance expectancy, effort expectancy, social influence, facilitating conditions, performance risk, financial risk, time risk, psychological and social risk, privacy and overall risk, behavioral intention and lazy user behavior

5.4.2 Behavioral intention as dependent variable

The aim of the second regression model was finding significant factors that explained the behavioral intention, in other words, the intention of starting or continuing using mobile payment within the next two months.

Table 12. Goodness of fit of the model

R-Square (L)	0,0029
R-Square (CS)	0,0040
R-Square (N)	0,0054
Chi-Square	9,7220
P-value	0,6403
Alpha	0,05
Sig	No

The goodness of fit statistics of the model suggest that the model do not succeed to explain more than about 0,5 percent of the variance in dependent variable and that the model is not statistically significant. This basically tells that the fit of the model is not good.

Table 13. Regression coefficients

	coeff b	s.e.	Wald	p-value	exp(b)	lower	upper
Intercept	-0,2747	0,6433	0,1824	0,6693	0,7598		
Gender	-0,0078	0,0910	0,0074	0,9314	0,9922	0,8300	1,1860
Age	0,0301	0,0336	0,8050	0,3696	1,0306	0,9649	1,1007
Performance expectancy	0,0102	0,0379	0,0724	0,7879	1,0102	0,9380	1,0881
Effort expectancy	0,0191	0,0553	0,1189	0,7302	1,0192	0,9146	1,1359
Social influence	0,0393	0,0206	3,6431	0,0563	1,0401	0,9989	1,0830
Facilitating conditions	-0,0330	0,0583	0,3215	0,5707	0,9675	0,8631	1,0846
Performance risk	-0,0167	0,0397	0,1767	0,6743	0,9834	0,9098	1,0631
Financial risk	0,0091	0,0508	0,0325	0,8569	1,0092	0,9136	1,1147
Time risk	-0,0055	0,0498	0,0122	0,9122	0,9945	0,9021	1,0964
Psychological and social risk	0,0262	0,0441	0,3542	0,5518	1,0266	0,9416	1,1192
Privacy and overall risk	0,0221	0,0361	0,3757	0,5399	1,0223	0,9526	1,0972
Dummy usage	-0,2295	0,1738	1,7434	0,1867	0,7949	0,5654	1,1176

In this model, there is only one independent variable close to our confidence level. That is the variable of social influence. The coefficient of the factor is 0,0393, which indicates that an increase in the value of the factor increases the probability of intending to use mobile payments in the future. Next, like above in the regression model explaining mobile payment usage, the sample size is reduced and contains only the responses of mobile payment users.

Table 13. Goodness of fit of the model

R-Square (L)	0,0024
R-Square (CS)	0,0034
R-Square (N)	0,0045
Chi-Square	7,4785
P-value	0,8244
Sig	No

Again our goodness of fit statistics shows that the model is not successful in explaining the intention to use mobile payments. Regardless of the goodness of fit, the regression coefficients in table 14 tell us more about the model.

Table 14. Regression coefficients

	coeff b	s.e.	Wald	p-value	exp(b)	lower	upper
Intercept	-0,057	1,637	0,001	0,972	0,944		
Gender	0,020	0,095	0,043	0,836	1,020	0,847	1,228
Age	0,029	0,035	0,673	0,412	1,029	0,961	1,102
Performance expectancy	-0,002	0,042	0,002	0,961	0,998	0,920	1,083
Effort expectancy	0,032	0,063	0,261	0,609	1,033	0,912	1,170
Social influence	0,043	0,022	3,932	0,047	1,044	1,001	1,090
Facilitating conditions	-0,052	0,073	0,504	0,478	0,950	0,824	1,095
Performance risk	-0,022	0,041	0,286	0,593	0,978	0,903	1,060
Financial risk	0,014	0,053	0,067	0,796	1,014	0,914	1,124
Time risk	0,008	0,054	0,019	0,889	1,008	0,906	1,120
Psychological and social risk	0,026	0,048	0,291	0,589	1,026	0,935	1,126
Privacy and overall risk	0,011	0,039	0,080	0,777	1,011	0,936	1,092
Dummy usage	-0,342	1,460	0,055	0,815	0,710	0,041	12,408

Like the regression ran for the whole sample, regression ran for the users of mobile payments, indicates that the social influence is the only statistically significant explanatory variable. The coefficient of the variable is positive, which indicates that an increase in the social influence increases the probability of intending to use mobile payments.

Original aim of this study was to be able to identify the attitudes of consumers toward mobile payments in Finland, Sweden, Norway and Denmark. This research failed in being able to compare differences between the countries due to the fact that the

survey did not reach enough respondents from Sweden, Norway and Denmark. Aim of this research was also to be able to compare the significant factors of those who have already started using mobile payments and those who were not using mobile payments applications yet. However, as most of the respondents were already using mobile payments, the results are heavily skewed and the results are only exploratory and cannot be generalized. In addition, the sample size in this quantitative examination is small, generalization about the results cannot be done and the results only present the sample used in the examination.

5.5 Qualitative examination

To complete the quantitative examination of this research, the survey also included two open questions about mobile payment usage. The aim of including these questions was to give respondents an opportunity to fill in possible missing factors or affecting aspects that were not assumed by the author. Open questions were not obligatory, but most of the respondents did answer the questions. In this chapter, we will analyze and conclude the answers to those questions. Qualitative data statistics are presented in table 11.

Table 12. Qualitative data statistics

Question no.	Question	Responses	Percentage of responses from sample
Q37.1	What are the most important reasons that made you start using mobile payments?	86	64,66 %
Q37.2	What are the most important reasons why you haven't started using a mobile payment service (yet)?	20	80%
Q38.1	Do you have any other thoughts about paying mobile you would like to point out?	33	24,81%

Q38.2	Do you have any other thoughts about mobile payments you would like to point out?	10	40%
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From table 11 we can see that question 37.1 resulted overall 86 answers, which means that 64,66 percent of the mobile payment users who took the survey provided answer to that question. Questions 37.2 and 38.2 were targeted to those respondents who did not use mobile payments. All of them answered those questions. Only 24,8 percent of the 133 respondents who already used mobile payments provided further thoughts on mobile payments.

Qualitative analysis for the open questions was executed using excel using the filter tool in excel. The responses were eyed and few themes popped up from the responses. Based on the manual viewing of the responses, the frequencies of certain words were calculated. Let's first take a look at the question 37.1 that was targeted to those respondents who already used mobile payments. Open responses were first gone through by searching the words "easy", "easiness", "fast", "quick", "convenience" and "need". Each response was then marked with 1 under the themes. The themes used in analyzing the responses were "need", "convenience", "fast/quick" and "easy". Some responses included many of the categories and some only one. There were only two responses that did not include any of these themes. The author also viewed and translated two responses from Finnish to English also corrected some misspellings of the words. The most frequently used theme to describe reasons to start using mobile payments was "easy". The theme easy included responses that either included the word "easy" or its different forms. The frequencies of each theme in responses are shown in table 12. It is important to remember that these frequencies might be overlapping and actually in 32 respondents mentioned two of the themes in their response and six mentioned three of them.

Table 13. Frequencies of top four themes in responses to question 37.1

Theme	Keywords	Context	Frequency and percentage
Easiness	“Easy”, “ease”, “Easiness”	Relates to the easiness and usability of mobile payments	69 83 %
Fast/quick	“Fast”, “quick”	Related to a speed of conducting tasks	33 40%
Convenience	“Convenience”, “effortless”, “effort”	Relates to how convenient and effortless it is to use mobile payments	14 17%
Need	“Need”	Relates to not needing old payment methods or needing a new method	11 13%

Hence it appears that the most important reason to start to use mobile payments is its easiness and fastness of use. 83% of the respondents who replied the question 37.1 mentioned theme “easiness” in their response. Second important factor appeared to be the fastness or quickness of the mobile payment usage and as many as 40% of the responses included this theme. Convenience of usage was mentioned in 17 percent of the responses and need appeared in 13 percent of the responses. Also other things, such as security and availability of mobile payments were mentioned in multiple responses.

Overall the next three qualitative questions were harder to analyze. All of the responses were read through carefully and categorized by the theme and attitude of the answer. A clear theme of the open answers was obvious; privacy and security issues were the clear top of the topics. Let’s take a closer look to the categories each question at a time. The themes of the answers to question 38.1 are presented in table 13. Question 38.1 was presented to respondents who reported to be using mobile payments and the aim of the question was to provide respondent a chance to point out any thoughts about mobile payments.

Table 14. Frequencies of top four themes in responses to question 38.1

Theme	Keywords	Context	Frequency and percentage
Security	“Security”, “safety”, “safer”, “privacy”	Related to the security of using mobile payment apps.	14
		Both positive and negative attitudes are included.	42%
Usability	“Working”, “work”, “convenience”, “available”	Relates to usability, availability and functionalities of mobile payment apps. Positive and negative attitudes are included	9 27%
		Easiness of using mobile payment apps.	6 18%
Lack of integration	“Integration”, “integrate”	Relates to lacking integration between providers, functionalities a different card types in use.	5 15%

Interestingly, 42% of the respondents who provided their thoughts for question 38.1 were thinking about the security issues related to mobile payments. Four of the 14 respondents commented that the security of mobile payments was a positive factor related to using apps. But ten responses to this question included worries about safety and privacy issues of using those apps. Usability of mobile payments apps was notified in 27% of the responses. Five out of the nine responses were positive and rest of the responses reported some issues with the usability. Notified issues included payment errors, lack of places to use mobile payments and lack of knowledge about mobile payment usage in stores. Easiness of the mobile payments was highlighted in 18 percent of the responses. Lack of integration among service providers, banks, bonus card systems etc. was noted in 15% of the responses. Respondents hoped that all the cards, including ID cards and loyal customer cards could be available on mobile so that they wouldn't have to carry their wallet anymore and could have everything necessary on their phone.

Questions 37.2 and 38.2 were presented to the respondents that reported not to be using mobile payments. Those two questions resulted with three clear themes: security worries, feeling of not needing mobile payment services and good usability of credit and debit cards. Seven of the 20 respondents (35%) who replied question 37.2 simply reported that they feel that they don't need to use or do not see or know any additional benefit of using mobile payments versus credit or debit card payments. The same theme remained in question 38.2, where 30 % of the respondents reported that they prefer staying in more traditional payment methods. In questions 37.2 (30%) and 38.2 (40%) notified the safety aspect of mobile payments.

Qualitative examination of the results show that most of the respondents who use mobile payments think that it is easy. Other significant factors of using mobile payments were the quickness of the payment process, convenience and feeling of not needing old payment methods or a need to use mobile payments. The most remarkable reason not to use mobile payments was found to be the feeling of not needing it because other payment methods are better or work well. Also security issues were top issues for the respondents who reported not to use mobile payments. Worries about security included worries about unacknowledged usage of personal payment data and payment errors. Many respondents hoped that integration between the providers and worldwide integration would improve. Many of the respondents, regardless of whether they used or didn't use mobile payments, were looking forward of more services going mobile, so that all the services could be used by mobile device.

5.6 Summary of findings

After analyzing the results of the survey, using different kinds of tools including word analysis and linear regression analysis, in this chapter, we will shortly summarize the findings and valuate the reliability and validity of this research. After this chapter, in chapter 6, findings are discussed and reflected to earlier research presented in chapter 2.1. Some of the findings were surprising and some were expected.

First, after analyzing the demographic distribution of the respondents, it was clear that comparison between the Nordic countries was not a possibility due to the fact that almost 94% of the respondents were from Finland. Because of this, the author decided to use all the responses as a mass of Nordic users and not specify countries further in the analysis. When drawing conclusions from the results, it must be kept in mind that the data used for this research is mainly from Finland and therefore the results mostly present the Finnish users. It must also be kept in mind when generalizing the results that 84 percent of the respondents were already using mobile payments and 62 percent of them were women. Also majority (50%) of the respondents were 26-35 years old. So the regression analysis is heavily weighted of the opinions of the user of mobile payments. Due to the fact that the majority of respondents were already using mobile payments, regressions were run also for sample that only included respondents using mobile payments. Users and non-users were further differed in the qualitative analysis to find differences in between the two. It is also notable that the survey was in English, which is not a native language in any of the Nordic countries, so there may always be some language barriers or misunderstandings of the questions.

First we gathered the factors to make 12 variables. Each group included two to four statements regarding the factor. Questions are presented in the appendix 1. One of the 12 factors was a dummy variable of two response options, yes or no. After combining the factors the results could be analyzed. The first analyze was to take a look how the means of the answers to different categories differed between the users and non-users of mobile payments. The comparison showed that factors with greatest differences were performance expectancy, privacy and overall risk and the behavioral intention and lazy user behavior. Respondents who reported to use mobile payments had remarkably higher performance expectations and higher intentions to use mobile payments as well as the lazy user behavior seemed higher among the users of mobile payments. Privacy and overall risk got higher mean among the non-users, which indicates that non-users are more worried about the privacy and overall risk than those respondents who already used mobile payments.

Next step was to conduct a logistic regression analysis using the dummy variable of mobile payment usage as a dependent variable and the regression was run for the

whole sample. The model succeeded to explain about 39-66 percent of the dependent variable. Two of the explanatory variables appeared as statistically significant. Both of them have a positive relationship to dependent variable. Statistically significant variables are facilitating conditions and behavioral intention. Increase in these factors cause an increase in the value of mobile payment usage, which in this case means that those factors increase the possibility of using mobile payments. Next, a regression was run using the same independent and dependent variables for the part of the sample that reported to be using mobile payments. This regression succeeded to explain only about one percentage of the usage and only one statistically significant independent variable was found. Behavioral intention was the only significant factor in the model and it has a positive impact on mobile payment usage.

Third regression analysis was done using the behavioral intention as dependent variable and other factors as explanatory variables and used for the whole sample. Model succeeded to explain 0,3-0,5 percent of the intention to use mobile payments and was not statistically significant. Only one statistically significant explanatory variable was found. Social influence appeared to have a positive relationship to intention to use mobile payments. Similarly, when regression was run for the part of the sample that already used mobile payments, the model explained only about 0,2-0,4 percent of the intention to use mobile payments and the only statistically significant explanatory variable was the social influence with a positive impact on the intention to use mobile payments.

After conducting quantitative analysis for the data, qualitative analysis was used to examine the replies to two open questions in the end of the questionnaire. Questions were specified to suit whether the responded had reported to be using mobile payments or not. Aim of the question number 37 was to provide respondents a free word to describe the factors that made them start using mobile payments or what were the reasons they had not started using mobile payment (yet). After the word analysis of the replies, the top reasons for starting to use mobile payments were quickness, need, convenience and easiness of the usage. Top reasons for not using mobile payments were security concerns, feeling of not needing it and the easiness of other payment methods. The question number 38 provided respondent a chance

to point out anything about the topic. Users of the mobile payments pointed out usability and easiness of mobile payments and also downsides of it, the lack of integration. Both, users and non-users pointed out security issue related to mobile payments, some of the respondents pointed out that they know it safe, but it doesn't feel like it. Others were concerned about their privacy. Top theme among the non-users was the fact that they do not see any additional benefit of using mobile payments compared to traditional payment methods.

In the next chapter, findings of this thesis are reflected to the theoretical framework, the original research questions are answered, validity and reliability of this thesis are discussed and future research suggestions are presented.

6. Discussion and conclusions

Aim of this thesis was to investigate the reasons that are the most important factors leading Nordic consumers to use mobile payment applications and what are the reasons that lead to not using these applications. Data was gathered by a survey that was targeted to all Nordic consumers. In this chapter, results of the research will be discussed and reflected to previous research. Also some limitations of this research are discussed. In this part of this thesis suggestions for future research are presented. Conclusions are drawn and the research questions presented in chapter 1.1 are answered.

6.1 Discussion

In the second chapter of this thesis, four studies were presented and findings of those studies were further presented in table 1. One factor that was found remarkable in all of the four studies was the performance expectations of mobile payments. The same factor was also found remarkable and significant in all of the analyses executed in this thesis. Thus it can be stated that one of the most important factors that affect mobile payment usage is the expected performance of the applications. Performance expectancy is defined in chapter 3.6. Overall we can conclude that the more consumers believe the applications can help them perform better and faster of the tasks they are able to conduct with it, the higher the possibility is that they start using mobile payments.

One of the main themes that arose especially in the qualitative analysis of this thesis was the security aspect of the mobile payments. Quasim and Abu-Shanab (2016) and Oliviera, Thomas, Baptista and Campos (2016) also found that the perceived security issues and trust in applications are among the main factors that lead people to make a choice about using mobile payments. Interestingly social influence was found to be a significant factor in two of the previous research (Quasim & Abu-Shanab 2016; Oliviera et al. 2016). Neither social influence nor social risk were found to be remarkable in this thesis. This might be due to the geographical areas of the research because cultural factors differ. It is generally assumed that Nordic culture is far more individualistic culture than Middle-Eastern or Southern European cultures,

which were the geographic areas in the research by Quasim and Abu-Shanab (2016) and Oliviera et al. (2016).

Ease of use, convenience, reachability and effort expectancy are among the most important factors that lead to the mobile payment usage according to research by Maduku (2017) and Kim et al. (2010). These were found to be significant factors in the analyses of this thesis as well. All the research had some factors that were found significant only in that certain research. These might be due to differences in target groups, point of time or wording of the questions and including themes in the questionnaires. It should also be noted that the fast development of the mobile payments and new technologies can affect the results of the research as users get more used to new technologies appearing frequently.

Overall we can state that this research provides a confirmation that the theoretical framework about technology acceptance is usable in the area of mobile payments. This research also confirmed similar research findings as previous research, but in addition also found out some new perspectives, such as the good usability of credit cards and lack of integration.

6.2 Reliability and validity

There are few main things that affect the validity and reliability of this research. First of all, the sample size of 158 is a small sample size. The smaller the sample size is, the worse the reliability and generalizability of the research is. The most important thing that should be held in mind when drawing conclusions from the results of this thesis is the fact that 94% of the respondents were from Finland and thus this research does not present opinions of the Nordic countries. It might be argued that this research is mainly about mobile payments in Finland. Respondents of the research were mainly Finnish, 26-35 years old women, who already use mobile payments. This distortion of demographical factors of the sample must be kept in mind. It can be drawn that the research is only exploratory and the results are only applicable for this sample and it does not necessarily represent the population of the Nordic countries. This issue could be again fixed by increasing the sample size.

Validity of this research is threatened by a fact that the goodness of fit statistics are somewhat poor and models fail to explain dependent variables.

Because of the survey was executed anonymously via open-link online survey, we cannot be sure of who the respondents really are. There are some considerable aspects that some might have replied the survey several times or without reading the instructions. Survey was in English, and language barriers might have caused some misunderstandings that affect the results of this survey.

However, the fact that the research findings of this research were in line with previous research done about the mobile payments, indicates that the reliability of this research is good. Quantitative and qualitative analysis were in line with one another and that also indicates good reliability and validity of research findings.

6.3 Answers to research questions

In the beginning of this thesis, in chapter 1.1 four main research questions were presented and the aim of this research is to answer those questions. There were some limitations that might have affected the quality of these answers, but validity and reliability of this research have already been discussed earlier in this chapter.

RQ1: What are the most important factors affecting mobile payment usage found in earlier research?

During the review of earlier research regarding adaptation of mobile payments, one factor was found in all the research regardless of the geographic area of the research. Performance expectancy was found to be the top factor in all the research reviewed. Security aspect and the convenience, effortlessness of the mobile payment was found out to be top factors as well in the previous research. Social influence was also found to be important aspect when discussing about mobile payment usage.

RQ2: What are the most important factors that affect in mobile payment usage among Nordic consumers?

There were 11 explanatory factors used in this research. Each factor was based on the theoretical framework of this thesis. Theoretical framework is presented in chapter 3. Regression analysis showed that facilitating conditions, behavioral intention and social influence are the significant factors affecting the mobile payment usage. Analysis of difference in mean resulted top three factors: performance expectancy, privacy and overall risk and behavioral intention and lazy user behavior. In addition of the results of the qualitative analysis, top three factors affecting mobile payment usage in the Nordic countries are performance expectancy, effort expectancy and privacy and overall risk.

RQ3: What are the most important reasons that lead consumers to start using mobile payments?

The qualitative analysis executed for this research provided respondents a chance to freely describe the reasons they started using mobile payments. There were four main themes that rose above other themes among the answers for this question. Quickness, convenience, easiness and need were the four top themes. Overall it was said that mobile payments are easy and fast to use. Many of the respondents also reported that because of mobile payments apps, they do not necessarily have to carry their wallet.

RQ4: What are the most important reasons why consumers have not started using mobile payments (yet)?

After analyzing the replies for the open questions to Nordic consumers who do not yet use mobile payments, three main themes arose explaining why consumers had not yet adopted mobile payment apps into use. On the top of the three themes is that consumers do not feel like they need to use these services or they do not see any additional benefits of starting to use mobile payment apps. Second theme that was security concerns affect consumers' decisions about starting to use mobile payments. And thirdly, consumer who have not yet started using mobile payment

services feel like more traditional payment methods are better and they prefer sticking in to those methods that they already are familiar with.

6.4 Suggestions for future research

This research was based on the theories of technology acceptance and those theories were then applied to the context of mobile payment usage. According to the regression analysis, the model used in this thesis succeeded to explain about 60 percent of the mobile payment usage. It would be interesting to execute for example focus group interview with open questions to analyze reasons for consumers to use mobile payment that traditional technology theories does not include. Due to the nature of the data used in this research, it would be interesting to see how other methods would be able to predict the use of mobile payments.

Another interesting suggestion for future research and also interesting topic for service providers would be to purely concentrate on those consumers who do not have any experience of using these applications and examine how their opinions might change after having an opportunity to try out these services. In addition to purely concentrating on the factors affecting the mobile payment usage, it would be interesting to find out what would be the key factor that would change the opinion of non-users of mobile payments and make them start using these services.

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Appendices

Appendix 1. Survey

Mobile Payment Usage in Scandinavia

Results of this survey are used as a material for a masters thesis. Purpose of the survey is to analyze the reasons why people in scandinavia use or do not use mobile payments.

In this survey, mobile payments are defined as: money transfers and payments that can be done by using a mobile device, such as smartphone or a smart watch.

Answering the survey will take about 10 minutes and it is done anonymously. Please answer the questions with the most suitable option for you according to your own opinions and beliefs.

Please note, when answering questions (5-36) with response options from 1-10:

- 1 = fully disagree
- 10 = fully agree
- Empty = can't answer the question

	1. Gender	Male Female Other
	2. Age	0-15 16-25 26-35 36-45 46-55 56-65 66-75 75-
	3. Nationality or Country of residency	Finnish (Finland) Swedish (Sweden) Norwegian (Norway) Danish (Denmark)
	4. Do you use mobile payments?	Yes No
Performance expectancy	5. Paying mobile is useful to carry out my tasks	Paying mobile would be useful to carry out my tasks
	6. I think that using mobile payments enable me to conduct my tasks more quickly	I think that using mobile payments would enable me to conduct tasks more quickly

	7.	I think that using mobile payments increase my productivity	I think that using mobile payments would increase my productivity
Effort expectancy	8.	Using mobile payments is clear and understandable	I believe that using mobile payments would be clear and easy
	9.	It is easy for me to become skillful at using mobile payment apps	I believe that it would be easy for me to become skillful at using mobile payment apps
	10.	Paying mobile is easy	I believe that paying mobile would be easy
	11.	Learning to pay mobile was easy	I believe that learning to pay mobile would be easy
Social influence	12.	People who influence my behavior think that I should use mobile payments	People who influence my behavior think that I should use mobile payments
	13.	People who are important to me think that I should pay mobile	People who are important to me think that I should pay mobile
	14.	People in my environment who use mobile payment services have more prestige than those who do not	People in my environment who use mobile payment services have more prestige than those who do not
	15.	Using mobile payment apps is a status symbol in my environment	Using mobile payment apps is a status symbol in my environment
Facilitating conditions	16.	I have the resources to pay mobile	I have the resources to pay mobile
	17.	I have the knowledge to use mobile payment	I have the knowledge to start using mobile payments
Performance risk	18.	Mobile payments might not perform well and create problems with my credit	Mobile payments might not perform well and create problems with my credit
	19.	The security systems built into the mobile payment systems are not strong enough to protect my checking account	The security systems built into the mobile payment systems are not strong enough to protect my checking account
	20.	The probability that something's wrong with the performance of mobile payments is high	The probability that something's wrong with the performance of mobile payments is high
	21.	Mobile payment servers may not perform well and thus process payments incorrectly	Mobile payment servers may not perform well and thus process payments incorrectly
Financial risk	22.	The chances of losing money if I use mobile payments are high	The chances of losing money if I use mobile payments are high
	23.	Using an mobile payment services subjects my checking account to potential fraud	Using an mobile payment services subjects my checking account to potential fraud
	24.	My signing up for and using a mobile payment service would lead to a financial loss for me	My signing up for and using a mobile payment service would lead to a financial loss for me

	25.	Using a mobile payment service subjects my checking account to financial risk	Using a mobile payment service subjects my checking account to financial risk
Time risk	26.	I think that I lost time when started to use mobile payment services due to having to switch to a new payment method	I think that if I use mobile payment services then I will lose time due to having to switch to a different payment method
	27.	Paying mobile lead to a loss of convenience for me because I have to waste a lot of time fixing payments errors	Paying mobile would lead to a loss of convenience for me because I would have to waste a lot of time fixing payments errors
	28.	The time loss from having to set up and learn how to use mobile payment is high	The possible time loss from having to set up and learn how to use mobile payment is high
Psychological risk	29.	I think that paying mobile doesn't fit in well with my self-image or self-concept	I think that paying mobile will not fit in well with my self-image or self-concept
Social risk	30.	If i pay mobile, it will negatively affect the way others think of me.	If i pay mobile, it will negatively affect the way others think of me.
Privacy risk	31.	The risk of losing the control of my payment information is high	The risk of losing the control of my payment information is high
	32.	The risk of losing my privacy because my personal information would be used without my knowledge is high	The risk of losing my privacy because my personal information would be used without my knowledge is high
Overall risk	33.	On the whole, considering all sorts of factors combined, it is risky to pay mobile	On the whole, considering all sorts of factors combined, it would be risky if I pay mobile
Behavioral intention	34.	I plan to continue using mobile payments	I plan to start using mobile payments in the next 2 months
Lazy user model	35.	I think I need to use mobile payment services	I think I need to use mobile payment services
	36.	Even if I have other options, I will pay mobile	Even if I have other options, I will start paying mobile
Open questions	37.	What are the most important reasons that made you start using mobile payments?	What are the most important reasons why you haven't started using a mobile payment service (yet)?
	38.	Do you have any other thoughts about paying mobile you would like to point out?	Do you have any other thoughts about mobile payments you would like to point out?