Aalto University
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Easy mobile person-to-person payments – end-users' perspective

Master's Thesis

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Supervisor: Professor Marko Nieminen

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Aalto University
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Aalto University School of Electrical Engineering Degree programme of Communications Engineering	ABSTRACT OF THE MASTER'S THESIS

Author: Tapio M. Haanperä

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Background: Mobile phones are rarely used as payment instruments at point-of-sale in Finland. Consumers are satisfied with the payment instruments for person-to-business (P2B) payments, but are interested in mobile person-to-person (P2P) payments (due to their numerous advantages). Thereby, mobile P2P payments can serve as the first step towards mobile P2B payments. This thesis studies Finnish consumers' P2P payment habits and the situations in which these payments occur. The thesis also studies the consumers' expectations and desires about mobile P2P payments.

Approach: The empirical part of this research consists of 8 interviews and an online survey with 79 respondents.

Results: Most P2P payment situations consist of sharing bills and costs with friends. These money transfers are made using online bank or cash. However, these methods have some evident shortcomings that mobile payment methods could overcome. With mobile phones, users can pay instantly (regardless of time and place), save all transactions for personal recordkeeping, set a transaction limit, pay the exact amount, make payment requests to others and receive confirmation for all transactions. In general, study participants were interested in mobile P2P payments and believed to be using their mobile phones for P2P payments in the future – even more than for P2B payments.

Conclusion: The results of the empirical study, backed with related research, indicate that mobile phones are likely going to be used as an alternative payment instrument for person-to-person payments in Finland.

Keywords: Mobile payment; person-to-person payment; money transfer; payment habits; electronic/wireless commerce; consumer acceptance; payment scenario; user-centered design

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Aalto-yliopisto Sähkötekniikan korkeakoulu Tietoliikennetekniikan tutkinto-ohjelma/koulutusohjelma	DIPLOMITYÖN TIIVISTELMÄ

Tekijä: Tapio M. Haanperä		
Työn nimi: Kuluttajien välinen mobiilimaksaminen loppukäyttäjien näkökulma		
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Tausta: Mobiili lähimaksaminen ei ole yleistynyt Suomessa useasta syystä. Kuluttajat ovat tyytyväisiä nykyisiin maksutapoihin kaupoissa, mutta kuluttajien välistä mobiilimaksamista kohtaan vaikuttaisi olevan selkeää kiinnostusta sen tarjoamien lukuisten hyötyjen vuoksi. Kuluttajien välinen mobiilimaksuliikenne saattaisikin avata tien laajempaan matkapuhelinten käyttöön maksuvälineinä myös kaupoissa. Tämä diplomityö käsittelee millä tavalla suomalaiset tällä hetkellä maksavat kuluttajien välisiä maksuja sekä minkälaisia tilanteita nämä ovat. Tässä tutkimuksessa myös selvitetään minkälaisia odotuksia ja toiveita suomalaisilla on kuluttajien välisestä mobiilimaksamisesta.

Tutkimusmenetelmä: Tutkimuksen empiirinen osa käsittää 8 haastattelua sekä kyselyn, jossa oli yhteensä 79 vastaajaa.

Tulokset: Suurin osa kuluttajien välisistä maksutilanteista liittyvät laskujen ja kulujen jakamiseen ystävien välillä. Nämä rahansiirrot suoritetaan joko verkkopankin kautta tilisiirtona tai käteisellä. Nykyisissä maksutavoissa on kuitenkin selviä puutteita. Kuluttajien välisellä mobiilimaksamisella voidaan tuoda selviä parannuksia verrattuna nykyisiin maksutapoihin: mahdollisuus maksaa välittömästi (riippumatta ajasta ja paikasta), tallentaa maksutapahtumat, asettaa siirtoraja, maksaa tarkka summa, tehdä maksupyyntöjä sekä saada vahvistus tehdyistä rahasiirroista. Suurin osa tutkimukseen osallistuneista uskoivat käyttävänsä matkapuhelinta kuluttajien väliseen maksamiseen tulevaisuudessa ja olivat myös kiinnostuneita tästä mahdollisuudesta – jopa enemmän kuin kaupassa tehtävästä mobiilimaksamisesta.

Johtopäätös: Tämän tutkimuksen tulokset yhdessä aiempien tutkimusten kanssa viittaavat siihen, että matkapuhelimia tullaan Suomessa käyttämään vaihtoehtoisena maksuvälineenä kuluttajien välisessä maksamisessa.

Asiasanat: Mobiilimaksaminen; kuluttajien välinen maksaminen; rahansiirto; maksutottumukset; sähköinen/langaton kaupankäynti; kuluttajahyväksyntä; maksuskenaario; käyttäjäkeskeinen suunnittelu

Foreword

I would like to give a warm thank you to my instructor Sirpa Riihiaho and supervisor Marko Nieminen for their help and fruitful comments. Their guidance and support has been irreplaceable throughout the process.

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My friends and family have been amazing and they have really given me the strength and the energy to finish this thesis – so thank you.

Otaniemi, 16.4.2012

Tapio M. Haanperä

Acronyms

3G	3rd generation (for mobile telecommunications)
ATM	Automated teller machine (i.e. cash dispenser)
B2C	Business-to-consumer
C2B	Consumer-to-business
C2C	Consumer-to-consumer
EFTPOS	Electronic funds transfer at point of sale
EUR	Currency code (ISO 4217) for euro (sign €)
GPS	Global positioning system
GSM	Global system for mobile communications
IT	Information technology
KES	Currency code (ISO 4217) for Kenyan shilling (sign Ksh)
MMT	Mobile money transfer
MNO	Mobile network operator
MPSP	Mobile payment service provider
NFC	Near field communications
P2B	Person-to-business
P2P	Person-to-person
PIN	Personal identification number
POS	Point-of-sale
RFID	Radio-frequency identification
SMS	Short message service
OTA	Over-the-air
OTP	One-time password
TAM	Technology acceptance model

Definitions

Credit transfer	Also referred as bank account transfer and giro transfer
Direct operator billing	The payment is billed by the operator or reduced from prepaid airtime.
Mobile payment	Payments or money transfers that are made using a mobile device (in this thesis with a mobile phone).
Person-to-person payment	Payment or a money transfer between two private persons (e.g. between friends an family member or at a flea market or buying from an online auction).
PIN-code	Typically a four (or five) digit number sequence used as a password.
Proximity payment	Payments take place at the point of sale or at the same physical location as the payee is.
Remote payment	Payments that occur in a geographically remote location from the payee. Sometimes referred as virtual payments.

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1 Introduction

This thesis is part of a project called Mobile Financial Services. The project is made in collaboration with Aalto University, Nokia, Tieto and Nordea. The aim of this project is to integrate several different financial services into a mobile phone. Mobile person-to-person (P2P) payments fit well into this project and have not been studied within this project before.

There has been a lot of talk about mobile payments since the late 1990s. Mobile phones were believed to be the next cashless payment instruments (e.g. Sekino et al. 2007; Dahlberg et al. 2008). From technology perspective mobile phones can already be used as payment instruments (e.g. Leinonen 2008). However mobile payments in Finland are mostly used only for smaller payment to buy digital content, bus and tram tickets or goods from unmanned point-of-sale (e.g. vending machines). Mobile person-to-business (P2B) payments in shops are not used basically at all in Finland. Merchants are not interested in investing in a new payment instrument and consumers are not interested in using a payment instrument that is not widely applicable. Finnish consumers are also pleased with the current methods for cashless P2B payments. Therefore, there is no real need for a new P2B payment method to be used in stores. (Dahlberg et al 2006)

Most of the research made in mobile payments has been about P2B payments, although one of the most successful mobile payment services today, M-PESA in Kenya, at first offered only P2P money transfers. Today M-PESA offers all kinds of payments – for example paying bills, paying for purchases and even paying salaries. Because the previous research made for person-to-person (P2P) payments and money transfers have been minimal compared to P2B payments this thesis concentrates on mobile P2P payments only.

Finnish consumers use mostly credit transfers (from online bank) and cash for P2P payments. However these methods have clear shortcomings. These shortcomings can be improved with the help of present mobile technology. Mobile phones are almost always carried with and they can be used almost anywhere at anytime. The idea of this study is that mobile payments in Finland would start to evolve from mobile P2P payments,

much like in the case of M-PESA. If mobile P2P payments became popular enough the merchants would likely follow.

As presented in Figure 1, Finland has been moving towards a more cashless society during the past 30 years. Card payments have become more popular while cash usage has been declining. Mobile payments have not been adopted widely in point of sales (merchants). Interesting possibilities however exist in enabling P2P payments as a step towards mobile P2B payments. This thesis suggests that the next steps taken towards a more cashless society are mobile P2P payments followed by mobile P2B payments.

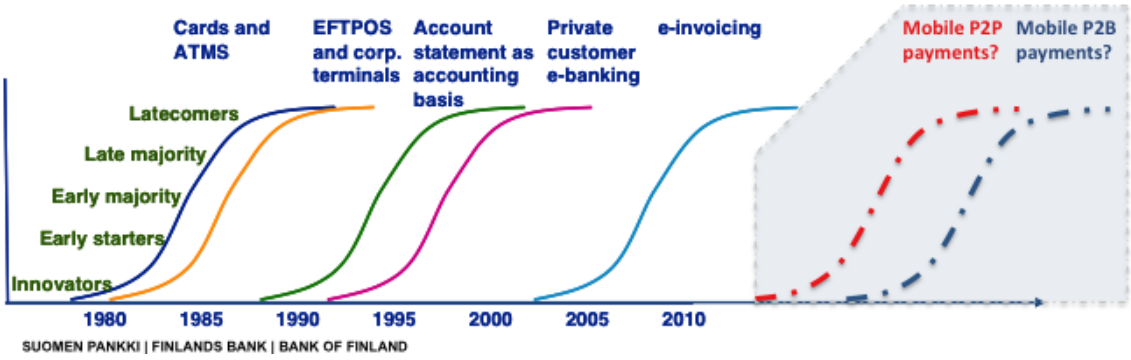

Figure 1 Payment services have developed in a more cashless society in the past 30 years. Will mobile phones be the next cashless payment instrument? (Modified from Leinonen 2008 & Zhong 2009)

1.1 Objectives and research questions

The goal of this research is not to find out whether Finnish consumers are interested in mobile P2P payments or not. Instead, this research studies what expectations and wishes the early adopters have about a new mobile P2P payment service – what should be taken in to consideration when designing a new mobile P2P payment service in Finland. Mobile payments in this thesis equal all payments made with a mobile phone. The scope is strictly kept in just mobile P2P payments from the users' perspective. Technological, regulatory and legislative factors are not included in the recommendations.

The thesis aims to answer the following research questions:

Rq1: How do Finnish consumers currently manage P2P payments?

Consumers already have various methods for P2P payments. The current P2P payment methods will be studied and presented in this thesis – what are the most popular

methods and how are they used and how often are P2P payments made. Also the challenges and constraints of these methods will be presented.

- What are the pros and cons of these methods?
- What can be learned from the current practices when designing a new mobile P2P payment service?

Rq2: What kind of P2P payment situations do Finnish consumers currently have?

This thesis studies what kind of P2P payment situations and scenarios are most common with the study participants in this research. The most typical amount of money paid is also studied in this thesis.

- What can be learned from the most common P2P payment situations when designing a new mobile P2P payment service?

Rq3: What are end-users' expectations and wishes about a new mobile P2P payment service?

At the end of this thesis, some recommendations are given for designing a new mobile P2P payment service, and factors that influence the intention to use mobile P2P payments will be presented. The end-users' expectations and wishes about a new mobile P2P payment service will also be presented. By taking into account the context and technology for mobile P2P payments, the following questions are considered important:

- Are consumers interested in mobile P2P payments?
- Which is more important / interesting: mobile P2P or P2B payments?
- What are the factors affecting to the intention to use mobile P2P payments?
- What additional value can mobile P2P payments bring to the users?
- Are users willing to pay for a mobile P2P payment service?
- What is the feasibility for mobile P2P payments for early adopters?

Hypothesis: This thesis also starts with the hypothesis that the wide usage of mobile P2P payments would positively affect the intention to use mobile P2B payments. It will

be examined whether the previous research as well as the results from this study supports this hypothesis.

1.2 Structure

The structure of this thesis is divided into two parts, literature review and empirical research. The literature review in Chapter 2 is meant to give background on mobile payments and mobile P2P payments. It also discusses the factors affecting consumers' intention to use mobile payment and what other related research have been done in this field. At the end of the chapter, three very different mobile P2P payment services are presented – M-PESA, PayPal and Apple's NFC-based P2P payment service. The advantages and disadvantages of these services are discussed later in Chapter 2.7.

Chapter 3 starts the empirical part of this thesis. The empirical research included interviews and a survey. The target group is users that are most likely (based on previous research) to change their payment behaviors and start using mobile payments. Chapter 3 presents all the methods and the process of the empirical part.

Chapter 4 presents the results from the interviews and online survey. These results were also examined with a computer program called TAMSAnalyzer. The results in this chapter are presented as they occurred and not analyzed at this point. This chapter also presents the current P2P payment use situations and scenarios that the study participants have.

Chapter 5 combines the results from the survey and interview with the use situations and scenarios as well as previous research. This chapter also discusses about the three mobile P2P payment services presented in Chapter 2.7. These results are analyzed and compared.

Chapter 6 provides answers for the research questions. This chapter also includes a short summary of all the results and gives recommendations for a new mobile P2P payment service.

Personal experiences of this research, suggestions for future research and reliability and validity of this study are discussed in Chapter 7.

2 Related research

Information for the related research was gathered using services and sources such as ACM Digital Library[1], Science Direct[2], Emerald[3], Google Scholar[4], Bank of Finland[5] and IEEE Xplore Digital Library[6]. Using these services the following search term were used most often: "mobile payment", "person-to-person payment", "consumer-to-consumer payment", "mobile person-to-person payment", "mobile payment acceptance" and "intention to use mobile payment".

2.1 Mobile payments

Mobile payments are alternative payment methods that are made using a mobile device, i.e. mobile phones. All mobile payment and money transfer methods described in this thesis require a mobile phone.

Mobile payments are categorized in various ways. They can be categorized into micro- and macro-payments. Micropayments typically cover payments less than 10 Euros. Mobile payments are also categorized into mobile proximity payments, mobile remote payments and person-to-person (P2P) payments (Laaksonen 2008 & Mallat et al. 2004). Proximity payments take place at point-of-sale (POS). In some situations mobile remote payments and P2P payments are classified as mobile money transfer (MMT) services (e.g. Goeke et al. 2010). Figure 2 presents the different mobile payment categories.

[1] http://portal.acm.org/
[2] http://www.sciencedirect.com/
[3] http://www.emeraldinsight.com/
[4] http://scholar.google.com/
[5] http://www.suomenpankki.fi/en/
[6] http://ieeexplore.ieee.org/

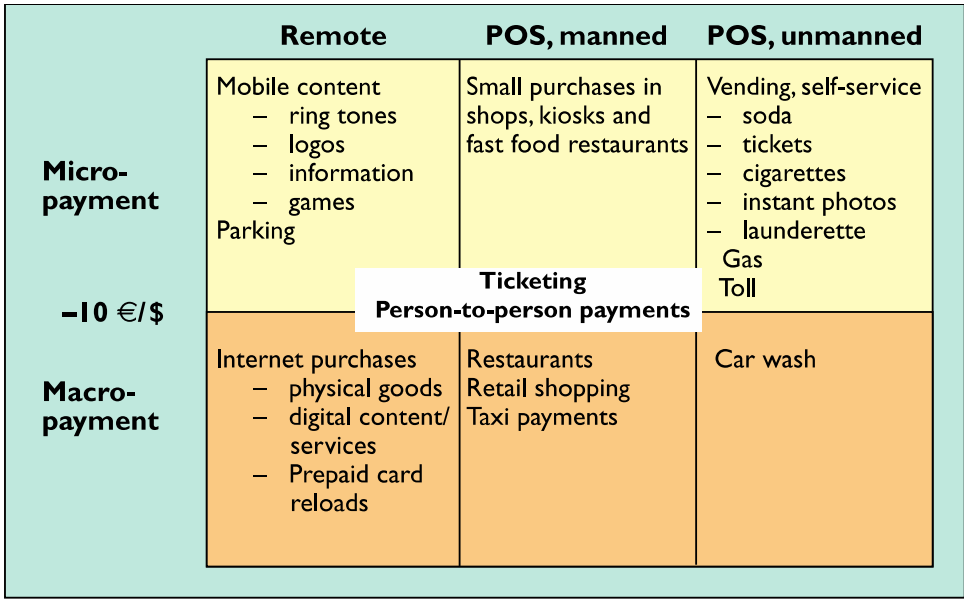

Figure 2 Mobile payments framework (Mallat et al. 2004)

Kreyer et al. (2002) describes four different types of mobile payment scenarios and the current competing payment method or instrument. These are presented in Table 1.

Table 1 Four different mobile payment scenarios (Kreyer et al. 2002)

Scenario	**Description/Example**	**Competing payment method**
Mobile commerce scenario	New applications and services, e.g. context sensitive information	- - -
Electronic commerce scenario	All kinds of business-to-consumer (B2C) electronic commerce excluding mobile commerce, e.g. purchase of goods or content via the Internet	Offline Debit-/credit card e-payment
Stationary merchant scenario	Classical "face-to-face" commerce, e.g. purchase in a supermarket, usage of a ticket machine, taxi	Cash Debit-/credit card
Customer-to-customer scenario	Money transfers between individuals, e.g. pocket money for children, settling debts for small amounts	Cash (credit transfers via online bank)

Mobile payment services require the co-operation of many different stakeholders. These stakeholders include mobile network operators, mobile handset manufacturers, financial sector and institutions, customers, government, software providers, service providers and merchants (Karnouskos 2004). Figure 3 presents all the key players included in mobile payments. The challenge with mobile payments is that all of these players (excluding customers and government) have to agree on the distribution of the financial profits. This is typically a very slow process. (Salonen et al. 2010; Dahlberg et al. 2008) It is also yet unclear that who will actually run the mobile payment service of the future (Leinonen 2008).

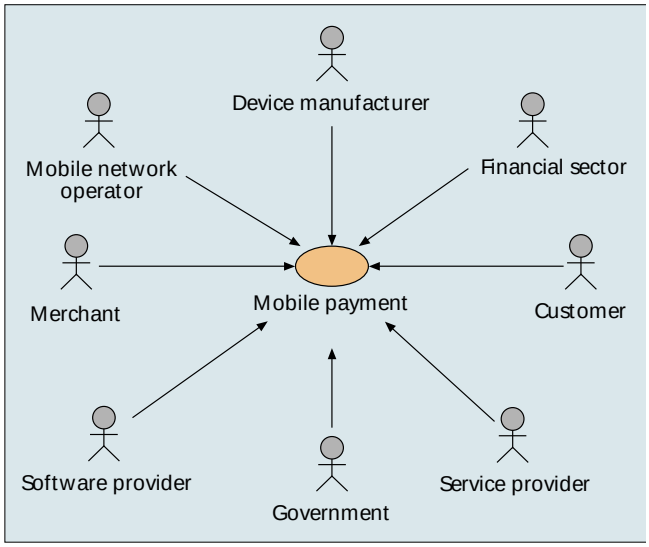

Figure 3 The major mobile payment players (Karnouskos 2004)

2.1.1 Mobile proximity payment

Mobile proximity payments, or sometimes referred as 'physical payments' (Broex et al. 2008), take place at the point of sale (POS) or at the same physical location as the payee is. POS is the place where the payment occurs. POS can be unmanned or manned. Unmanned POS can be for example a vending machine or an unmanned gas station (e.g. Massoth et al. 2009). Manned POS include for example shops, restaurants and taxi payments (Mallat et al. 2004). Mobile proximity payments would basically be an alternative or replacing payment method for cash or debit/credit cards.

Currently mobile proximity payments in Finland are usually micropayments at unmanned POS. One typical example is paying for a soft drink at a vending machine.

The user calls to a specific number and the payment is charged in the mobile phone bill or reduced from the prepaid airtime.

There has been a lot of excitement about mobile person-to-business (P2B) proximity payments during the last decade. Banks, mobile network operators, credit card companies, third party financial institutions and handset manufacturers started to see a huge market potential for mobile payments in the late 1990s and early 2000. (e.g. Sekino et al. 2007; Dahlberg et al. 2008). In fact technology has been ready to support mobile payments and in Finland there has been, at least to some extent, a demand from consumers for mobile payments (Dahlberg et al. 2006). Even so mobile proximity payments have not been at all successful in Finland.

However in Japan and South Korea mobile proximity payments are very popular. In 2004 Japan's largest mobile network operator, NTT DoCoMo, deployed mobile phones with Sony's FeliCa chip that enables contactless payments. In October 2009 there were 60 million handsets that are equipped with a FeliCa smart chip. This contactless chip can contain several forms of data, such as credit card and bank account information, personal identification, transit passes and loyalty coupons. (Suketomo 2010; Bradford et al. 2007). Consumers are able to make payments by placing their mobile phones next to a reader at POS.

2.1.2 Mobile remote payment

Mobile remote payments, or sometimes referred as 'virtual payments' (Broex et al. 2008), are payments that occur in a geographically remote location from the payee. Buying for example ring tones, logos and games to a mobile phone are typical mobile remote payments. In these cases the mobile network operator bills the payment. Mobile remote payments may also be used to purchase physical goods as well (Mallat et al. 2004).

Mobile remote payments can also be used for example buying tickets, paying bills or loading airtime. These types of services have been most successful in emerging markets where people don't necessary have bank accounts but have mobile phones. For example Nokia Money is one such service that lets its users pay bills and make other financial transactions using their mobile phones. (Dolan 2009). The service is marketed

especially in India where users would normally have to travel long distances just to pay their bills.

Mobile remote payments are always dependent on the mobile infrastructure. If there is no cellular network coverage or there is some other problems with the infrastructure payments cannot be made.

2.1.3 Mobile person-to-person payments

Mobile person-to-person payments (P2P), sometimes referred as customer-to-customer (C2C) payments (e.g. Goeke 2010; Pousttchi 2008), are money transfers that are made using mobile phones. Mobile P2P payments can either be mobile proximity payments or mobile remote payments. In this thesis mobile P2P payments are described as payments or money transfers that are made using a mobile phone to other private persons. These can include friends and family members or when for example paying to a babysitter or a seller at a flea market.

Services that support mobile P2P remote payments in developing countries are usually referred as mobile money transfer (MMT) services (e.g. M-PESA, Nokia Money). For example in the case of M-PESA the most popular use-case is to send money to relatives (Morawczynski et al. 2009). NACHA (The Electronic Payments Association) and eCom Advisors (2010) found out in their research that sending money to children, and sending money out of the country to a family member, friend or relatives. would be the most likely use cases for P2P payment service in USA. From the user's perspective the term 'money transfer' may describe such use-cases better than the term 'payment'.

As shown in Figure 4 domestic mobile money transfers are expected to increase rapidly. Currently these services are already being provided in developing countries. GSMA (2008) conducted a survey in which they expect mobile money transfers to increase even faster than in developing countries.

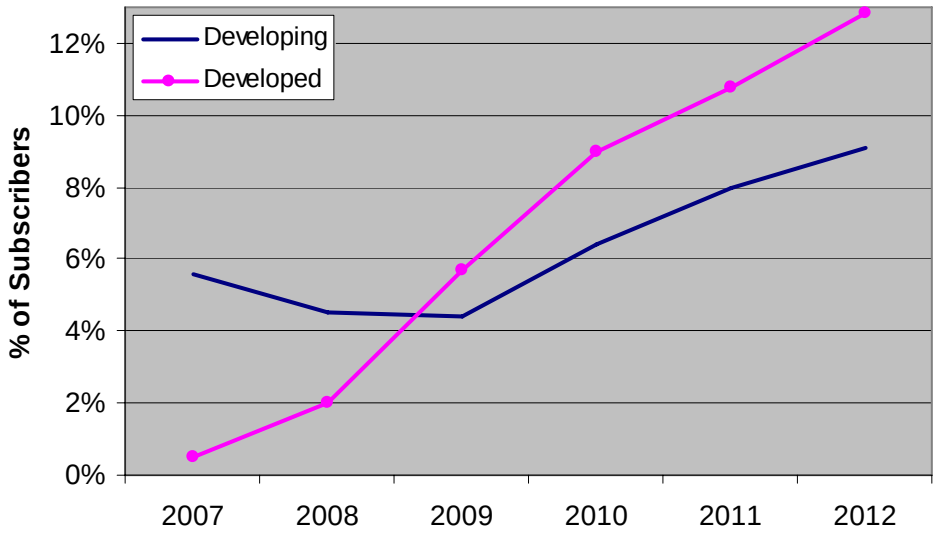

Figure 4 Mobile domestic money transfers are expected to increase significantly (GSMA 2008)

Telecoms Market Research reported a research by Portio Research (2010). According to this research in 2009 there were 81,3 million people using mobile payments worldwide and by the end of 2014 there are estimated to be almost 490 million users. IntoMobile.com reported on another study by Juniper Research (2010). This research estimates about the same kind of growth in mobile money payments estimating that mobile money transfers will reach nearly $630 by 2014. For the year 2010 the same estimation is $170. According to Forrester Research, mobile P2P payment is just a technology without a market. Thus Forrester Research believes mobile P2P payments as "just one feature within broader mobile banking and mobile payment services". (Lussanet et al. 2007)

2.2 Technologies supporting person-to-person payments

The technology for mobile P2P payments is already available. In fact mobile P2P payments from technology perspective has been available for the whole 21st century. However the smart phones today have large displays and can provide a much better user experience than older phones. Some smart phones may even have the same capabilities than a PC. Nowadays consumers are already familiar using their mobile phones for several different purposes other than calling and texting. Figure 5 presents some of the technologies that modern mobile phones have that support mobile payments. (Leinonen 2008)

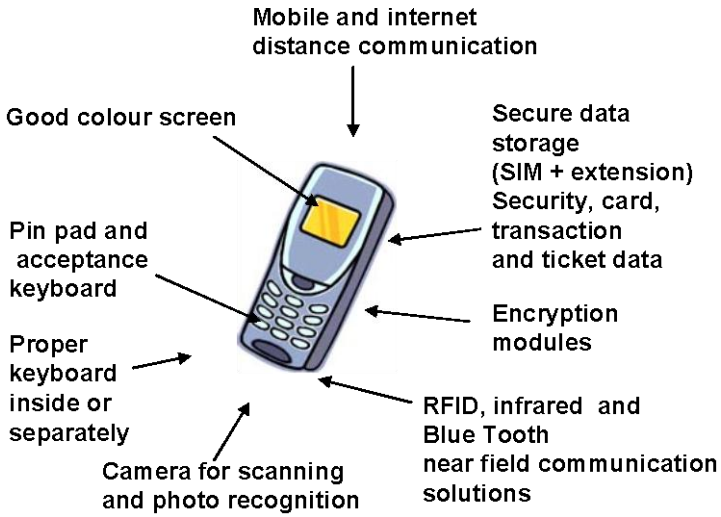

Figure 5 Modern mobile phones are already capable for mobile payments (Leinonen 2008)

2.2.1 Basis of payment

Mobile P2P payments can be charged from various accounts. Most of the financial institutions and P2P payment service providers require both, the payer and the payee, to open an electronic account. Users can typically deposit money to their e-accounts from their normal bank account, using a credit card or from another e-account. Usually in developing countries users can also use cash to deposit money. Typically these types of payments are prepaid. Usually the recipient side can be identified by his or her phone number or e-mail address. Forcing both users, the payer and payee, to register to a separate account can be problematic. According to a study by Mallat (2007) Finnish consumers are not interested in having a separate account. This causes additional and unnecessary complexity. Users are more willing to keep their money in one centralized place, i.e. in a bank account. (Valcourt et al. 2005)

The payer can be charged in the mobile phone bill as well. This is called direct operator billing and it is usually post paid. The advantage is that it does not require the user to have a bank account or a credit card. Also the user is not required to acquire and register to an electronic account. Normally this type of payment is not used for P2P payments. However some mobile network operators allow their customers to transfer prepaid airtime with each other. Private persons use airtime in such cases as a form of currency. (Chatain et al. 2008) In this case the payer has to know the payee's phone number. One problem with this type of charging has been company owned phones, since they cannot be used for any personal payments (Keinonen 2007).

Finnish banks offer their customers to transfer money to others using their Internet banking services. This can be done using the mobile phone's Internet browser. In this case the money is directly reduced from the payer's bank account in real time (aka direct debiting). If the money sender and the recipient are customers of the same bank the money transfer is made immediately. However if the two persons are not customers of the same bank it takes about 1-3 days to make the transaction. The payer is required to know the payee's exact bank account number. Finnish consumers prefer identifying the payee by a bank account number when transferring money to another bank account. Using the payee's e-mail address, identity number, etc. for identification is not considered interesting at all. The advantage in credit transfer is that the received money can easily be used from the bank account. (Dahlberg et al. 2006)

Some credit card companies such as MasterCard (MasterCard MoneySend) and Visa (Visa Money Transfer) offer their customers mobile P2P payment services. Visa advertises that funds are transferred within minutes to other Visa card accounts. In these services the sent money is naturally deducted from the credit card bill. Basically the only requirement to use such services is a credit card. The advantage of credit card based P2P payment is the ability to send money easily abroad as well.

2.2.2 SMS based mobile payment

Most services that offer mobile P2P payments can be used with Short Message Service (SMS) text messages as well. Especially in developing countries SMS text messages are widely used for mobile P2P money transfers.

Almost all of the SMS based mobile P2P payment services require the user to register for an electronic money account. The payments are reduced from this account and the payee receives the payment to his or her electronic money account. Both the payer and the payee have to be customers of the same service. If the recipient is not a customer of the same service he/she is requested to create an account to the service.

SMS based P2P payments can work with basically any mobile phone on the market – even the inexpensive low-end devices. So mainly because SMS is compatible for use in almost any mobile phone it has emerged as the most common method for P2P payments. (Merritt 2010) In a survey by GSMA (2008) SMS was the most preferred mobile money transfer method in developing (93 % of the respondents) and developed

(77 % of the respondents) countries. These types of payments do not require the use of mobile data and there's no need to install any applications to the mobile phone. Sending text messages, on the other hand, may cause additional cost from the mobile network operator.

The payments are completed sending a text message to the service provider. The message has to include the amount to be sent and something so that the payee can be identified, such as the recipient's phone number or e-mail address (e.g. in M-PESA and PayPal). In some cases the recipient has to validate the payment. If this is not done the transferred money is typically returned to the payer.

SMS-based mobile P2P payments are very prone for errors. Just one mistyped digit or a letter in the recipients phone number or e-mail address is enough to fail the payment. In a worst case scenario the payer may not get the money back.

According to a research by Mallat (2007) Finnish consumers find SMS based payments to be complex and slow to use. SMSs were heavily criticized because the message formats are often complicated, the service numbers are difficult to remember and instructions can be hard to find. Therefore Mallat suggests that SMS is not the best possible technology used for mobile payments in Finland.

Another disadvantage of this type of system is that it requires infrastructure support from the mobile network. Payments cannot be made if there is no mobile phone reception. Basically it means that SMS based payments may not work in remote districts. Even stormy weather could cause problems to the cellular network infrastructure making it impossible to make SMS-based payments. (Balan et al. 2009). However the cellular network coverage and at present the whole mobile infrastructure in Finland is so good that these types of scenarios can be considered fairly unlikely.

2.2.3 Installed applications or browser based payments

Banks, credit card companies and financial institutions started to provide their users Internet services in the late 1990s and early 2000. When mobile phones and mobile Internet have become more and more popular these same banks and financial institutions have started providing the same online services designed specially for mobile phones as well. The majority of these banks and financial institutions have

dedicated mobile websites. Normally users are able to do most of the same things (e.g. transfer money between bank accounts) with a mobile device and a desktop computer. (Leinonen 2008).

Logging in to an online bank usually requires a one-time-password (OTP). Users are then required to carry their OTPs with them. Some financial institutions, such as PayPal, require only a single password for authentication. Thus the payments can be made faster with the cost of security.

2.2.4 Near Field Communication

Near field communication (NFC) is used for wireless communication between two devices in very short distances (i.e. less than 10cm). It is based on the Radio-frequency identification (RFID) technology. Compared to basic RFID tags, NFC can also act as a reader. This means that NFC tags can both send and receive data. This enables interaction between two devices (e.g. mobile phones). (RFID Lab Finland).

NFC technology is a two-way contactless technology. This means that NFC chips can receive and send data. NFC chips and antennas can be embedded to mobile phones. NFC chips can then store much more information and the information can be updated over-the-air (OTA) anytime and anywhere. (Crowe et al. 2010). NFC technology is entirely compatible with the existing contactless technologies.

Contactless proximity payments using Near Field Communication (NFC) technology is believed to be the standard for mobile proximity payments (see e.g. Massoth et al. 2009; Ondrus et al. 2007 & Wilcox 2011). The good experiences from Japan and South-Korea, where this type of technology is used, encourages the use of NFC technology for mobile payments in other countries as well. Nokia's executive vice president for markets, Anssi Vanjoki, announced that Nokia is going to include more NFC chips in to their smart phones in 2011 (Clark 2010). Google announced that its mobile platform, Android 2.3 (and later), have the support for NFC technology (Oreskovic 2010). In addition Apple Inc. made a patent request in 2010 for NFC-enabled P2P payments used with iPhones (Apple 2010). A report by Juniper Research estimates that mobile NFC payment transactions will reach USD 50 billion by 2014 (Wilcox 2011).

NFC technology has been mostly related to person-to-business (P2B) type of mobile proximity payments. However NFC can also be used for mobile P2P payments as well. Because NFC enabled mobile phones can be used as a reader and a tag, the use in P2P and P2B payments could happen in the same way from the payer's perspective. Also small merchants could use their mobile phones as POS terminals.

From the users' perspective paying with NFC-enabled mobile phones is made simple. Users have to just wave their mobile phone in front of a reader or another NFC-enabled device in order to make payments. For enhanced security users could also be asked to enter for example a PIN-number while executing the payment. Users are able store multiple payment accounts (e.g. bank account or a credit card) in their NFC-enabled mobile phones and choose appropriate method for each payment. Mobile phones would then act as mobile wallets or debit/credit cards.

NFC based mobile payments are considered to be fast and easy to use. Massoth et al. (2009) compared several mobile payment methods to an NFC-based payment solution. Their research showed that in terms of speed NFC was clearly the fastest method. Balan et al. (2009) presented an NFC-based mobile P2P payment application called mFerio. Also this application was proven to be very fast, accurate and easy to use. In common payment situations it outperformed the use of cash in terms of speed and cognitive load.

The major disadvantage of NFC-based P2P payments is that both the payer and the payee have to own an NFC-enabled mobile phone. At the moment there are only a few mobile phones that are equipped with NFC chips. Another disadvantage is that NFC technology enables only proximity payments. Thus one essential use case, transferring money to another person who lives in another city, is not possible using NFC technology.

NFC-enabled mobile phones could potentially be used as mobile wallets. This means that the money would be stored in the mobile phone itself in electronic form. Thus it would not be dependent on the mobile infrastructure and would work in places that have no network coverage. These types of payments are sometimes referred as 'local payments' (Tuominen 2003).

2.3 Payment habits in Finland

Cash usage in Finland has been decreasing rapidly in the 21st century. Also the cash withdrawals from ATMs have declined. At the same time card payments have become more and more popular. Cash is mostly used for payments under EUR 20. In 2006, the total number of cashless payments per capita in Finland was the highest of all European countries. The two most popular cashless payment methods in Finland are card payments and credit transfers. For example the number of card payments have doubled its popularity from 2002 to 2006. (ECB 2007) This same kind of development in payment habits can also be seen in Finnish consumers' expectations. According to a study by Dahlberg et al. (2006) Finnish consumers expect the use of cashless payment methods, especially mobile payments, to increase significantly. In a study by Keinonen (2007) interviewees were interested to replace cash especially for smaller payments (i.e. EUR 20) using for example their mobile phones.

Other cashless payment methods have not been as successful or popular. Checks are basically not used at all in Finland. Also the use of e-money is still very minimal. (Leinonen 2008)

Finnish consumers use credit transfers more than other Europeans. In 2006 an average Finnish consumer made almost 130 credit transfers per year. This can at least partly be explained by the huge popularity of online banking in Finland. The vast majority of credit transfers are made online (ECB 2007). Online banking is more popular in Finland than in any other European country. (Leinonen 2008)

The statistics and research results mentioned in this chapter show that Finnish consumers in particular have adapted the new cashless payment methods very well. This implies that Finnish consumers could as easily adapt mobile payments as well. On the other hand, the infrastructure for paying with different cashless methods is so good in Finland that there is no direct need for a new method. In fact Finnish consumers seem to be very pleased with the current situation in payment methods and are not actively seeking for any new payment instruments. However people would like to get more information on each transaction, i.e. an electronic receipt (e.g. the shops contact details and what they purchased). (Keinonen 2007 & Dahlberg et al. 2006)

As shown in Figure 6 payment methods and behaviors in Finland have evolved very rapidly over the past 30 years. In the recent years this evolution has been made towards a more cashless society with the help of advanced technology.

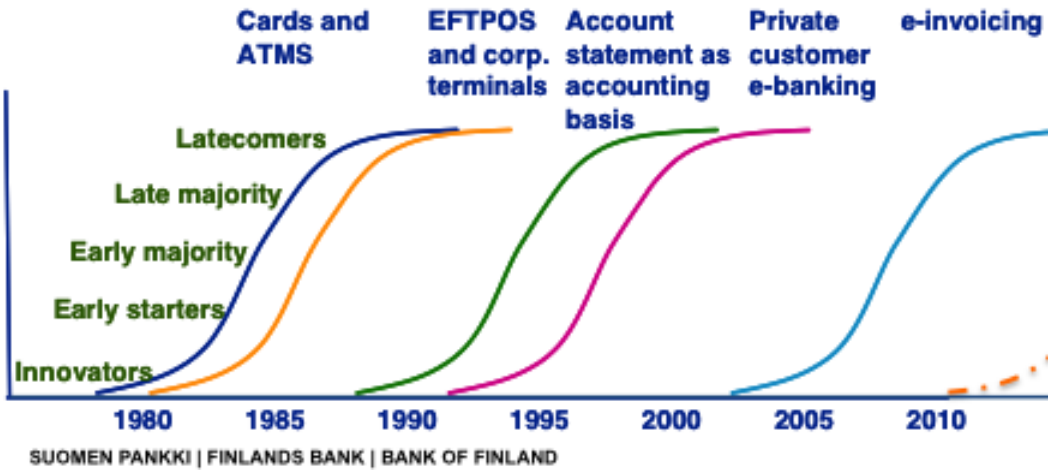

Figure 6 Payment service developments over the past 30 years towards a cashless society Leinonen (2008)

2.4 Mobile payments in Finland

Although the history of mobile payments is more than 10 years old, mobile payment services in Finland are still relatively unpopular. Consumers have shown clear interest towards mobile payments. Also technologies, competencies and regulations have been ready for years. Still there is no de facto design emerged in Finland for mobile payments as there have been in e.g. Japan or South Korea. (Dahlberg et al. 2008; Ainardi, Matteo)

One of the reasons for the success of mobile payments in Japan is that there is one dominant mobile network operator (MNO), NTT DoCoMo. This operator has used its dominating market position to create a de facto standard for mobile proximity payments. It has been easy for NTT DoCoMo to push this service forward when it has had the ability to make the decisions by itself – not competing with other MNOs. The Kenyan extremely popular mobile payment service, M-PESA, has been successful for the same reasons. The service is being provided by Safaricom, which is the dominant MNO in Kenya. (Mas et al. 2009). In Finland there are three major MNOs. This makes establishing such services harder.

Most of the mobile payment services in Finland are somehow related to the use of the mobile phone itself. Ordering digital content to the mobile phone such as applications,

ringtones and pictures (i.e. logos, wallpapers) has been popular. Typically these services and content are charged in the customer's mobile phone bill. (Dahlberg et al. 2006, pp 72)

Buying tram and bus tickets with a mobile phone have proven to be successful in Finland. Passengers can send a simple SMS message to receive their ticket. In this case mobile payment is just an alternative method for other payment methods. In a research by Keinonen (2007) interviewees found cash awkward and did not typically carry any cash with them. This is why they believed mobile payments to be a good alternative solution for cash. However most interviewees said they always use a card whenever it is possible. They did not look for any alternative payment solutions to replace cards. According to a qualitative study by Mallat (2007) one of the most compatible areas for mobile payments is electronic ticketing especially in micro payment scenarios. In this research users who were interviewed said that they would be most willing to use mobile payments for small purchases.

One example for interest towards mobile payment services in Finland is a service called Pizza-online. From this Internet service users are able to order food to their home from various restaurants. Payments can be made with cash, from the customer's online bank, with a credit card or with a mobile phone. Mobile phone payments can be made calling to a specific number. The payment is charged in the mobile phone bill. In this service approximately 7 % of all the payments are made using a mobile phone. For comparison the share of credit card payments is only 2,7 percent. (Toijanaho et al. 2010). This implies that consumers are willing to adopt mobile payments when they are given the opportunity.

2.5 Means to enhance security in mobile payments

This chapter discusses the security in mobile phone payments from the users' perspective. How users can prevent any unauthorized use of their mobile phone and mobile payment service. The technical side of the security concerns is left out.

According to a study conducted by YouGov on behalf of SecurEnvoy 61 % of mobile phone users notices if their mobile phone is missing within an hour. According to the same study men and young persons are more likely to notice the missing mobile device

quicker. Even though missing mobile phone is typically noticed relatively fast by most, this still leaves enough time for any unauthorized use. (Infosecurity 2011)

Using mobile payments may in fact increase security. Especially the services that are available for developing countries advertise the use of mobile payments with better security. This is because consumers do not have to carry cash anymore. This makes it harder for pickpockets and other criminals to steal money. (Vodafone)

Another advantage when using mobile payments is that the mobile phone can be remotely deactivated. In case the mobile device gets lost or even stolen users can remotely deactivate the device so that it cannot be used for payments anymore. (Homer)

Mobile phones that have GPS (Global Positioning System) can also be tracked to a specific geographical location if they get lost. Mobile phones can also be tracked even without a GPS-chip using wireless networks or the cellular network. However this type of positioning is not as accurate. (Salcic et al. 2000)

Users may also decide to use PIN-code or password authorization for every payment. This is called ‘what you know’ type of authentication. This means that when the user is making the payment he or she has to type the correct password or PIN-code to the mobile phone. This type of authentication method can be limited only for larger payments (e.g. payments above 20 euros).

With mobile payments it would also be possible to use a type of ‘what you have’ authentication. This means that any transactions from a person would only be allowed from a specific mobile device. For example debit and credit cards together with a PIN-code use this kind of security.

Consumers can use restricted functionality for their mobile payments. This means that users can limit that they are only able to make payments to certain predetermined payees. (Homer). These authorized payees can for example be family members and close friends. Essentially this is based on the trust between the payer and the payee. Also the amount of money transferred can be limited. Users can for example choose that they can only make transactions less than 50 Euros. Transaction-independent (e.g. daily- or monthly-based) limits are also possible.

Users can also record all money transactions made with their mobile phone. So if somebody's phone would have got stolen all the transactions made with that phone could be tracked to a specific location as well as time and date.

2.6 Mobile payment acceptance

Changing the way consumers do something, in this case changing their payment methods and habits, can be extremely difficult. In order for consumers to change their payment behaviors the new payment method basically has to be somehow better than the existing ones. There has to be some kind of force or forces that drive consumers to change their payment methods and instruments. This chapter discusses the factors that influence the intention to use mobile payment especially from the consumers' point of view. These factors have to be taken into account in order for consumers to change their existing payment behaviors.

Technology acceptance model (TAM) has been a very significant research model explaining consumers' behavior when adopting new IT (Davis 1989). This model suggests that the two most influential factors that affect consumers to adopt new IT are *perceived usefulness* and *perceived ease of use*. Many of studies on mobile payment acceptance start with this hypotheses (e.g. Kim, C et al. 2010; Chen 2008; Goeke et al. 2010; Pousttchi et al. 2007 & Gu et al. 2009).

Some of the factors influencing the intention to use mobile payment presented in this chapter can differ from a country to another. This means that some of the research results and suggestions may be very different in Finland.

Many of the factors presented in this chapter are very subjective. This is then dependent on how consumers perceive the factor in question. For example the mobile payment service can be very secure and safe to use from an objective standpoint. However the objective security does not matter if the users' do not perceive it to be secure to use.

Figure 7 presents an overview of the factors affecting the intention to use mobile payments. These factors are divided in to three groups. First group, *qualities of the service*, includes those factors that arise from the mobile payment service. Most of these factors can also be addressed when designing a new mobile payment service. The second group, *qualities of the end-user*, presents the factors that arise form the potential

end-users of a mobile payment service. The factors in the third group, *others*, do not fit to the first and second group but still have been proven to affect the intention to use mobile payments.

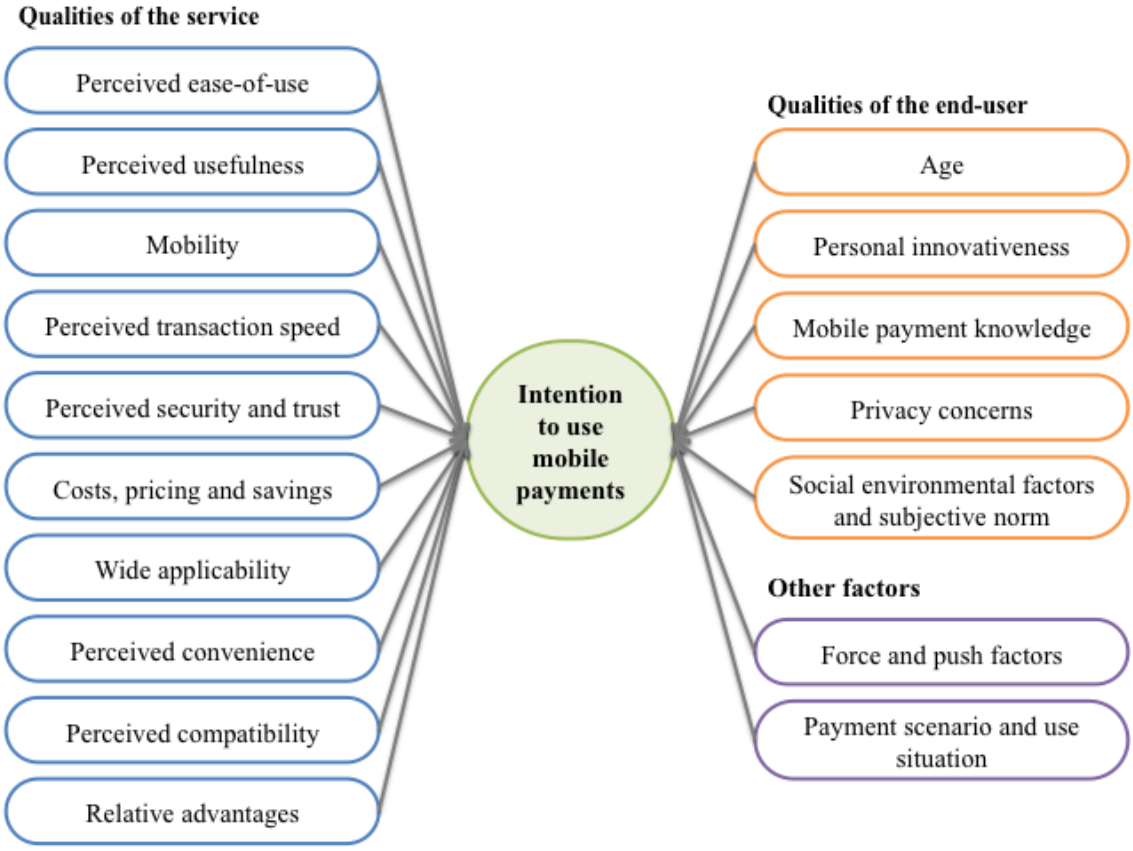

Figure 7 Factors affecting the intention to use mobile payments

Perceived usefulness. People tend to use applications and services that they believe will help them somehow to perform their job better – enhance their performance to do different tasks. This is referred as perceived usefulness. (Davis 1989) Perceived usefulness influences extremely strongly on the intention to use mobile payments (e.g. Schierz et al. 2009; Kim, G et al. 2009; Goeke et al. 2010; Chen 2008; Pousttchi et al. 2007 & Kim, C et al. 2010).

Perceived ease-of-use. Even if consumers believe that an application or a service is useful for them they may feel that the advantages and benefits of using the application or service is overshadowed by the effort needed to use it. (Davis 1989) This is why also mobile payment services should be easy-to-use. Consumers' should not be expected to put too much effort in to using a new payment instrument. Perceived ease-of-use has been found to influence significantly on the intention to use mobile payments (e.g.

Schierz et al. 2009; Keinonen 2007; Kim, G et al. 2009; Goeke et al. 2010; Chen 2008; Pousttchi et al. 2007 & Kim, C et al. 2010).

Mobility. Non—mobile online banking can offer users richer user interfaces, better user experience and better security. However mobile technology has some clear advantages. The most important quality of mobile technology is naturally its mobility. Mobile phone consumers can access different services anywhere and anytime. This is very important in time-critical situations in which users can get the needed information immediately. Individuals do not always satisfy their needs and wants as a result of a carefully planned behavior. Many needs and wants that arise (e.g. the need to pay someone) are often fulfilled spontaneously right there and then – for example with a mobile phone. (Anckar et al. 2002 & Schierz et al. 2009)

Perceived transaction speed. Consumers are more willing to use payment instruments that are fast to use (e.g. Leinonen 2008 & Mas et al. 2010). The time from the initial payment need to making the actual payment should be made possible with only a few steps (NACHA & eCom Advisors 2010). Perceived transaction speed has been found to influence perceived usefulness (Chen 2008). Transaction speed is a highly subjective measure and it is always compared to any other alternative method. This means that a new P2P payment method should, in terms of transaction speed, be faster than the previous ones. NFC technology has been proven to be a very fast for mobile payments. On the other hand some technologies used for mobile payments are highly dependent on the mobile phone skills of the consumer. For example transaction speed for SMS-based mobile payments have a large variance because people have very different skills in typing SMSs. (Massoth et al. 2009)

Perceived security and trust. Pousttchi et al. (2007) explain "subjective (perceived) security as the degree to which a person believes that using a particular mobile payment procedure would be secure". Schierz et al. (2009) found perceived security to have a strong influence on the intention to use mobile payment. In qualitative studies perceived security and the trust towards the service provider in mobile payments and in mobile banking is typically found to be extremely important. (Linck et al. 2006; Rotchanakitumnuai et al. 2003; Gu et al. 2009; NACHA & eCom Advisors. 2010 & Mallat 2007). Especially in banking, trust is the most important factor affecting customer satisfaction (Lee et al. 2009). Linck et al. (2006) did a large study on the

security issues from the consumer's perspective. This study proposes that the real security problem that should be addressed is *subjective security* (i.e. *perceived security*). Table 2 shows the most important categories that were found to influence perceived security in mobile payments. The categories are ordered so that the first one is the most important and the last one is the least important.

Table 2 Factors (in order of importance) affecting perceived security in mobile payments (Linck et al. 2006)

Rank	Category
1	**Confidentiality** Consumers want that their private data have to be private, protected and secure. Also all unauthorized access should be prevented.
2	**Encryption** All data transferred data should be encrypted. Also clear statement of the encryption level or procedure is desired (i.e. "128 / 256 bit" or "SSL / PKI".
3	**Stating "security"** Just simply stating that something is secure affects the perceived security in a positive way.
4	**Transparency and traceability** This category implies that consumers should be able to trace all costs and accounts as well as have a confirmation of all payments.
5	**Authentication and authorization** Using a password or a PIN is a very important category that affects subjective security.
6	**Trust in mobile payment service provider (MPSP)** Consumers stated that MPSP has to be reliable and well-known. Also all safety guarantees and the information made available for customers are important.
7	**Fraud protection** This category includes statements regarding integrity and protection against hackers.
8	**Convenience and ease-of-use** Consumers feel more secure if they understand more about the mobile payment procedure. Mobile payments should be easy-to-use and quick.
9	**Secure infrastructure** Confirming that the mobile payment infrastructure from the technical perspective is secure.
10	**Liability issues** Information on what happens in case of fraud. Customers want to know that they are treated favorable.
11	**Cancellation** Any errors and mistakes should be possible to adjust.
12	**Third party certification** Using for example advertisement and publication of certificates that the service is secure.
13	**Technical reliability** Meaning the objective security of the service.
14	**Broad acceptance and diffusion** Consumers want to know that the service is used widely.
15	**Anonymity** Possibility to use the service anonymously.

However the importance of *perceived security* is not supported in quantitative studies conducted by Goeke et al. (2010) and Pousttchi et al. (2007). These studies suggest that perceived security does not influence the intention to use mobile payments. According to a research by Chen (2008) *perceived risk* has a negative affect on the intention to use mobile payment. These research findings imply that perceived security could only have a negative affect on the intention to use mobile payments. Security is a basic need for mobile payments but a greater perceived security does not affect on the intention to use mobile payments (Goeke et al. 2010).

Privacy concerns. In a research by Chen (2008) consumers' privacy concerns have an indirect negative influence on the intention to use mobile payments. This study claims that privacy concerns have an affect on perceived risk, which has a negative influence on the intention to use mobile payments. Consumers are worried about their privacy and unauthorized use of their personal information. In this research almost half (49.5 %) of the respondents were concerned that too much of their private and personal information are being collected. Respondents were also found to be concerned about secondary use of their personal information. Chen (2008) suggests that MPSPs should avoid collecting too much information of their consumers, prevent all unauthorized access to customer information and stop secondary use of customer information. Companies should also be very transparent about what information is collected, why it is collected and how it is going to be used.

Relative advantages. How consumers perceive relative advantages is dependent on the payment instrument. Relative advantages can be for example time and location independence, cost savings, recordkeeping for transactions, bonus point systems for credit cards or ability to pay abroad. Consumers are more willing to use a payment instrument if they perceive it has some relative advantages compared to current methods. Thus it is suggested that the relative advantages of a new payment instrument should be included in the marketing of a new payment method also. (Keinonen 2007 & Mallat et al. 2005)

Perceived convenience. Technology is often intended to make life somehow easier and to make common tasks simpler. Mobile payments can be more convenient in certain situations when comparing to other payment methods. This is because people have their mobile phones with them most of times and mobile phones can be used any time and in

any situation. (Kim, G et al. 2009) Convenience is dependent on the use situation, time of use and place. For example reading e-mails at home is most convenient with a regular PC. However reading e-mails for example in a crowded bus is more convenient with a mobile phone. Basically these are situations where the service needs to be accessed instantly and there are no alternative or better methods available. These are some reasons Finnish consumers find purchasing tram, subway and local train tickets to be convenient using a mobile phone. (Mallat et al. 2006)

(Perceived) compatibility. Compatibility refers on how mobile payment is consistent to the consumer's lifestyle, needs, with own skills and technology currently in use, purchasing behaviors and the way consumers like to shop. New payment method has to be compatible with the existing payment instruments. In numerous researches compatibility has been found to have a strong influence on mobile payment adoption and changing consumers' payment behaviors. (E.g. Chen 2008; Dahlberg et al. 2006; Keinonen 2007 & Schierz et al. 2009)

Schierz et al. (2009) claim compatibility to be the most important driver of the consumer acceptance of mobile payment services. Thus they suggest that mobile payment services should be developed and advertised so that consumers regard them suitable for their own individual behavioral patterns and past experience.

However not all studies share these same results for compatibility. Kim, C et al. (2010) studied the relation between compatibility and the intention to use mobile payments. In this research the respondents reported that compatibility was not essential for adopting mobile payments.

Another example comes from the huge success of online banking in Finland. In order to start using a new payment instrument, new skills have to be learned usually. For some this can be an obstacle for adopting for example mobile payments. However when online banking was first introduced in Finland, consumers had to learn a completely new way to handle their finances. Even new devices were required in some cases and behaviors had to be changed. In other words, online banking was not compatible with consumers' prior behavior. Nonetheless, this did not slow the success of online banking because the relative advantages were considered so significant. (Keinonen 2007)

Wide applicability. Wide applicability in a new mobile payment system or service is important. Consumers want that their new payment method to be applicable in various use situations. (E.g. Leinonen 2008 & Mallat et al. 2006) In a research by Dahlberg et al. (2006) the study participants (Finnish) were interested using a single payment method or instrument that could be used everywhere at anytime. According to the same study consumers are not willing to learn to use mobile payments if there are not enough possibilities to use mobile payments. On the other hand merchants are not interested investing for new payment methods if they are not widely available and used. One solution for this problem could be that mobile payments would be a standard feature in all mobile phones. (Dahlberg et al. 2006)

Costs, pricing and savings. Consumers are more willing to choose a payment method that is most inexpensive compared to other payment methods. On average consumers are willing to use a certain payment method if they can save money. (Keinonen 2007) Consumers in Finland have the impression that mobile network operators charge quite a lot for using mobile services (Dahlberg et al. 2006). For example in Finland the cost of a soft drink, purchased from a vending machine, is in fact more expensive if it is paid with a mobile phone and not by cash. These are some reasons that may create an image that paying with a mobile phone in other situations as well is more expensive and is thus slowing the growth of mobile payments.

Luarn et al. (2005) conducted a study where perceived financial cost was found to have a significant influence on the behavioral intention to use mobile banking. Also according to a study by Goeke et al. (2010) cost is a significant factor on the intention to use mobile payments. In their research respondents preferred transaction-independent fees (i.e. on a monthly basis, e.g. EUR 1.50 per month) rather than transaction-based fee (e.g. price of an SMS for every payment). It is important that the pricing is clear and easy to understand (Dahlberg et al. 2006).

Personal innovativeness. Kim, C et al. (2010) suggest that personal innovativeness has a strong positive effect on the perceived ease-of-use and thus affects person's intention to use mobile payments. Personal innovativeness here means consumers' inclination to try out any new information system, i.e. early adopters of IT. This refers to consumers who 1) on average have a greater knowledge about new products 2) are usually the first ones to try out new products and 3) generally find new products to be exciting. This is

believed to be an important factor because consumers still have very little experience about mobile payments. This is why personal innovativeness plays an important role when an individual is considering adopting mobile payments. (Kim, C et al. 2010)

Kim, K et al. (2009) found convenience to have a strong influence on perceived usefulness. However according to this research, convenience has a significant influence only for late adopters – not for early adopters.

Mobile payment knowledge. According to Kim, C et al. (2010) consumers with greater mobile payment knowledge find mobile payment services easier to use - thus affecting the intention to use mobile payments. One challenge is that mobile payments are still very new and consumers have no previous experience or knowledge to depend on. The prior trust towards the MPSP has a very important role for the trust of mobile payments as well. The lack of mobile payment awareness may restrain consumers to start using mobile payments (Jenkins 2008).

Age. Consumers' age has been found to have an affect on the intention to use mobile payments. In Finland mobile payment services are mostly by younger persons. According to a study made by TNS Gallup (reported by Ylikoski) the majority of the consumers that used mobile phones (i.e. SMS-based) for payments were under 30 years old. Also Leinonen (2008) found out in his research that less than 30-year-old consumers are most interested and likely to change their payment behaviors. According to Leinonen one explanation for this is that younger consumers are just starting their working life, and thus their economic situation is changing. For an individual consumer this makes changing the payment method and habit more current and relevant.

Social environmental factors and subjective norm. Many of the factors mentioned in this chapter affecting consumers' intention to use mobile payments have applied only to individual consumers. However consumers operate in a social environment where other people's opinions and attitudes affect decision-making – for example payment habits. (Dahlberg et al. 2006)

Venkatesh et al. (2000) included an extension to the traditional technology acceptance model by Davis et al. (1989). In their extended model also social influences were taken into account via subjective norm. Subjective norm is there defined as "person's perception that most people who are important to him think he should or should not

perform the behavior in question". Social influence (or subjective norm) was found to affect strongly to perceived usefulness. Schierz et al. (2009) found subjective norm to have significant influence on the intention to use mobile payment.

Payment scenario and use situation. The scenario and use situation affects the intention to use mobile payments. This is relevant in situations where possibly more convenient (i.e. better) payment methods are not available. In situations where the service needs to be accessed immediately, independent from time and place, the current use situation has a significant impact on the intention to use mobile payment. (Mallat et al. 2006)

According to a research by Goeke et al. (2010) the payment scenario affects consumers' intention to mobile payment strongly. In their study the payment scenarios with the highest influence on the intention to use mobile payment were *1st mobile tickets (e.g. but tickets), 2nd payment at vending machines (e.g. soft drinks)* and *3rd payment at stationary merchants (e.g. at the retailer, shops).* Money transfers between private persons (i.e. P2P payments) –scenario was also found to have a significant influence on the intention to use mobile payment.

Force factors. Force factors are the most influential factors to affect consumer's intention to use a certain payment instrument. These factors mean that the consumer does not have any other alternative payment methods available and is forced to use a specific payment instrument. Force factors can have various sources such as the consumer's situation, legislative environment and the action of financial institutions. (Keinonen 2007)

Push factor. Push factor can be powerful and influence consumers' payment behaviors. Push factors can be for example forceful marketing or pricing. These were used when online banking was first introduced in Finland. Online banking was heavily marketed and the new pricing models made the use of online banking cheaper. Push factors however are not sufficient if other influential factors are lacking. For example heavy marketing does not make consumers to change their payment behaviors if the new payment instrument is not compatible with existing payment methods, is not easy enough to use or does not provide any relative advantages. (Keinonen 2007)

2.7 Person-to-person mobile payment services

There are already several different types of mobile person-to-person payment services available. This chapter presents three services that are very different from each other. All the services are presented from the user's perspective – what is required from the user, what does the user have to do in order to make a P2P payment.

These services differ in various ways. Some services require new and advanced smart phones. Some services can be operated even with very low-end devices using SMS-messages. The services are marketed for different types of markets. Also the use situations for these services are very different.

2.7.1 PayPal

PayPal is the most popular online payment service at the moment. PayPal users can pay and send money to each other or pay in various online shops. PayPal users can deposit money to their PayPal accounts from their bank account or link their credit cards to the account. Basically PayPal offers its users a way to pay globally without the fear of exposing bank or credit card information to the payee. PayPal has become extremely popular in different online auctions where person-to-person payments are needed. In order to receive money, the recipient has to register to a PayPal account. PayPal's application also allows users to make payment requests to others.

PayPal is a worldwide service that can be accessed from basically anywhere in the world. Money needs to be deposited to a PayPal account from bank account or credit card. However most people in developing countries do not have a bank account or a credit card that makes PayPal is better suitable for developed countries (Chaia et al. 2009). Initially PayPal was designed for payments between unfamiliar persons and to small businesses that do not accept credit cards.

PayPal has also introduced a smart phone application for iPhone and Android devices, which allows users to send money with their mobile phones. The money is sent using the recipient's e-mail address or using a technology called Bump where users have to literally bump their mobile phones together for authentication. The second option requires both users to have an iPhone or an Android based mobile phone and the PayPal application installed.

Figure 8 presents three screenshots of PayPal's iPhone application. First screenshot (left) shows the first step in making a P2P payment. User can either type the recipient's e-mail address or mobile phone number or bumping the phones together with the recipient. User is also asked to type the amount to be paid. The second screenshot (middle) presents the process after the payer has selected the recipient by typing his e-mail address and typed the amount to be paid. The user at this point has a possibility to add a short message to the payment as well. After clicking the 'Send' button the money will be transferred to the selected recipient. Third screenshot (right) presents the users transaction history (i.e. recordkeeping) and also payment requests.

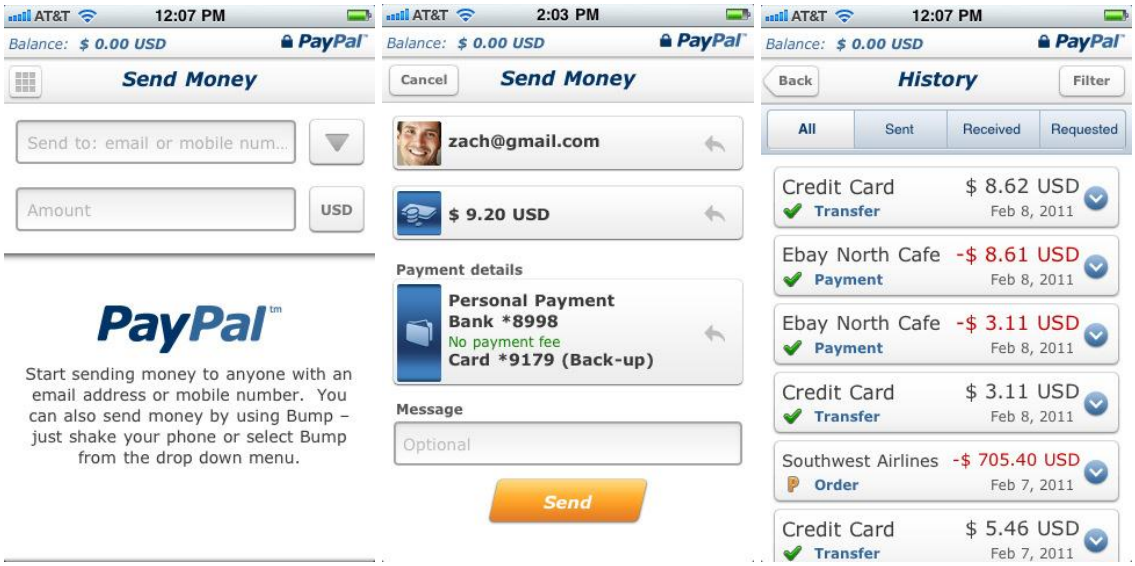

Figure 8 Screenshots from PayPal's iPhone application (Apple iTunes)[7]

Registering to PayPal and sending money to another PayPal account is free. However receiving money is not free. PayPal takes between 1.9 to 2.9 percent of the money received. There is also a 30-cent USD transaction fee.

2.7.2 M-PESA

M-PESA is an extremely popular mobile P2P payment service used in Kenya. The service provider of M-PESA is Safaricom. Safaricom is the largest and most popular mobile network operator in Kenya with a market share of almost 80 %. M-PESA is available in South Africa as well.

[7] http://itunes.apple.com/us/app/paypal/id283646709?mt=8

Users can send money with M-PESA by SMS text messages. The payer needs to type how much he or she wishes to send money, the recipients phone number and additionally a PIN-code for enhanced security. M-PESA customers can withdraw cash from their M-PESA accounts from various certified M-PESA agents or ATMs. The agents are typically small shop or kiosk owners at the local village.

M-PESA was initially marketed for low-income consumers who do not have bank accounts. The idea was that people who live and work at cities could more easily send money to their family members who live in the rural areas. However the first users who started using M-PESA were the wealthier customers of Safaricom. By the year 2009 M-PESA has become the most popular money transfer method in Kenya. Today M-PESA is not just about person-to-person money transfers. Companies can for example pay salaries and collect bill payments from their customers using M-PESA. (Mas et al. 2010)

Figure 9 presents detailed description how to send money to another person. Payments can be made using the recipient's mobile phone number. After this user is asked to type in the amount to be paid. M-PESA uses a simple four-digit PIN code as a password for authentication. In the last step (right), payer can either confirm or decline the payment.

Press **OK** Choose 1 Press **Send**	Press **OK** Enter recipient's cellphone number Press **Send**	Press **OK** Enter the amount Press **Send**	Press **OK** Enter PIN Press **Send**	Check that all the details are correct Press **OK** Enter **1** Press **Send**

Figure 9 Details how to make a P2P payment using M-PESA (Vodacom)[8]

[8] http://www.vodacom.co.za/vodacom/StaticFiles/Images/Services/MPESA/3.jpg

2.7.3 NFC based person-to-person payment

Apple Inc. made a patent request in April 2010 for iPhone based P2P payments. This patent described how person-to-person payment could be made using two iPhones that can use also NFC chips to identify the payee and send the necessary payment information. This helps to speed up the payment process. The patent request explains in detail the functionality of this service from the user's perspective and how the interface would look like. This patent request uses lo-fidelity wireframe prototype pictures. (Apple 2010). Although the patent is Apple's, it does not mean that other mobile phone manufacturers could not provide NFC-based P2P payments to their customers as well.

When NFC is used with this service, it means that it can be used for proximity payments only. However in this case the payer and the payee must be at the same physical location. The two mobile devices need to be next to each other (i.e. less than 10cm apart) for authentication.

User can add several accounts to the service. The account for charging the payment can be chosen at the time the payment occurs. The payments can for example be charged from the user's existing bank account, credit card, debit card or iTunes account. Apple's patent uses a four digit PIN-code for authentication. This same PIN-code is used for all accounts. This is then a 'what you know' (PIN-code) and 'what you have' (mobile phone) type of security solution. Figure 10 is taken from the patent. It presents a snapshot on how payments can be made using this service. In the first screen user is asked to select the payee, amount to be paid and a short message for the payment reason. In the second screen the payment information is showed to the user. The user can either pay using a preselected default account or select another account. On the third screen user confirms the payment by typing his or her PIN-code and clicking "Authorize".

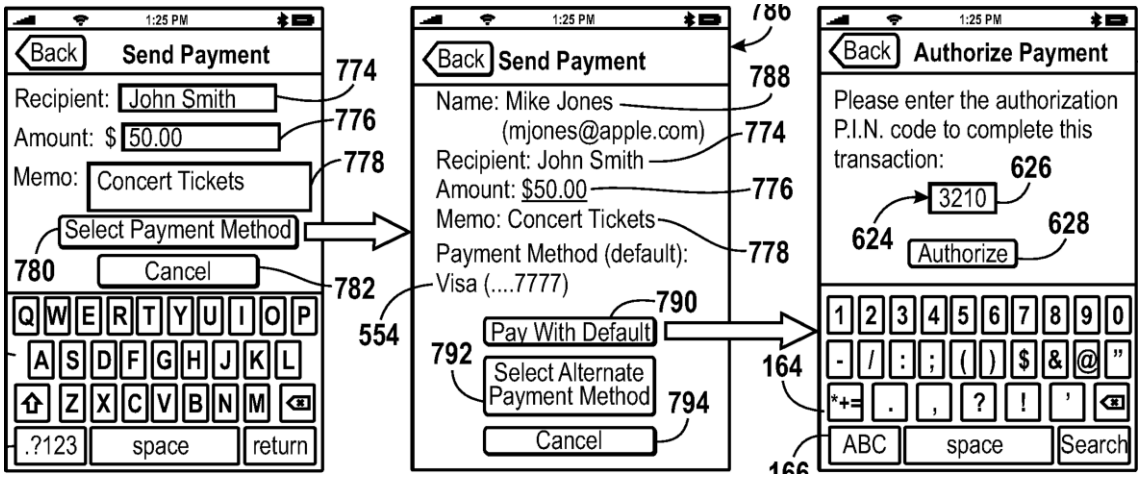

Figure 10 Paying a P2P payment with iPhone (Apple 2010)

3 Qualitative user study – methodology

This chapter presents how the empirical part of this research was conducted. Chapter 3.1 presents the study objectives. The methods used in this research are presented in Chapter 3.2. Study participants are presented in Chapter 3.3 and the study procedure is presented in Chapter 3.4.

3.1 Study objective

There has been a lot of discussion and articles about P2B mobile payments during the past ten years. Many believed mobile payments to be the next widely used cashless payment instrument in Finland. However most merchants have not offered any mobile payment solutions. Also there are currently a lot of cashless payment methods available already in Finland. Consumers have not started using mobile payment services because they are not widely available and there already are many good alternative methods.

Because of the reasons mentioned above the objective is not to study mobile P2B payments. However the different possibilities to make P2P payments currently in Finland are limited. Basically the mostly used options are paying with cash or by credit transfer in online bank. The aim is to find a new solution for Finnish consumers to do P2P payments using a mobile phone.

Things that will be studied are what factors should be taken into account when designing a new mobile P2P payment service for Finnish consumers. What consumers expect from such a service? Which features are necessary and which are just “nice to have” features.

The results are based from interviews (8 interviewees) and online survey (79 respondents).

3.2 Methods used in study

This chapter presents the methods used in this research.

3.2.1 Interviews

For this thesis eight (8) interviews were conducted. The interview took approximately 50 to 75 minutes to go through. Interview questions are presented in appendix A. The interviewees were given a movie ticket for their participation end effort. All interviews were recorded (audio) for later analysis. The interviews were not transcribed.

After the demography questions interviewees were asked about their P2P payment habits in general. What kind of P2P situations do they have, how do they usually handle P2P payments, etc. Secondly they were asked about mobile payments in general. Have they used mobile payments or mobile ticketing services, do they use mobile banking etc.

After this the interviewees were presented with three advertisement videos that demonstrated three very different P2P payment services and how those are used. The purpose of this was to show the interviewees what mobile P2P payments could really be about. Because consumers in Finland currently are not very aware what mobile P2P payments are about these videos gave them a little idea on how mobile P2P payments could be made and especially what kind of scenarios could these be.

First video presented P2P payment service by M-PESA. In this video a man sits in his office and decides to send money to his parents using a mobile phone. His parents who in the video are working in a farm then receive an SMS message that their son has send them money. This video was chosen to demonstrate especially remote P2P payments.[9]

Second video was an advertisement of a mobile P2P service by Mobex. This video presented a mom and a babysitter. Because the mom in this video did not have any cash she used an SMS-based P2P payment service. The babysitter received an SMS that she received the money. This video was chosen to demonstrate mobile payments for private persons who the payer does not know. Also this demonstrated that mobile payments could be just simple SMS-based services that do not require a new smart phone.[10]

Third video presented PayPal's mobile P2P payment application that used a technology called Bump (see more in Chapter 2.7). In this video two men have ordered a pizza. The

[9] http://www.youtube.com/watch?v=nEZ30K5dBWU *from 0:00 to 0:31*
[10] http://www.youtube.com/watch?v=xi7W95XEFVA

other man pays his half of the pizza using his mobile phone. In the same video there's a scenario in which the other person has purchased two tickets and is shy to directly ask his friend money for his half. He then sends a request to the other person to pay for his half using the same application. This advertisement was chosen to demonstrate proximity payments (they had to bump their mobile phones together) and sending payment requests.[11]

Participants were also given one additional movie ticket if they gathered different P2P payments situations that they've had during the past year. The participants were sent e-mail after the interview (appendix A). They were asked to answer these questions below via e-mail (appendix B):

- what the payment situation was
- how did they pay in that specific situation
- who did they pay (someone they know or someone unknown)
- how much approximately did they pay
- could they have paid it as a proximity payment they would have had cash with them.

3.2.2 Survey

Based on these interviews a survey was conducted that included a total of 79 respondents. The online survey was made using Google Docs[12]. Participation to the online survey was compulsory for all the students in the course T-121.3100, 'Käyttäjäkeskeisen tuotekehityksen harjoitustyöt'[13]. All of the survey respondents are students in Aalto University. All of the questions are presented in appendix C. Because of its compulsory nature the survey was quite long with some open questions as well. The survey was conducted together with Jussi Rämänen who is doing his research on perceived security in mobile authentication. Because the online survey was quite long, for half of the respondents Rämänen's questions were presented for the respondents first and vice versa.

[11] http://www.youtube.com/watch?v=suCe4-SWsHo *from 0:25 to 1:32*
[12] http://docs.google.com
[13] Practical work course of user-centered product development (Aalto University, SoberIT). Course website: https://noppa.aalto.fi/noppa/kurssi/t-121.3110/etusivu

In total the survey included 49 questions and seven demography questions. 23 of the questions were about mobile P2P payments. The other 26 questions were about perceived security and not included in this study. Of those 23 questions 6 were open ones.

3.3 Study participants

All of the study participants were chosen to be 30 years old or under. The aim was to interview consumers who most likely, based on their demography, would already be interested on a mobile P2P service. Young people (30 years or less) are most willing to change their payment behaviors (Leinonen 2008). Also consumers in this age group use mobile payments most in Finland. All of the study participants have a technological education background.

The interviewees were all from 25 to 27 years old. Average age was 25,9. The respondents for the survey were all from 19 to 30 years old. Average age for the survey is 22,5 and median is 22. Figure 11 shows the age distribution of the respondents for the survey.

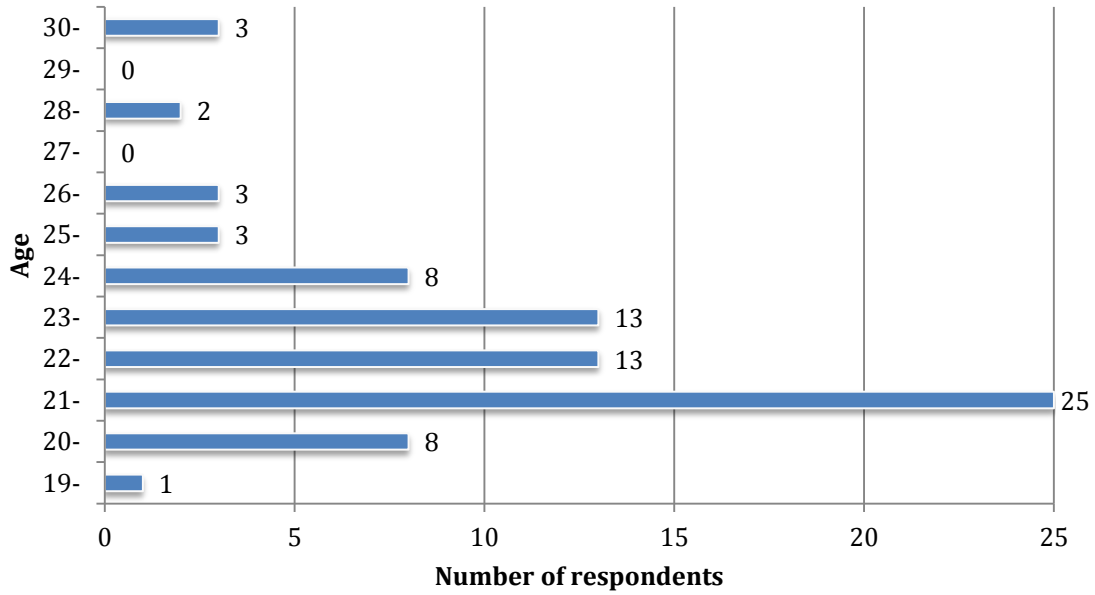

Figure 11 Age distribution (survey respondents)

All of the interviewees owned a smartphone and had installed numerous applications to their mobile phones. They all used Internet with their mobile phones at least weekly.

For the survey respondents 61 % had a smartphone. 63 % of the respondents had installed applications to their mobile phones. 57 % mentioned to use Internet with their mobile phones at least weekly. Figure 12 present how often do the survey respondents use Internet with a mobile phone.

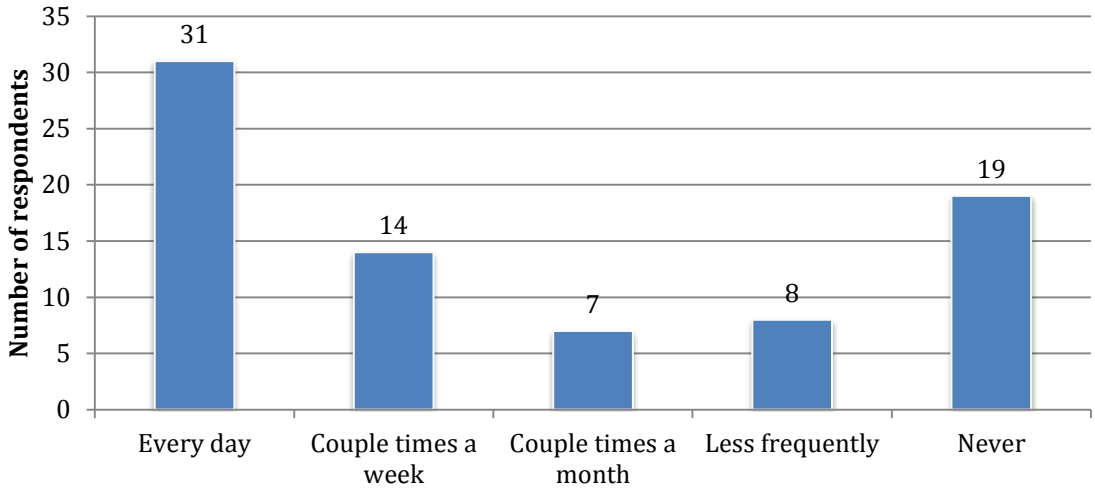

Figure 12 How often do you use Internet using a mobile phone (survey)

In the interview there were 5 males and 3 females. For the survey 56 males and 23 females. That is 71 % males and 29 % females in the survey. All of the survey respondents are students in Aalto University. Four out of eight interviewees were also students in Aalto University.

3.4 Procedure of the study

This chapter presents the process how this research was conducted. In Figure 13 is presented a summary of the whole procedure. This is discussed in more detail below.

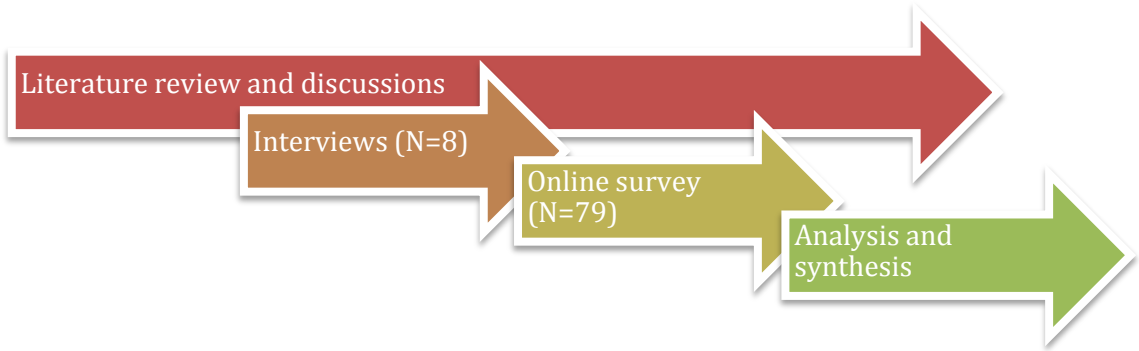

Figure 13 Procedure of the study

The research began with a literature review and examining current mobile P2P payment solutions already available. This lasted almost at the end of this study. At the beginning there was also an hour-long discussion with Juha Risikko from Nordea (bank). Risikko has a good knowledge and insight on mobile payments. He was able to guide me well at the beginning.

During the process there were also conversations with a fellow researcher Tatu Lyytinen. He is a postgraduate who is doing his doctoral dissertation about a popular Kenyan P2P payment service M-PESA. Lyytinen was also visiting Kenya and therefore had a good insight on a highly successful mobile P2P payment service.

The interview questions were generated from literature and discussions with Juha Risikko, Tatu Lyytinen and Sirpa Riihiaho. Interview participants were given one extra movie ticket if they gathered some P2P payment situations and scenarios that they've had during the past year. Six interview participants out of eight did send some P2P payment situations.

The online survey was based on the interview with few exceptions (questions 17 and 18, see Appendix C). The survey was compulsory for all the students in a course. Thus all of the 79 individuals in that course responded to the survey.

The results from the interviews and survey were then analyzed and compared with previous research and literature on this study field. The quantitative data in this research was processed using Microsoft Office Excel 2011[14]. This data was further analyzed with a program called StatPac Statistics Calculator[15] to determine the statistical significance of each result.

The open questions included in the survey were analyzed with the help of a computer program TAMSAnalyzer. TAMS stand for Text Analysis Markup System. TAMSAnalyzer is an open source application for Macintosh OS X. The use of this program was helpful. According to TAMSAnalyzer website TAMSAnalyzer "is a

[14] http://www.microsoft.com/mac/excel
[15] http://www.statpac.com/statistics-calculator/index.htm

convention for identifying themes in texts (web pages, interviews, field notes). It was designed for use in ethnographic and discourse research."[16]

All the open questions were read several times and every comment / statement was "tagged" to a specific 'code' depending on the content using TAMSAnalyzer. For example if a survey respondent had comments about security, it was tagged under the code "security issues". All the persons with tags concerning security issues were counted. The codes with most tags are considered most important. Some comments did have several different tags. All the P2P payment situations were tagged as well.

[16] http://tamsys.sourceforge.net

4 Results

This chapter presents the study results as they are. The results are not analyzed in this chapter. The P2P payment situations and scenarios are presented separately in Chapter 4.2. All of the result charts are based on the results from the survey.

4.1 Results from the survey and interview

This chapter presents the results from the online survey and from the interviews. The use situations and scenarios are left out of this chapter. Chapter 4.1.4 presents results from the interview questions that were not included in the survey. Chapter 4.1.5 presents other findings that were not asked directly but arose from the open questions in the online survey.

For most of the quantitative results obtained from the web survey the statistical significances were calculated. Table 3 illustrates how the statistical significances are presented in this chapter.

Table 3 Markings and criteria used for statistical significances

P value (probability)	Notation	Symbol
≤ 0,001	Extremely significant	***
0,001 to 0,01	Very significant	**
0,01 to 0,05	Significant	*
> 0,05	Not significant	NS

4.1.1 Current person-to-person payment habits

This chapter presents how the interview and survey participants handle their P2P payments at the moment. How they make P2P payments and how often and what kind of P2P payments situations do these individuals have at the moment.

All of the interview participants pay mainly to people they know (i.e. friends and family). Same result applies for the survey as well. Figure 14 presents how often the survey participants make P2P payments currently.

75 % responded that they have P2P payments for people they know at least monthly. A one-sample t-test was performed to determine whether the proportion of respondents having P2P payments to familiar people at least monthly was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=5,132 and the corresponding one-tailed probability p=0,0000.

Only 22 % make P2P payments at least monthly to private persons they don't know (e.g. flea market or buying from an online auction). Again, a one-sample t-test was performed to determine whether the proportion of respondents having P2P payments to unfamiliar people at least monthly was significantly smaller compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=6,008 and the corresponding one-tailed probability p=0,0000.

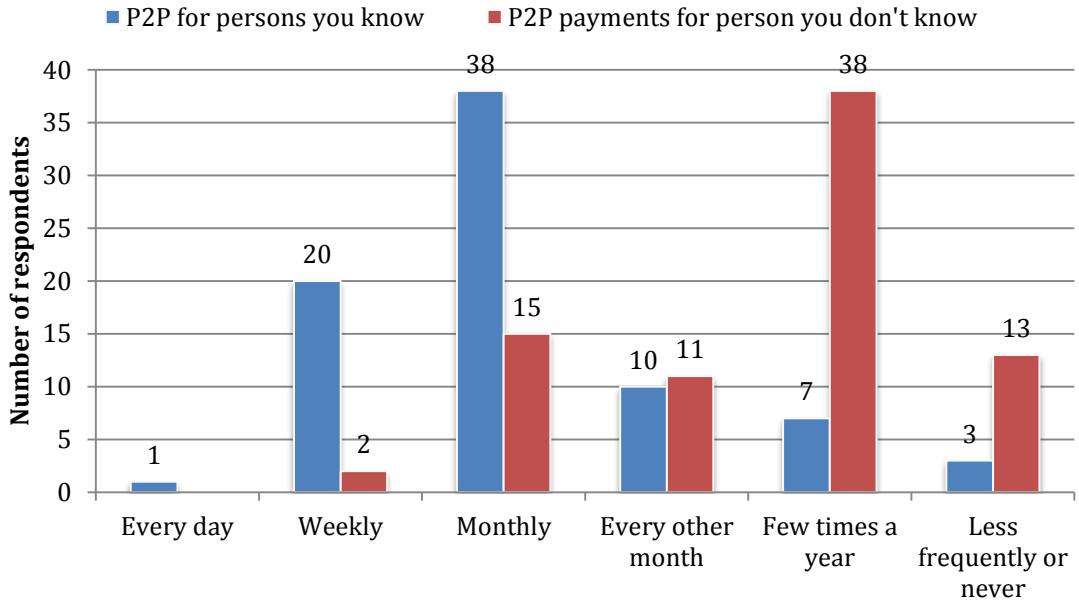

Figure 14 How often do you pay P2P payments?

"I usually choose the payment method based on the situation – not based on who I'm paying."

As seen from Figure 15 credit transfer using bank account is the by far most used method for paying P2P payments. A one-sample t-test was performed to determine whether the proportion of respondents using mostly credit transfer in the case of P2P payments to familiar people (77%, 61 out of 79 respondents) was significantly larger

compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=5,703 and the corresponding one-tailed probability p=0,0000.

A one-sample t-test was also performed to determine whether the proportion of respondents using mostly credit transfer in the case of P2P payments to unfamiliar people (84%, 66 out of 79 respondents) was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=8,243 and the corresponding one-tailed probability p=0,0000.

Also all of the interviewees responded that they mostly use credit transfer for P2P payments. Cash is also used to some extent. The respondents who answered "Other" said that they couldn't tell which method they used more often. One person stated to use PayPal for P2P payments for unfamiliar people most often.

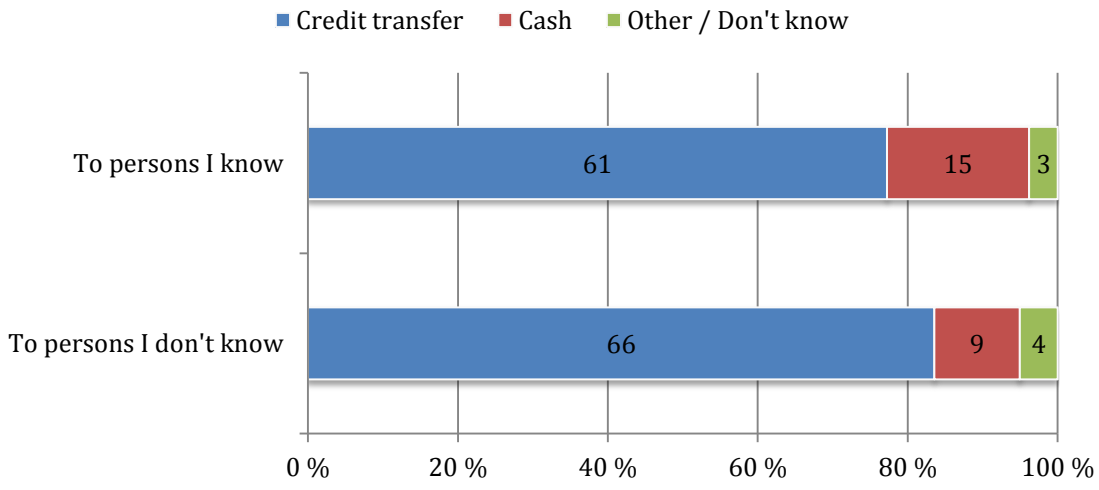

Figure 15 Most used method for P2P payments

41 survey respondents mentioned in the open questions that they typically do not carry any cash or that it would be good if they would not have to carry any cash with them. Many of the study participants mentioned that they only use cash for small payments, i.e. less than EUR 10. The people who do carry cash said it is troublesome to pay with cash because they typically don't have exact change with them. This is why some said to round the amount to be paid.

"Credit transfers are great because I can pay the exact amount. I rarely have exact change in cash to pay someone."

Respondents mentioned that the benefit of cash is that the payment can be made instantly. Many said that payments by credit transfer are typically made after days of the initial payment request. 10 survey respondents stated in the open questions that they've even had situations where they have forgot to pay the other person if the payment was not made immediately.

"I've had situations were I've had to dun the payment from my friends for weeks even."

Many of the respondents said that they use and prefer cash for small payments (less than EUR 5). Some even said that they are too embarrassed to request small money sums back.

"Smaller payments (less than EUR 5) I typically handle by cash or sometimes compensate those debts some other way."

Credit transfer was seen as a good solution for P2P payments for unknown people because it leaves a mark (transaction history) that can be used as a receipt. Respondents mentioned this to be a good feature for all P2P payments. This way, consumers can verify that the payment has occurred and keep track of their P2P payment transactions.

"I usually use credit transfers because it leaves an evidence for both persons' (payer and the payee) bank statement. Cash doesn't leave any evidence."

However some mentioned that one disadvantage with credit transfers is that the payer cannot physically see that the money is paid to the other person. Some also commented that bank account numbers are challenging because they are hard to remember and have to be asked from the payee. 12 survey respondents had statements that credit transfers are somewhat time consuming and cumbersome – especially for smaller payments.

"The good thing about cash is that I can see and always know for sure that the other person gets the money."

"Paying small amounts (i.e. few Euros) is annoying to do as a credit transfer but I don't always have cash with me or don't see the other person."

Another disadvantage with credit transfers was that the payments are not made immediately. Respondents said to pay via online bank usually within couple of days or

sometimes even weeks from the initial payment request. The delay (1-2 days) when paying to another bank was not seen as a problem during the interview when paying to friends and family.

"Credit transfers are easy and convenient. I don't have to carry any cash with me."

"I use credit transfers (online bank) mostly but it's clumsy and slow."

Six survey respondents mentioned in the open questions that they currently compensate smaller payments in other means (e.g. buying the other person a drink). However majority believed P2P payments to be easy enough at present.

4.1.2 Current mobile payment habits

This chapter presents the results from the interviews and survey about respondents' mobile payment habits in general. Do people use mobile payments currently and do people manage their finances with a mobile phone. 68 % of the survey respondents have used their mobile phones to pay for something.

Most of the survey respondents have purchased or paid something using their mobile phones during the past year. Mostly participants (48 %, 38 out of 79) have purchased physical products such as soft drinks from a vending machine. Figure 16 presents what the respondents have purchased or paid with their mobile phone. 28 % (22 out of 79) have bought digital content (e.g. applications, games and ringtones) to their mobile phone. 24 % (19 out of 79) said to have purchased travel tickets using their mobile phone (e.g. subway or tram tickets). Few mentioned that they use their mobile phone to pay for laundry.

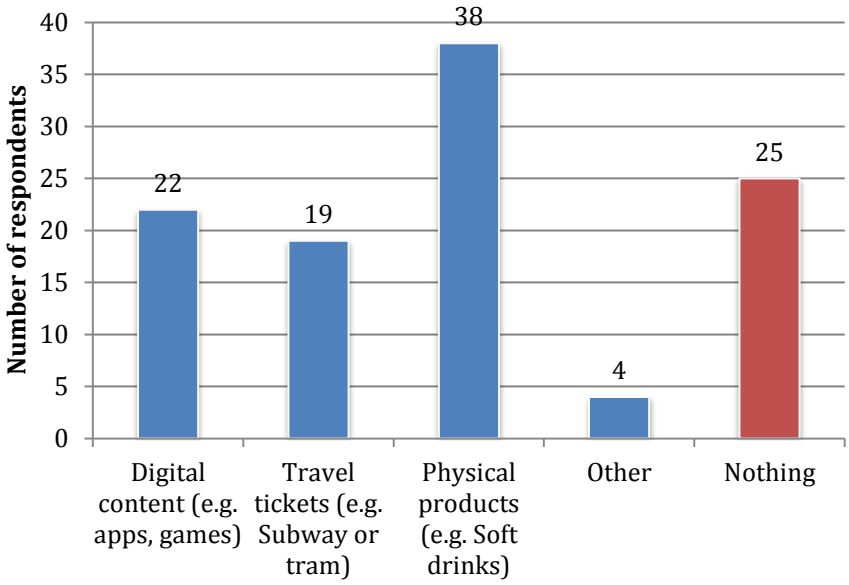

Figure 16 What of the following have you purchased or paid using a mobile phone?

The vast majority (67 %, 53 out of 79) has never used online banking with their mobile phone (survey). Few mentioned that they sometimes pay P2P payments in mobile bank. A one-sample t-test was performed to determine whether the proportion of respondents who have never used online bank with their mobile phone was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=3,213 and the corresponding one-tailed probability p=0,0001.

Only one interviewee mentioned to have tried mobile bank. None of the others have ever even tried. All of the answers for mobile banking using a mobile phone are presented in Figure 17.

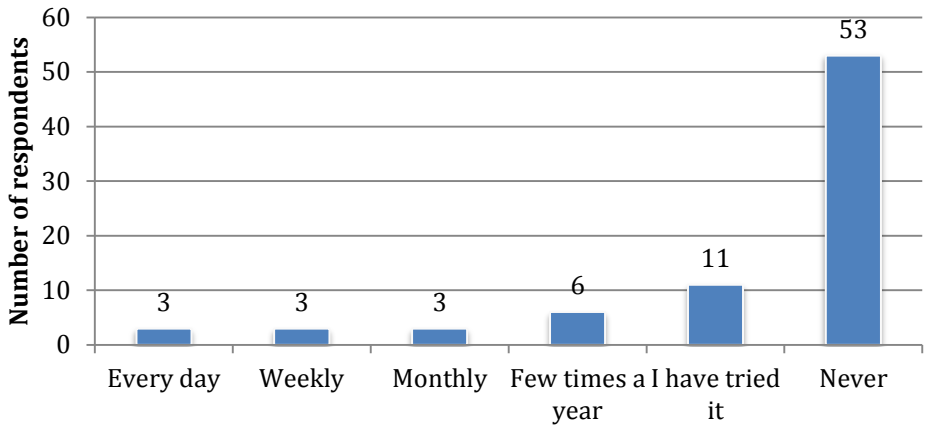

Figure 17 How often do you use online bank with a mobile phone?

4.1.3 Mobile person-to-person payments

This chapter presents the results concerning mobile P2P payments. All of the results in this chapter are about mobile P2P payments.

Interest towards P2P payments. None of the study participants use any kind of mobile P2P payment service currently. However few mentioned that they sometimes use mobile bank for P2P payments. The vast majority (73 %, 58 out of 79 respondents) said that they are at least to some extent interested in mobile P2P payments. A one-sample t-test was performed to determine whether the proportion of respondents interested in mobile P2P payments was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=4,605 and the corresponding one-tailed probability p=0,0000.

As seen in Figure 18, 90 % (28 out of 31) of those who use Internet with their mobile phones daily mentioned to be interested in mobile P2P payments. Again, a one-sample t-test was performed to determine whether the proportion of respondents who use Internet with their mobile phones daily and are interested in mobile P2P payments was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(30)=7,424 and the corresponding one-tailed probability p=0,0000. In contrast 62,5 % (30 out of 48) of those, who mentioned that they use Internet with their mobile phones rarely, stated that they are interested in mobile P2P payments. A one-sample t-test was performed also in this case to determine whether the proportion of respondents who use Internet with their mobile phones rarely and are interested in mobile P2P payments was significantly larger

compared to the other respondents. The t-statistic was significant at the 0,05 critical alpha level (*), as t(47)=1,789 and the corresponding one-tailed probability p=0,0401.

Furthermore, a two-sample t-test was performed to determine whether there was a statistically significant difference between the proportions of daily mobile Internet users interested in mobile P2P payments and other users interested in mobile P2P payments. The t-statistic was very significant at the 0,01 critical alpha level (**), as t(77)=2,698 and the corresponding two-tailed probability p=0,0086.

Seven out of eight of the interview participants said to be very interested in mobile P2P payments. All of the participants were mostly interested in mobile P2P payments for smaller payments (i.e. less than EUR 50).

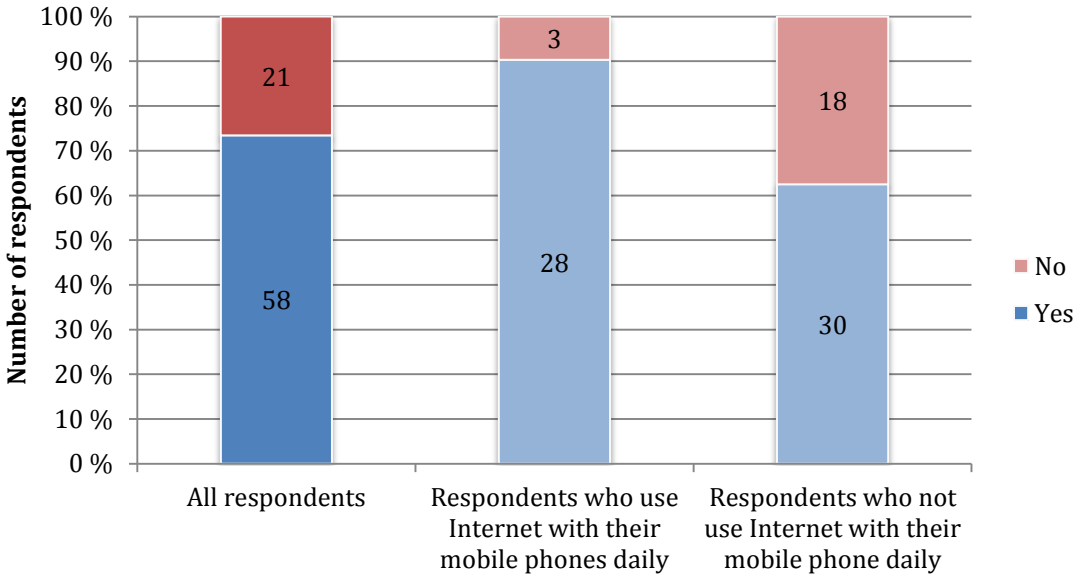

Figure 18 Are you interested in mobile P2P payments?

"I'm interested. Paying small amounts quickly without cash would be good."

"I'm interested (in mobile P2P payments) because I usually don't carry any cash with me and if I'm buying something with a friend I easily forget to pay my share to him via online bank."

"I'm interested especially for small payments between friends, because I don't carry any cash with me."

"I don't believe I would make anymore P2P payments. P2P payments are already easy and fast enough."

"I'm not interested. There's usually not that big of a rush to pay instantly. I can wait until I get home and pay from online bank."

Interests towards mobile P2P payments compared to mobile P2B payments. Majority of the respondents (75 %, 59 out of 79) were more interested in mobile P2P payments than using mobile P2B payments. A one-sample t-test was performed to determine whether the proportion of respondents interested in mobile P2P payments was significantly larger compared to the respondents interested in mobile P2B payments. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=5,132 and the corresponding one-tailed probability p=0,0000.

One interviewee out of eight was more interested in mobile P2B payments. All of the interviewed and many of the survey participants mentioned P2P to be interesting because there already are many good alternative methods for cashless P2B payments. They are not seeking for any alternative payment instruments to replace cards (i.e. debit and credit cards). Study participants did not feel that there were good solutions for P2P payments that can be made instantly, regardless of time and place.

"In shops I pay with cash or card and mobile phone wouldn't provide any value. Person-to-person payments would be interesting because it could be more convenient than credit transfers or cash payments."

"I can easily pay with a card in shops. To private persons I can't."

"I'm more interested in P2B payments because those situations occur a lot more often than P2P payments."

"I can't see why mobile phone as a payment instrument in shops would be more convenient and secure than a bank card."

"Yes, I would (use mobile P2P payments). For smaller payments, 0-20€, online bank is frustrating and a long process."

Belief towards mobile payments. Respondents were also asked how strongly they believe that they will make mobile P2P and P2B payments in five years. The scale in which they were asked was 1 (I don't believe at all) to 6 (I believe strongly). The results on how strongly the respondents believe to be using mobile P2P and P2B payments in five years are presented in Figure 19.

61 % (48 out of 79) believed at least to some extent (scale 4-6) that they would use mobile phones for P2P payments in five years time. A one-sample t-test was performed to determine whether the proportion of respondents believing to be using mobile P2P payments in five years was significantly larger compared to the other respondents. The t-statistic was significant at the 0,05 critical alpha level (*), as t(78)=2,005 and the corresponding one-tailed probability p=0,0243.

For mobile P2B payments the result in the same scale was 38 % (30 out of 79) of the respondents. A one-sample t-test was performed to determine whether the proportion of respondents believing to be using mobile P2B payments in five years was significantly larger compared to the other respondents. The t-statistic was significant at the 0,05 critical alpha level (*), as t(78)=2,197 and the corresponding one-tailed probability p=0,0155.

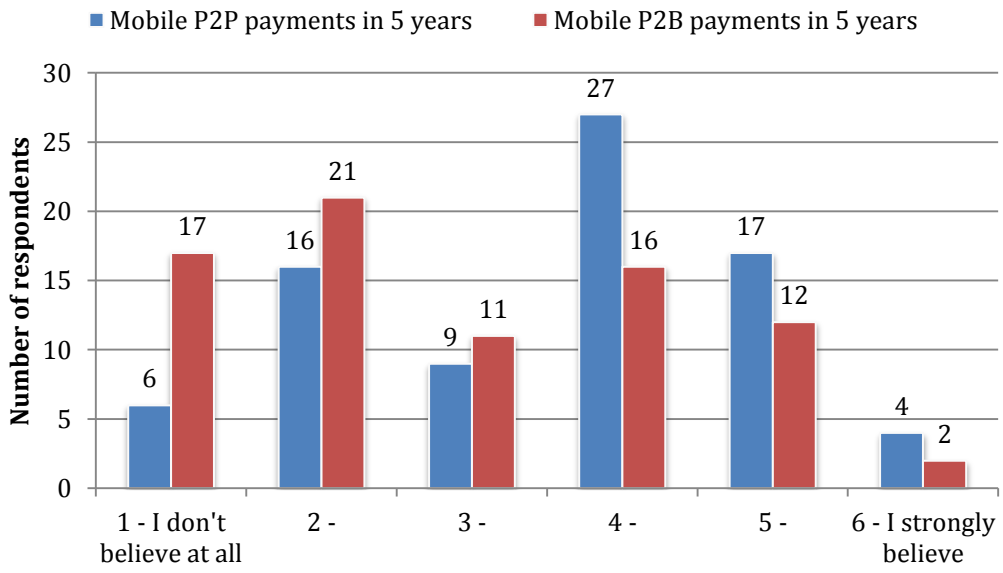

Figure 19 I believe to be using mobile P2P/P2B payments in five years time[17]

[17] Average for mobile P2P payments in five years time is 3,6 and median is 4. Average for mobile P2B payments in five years time is 2,9 and median is 3.

Respondents who are more interested in mobile P2B payments also believe to be using P2P payments more in five years time. Most of the respondents who believe to be using mobile P2P payments in five years generally believed to make mobile P2B payments in the future as well.

Respondents who use Internet with their mobile phones daily believed to be using mobile P2P and P2B payments more in the future at least to some extent (answered 4-6 in a scale of 1-6). 77 % (24 out of 31) of those who use Internet with a mobile phone every day believe to be using mobile P2P payments in 5 years and 45 % (14 out of 31) to be using mobile P2B payments. Respectively only 50 % of the individuals who use Internet with their mobile phones seldom believe in P2P payments in five years and 33 % in P2B payments.

A two-sample t-test was performed to determine whether there was a statistically significant difference between the proportions of daily mobile Internet users believing to be using mobile P2P payments in five years and the other users believing to be using mobile P2P payments in five years. The t-statistic was significant at the 0,05 critical alpha level (*), as t(77)=2,398 and the corresponding two-tailed probability p=0,0189.

Furthermore, a two-sample t-test was performed to determine whether there was a statistically significant difference between the proportions of daily mobile Internet users believing to be using mobile P2B payments in five years and the other users believing to be using mobile P2B payments in five years. The t-statistic was not significant at the 0,05 critical alpha level (NS), as t(77)=1,075 and the corresponding two-tailed probability p=0,2859.

Also respondents who mentioned that they currently make P2P payments most often (at least once a week) believe to be using mobile phones for P2P payments more in five years. Of those 21 respondents who make P2P payments at least weekly, 81 % (17 respondents) believed (scale 4-6) to make mobile P2P payments in five years.

"At the moment I'm somewhat interested in mobile P2P payments. Probably I would be more interested in the future."

"I'm interested but I'm a little concerned about the security. So I wouldn't be testing and using the service among the first users. Perhaps when it would get more popular I would be extremely interested."

Easy mobile P2P payments. Study participants were asked if they would pay P2P payments more if it were made easier and faster. Participants were also asked to tell what kind of payments would they do more. As presented in Figure 20, majority (53 %, 42 out of 79) of the survey respondents did not believe that they would make P2P payments more even if it were easier. Many of the survey respondents mentioned that if P2P payments have to be paid it doesn't matter if it is easy or not.

"I make P2P money transfers only when I have to. It doesn't matter how easy or difficult it is."

However 33 % (26 out of 79) of the respondents did believe that easier P2P payments would increase their P2P payment transactions. This was seen especially interesting for small payments that could be made immediately and fast. In the open questions 22 respondents stated that easy P2P payments would be especially interesting for small payments. The most common statements were about sharing bills and costs between friends (e.g. in restaurants, groceries). The rest (14 % of the survey respondents) were unsure. Many of them mentioned that they also might pay small payments more.

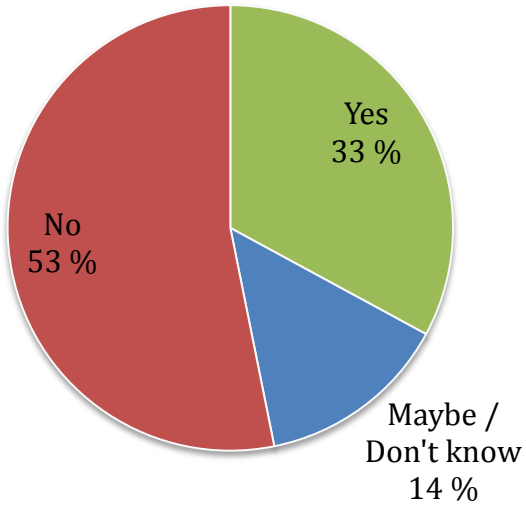

Figure 20 Would you pay P2P payments more if it were easier?

"I don't think so. I don't give money to other people just because it is easy. Perhaps I would still make very small payments more."

"Not much. Maybe if a friend loans small amount of cash from me I wouldn't have to write down that he owns me money. He could pay me instantly."

"Yes. Currently I often compensate my 'payments' by buying my friend a lunch or a beer."

"Yes, if it were very convenient I could transfer small amounts with people I interact often."

Transfer limit. Most of the study participants (65 %, 51 out of 79) said that a transfer limit of EUR 50 would be adequate for them. 25 % (20 out of 79) of the respondents mentioned that they would want a larger transfer limit and 10 % (8 out of 79) mentioned that a smaller transfer limit would be better. A one-sample t-test was performed to determine whether the proportion of respondents preferring a transfer limit of EUR 50 or less was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=5,132 and the corresponding one-tailed probability p=0,0000. Figure 21 presents how many of the respondents felt that a transaction limit of EUR 50 would be sufficient.

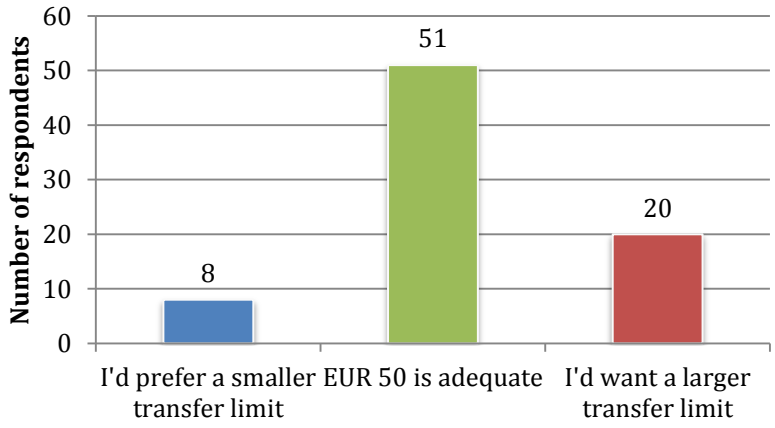

Figure 21 Would EUR 50 transfer limit be adequate for mobile P2P payments?

These results are analogous with several answers in the survey's open questions. Many mentioned on their own initiative that they are especially interested making small mobile P2P payments, i.e. less than EUR 50 (question 22). Some felt that for larger

amount credit transfer (online bank) felt more appropriate. In the open questions in the survey there were a total of 53 respondents that had statements concerning payments less than EUR 50. In contrast only 14 survey respondents had statements that were about payments larger than EUR 50. These statements were either regarding their current payment behaviors or mobile P2P payments.

Interviewees also mentioned that they might even want an optional transfer limit for security purposes. If their mobile phones would get stolen or lost, the damages of any unauthorized use would not be as bad. However five out of eight felt that EUR 50 is too small and would rather have EUR 100 as a transfer limit.

"For large payments credit transfer is the best option. For small payments, mobile phone could be useful."

"I'm interested especially when I'm paying smaller amounts, like EUR 7-50."

Mobile P2P payments for familiar persons only. Mobile P2P payments can only be allowed to be made between friends – i.e. trusted people. As described in Chapter 2.5 this could make mobile P2P payments more secure to use. Study participants were asked if a service, that would enable P2P payments only for friends, family members etc. be sufficient. As presented in Figure 22, 51 % (40 out of 79) of the survey respondents did believe that P2P payments only for friends and family would be sufficient. As mentioned previously in Chapter 4.1.1 all of the study participants (interview and survey) mentioned that they currently make P2P payments to persons they know a lot more often than to unfamiliar persons. Based on the open questions mobile P2P payments for friends was considered to be most interesting. Majority (75 %) of the survey respondents said to make P2P payments to people they know at least monthly. Only 22 % said to make P2P payments at least once a month to unfamiliar persons.

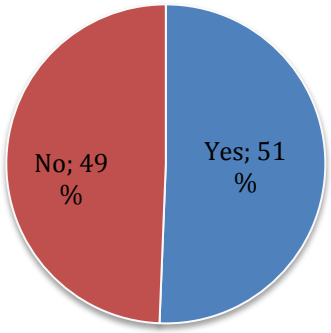

Figure 22 Would mobile P2P payments just for people you know (e.g. friends and family) be sufficient?

Authentication method. Study participants were asked what kind of authentication would they prefer in mobile P2P payments. Most popular choice (62 %, 49 out of 79) was a single "stronger" password (i.e. 8-10 characters). Second most popular (20 %, 16 out of 79) was a shorter PIN-code like password (i.e. 4-5 numbers). 8 respondents (10 %) mentioned they would rather use a one-time password (OTP) and a strong password (i.e. same they use for online banking). A one-sample t-test was performed to determine whether the proportion of respondents preferring a stronger password (8-10 characters) was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,05 critical alpha level (*), as t(78)=2,197 and the corresponding one-tailed probability p=0,0155.

In the open questions, 9 survey respondents stated that online bank authentication is a bit cumbersome to use. Few also shared their interest toward biometric (e.g. fingerprint) authentication. Figure 23 presents the results on how respondents wish to authenticate.

"I'm interested (in mobile P2P payments). However I'm worried about the security side of it."

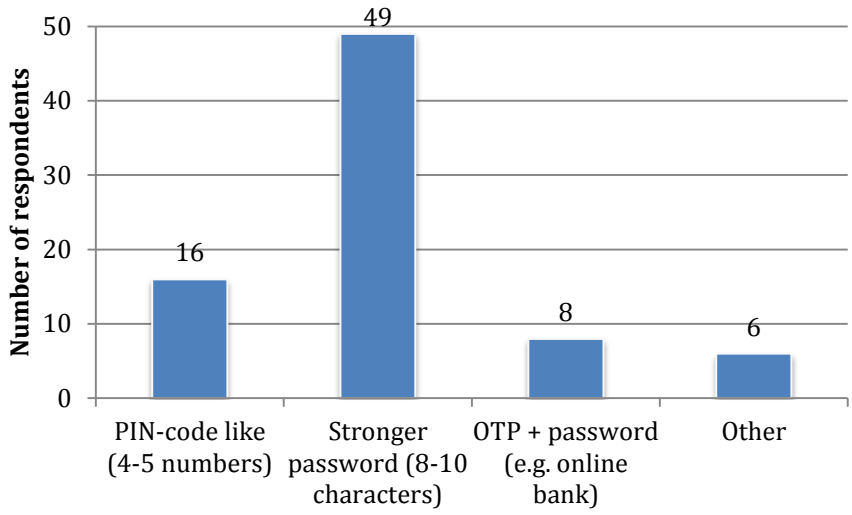

Figure 23 Preferred authentication method for mobile P2P payments

Interviewees were also asked at which point would the like to authenticate. Three out of eight interviewees said they would prefer to only authenticate (i.e. type the password, PIN-code etc.) at transaction points. Three interviewees would in addition also like to authenticate at the beginning of the payment. Two interviewees wished to only authenticate at the beginning – not at transaction points. One mentioned that there should be a timer after which the user would be required to authenticate again.

Basis of payment. The vast majority of the study participants mentioned they would prefer to use their current bank accounts for mobile P2P payments. Also most of the interviewees (six out of eight) preferred using bank account as basis for P2P payments. 67 % (53/79) of the respondents preferred that they would be charged from their bank account in real time. Thirteen (16 %) considered electronic money stored in their mobile phones to be the best solution for mobile P2P payments (i.e. mobile wallet). Five (6 %) would want a new and separate account just for P2P payments. This type of account can be considered equal to for example a PayPal account. All the different possibilities and results are presented in Figure 24.

A one-sample t-test was performed to determine whether the proportion of respondents preferring bank account as the basis for P2P payments was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=3,213 and the corresponding one-tailed probability p=0,0010.

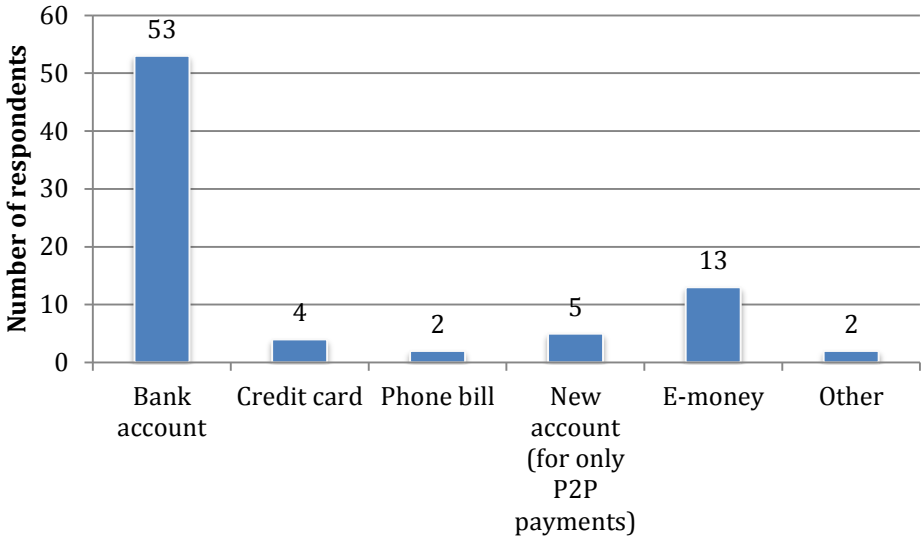

Figure 24 Preferred basis of payment

Interviewees were also asked if the payment amount affects the preferred basis of payment. For small payments e-money and phone bill were considered also good. For large payments bank account was the preferred basis by everyone. All of the interviewees also wanted that the payments made for them would be saved in to their bank accounts.

"Transferring money to a separate account for mobile P2P payments sounds inconvenient."

"It's best to pay straight to bank account because then the money is instantly available for other payments as well."

"I could have paid my friend in cash but he wanted me to pay straight to his bank account."

Payee identification. Respondents were given a series of options that they would prefer as the means to identify the payee: number sequence (such as a bank account number), phone number, e-mail address, identity number or other. Most (46 %, 36 out of 79) said they would prefer to use bank account number or alike (i.e. a number sequence). However most of the interviewees (five out of eight) mentioned they would rather use phone number to identify the payee. This was the second most preferred in the survey (27 %, 21 out of 79). This was the only question were interviewees and survey participants had dissenting opinions. During the interviews everybody mentioned that it

would be important that the payees could be saved as well (like contacts in the phone). Results for the preferred method to identify the payee are presented in Figure 25.

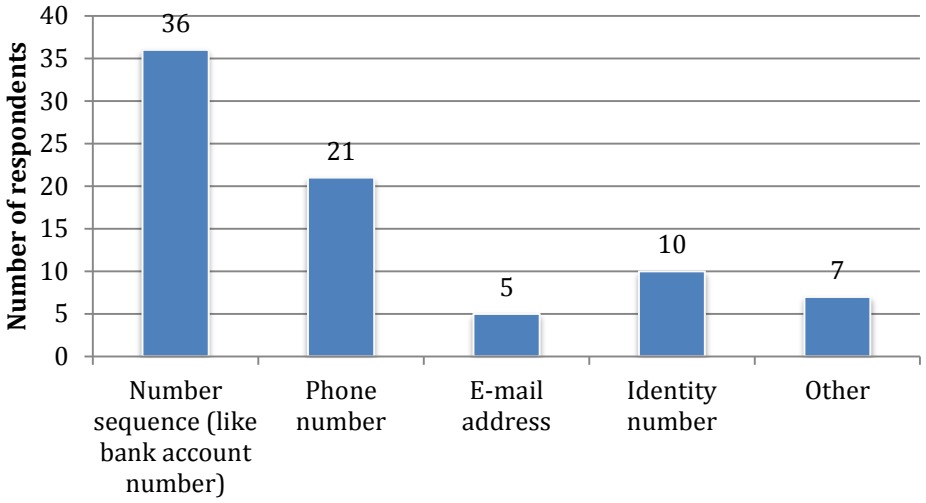

Figure 25 The preferred identification of the payee

Mostly the study participants (interview) wanted to use phone number for identification because the payments are also made with a mobile phone. They believed it felt more natural that way. One interviewee stated that bank account number felt more personal and better, because the owner of the mobile subscription may not be the actual user / holder.

"If I'm using my mobile phone to pay, it feels more natural to use phone numbers for payments."

"Bank account number feels more personal (thus better). Phone subscription's owner may ne a different person than the user is."

"Only problem is that I never remember other persons' account numbers. I barely remember my own."

Payment requests. For the interviewees making payment requests was considered extremely important. Most said that at first they didn't imagine such a feature. However after they were introduced the feature in one of the videos (PayPal commercial) they said it seemed very convenient. Two persons mentioned that they sometimes hesitate to ask for small payments back face-to-face. Also few mentioned in the survey that they are sometimes even ashamed to ask for small debts back. Some considered payment

requests made with a mobile phone to be less personal and therefore a good way to request debts back from other people.

"I borrowed EUR 20 to a friend. I sent him my account number but he forgot to pay. He paid me later in cash."

"I sometimes don't even bother to ask small amounts back personally."

"I shared groceries with six friends. Mobile P2P payments would be good because then the payment would be made immediately. Now I had to wait 1-3 weeks for everyone to pay via online bank."

Study participants were asked in the survey how important would making payment requests as a feature be for them. This was asked in a six-step scale. Most (58 %, 46 out of 79) considered this feature to be at least somewhat important. A one-sample t-test was performed to determine whether the proportion of respondents considering payment requests to be at least somewhat important was significantly larger compared to the other respondents. The t-statistic was not significant at the 0,05 critical alpha level (NS), as t(78)=1,441 and the corresponding one-tailed probability p=0,0769. However, the ability to make payment requests can be considered important because more than half of the respondents mentioned this feature to be important at least to some extent. The results are presented in Figure 26.

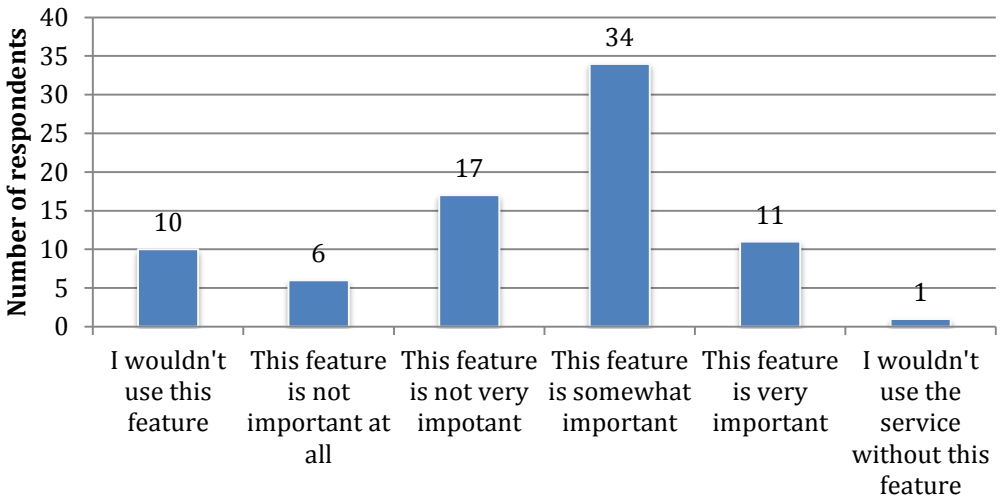

Figure 26 Would you like to make payment requests?[18]

Willingness to pay for a mobile P2P payment service. Study participants were asked if they are willing to pay for a mobile P2P payment service and how would they like to pay for the use. As seen from Figure 27, most (43 %, 34 out of 79) said they wouldn't pay anything to use such a service. Of those who were willing to pay wanted to pay a small amount (e.g. the price of an SMS) for every transaction (53 %, 24 out of 45) or a one-time payment (e.g. EUR 5) in pursuance of taking the service in to use (36 %, 16 out of 45). Interviewees (six out of eight) were most willing to pay for the service at once – not pay for the actual use.

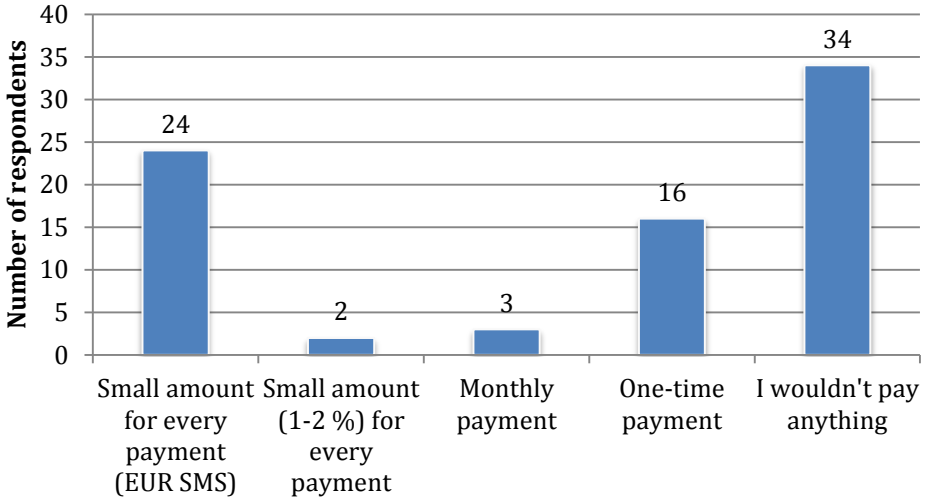

Figure 27 Would you be willing to pay for a mobile P2P payment service?

[18] Converted to scale 1-6 (1 = "I wouldn't use this feature" and 6 = "I wouldn't use the service without this feature"). Average is 3,4 and median is 4.

"I would be willing to pay if the service would fulfill all my requirements."

"The service fee should be transaction based and should be reduced from the account immediately."

"I wouldn't pay because there are alternative options that are free to use. However I would respect my bank more if my they would offer this kind of service."

Anonymous payments. At this moment consumers can make P2P payments anonymously using cash only if the payee does not recognize the payer. Survey and interview participants were asked if they wanted to pay P2P anonymously as well. As seen from Figure 28, anonymous P2P payments are not considered very important or even interesting. 75 % (59 out of 79) of the survey participants felt that anonymous payments are not important (scale 1-3). A one-sample t-test was performed to determine whether the proportion of respondents considering anonymous payments as not important was significantly larger compared to the other respondents. The t-statistic was extremely significant at the 0,001 critical alpha level (***), as t(78)=5,132 and the corresponding one-tailed probability p=0,0000.

Also all of the interview participants mentioned that anonymous payments are not an important feature. Some mentioned that transaction traceability suffers in anonymous payments, which makes anonymous payments feel less secure.

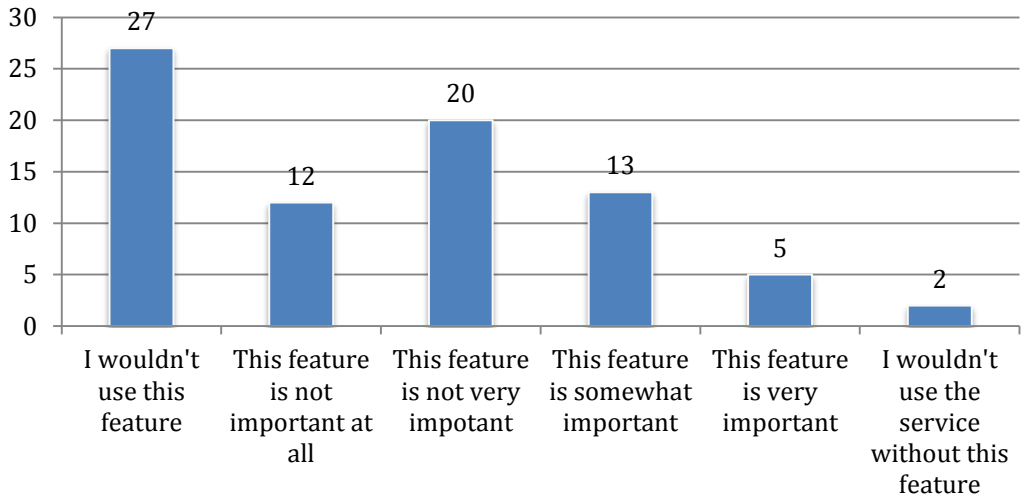

Figure 28 Importance of anonymous mobile P2P payments[19]

"It's hard to imagine why I would need such a feature."

Transaction archiving. All interviewees mentioned that some kind of recordkeeping feature would be extremely important. This way they could keep track of their transactions: who they have transferred money, when and how much. Also all of the incoming transactions would be recorded. Some of the interviewees mentioned that the transactions do not have to be recorded to the mobile phone itself but have to be accessible somewhere and somehow (e.g. Internet).

Recordkeeping was not asked directly in the survey. However 16 survey participants stated in the open questions that transaction archiving is important for them in their current P2P payment method (i.e. credit transfers) or in a future mobile P2P payment service. Recordkeeping is important for two reasons. First of all every online credit transfer leaves a record (i.e. receipt) that the payment has been made. Secondly some study participants felt this as a good way to follow and monitor their finances.

"It's better to pay via online bank as a credit transfer. It leaves evidence that I've paid for both – the payer and the payee."

[19] Converted to scale 1-6 (1 = "I wouldn't use this feature" and 6 = "I wouldn't use the service without this feature"). Average is 2,5 and median is 3.

4.1.4 Results from interviews

These results were not included in the survey. All results in this chapter are from the interviews.

Domestic and cross-border payments. Interviewees were asked if domestic-only P2P payments would be enough and do they even want to transfer money abroad with their mobile phone. Disabling mobile P2P payments abroad could possibly bring greater security if mobile phone gets lost or stolen. Five out of eight said that they want to pay P2P payments outside Finland also.

Proximity and remote payments. P2P payments are currently paid as proximity payments (i.e. cash) or remote payments (i.e. credit transfer). Half of the interviewees mentioned that just proximity P2P payments would be sufficient although they stated that remote payments are important as well. The other half felt that remote payments are necessary.

Money transfer delay. Five out of eight interview participants mentioned that a one or even two days delay in the money transfer would not a problem for them. Most of them said that in credit transfers between two banks there already is such a delay, which is why they're used to the delays. However all of the interviewees said that the payee has to receive some kind of confirmation that the money is transferred. This was considered extremely important. It is even more important if there is a delay. Long delays were considered problematic especially when paying to someone unfamiliar.

"I don't' mind as long as the payee gets a confirmation that I have paid."

"If there would be a delay I might as well use credit transfer."

Payment information. Basically the only information needed for paying someone is the amount to be paid and information of the payee (identification). Interviewees mentioned that they would like to add additional information such as a message for the payee. This message would include information about the payment, such as why the payment was made.

Three interviewees mentioned that they might be interested choosing the reason of payment from dropdown list. This list would contain all of the most common payment situations that they have.

How should a mobile P2P payment service work? Seven out of eight interviewees would like to use a mobile P2P payment service as an installed application on their mobile device. Some stated that this way the service would have better user interface and thus be better to use. Many also mentioned that SMS messages are prone to errors easily - it is easy to make typos. Two interviewees also stated that SMSs do not feel as secure as a dedicated application. One interviewee said he would like to use the service straight from his phonebook. All of the interviewees own a smart phone and already have installed applications to their smart phones.

Service provider. Three interviewees mentioned that they would like to start using a mobile P2P payment service from their current bank. They would also like to take the service in to use from the bank's Internet site. Three other stated that the service provider has to be well known and trustworthy. They also perceived banks to be trustworthy. Two interviewees mentioned that it does not matter how the service is taken in to use but it is very important that it is made easy.

"Some reliable service provider… Main thing is that the bank is also involved."

Payments allowed with only a single device. As mentioned in Chapter 2.5, mobile P2P payments can only be allowed using payer's mobile phone. This could possibly make mobile P2P payments more secure. It is called 'what you have' type of security solution. Seven out of eight interviewees thought this was a good idea. One person mentioned that if P2P payments are possible to make also with other persons' mobile phones there should be no transaction traces left to that device. Two interviewees however mentioned that they own several mobile phones and they would like to be able to use all of these devices for mobile P2P payments – not just one.

4.1.5 Other findings

This chapter presents the findings that were not asked directly but came up during open questions in the survey or in the interview. All the open questions were analyzed using

TAMSAnalyzer. Most of the results in this chapter arose from the analysis using TAMSAnalyzer.

Easy and fast. Majority of the study participants stated in the open questions that the main reasons they use a specific P2P payment method or the main reasons affecting the intention to use mobile P2P payment is that it is fast and easy. In total 56 of the survey respondents had statements about ease-of-use. Also 40 respondents had statements that speed is important. This means that the actual time to make the payment doesn't take too much time (i.e. less than current methods).

"I could be interested in mobile P2P payments but it should be at least as easy or easier than credit transfers via online bank."

"I'm interested (in mobile P2P payments) but it's already possible using online bank with a mobile phone. If it would be made easier and cheap I might be interested."

Fast and easy payments were mentioned to be interesting especially for small payment. Some of the survey respondents mentioned that credit transfers via online bank is a too long process for paying just few Euros.

"I could pay small amounts more if it would really be made possible with just a few clicks."

Paying immediately. One of the most important factors affecting the intention to use mobile P2P payments is that the payments could be made instantly. In total 25 of the survey respondents had comments in the open questions that paying immediately is important. The main reason for this is that study participants wish to make payments right away in order to take the load off their mind. Another reason is that some participants believed that if the payment is not made right away it might be forgotten. In fact 10 study participants mentioned that they have even forgot to pay if the payment was not made immediately.

"It would be good if the payments would be made immediately – for example after a taxi ride – and I wouldn't have to think about that afterwards in online bank.!

Convenience and mobility. Mobile P2P payments were also seen extremely convenient. Also many of the survey respondents mentioned that the main motives to

use a certain P2P payment method (i.e. cash or credit transfers) is because it is convenient. 25 of the survey respondents had statements about convenience.

"I believe mobile P2P payments could be more convenient than credit transfers or by paying in cash."

Study participants mentioned that convenience comes from several factors. Many felt that it is convenient if payments could be made instantly - not having to wait to go home and pay there. Some also mentioned they feel credit transfers to be convenient because then they can pay the exact amount without having to carry any exact change with them.

One of the most significant factors affecting greater convenience is mobility – ability to pay anywhere at anytime. Users don't have to go home or find an ATM in order to pay. Also most consumers carry their mobile phones – a potential payment instrument – with them at all times. In total of 15 survey respondents had statements about mobility.

"The need to pay P2P payments can come unexpected when there are no cash dispensers near or the is no possibility to pay using a card.

"I always carry my mobile phone with me."

Security and trust. Security and trust issues were considered extremely important in current payment methods and for mobile P2P payments. 32 of the survey respondents had comments and statements about security and trust issues in the open questions. Credit transfers were seen particularly secure to use between friends and family – persons that are trustworthy. However some had trust issues when purchasing from unfamiliar persons. They felt that the payee could easily steal the transferred money without giving the purchased item.

"I rather use cash or credit transfers – I trust these more than mobile P2P payments."

"I use both, credit transfers and cash to pay depending if I trust the other person."

"I would use mobile P2P payments if they were easier to use than online bank and the security side would be in good trim."

4.2 Scenarios for mobile person-to-person payments

This chapter presents the results from the interviews and survey concerning what kind of P2P payment situations and scenarios the study participants have had during the past year. Who do people pay to, how much, why etc.? The payment scenarios were asked as an open question from the survey participants. Participants did not mention all the P2P payment situations from past year but a few (i.e. 1 - 8) – the first ones that came to their mind. Chapter 5.2 discusses how these scenarios fit in to mobile P2P payments – could mobile phones bring any benefits concerning the presented scenarios and how.

The scenarios study participants mentioned during the interviews and sent after the interviews via e-mail were very similar with the scenarios participants mentioned in the survey. All of the payment scenarios from the survey and from the interviews are discussed in this chapter together. The question about P2P payment scenarios was optional in the survey. 63 out of 79 (80 %) survey respondents shared some of their P2P payment situations and scenarios from the past year.

4.2.1 Most common scenarios

The scenarios in this chapter are separated in to three of the most common use situations for P2P payments. The presented scenarios are high level and they are addressed in more detail below. The three main high level scenarios found were sharing bills and costs with friends, purchases and cash loans.

Mostly the payments were between friends and family. In 116 cases the payment was made between two private persons that already are familiar with each other (e.g. friends). In contrast, in only 14 situations the payment was made between persons who are not familiar with each other (e.g. at a flea market or online auction). In the P2P payment situations study participants mentioned 89 % were made between friends, family etc.

Table 4 presents the three most common P2P payment scenarios that came up during the research. The scenarios are three different features: to whom the payment was made, payment amount and where the payer and the payee at the same location when the initial payment need occurred. These scenarios are discussed in more detail below.

Table 4 Three most common scenarios for P2P payments

	Sharing bills and costs	Purchases	Cash loans
Typical examples	Sharing a taxi, groceries or a restaurant bill	Buying something from an online auction or a flea market	The unexpected need for cash: e.g. cloakroom, vending machine, bus ticket
Number of situations (N=69)	81	18	12
Payee	Friends and family	Unfamiliar persons; friends and family	Friends and family
Payment amount	EUR 5 – 50	EUR 20 - 200	EUR 0 - 20
Payer's and the payee's location	Proximity and remote	Proximity and remote	Proximity

Sharing bills and costs. The by far most common P2P payment situation is sharing bills or other costs with friends. In fact 81 of the scenarios stated were somehow related to sharing bills or costs. Sharing a restaurant bill, buying groceries together, sharing a taxi, booking a trip together with friends, buying a shared gift etc. Basically one person pays for everything and other people pay their share. Usually this is done in online bank as a credit transfer. However most participants mentioned that in these types of scenarios they could have paid with cash, as proximity payments. The problem has been the lack of cash or exact change.

Sharing the costs for groceries with friends had 16 statements making it the most common use situation and scenario for P2P payments. A typical scenario of this is when people are spending an evening together with a friend or friends and buying the needed groceries for dinner etc. All of these situations mentioned were less than EUR 50 -

mostly about EUR 5-20 per person. In these situations the costs were usually shared within a group of people – not just between two persons. Usually the payment is made later via online bank as a credit transfer.

"The most common P2P payment situations are get-togethers where we cook together with friends. Somebody has bought the needed groceries in advance and the costs are then divided between with the participants. Usually the payments are about 10 €."

Sharing a taxi bill was the second most common scenario for P2P payments with 15 statements. All of these situations mentioned were less than EUR 50 per person. The payment was typically paid later as a credit transfer. In these situations the payer and the payee were always at the same location when the payment need occurred.

"There has been a lot of situations in which I've shared a taxi with my friends. I've paid as a credit transfer because I didn't carry any cash with me."

Study participants mentioned to have situations were they have had to share a bill at restaurant. In these cases the waiter did not split the bill so one person would pay for everything. Other persons pay their share of the bill with cash or later as credit transfer. All of these cases were less than EUR 50. In this scenario the payer and the payee were always at the same location when the payment need occurred.

"We were at a trip with friends and sharing a bill at a restaurant abroad is rarely possible. In these cases paying with cash can be very complicated. We marked all the expenses down to a spreadsheet, kept all the receipts and paid later as credit transfer. It would've been easier if the payments could've been made instantly."

Six survey respondents mentioned in the open questions that they don't necessarily pay back with money – especially in smaller amounts. They compensate their debt by other means such as offering a lunch or a beer for their friends. In these situations many study participants believed that they would probably pay P2P payments more often if it were somehow easier.

The most complex P2P payment scenarios (and quite common) are due to trips with friends. Study participants (interview and survey) mentioned that in these situations typically someone pays for the travelling expenses, someone for food, someone for the

cabin or the hotel etc. These expenses are then typed in to a spreadsheet and the total expenses for each individual then counted.

Study participants commonly used terms such as ‘debt’ or ‘loan’ to describe situations where they have shared costs or bills.

Purchases. Actual P2P purchases (i.e. buying an item from another private person) were not as common. 18 of the P2P payment situations described were about purchasing something from another private person. 4 of these P2P purchases were between friends. Other 12 are purchases from unfamiliar persons. These purchases were mostly made in online auctions or in three cases at a flea market. The amounts of money were higher in purchases than in any other situations. Half (9) of the purchasing scenarios mentioned were EUR 50 or higher.

Some survey respondents and interviewees expressed their concern for security and trust in purchases from unfamiliar persons from online auctions. They were worried that the item they have paid for will not be delivered and that they will lose the money they have paid.

Cash loans. The second most common P2P payment scenario is cash loans. The initial need for a cash loans is at places where cash is the only possible payment method. For example small cash loans for cloakrooms, vending machines or for a bus ticket were relatively common. 12 study participants stated that they have had such scenarios. All of these scenarios were between friends. However one person wished that cash loans even from unfamiliar person would be made realistic.

The need for the cash loan came always very unexpected and was always unplanned. All of the cash loan scenarios were amount less than EUR 20, typically around EUR 5. These types of scenarios were relatively often compensated by other means – not paying back with money.

Study participants were asked if they would make more P2P payments if it were easier and are they even interested in mobile P2P payments. Six survey respondents mentioned they probably would make more mobile P2P payments to pay back for small cash loans. Also four survey respondents mentioned that one of the reasons they are

interested in mobile P2P payments is that they could pay small cash loans back straight away.

"Easy P2P payments would be good in situations where I cannot pay using a card and a friend of mine loans me cash to pay."

4.2.2 Other scenarios

Six study participants mentioned that one P2P payment scenario for them has been normal loans from friends or family. These have regularly been anywhere from EUR 20 to even hundreds of Euros. Typically these types of loans have been made as credit transfers.

Few study participants mentioned that they have also had situations where they have bought something on behalf of their fiend or family member. The other person has then paid back the item. Usually the other person was unable to purchase the item because of lack of money. Another reason was that the person was not able to purchase the item due to his geographical location. These types of scenarios were usually more than EUR 50.

4.2.3 Payment amount

This chapter discusses how large amounts have the study participants paid as P2P payments during the past year. The results are based on the P2P payment situations that all of the survey respondents and the interviewees mentioned. In 9 P2P payment situations the total amount paid was not mentioned in the description. These payment situations were left out from this analysis.

In most of the scenarios the amounts paid were typically less than EUR 50. In total of 85 P2P payment situations were less than EUR 50. That is 79 % of all the scenarios the study participants listed. In contrast in 23 P2P payment situations the amount transferred was more than EUR 50.

4.2.4 Common scenarios

This chapter presents the most common P2P payments scenarios that came up during this research. The scenarios are presented on how mobile phones could be used as a payment instrument.

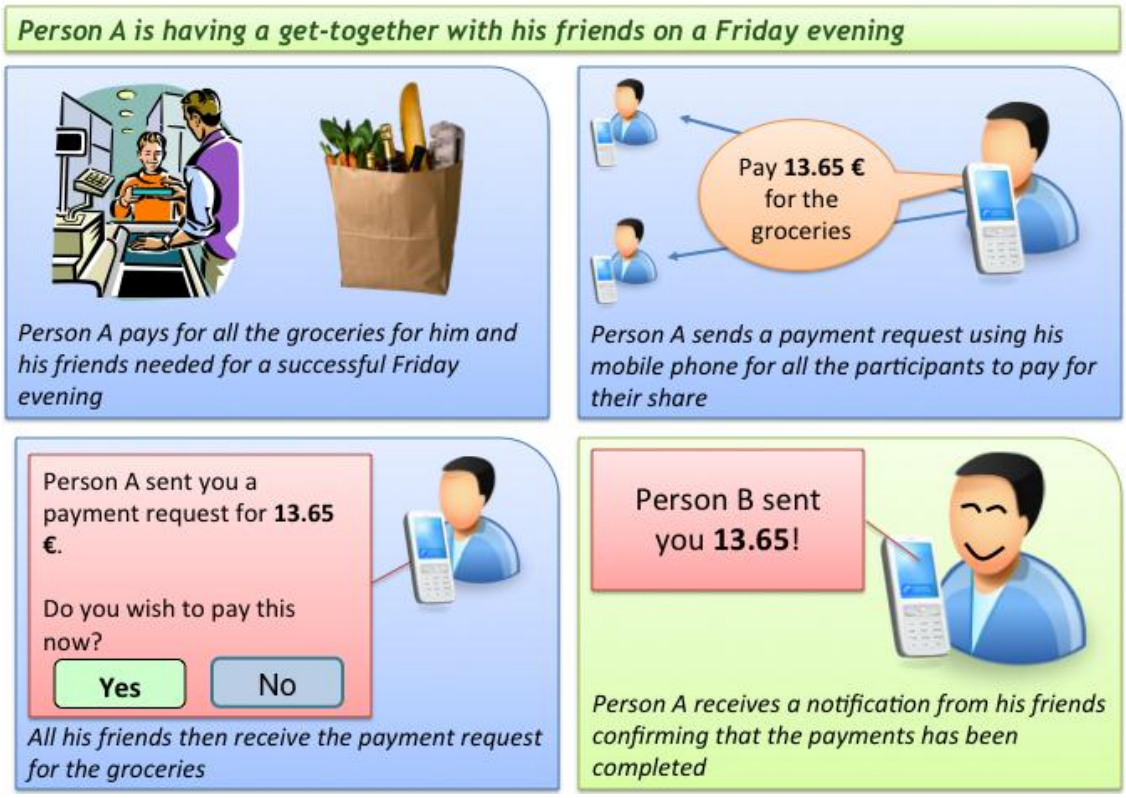

Figure 29 One of the most common P2P payment situations

Sharing the costs from groceries (see Figure 29):

1. Person A is having a get-together with her friends B and C.
2. Person A buys all the groceries needed for a successful evening with friends.
3. Person A types the amount on her mobile phone how much each person has to pay for the groceries. Person A also types the reason for the payment and selects the payees – persons B and C.
4. Persons B and C receive the payment request to their mobile phones.
5. Persons B and C accepts the payment, type their password and pay.
6. Person A receives a confirmation that the payments have been made.

5 Synthesis of the results

This chapter presents an overall of the results from the interviews, survey and scenarios. These results are analyzed on how the results from the different questions and scenarios reflect to one another. This chapter also discusses how the results from this research reflect to other studies made in this field and to the current mobile P2P payments services – PayPal, M-PESA and Apples NFC P2P payment patent (see Chapter 2.7).

One concern in the survey was that would study participants comprehend all questions the same way as in the interview. Naturally it is easier to give a better picture on the topic (mobile P2P payments) during the interview. Interviewees were also shown three videos to help them comprehend mobile P2P payments better. However all of the answers in the interviews and in the survey were very similar. Results from literature and other studies have also similarities.

Based on the results and P2P payment situations there is a need and interest towards a new way to pay P2P payments. Most (75 %) study participants (interview and survey) were interested in mobile P2P payments (see also GSMA 2008) Most are not looking for any replacement or alternative methods for payments in shops. Generally the study participants are satisfied with the current situation especially in P2B payments (see also Keinonen 2007).

In a study conducted by Dahlberg et al. (2006) Finnish consumers believed to be using mobile payments in the future more. This was the case also in this research. 61 % of the study participants believed, at least to some extent, to be using their mobile phones for P2P payments in five years time. In contrast only 38 % believed to be using their mobile phones as a payment instrument in shops etc.

5.1 Current situation

Currently users use mostly online bank and some cash to pay P2P payments. However these P2P payment methods have clear shortcomings that can be improved. The problem seen with credit transfers is that they are bothersome for smaller payments, account numbers can be hard to remember and they are almost always made from home. This means that credit transfers cannot be made instantly independent from time and

place. Credit transfers are typically made days or even weeks after the initial payment need. In such cases many had even forgotten to make the payment. There is also a 1-2 day delay when making a credit transfer to another bank.

The problem with cash on the other hand is that participants rarely carry any cash with them. In fact 40 of the survey respondents had statements that they rarely carry any cash with them or that it would be nice if they did not have to use cash. Another problem using cash for P2P payments is that people rarely have exact change or any spare money, and that cash cannot be used for remote payments. Also according to other studies, Finnish consumers are using cashless payment methods more and more. The use of cash has become less popular in Finland during the 21st century. Cashless methods such as card payments and online bank are more popular every year. (E.g. Leinonen 2008, ECB 2007)

5.2 Mobile phones for person-to-person payments

Mobile phones can be used for P2P payments. Mobile phones already have all the necessities for P2P payments. As mentioned in Chapter 2.7 there are already many different services for mobile P2P payments. Most of the study participants were familiar using their mobile phones for other purposes than just calling and texting. Mobile phones are almost always carried with. More than half use Internet with their mobile phone at least couple of times a week and have installed applications to their smart phones. Also most of the participants are already familiar using their mobile phone for payments. These imply that mobile phones could easily be transformed as P2P payment instruments as well.

Mostly study participants wished to have a P2P payment method that would be easy and fast to use. These two qualities had by far most statements in the open questions. *Perceived ease-of-use* and *transaction speed* are also named as extremely significant factors affecting the intention to use mobile payments (e.g. Schierz et al. 2009; Kim, G et al. 2009; Goeke et al. 2010; Chen 2008; Pousttchi et al. 2007 & Kim, C et al. 2010). Transaction speed here regards to the time it takes to make the payment from the payee's perspective. The payment should be able to make with only few steps. The 1-2 day delay was only seen as a minor drawback by the interviewees because they are accustomed to the delays. However all mentioned that it would be extremely important

to receive some kind of *confirmation* that the payment was successful. Most of the study participants (83 %) preferred to use a single password (or a PIN-code) for mobile P2P payments. Only 9 % wished to use OTPs (i.e. code list) for authentication. These results suggest that users are willing to use a faster and easier authentication method (password or PIN-code) even with the cost of security (OTP, code list). PayPal's mobile P2P payment service uses password and M-PESA relies on a shorter PIN-code. According to a study by Mas et al. (2010), the users of M-PESA also appreciate transaction speed. In fact 98 % of the M-PESA users believe it to be a faster method to transfer money than any alternative method. Also NFC technology, which Apple introduced in their mobile P2P payments patent, has been proven to be fast for mobile payments (Massoth et al. 2009). This technology could be used as an additional method to make fast P2P proximity payments in the future.

Study participants mentioned that it is important that they could pay P2P payments instantly – regardless of time and place. Even though if cash is not carried with anymore, mobile phones are almost always carried everywhere, so that the payment in fact could be made right there and then. Comparably in previous studies *mobility*, payments that can be made anywhere and anytime, has been found to be a significant factor affecting the intention to use mobile payments. NFC-based P2P payments can only be used for proximity payments. Only half of the interviewees believed that this would be sufficient and wished greater mobility for a mobile P2P payment service.

Some of the study participants considered the mobility of a P2P payment service to be extremely *convenient* as well. In fact 25 of the survey respondents had statements about convenience. Convenience has been found to have a significant influence affecting the intention to use mobile payments (Kim, G et al. 2009 & Mallat et al. 2006). Also the users of M-PESA consider it to be extremely convenient to use. This for one has led to the success of the service. (Mas et al. 2010)

Mobile P2P payments would most likely be used for payments less than EUR 50. Most of the P2P payment situations (80 %) were less than EUR 50. Also 75 % of the survey respondents felt that a transfer limit of EUR 50 or even less would be sufficient. Interviewees mentioned (5 out of 8) that they would rather have a transfer limit of EUR 100 but said that they would use the service even with transfer limit of EUR 50. Transfer limits were also seen interesting for security purposes. With small transfer

limits any unauthorized use would not be as bad. Also in a study by Keinonen (2007) consumers were most interested in mobile payments (P2B) especially for smaller payments, i.e. less than EUR 20. PayPal's and Apple's NFC-based patent mobile P2P payment services do not basically have transaction limits. M-PESA provides a daily transfer limit (KES 140000) and a transfer limit for single payments (KES 70000)[20] (Business Daily).

PayPal and M-PESA users have to register to a new separate account in order to use these services. Even the payee has to register and acquire a new e-account. In other words PayPal's and M-PESA's mobile P2P payment services only work between people who already are using these services or are willing to start using one. However Apple's NFC-based P2P payments patent uses existing accounts, which can be considered as an advantage. In this research, by far most of the study participants mentioned they would most likely want to use their current bank account as the basis for P2P payments. Finnish consumers prefer to keep their money in one centralized place where it can be used for almost anything (Mallat et al. 2007). Also most preferred to use bank account numbers for payee identification (see also Dahlberg et al. 2006). This is understandable considering that *compatibility* has been found to be an important factor affecting the intention to use mobile payments. Consumers prefer (payment) solutions and services that they are already familiar with and that are compatible with their current lifestyle and behavioral patterns. (E.g. Chen 2008; Dahlberg et al. 2006; Keinonen 2007 & Schierz et al. 2009)

Using bank accounts as basis for payments in Finland makes mobile P2P payments also more *widely applicable*. M-PESA is currently extremely widely used in Kenya. It can be used for example for P2P and P2B payments, bill payments and salary payments. This has been one of the reasons behind M-PESA's growing success. (Mas et al. 2010)

Only half of the survey respondents and 5 out of 8 interviewees said that mobile P2P payments for just familiar persons (i.e. friends and family) would be adequate. This is a bit surprising considering that by far most of the P2P payment scenarios and situations are in fact between friends and family. In fact 89 % of the P2P payment situations study participants mentioned were made between friends and family. Also in a survey

[20] 130 Kenyan shillings is 1 Euro (based on the currency exchange rate at 14.6.2011)

conducted by NACHA & eCom Advisors (2010) P2P payments for friends and relatives were considered most interesting. Also M-PESA is mostly used for money transfers between familiar persons as well (Morawczynski et al. 2009). Study participants also in this empirical research mentioned to make much more P2P payments to familiar persons than to unfamiliar. 75 % of the study participants make P2P payments at least monthly to friends and family. In contrast only 22 % mentioned to make P2P payments to unfamiliar persons at least monthly. However consumers are more willing to use payment services and methods that are widely applicable (Leinonen 2008, Dahlberg 2006 et al. & Mallat et al. 2006). If mobile P2P payments can be made for only friends and family, it is not that widely applicable anymore. This may be the reason why as many as half of the study participants wished to make P2P payments for everybody – not just friends and family.

Perceived security is often seen as one of the most important factors affecting the intention to use mobile payments and mobile banking (Linck et al. 2006; Rotchanakitumnuai et al. 2003; Gu et al. 2009; NACHA & eCom Advisors. 2010 & Mallat 2007). As many as 40 % of the survey respondents in this empirical research had comments, that they are concerned about security issues in a mobile P2P payment service. Also one success factor for M-PESA has been its perceived safety compared to other alternative payment methods (Mas et al. 2010). It is suggested that security issues would be addressed, not only from the technical side, but also from the subjective side. Interviewees also wished that the service will be provided by their bank or some other trustworthy party (see also Kim et al. 2009).

Mobile P2P payments should be inexpensive to use. Current methods (online bank and cash) are already free. Therefore it is difficult for a new entrant in mobile P2P payments to compete with pricing. 43 % of the survey respondents mentioned that they would not pay anything for a mobile P2P payment service. However if the relative advantages of the mobile P2P payments are considered great enough it can be assumed that consumers are willing to pay. Those who were willing to pay for the service wished to pay a regular price (e.g. a price of an SMS) for every payment or a single payment (e.g. EUR 5) when the service is taken into use. *Costs* have, in other studies as well, seen to be a significant factor influencing the intention to use mobile payments (e.g. Luarn et al. 2005; Dahlberg et al. 2006; Keinonen 2007 & Goeke et al. 2010). One of the success

factors of M-PESA is also the fact that it is considered to be relatively inexpensive (Mas et al. 2010). Opening a PayPal account and sending money is free. However receiving money costs for the user. Apple's NFC-based P2P payments uses existing payment accounts which means it is basically free to use.

The ability to make *payment requests* is important. More than half of the study participants felt this to be an important feature, at least to some extent. Based on the P2P payment scenarios the ability to send payment requests seem even more essential. The most common P2P payment use situations were sharing bills and costs with friends. This way one person could easily make a payment request to his friends. Payment requests can be considered somewhat equal to e-invoices. Persons receiving that payment request could then pay their share of the bill or costs. This also addresses the problem that debts are usually paid days or even weeks later, and sometimes they are even forgotten. This feature has been included in PayPal's and Apples NFC-based mobile P2P payment services. Both of these services allow users to make payment requests as well.

A clear advantage that M-PESA has is that it can be used with basically any mobile phone on the market because it uses SMS messages for payments. Users are then not forced to change their existing mobile phones. PayPal- P2P money transfer application requires a smart phone. The NFC-based P2P payment service naturally requires a new NFC-enabled smart phone. Seven out of eight of the interviewees mentioned in this research that they would prefer to use a mobile P2P payment service as a dedicated installed application on their smart phone such as the PayPal's application is. They believed that a dedicated application would be easier to use than typing text messages. Also Mallat (2007) concluded in her research that SMS-based payments are complex and slow to use. Thus she suggests that SMS-based payments should not be used in Finland. Also M-PESA had challenges with SMS technology. SMS text messages only allow 160 characters. This limitation has been a problem with the Swahili language. English is a much more compact language. The SMS responses in M-PESA were hard to fit in to just 160 characters. (Hughes et al. 2007) In a survey by GSMA (2008) most of the respondents wished to use SMSs for mobile money transfers. However this survey was conducted in 2007. Mobile phones and their use have evolved rapidly since.

One important advantage and feature considered for mobile P2P payments was *recordkeeping* (i.e. *transactions archiving*). All of the interviewees and many of the survey respondents mentioned recordkeeping to be important. This contains information about the payee, amount paid, time of payment etc. Recordkeeping was found to be extremely important also in another study by NACHA (2010). Also Keinonen (2007) and Dahlberg et al. (2006) found out in their studies that Finnish consumers would like to get more information from their purchases and other transactions and have a transaction history available.

Personal innovativeness (i.e. early adopters) has been found to be a significant factor affecting the intention to use mobile payments (Kim, C et al. 2010). This research also supports that. Study participants who use Internet with they mobile phones every day were more interested in mobile P2P payments and believed to be using their mobile phones for payments in five years time more. Persons who use Internet every day with their mobile phones are considered to be advanced users.

Anonymous payments were not found important in this research. Study participants did not indicate an interest towards anonymity in P2P payments. In fact some felt anonymous payments to decrease perceived security. Also in a study by Linck et al. (2006) anonymity was not found very important for mobile payments.

There are also factors that could be preventing Finnish consumers to start using mobile P2P payments. Study participants in this research and in a study conducted by Keinonen (2007) stated that most are happy and satisfied with the current situation in payments. Some stated also in this research that P2P payments already are easy and fast enough to make. The established practice of the current P2P payments methods (online bank and cash) is extremely strong. This may slow the growth for mobile P2P payments. (See also Mallat et al. 2005).

Figure 30 presents a conclusion of the results. The results are divided here in to three parts. First is presented the current situation and what shortcomings do the current P2P payment methods have. Second part contains the enablers for mobile P2P payments. Third part presents the factors affecting the intention to use mobile payments.

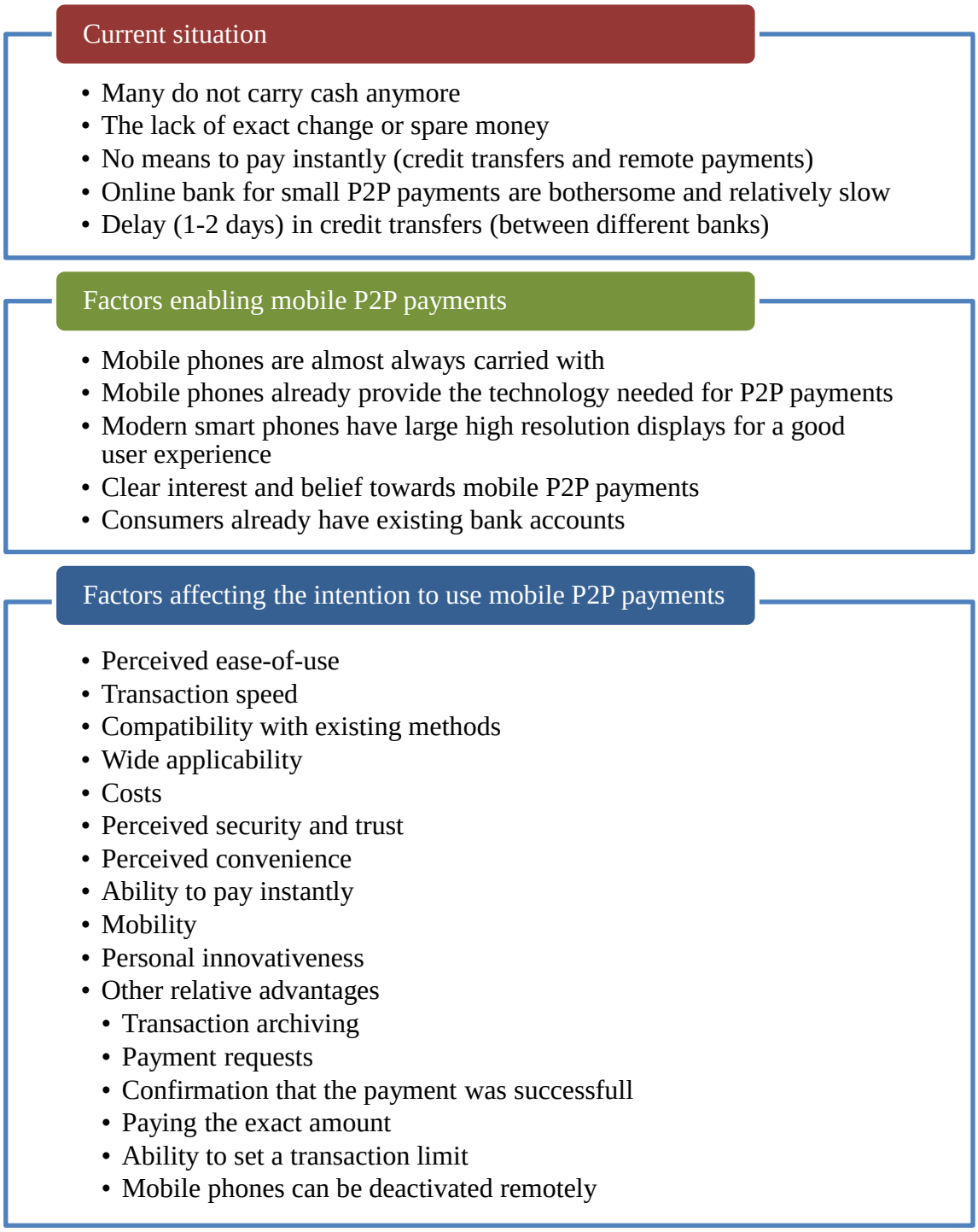

Figure 30 Factors enabling mobile P2P payments

6 Conclusions

This chapter concludes the results briefly. Chapter 6.1 presents the answers to the research questions. Chapter 6.2 is a short summary of the results and presents recommendations for a new mobile P2P payment service. The content in this chapter is presented in more detail in previous chapters.

6.1 Answers to research questions

Rq1: How do Finnish consumers currently handle P2P payments?

The study participants in this research mostly used credit transfers and some cash for P2P payments. Finnish consumers have been found to prefer cashless payment methods in other studies as well. However participants felt that there are some shortcomings in these methods for P2P payments. The problem with credit transfers is that they are made days or even weeks after the initial payment need. Also credit transfers cannot be made independent from time and place. The problem with cash is that many do not carry any cash with them anymore. Also there is the problem of exact change and spare money.

Rq2: What kind of P2P payment situations do Finnish consumers currently have?

By far the most use situations study participants mentioned in this research were sharing bills and costs. This were for example sharing restaurant bills, taxi, groceries or a shared gift. Most of these types of situations were under EUR 50. Typically even under EUR 20. Second most common scenarios were purchases (EUR 20 – 200) and small cash loans (less than EUR 20).

Rq3: What are end-users' expectations and wishes for a new mobile P2P payment service?

Most of the study participants mentioned that they are interested using their mobile phones for P2P payments. Most were also satisfied with current P2B payment methods and thus considered mobile P2P payments more interesting than mobile P2B payments. It suggested that mobile P2P payment service for early adopters is feasible. Study participants expect their P2P payment to be easy and fast to use. They want a P2P

payment method that can be used anywhere at anytime. The mobile P2P payment service should also be compatible with consumers' current payment methods. Participants wished to use their current bank accounts as basis for payments. This also makes mobile P2P payments more widely applicable, which is extremely important. Security was also seen a significant factor affecting the intention to use mobile P2P payments. Thus it is suggested that also the perceived security of a mobile P2P payment service should be addressed.

Mobile phones could work nicely as a payment instrument because they are almost always carried with. Mobile phones can also provide other relative advantages compared to the current methods. For example the ability to make payment requests, receive confirmation for all transactions, set a transaction limit, pay the exact amount and save all transactions for personal recordkeeping were considered to be important. Almost half of the study participants were not willing to pay anything for a mobile P2P payment service. However those who were willing to pay mentioned that they would rather pay a small amount for every payment (e.g. a price of an SMS) or a single one-time payment for the whole service.

6.2 Review of the hypothesis

This research started with a hypothesis that mobile P2P payments followed by mobile P2B payments will be the next steps towards a more cashless society. This hypothesis is supported by the results of this study and also other studies. This thesis and other research indicate that Finnish consumers are satisfied with current cashless P2B payment methods (i.e. debit and credit card). Therefore, there is no actual need or interest towards a new cashless P2B payment method (e.g. mobile P2B payments). However, the results of this study indicate that there is a clear interest and belief towards mobile P2P payments – much greater than towards mobile P2B payments. Currently, Finnish consumers lack a solution for P2P payments that can be made instantly, independent from time and place. Mobile phones can be seen as a viable option to be utilized for P2P payments. Mobile phones already have all the necessities from the technological perspective. Also, mobile phones are almost always carried with.

The wide adoption of mobile P2P payments can act as a push factor for mobile P2B payments. As presented in the related research around mobile payment acceptance,

there are several factors that affect the intention to use mobile payments. If mobile P2P payments would be widely used, this would positively affect several factors in the mobile payment acceptance model (i.e. perceived compatibility, wide applicability and mobile payment knowledge). These factors would further affect intention to use mobile P2B payments.

Perceived compatibility: Consumers are more likely to adapt a new payment solution if it is already compatible with their own skills, currently utilized technology and payment behaviors.

Wide applicability: Consumers are more likely to adapt a new payment solution if the payment method (i.e. mobile payments) is applicable in various different situations.

Mobile payment knowledge: The usage of mobile P2P payments would positively affect mobile payment knowledge. Consumers with greater mobile payment knowledge are more likely to start using mobile payments (in this case mobile P2B payments).

6.3 Summary and recommendations

This chapter presents a summary of the results and gives recommendations for a new mobile P2P payment service. The recommendations are given from the users' perspective. These are based on what is important for the actual end-users of the service. This chapter also addresses what influences consumers' intention to start using a new mobile P2P payment service.

The current methods for P2P payments could potentially slow the growth of mobile P2P payments. Basically there is no actual need for a new P2P payment method. P2P payments can already be made using credit transfers or cash. Both methods are relatively easy to use and are basically free to use. However these methods have clear shortcomings. The study participants were also well aware of these shortcomings. However these weaknesses can be addressed with the use of mobile phones as P2P payment instruments. Mobile phones are almost always carried with and they can be used basically at any time and almost everywhere in Finland. Mobile phones also have the required technology already available.

Table 5 presents the factors that should be taken into account when designing mobile P2P payment service in Finland. These factors present the wishes and expectations of the study participants towards P2P payments, the functionality and features of a mobile P2P payment service and other recommendations based on the results of this study.

Table 5 Factors to be considered when designing mobile P2P payment service

Users' expectations and wishes
• The service should be easy to use • Payments should be able to make fast, with only in few steps. • Payments should be able to make instantly, regardless of time and place. • The service should be able to be used for proximity and remote payments. • The service should be compatible with existing methods. • P2P payments for less than EUR 50 are adequate for most situations. • The service should be inexpensive to use - preferably free to use or price of an SMS (e.g. EUR 0.10) per payment or single payment (e.g. EUR 5)
Functionality
• Mobile P2P payments should use user's existing bank account as basis for payments. If user has several accounts the user should be able to choose a default account that is most commonly used. • The payee should be identified using the payee's bank account number. The service users should also be able to use their mobile phone numbers for this. • Users should be able to save contacts (i.e. payees) that they pay most often. • The service should be used as an installed application in the mobile phone. • The service should ask a password for each transaction. Users should be able to use a simple four-digit PIN-code as a password as well. • Users should be able to make payment requests to other persons. • Users should be able to include additional information (i.e. a message) for each payment.

Other recommendations based on results

- Both the payer and the payee should receive confirmation that the payment was successful.
- The service should save all transactions for recordkeeping. This should at least include information of the payment amount, date, information about the payee/payer and the optional message included in the payment.
- Users should be able to determine a transaction limit for P2P payments.
- The service should state and confirm clearly that the service is secure to use. The technical security solutions should be specified openly.
- Bank(s) should be involved visibly in this service, especially if an unknown vendor will provide the service.
- In order to enhance security the service should be able to use only with a certain mobile phone(s). I.e. a ‘what you have’ type of security solution.

7 Discussion

This chapter discusses how this study went overall – what went as planned and what did not and what could have been done differently. Chapter 7.1 provides suggestions for further research development in this field. Chapter 7.2 discusses the validity of this study.

At the beginning of this thesis the goal and aim was a bit different. Initially the purpose was to construct a concept and a low-fidelity prototype of a new mobile P2P payment service. This goal affected somewhat for some of the questions asked in the interview and survey.

As mentioned in the introduction there has been a lot of discussion and studies made about mobile payments. At first it seemed that there were almost too much information. Thus it was difficult at the beginning to keep the scope strictly in just mobile P2P payments and from the users' point-of-view.

Overall the research went as planned. The interview worked nicely and it was relatively easy to conduct the survey based on the interview. It was a challenge to give the interviewees and the survey participants a clear and similar picture of what mobile P2P payments are. Naturally this was easier to do during the interview. However basically all of the results, (excluding one question), were very similar in both, the interview and the survey. This suggests that also the survey participants did comprehend mobile P2P payments relatively well.

Even though by far most of the P2P payment situations were between friends or family members, half of the survey respondents mentioned that payments allowed for only these persons would not be sufficient. Study participants may have had difficulties imagining how payment for just people they know (e.g. friends and family) would work in practice. How and who decides who is their friend or some other trusted person and who is not? Study participants may have also felt that service that would allow payments to be made only for certain predefined persons would not be as flexible.

All of the larger payments (i.e. more than EUR 50) were mentioned as single situations. In contrast, many of the smaller payments (i.e. less than EUR 50) were mentioned as

situations that occur often. This implies that the amount of smaller payments is actually higher than mentioned in the results of this study.

7.1 Further development

In terms of study participants this research represented only one group of users – under 30-year old tech savvy users. According to prior studies, these users are most likely to change their payment behaviors and adapt using mobile payments. Amongst these users there is a clear interest towards mobile P2P payments. Thus it is suggested that further research would be made in this field regarding other user groups as well. This means users from all age groups with different technological capabilities.

Before implementing a new mobile P2P payment service for the Finnish consumers, it is suggested that some concepts and prototypes would be made. The potential end-users (Finnish consumers) of the service should be involved in the design process of the concepts and prototypes. Considering how important perceived ease-of-use and transaction speed were considered by the study participants in this research, it is suggested that usability testing of the service would be included as well.

Technology acceptance model (TAM) is widely used to study the factors influencing the intention to use mobile payments. However mobile phones today have become everyday devices for everyone regardless of for example age, education, income level and technological knowledge. Mobile phones have become a part of consumers' lifestyle. Thus it is suggested that use of technology acceptance model (TAM) should also be studied further for mobile phone usage.

Mobile payments can offer some very interesting possibilities for small merchants (i.e. small entrepreneurs) as well. This way the merchant would not have to invest on expensive payment terminals that are used with debit and credit cards.

Near field communication (NFC) technology is seen as an interesting technology for mobile proximity payments. This technology could be used for P2P payments as well. NFC technology provides interesting possibilities for private consumers as well as merchants.

7.2 Validity and reliability

The user group studied in this research was deliberately limited to cover Finnish consumers that, based on the previous studies, are most likely to change their payment behaviors. The study participants were from 19 to 30 years of age. The survey participants all had a technological study background. The user sample of this study only represents a small proportion of the Finnish population, and thus the results cannot be generalized to a great extent.

The P2P payment situations and scenarios mentioned by the study participants do not represent all of the P2P payments that they had during the past year. This is because the study participants only mentioned payments situations that came to their mind during the survey or interview.

The online survey included two sets of questions that were related to two different researches. For half of the survey respondents questions related to this study were presented first and for the other half questions related to another study were presented first. The other part of the survey included questions about perceived security. Thus, survey respondents that answered these questions first may have been more security-oriented while answering the questions about mobile P2P payments.

Almost all of the results were statistically significant. Also most of the results found in this study were very similar to other studies made in this field of research. These two factors can be considered to raise the credibility of the results found in this research.

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Appendix A - Interview questions and structure

Alkuperäiset haastattelukysymykset omista muistiinpanoista:	**Interview questions translated from Finnish in to English**
Ikä; Sukupuoli; Koulutus; Nykyinen puhelin; Netin käyttö kännykällä; Ohjelmat (0-2, 3-5, 6-10, 10->)	Age; Gender; Education; Current mobile phone; Mobile Internet usage (how often); How many applications do you have installed in your mobile phone?
Miten siirrät/maksat rahaa muille ihmisille? (Siirrät / maksat / lainaat / annat)	How do you usually pay or transfer money to other private persons?
Millaisia tilanteita nämä ovat?	What kind of situations are these?
Miksi olet siirtänyt ylipäätänsä? Entä miksi juuri sillä keinolla?	Why have you had to pay or transfer money (P2P)? Why have you used the specific method then?
Mitä hyvää/huonoa kyseisessä nykyisessä keinossa on ollut?	What pros and cons do you see with the current method(s) used for P2P payments?
Kumpia useammin: remote vai proximity? (millon tarve tulee) • Kaverit, perhe • Ei tutut yksityishenkilöt (esim. kirpputori)	Which typed of situations are more common: remote or proximity payments (when the actual need occurs)? • Friends and family • Unfamiliar persons (e.g. flea market)

Luuletko, että siirtäisit rahaa useammin muille ihmisille, jos se olisi helpompaa?	Do you believe to make more P2P payments if it were easier?
Oletko koskaan maksanut matkapuhelimella mitään? • Logot, soittoäänet ja ohjelmat? K/E • Matkalippuja: bussi, raitiovaunu? • Fyysiset tuotteet, kuten limut tms? • Muuta?	Have you ever used your mobile phone to buy anything? • Logos, ringtones and applications? • Travel ticket: bus, tram etc? • Physical products such as soft drinks (i.e. vending machine) • Anything else?
Siirrätkö rahaa verkkopankissa muille ihmisille (ei yritys)? Ei koskaan, kerran kuussa, kerran viikossa, päivittäin?	How often do you pay or transfer money to other private persons using online bank? Never, once a month, once a week, everyday?
Käytätkö verkkopankkia kännykällä? Ei koskaan, kokeillut, kerran kuussa, viikossa, päivittäin?	Do you use online bank with your mobile phone? Never, once a month, once a week, everyday?
Käytätkö jotain verkkomaksamiseen tarkoitettua palvelua: PayPal, Google Checkout…? Millaisiin käyttötarkoituksiin olet sitä käyttänyt?	Do you use any service for transferring money online? Such as PayPal, Google Checkout…? For what kind of purposes have you used these?
Haastateltaville esitetään videot tässä välissä	**Interviewees were presented three videos at this point**
P2P-maksaminen kännykällä. Oletko	Mobile P2P payments. Are you interested

kiinnostunut maksamaan / siirtämään rahaa toisille ihmisille kännykällä?	paying / transferring money to others using a mobile phone?
Millaisia tilanteita sinulla voisi olla m-P2P-maksuille?	What kind of use situations do you think you might have for mobile P2P payments?
Kuinka joustava m-P2P palvelun tulisi olla? Riittääkö alle 20 / 50 / 100 euron siirrot vai pitäisikö pystyä siirtämään suurempia summia? Pitääkö rahan siirtyä heti vai onko parin päivän viive liikaa? Riittääkö rahan siirto vain tutuille? Riittääkkö maksut vain Suomessa / ulkomailla?	How flexible should a mobile P2P service be? Is a transfer limit of EUR 20 / 50 / 100 sufficient? Does the money have to be transferred immediately or is a delay of few days too much? Would only “friend payments” be sufficient? Used only in Finland or everywhere?
Mistä rahat otetaan? Minne laitetaan? • Oma pankkitili, luottokortti, mobiiliraha, erillinen e-tili, puhelinlasku, muu? • Tutut ja ei-tutut. Suomessa / ulkomailla. • Vaikuttaako siirrettävä rahasumma valintaan? • Pitäisikö maksutapa pystyä valitsemaan?	Basis for payments and incoming money • Current bank account, credit card, mobile money, separate e-account, phone bill, other? • Does it matter if the payment is made for familiar persons or unfamiliar. What about if the payment is made in Finland or abroad? • Does the amount transferred affect the choice? • Should you be able to choose the payment method for each

	payment?
Miten käyttäjät haluaisivat ottaa palvelun käyttöön?	How would you like to take the service in to use?
Mitä muita ominaisuuksia palvelussa tulisi olla? Riittääkö pelkkä P2P-maksaminen vai pitäisikö sen tukea muutakin?	What other features should the service have? Are just P2P payments enough?
Erikseen ladattava ohjelma kännykkään, SMS…? Mitä eri tavoissa on hyvää / huonoa?	Should the service be used as an installed application, SMS, browser…? What is good with each method?
Mitä käytetään maksunsaajan tunnisteena: tilinumero, puhelinnumero, sähköposti, muu? Tallennetaanko mahdolliset maksunsaajat etukäteen palveluun?	What would you like to use for payee identification: bank account number, phone number, e-mail, other? Do you wish to save possible payees to your phone?
Ainoat pakolliset kentät: maksunsaaj a (ei tarvita, jos NFC) + siirrettävä summa. Mitä muuta? Kommentit (viesti, maksunsyy) = vapaasti kirjoitettava Valmiita ”pohjia”. ESIM: “taksimatka, ravintolalasku” ¬|¬ “laina, lainan takaisinmaksu“	The only required information for payments are the amount paid and payee. What else would you like to have there? Comments (message, purpose of the payment) = open field Do you wish to have ready made “payment reasons” such as “Taxi ride, restaurant bill” – “loan”
Haluatko mahdollisuuden maksaa	Do you want to pay anonymously as well?

anonyymisti (esim. kirpputorilla)?	
Haluatko, että palvelu tallentaa jokaisen transaktion puhelimeen? • Voidaan tarkistaa myöhemmin, onko maksu tehty. • Entä, mihin tiedot tallentuu, jos maksetaan tekstiviestillä?	Do you want every transaction to be recorded and archived to you mobile phone? • Ability check later that the payment was made • Where do you want to save this information if you pay with SMS-based service?
Pitääkö palvelulla voida tehdä myös ”lasku”: ”Lahjamaksu, 10€. Maksa”	Do you want to make payment requests as well? “Payment for the gift, 10€. Pay”
Turvallisuus: • Rahasumman rajoitus per transaktio? • Rahasumman rajoitus per aikaväli (päivässä, kuukaudessa)? • Rahan siirtäminen vain tietyille ennalta luotetuille henkilöille? • Pitääkö rahaa siirtää vain omalla puhelimella?	Security: • Transfer limit for each transaction? • Transfer limit for a certain time period (in one day, monthly)? • Payments only for people who you trust? • Should payments be allowed with just your own mobile phone?
PIN-koodi vs. salasana vs. koodilista?	PIN-code vs. password vs. OTP (code list)?
Autentikoidaanko vain alussa kerran vai jokaisen transaction yhteydessä?	Do you wish to authenticate only in the beginning or during each transaction?

Varmistusviesti. “Oletko varma, että haluat tehdä seuraavan rahasiirron?”	Confirmation. “Are you sure you wish to make the following payment?”
Pitääkö rahaa pystyä siirtämään myös ulkomaille? Entä ulkomailla (tuttu vs. kirpputori)?	Should you be able to send money abroad also? What about sending money while you are abroad (familiar vs. flea market)?
Olisitko valmis maksamaan palvelusta? Mieluisin tapa: per transaktio (maksu / saanti), kuukausittainen, yksi maksu, muu?	Would you be willing to pay for the service? Preferred method: per transaction (for payment or receiving, monthly payment, single payment, other?
Kumpi on tärkeämpi: mobiilimaksaminen kaupassa vai m-P2P?	Which one do you consider to be more interesting: mobile payments in shops or mobile P2P payments?
Haastattelun jälkeen haastateltavia pyydettiin lähettämään sähköpostitse:	**After the interview, interviewees were asked to send via email:**
Ohjeet käyttötilanteiden kirjaamista varten. Mieti seuraavan viikon / kahden aikana, millaisia P2P-maksutilanteita sinulla on ja on ollut joskus. Miten hoitanut olet hoitanut maksamisen näissä tilanteissa? Luuletko, että olisit voinut näissä tilanteissa maksaa kännykällä, jos se olisi ollut mahdollista?	Instruction for typing the P2P payment situations. During the next week or two think what kind of P2P payment situations do you have and have had. How have you handled the payment in these situations? Do you believe that you could have paid using a mobile phone if it were made possible? Who did you pay: familiar, unfamiliar

Kelle maksettiin: tuttu, tuntematon	How much: 0-5, 5-20, 20-50, 50->
Kuinka paljon: 0-5, 5-20, 20-50, 50->	Could you have paid using cash
Olisiko maksun voinut suorittaa käteisellä	

Appendix B - E-mail sent to the interviewees

Hei!

ja kiitos vielä kerran haastattelusta. Lupasin lähettää vielä postia liittyen henkilöltä henkilöltä maksamiseen, joten tässä tulee:

Mieti seuraavan viikon / kahden aikana, millaisia P2P-maksutilanteita sinulla on ja on ollut noin viimeisen vuoden aikana. Miten hoitanut olet hoitanut maksamisen näissä tilanteissa? Luuletko, että olisit voinut näissä tilanteissa maksaa kännykällä, jos se olisi ollut mahdollista?

Maksun syy?

Kenelle maksettiin: tuttu vai tuntematon?

Kuinka paljon maksoit suunnilleen: 0-5€, 5-20€, 20-50€, 50-100€, 100€-> ?

Olisiko maksun voinut suorittaa käteisellä? Eli olitteko samassa paikassa, kun maksamistarve tuli?

Ystävällisin terveisin,

Tapio Haanperä

 # Puhelinnumero #

Hi!

And thank you once again for the interview. I promised to send you e-mail concerning person-to-person payment, so here goes:

During the next week or two think what kind of P2P payment situations you have and have had during the past year. How have you handled the payment in these situations? Do you believe you could have used you mobile phone in these situations to pay if it was made possible?

Reason for payment?

Who did you pay: familiar or unfamiliar?

How much approximately: 0-5€, 5-20€, 20-50€, 50-100€, 100€-> ?

Could you have paid with cash? Where you at the same place when the payment need occurred?

Best regards,

Tapio Haanperä

 # Phone number #

Appendix C - Survey questions

Alkuperäiset kyselykysymykset:	**Survey questions translated from Finnish in to English**
* Pakollinen	* Required
Opiskelijanumero * *HUOM! Tätä tietoa käytetään ainoastaan suorituksen kirjaamiseen, eikä sitä yhdistetä vastauksiisi mitenkään.*	**Student number *** *Note! This information is only used to mark the survey completion. It is not used with your answers in any way.*
Sukupuoli * • Mies • Nainen	**Gender *** • Male • Female
Ikä * • -18 – 35-	**Age *** • -18 – 35-
Koulutusohjelma * • Tik • Inf • Tlt • Other:	**Study programme *** • Computer science • Information networks • Communications engineering • Other

Opintojesi vaihe * • Kandivaiheen opinnot • Maisterivaiheen opinnot	**Stage of your studies *** • Bachelor's level • Master’s level
Omistatko älypuhelimen? * • Kyllä • En	**Do you own a smartphone? *** • Yes • No
Oletko ladannut kännykkääsi sovelluksia? * • Kyllä • En	**Have you installed applications to you mobile phone? *** • Yes • No
Kuinka usein käytät Internetiä matkapuhelimellasi? * • Päivittäin • Muutaman kerran viikossa • Muutaman kerran kuukaudessa • Harvemmin • En koskaan	**How often do you use Internet with your mobile phone? *** • Every day • Couple times a week • Couple times a month • Less frequently • Never

Henkilöltä henkilölle maksaminen matkapuhelimella	Person-to-person payments using a mobile phone
Tämän osion tarkoituksena on kartoittaa, millä tavalla suomalaiset haluaisivat hoitaa henkilöltä henkilölle maksamisen matkapuhelimella. Henkilöltä henkilölle maksamisella tarkoitetaan kahden yksityishenkilön välistä rahan siirtoa. Kyseessä voi olla esimerkiksi maksutapahtuma, rahan siirto, rahan lainaaminen tai rahan antaminen. Perinteisiä maksutilanteita saattavat olla esimerkiksi ravintola- tai kauppalaskun jakaminen yhdessä kavereiden kanssa, yhteisen lahjan ostaminen työkollegalle sekä kirpputorilta tai nettihuutokaupasta tavaran ostaminen.	The purpose of this section is to find out how Finnish consumers would like to handle person-to-person payments using a mobile phone. Person-to-person payment in this context means money transfers between two private persons. This can be for example a purchase, money transfer, money loaning or giving money. Common payment situations can be for example sharing a restaurant or a grocery bill with friends, buying a shared present to a work colleague and buying items from a flea market or an online auction.
1. Millä tavalla yleensä maksat tai siirrät rahaa tuntemillesi henkilöille (esim. kaverit tai perheenjäsenet)? * • Tilisiirtona (pankkitili) • Käteisellä • Other:	**1. How do you typically transfer money to persons you know (e.g. friends and family members)? *** • Credit transfer • Cash • Other:
2. Millä tavalla yleensä maksat tai siirrät rahaa sellaisille yksityishenkilöille, joita et tunne? * • Tilisiirtona (pankkitili) • Käteisellä	**2. How do you typically pay or transfer money to persons you don’t know? *** • Credit transfer • Cash

• Other:	• Other
3. Miksi käytät edellisissä vastauksissa ilmoittamiasi tapoja hoitaa henkilöltä henkilölle maksuja? * *Mitä hyvää ja mitä huonoa?*	**3. Why do you use the methods mentioned in the previous questions? *** *What are the pros and the cons?*
4. Kuinka usein suunnilleen maksat tai siirrät rahaa tuntemillesi yksityishenkilölle? * *Esimerkiksi kaverit ja perheenjäsenet* • Päivittäin • Viikottain • Kuukausittain • Arviolta joka toinen kuukausi • Muutamia kertoja vuodessa • Harvemmin tai en koskaan	**4. How often do you approximately pay or transfer money to private persons you know? *** *For example friends and family members* • Every day • Weekly • Monthly • Every other month • Few times a year • Less frequently or never
5. Kuinka usein suunnilleen maksat tai siirrät rahaa sellaisille yksityishenkilöille, joita et tunne? * *Esimerkiksi kirpputorimyyjät tai ostettaessa verkkohuutokaupasta* • Päivittäin • Viikottain • Kuukausittain • Arviolta joka toinen kuukausi • Muutamia kertoja vuodessa • Harvemmin tai en koskaan	**5. How often do you approximately pay or transfer money to private persons you do not know? *** *For example at a flea market or when buying from an online auction* • Every day • Weekly • Monthly • Every other month • Few times a year • Less frequently or never

6. Tekisitkö henkilöltä henkilölle välisiä maksuja tai rahan siirtoja useammin, jos se olisi helpompaa (esimerkiksi pikkusummissa)? Millaisia? *	**6. Would you make more person-to-person payments / money transfers if it were made easier (e.g. in small payments)? What kind?**
7. Mitä seuraavista olet viimeisen vuoden aikana ostanut / maksanut matkapuhelimellasi? * • Digitaalista sisältöä puhelimeen (esim. soittoäänet, sovellukset) • Matkalippuja (esim. raitiovaunu, linja-auto) • Fyysisiä tuotteita (esim. virvoitusjuomat automaatista) • Other:	**7. What of the following have you bought / paid using your mobile phone? *** • Digital content to your phone (e.g. ringtones, applications) • Travel tickets (esim. tram, bus) • Physical products (e.g. soft drinks from a vending machine) • Other:
8. Kuinka usein käytät verkkopankkia matkapuhelimellasi? * • Päivittäin • Viikottain • Kuukausittain • Muutamia kertoja vuodessa • Olen kokeillut • En koskaan	**8. How often do you use online bank with your mobile phone? *** • Every day • Weekly • Monthly • Few times a year • I have tried • Never
9. Käytätkö jotain henkilöltä henkilölle maksamiseen tarkoitettua palvelua matkapuhelimellasi? Jos vastasit kyllä, niin mitä palvelua käytät? *	**9. Do you use some person-to-person payment service with your mobile phone? What? ***

10. Jos voisit hoitaa henkilöltä henkilölle väliset maksut matkapuhelimella, riittäisikö sinulle EUR 50 siirtoraja per transaktio? * • Haluaisin pienemmän siirtorajan (alle EUR 50) • EUR 50 on sopiva siirtoraja • Haluaisin suuremman siirtorajan (yli EUR 50)	**10. If you make person-to-person payments with your mobile phone, would a transfer limit of EUR 50 be sufficient? *** • I'd prefer a smaller transfer limit (less than EUR 50) • EUR 50 is adequate • I'd want a larger transfer limit (more than EUR 50)
11. Riittäisikö sinulle, että voit tehdä maksuja matkapuhelimella vain tuntemillesi henkilöille (kaverit, perheenjäsenet)? * *Tarkoittaen, että et voisi tehdä maksuja tuntemattomille esimerkiksi kirpputorilla tai nettihuutokaupassa.* • Kyllä • Ei	**11. Would it be sufficient if you could make mobile person-to-person payments to only persons you know (friends, family member)? *** *This means that you would not be able to make payments for example in a flea market or at an online auction.* • Yes • No
12. Tehdessäsi maksuja matkapuhelimella käyttäisitkö tunnistautumisvaiheessa mieluummin * • PIN-koodin tapaista lyhyttä 4-5 numeroista salasanaa • "vahvempaa" noin 8-10 – kirjaimista salasanaa • Other:	**12. How would you like to authenticate to make mobile person-to-person payments? *** • PIN-code like (4-5 numbers) • "Stronger" password (8-10 characters) • Other:

13. Tehdessäsi henkilöltä henkilölle maksuja matkapuhelimella, mistä haluaisit, että maksut veloitetaan? *	**13. What would you like to use as the basis for mobile person-to-person payments? ***
• Pankkitili • Luottokortti • Puhelinlasku • Uudenlainen tili, pelkästään henkilöltä henkilölle välisiä maksuja varten • Elektroninen raha matkapuhelimessa (vrt. matkakortin arvoon) • Other:	• Bank account • Credit card • Phone bill • New account for only person-to-person payments • Electronic money (cf. credit in a Travel Card) • Other:
14. Mitä seuraavista haluaisit käyttää maksunsaajan tunnisteena? *	**14. Which of the following would you like to use to identify the payee? ***
• Tilinumeron kaltaista numerosarjaa • Puhelinnumeroa • Sähköpostiosoitetta • Henkilötunnusta • Other:	• Number sequence (like bank account number) • Phone number • E-mail address • Identity number • Other:

15. Haluaisitko tehdä myös maksupyyntöjä toisille yksityishenkilöille? *	**15. Would you like to be able to make payment requests to other person as well? ***
Esim. "Maksaisitko minulle 14 € viime lauantain taksimatkastamme."	*E.g. "Please, pay me 14 € for the taxi trip from last Saturday."*
• En käyttäisi palvelua ilman tätä ominaisuutta • Ominaisuus olisi minulle hyvin tärkeä • Ominaisuus olisi kohtalaisen tärkeä • Ominaisuus ei olisi kovin tärkeä • Ominaisuus ei olisi lainkaan tärkeä • En tarvitsisi tätä ominaisuutta lainkaan	• I wouldn't use the service without this feature • This feature would be very important for me • This feature would be somewhat important • This feature is not very important • This feature is no important at all • I wouldn't need this feature
16. Olisitko valmis maksamaan tällaisesta henkilöltä henkilölle välisestä maksupalvelusta? *	**16. Would you be willing to pay for a mobile person-to-person payment service? ***
• Voisin maksaa jokaisesta tekemästäni transaktiosta pienen, esimerkiksi tekstiviestin hintaisen summan • Voisin maksaa jokaisesta tekemästäni transaktiosta prosentuaalisen (esim. 1-2 %) osuuden kokonaissummasta • Olisin valmis maksamaan kuukausimaksua palvelusta • Olisin valmis maksamaan kertamaksun palvelun	• I could pay for each transaction a small fee, for example the amount of a text message • I could pay for each transaction a percentual fee (e.g. 1-2 % of the total payment amount • I would be willing to pay a monthly fee • I would be willing to pay a single payment when the service is taken in to use • I wouldn't pay anything

käyttöönoton yhteydessä • En olisi valmis maksamaan palvelusta mitään	
17. Uskotko hoitavasi henkilöltä henkilölle välisiä maksuja matkapuhelimella viiden vuoden päästä? * • 1: En usko lainkaan – 6: Uskon vahvasti	**17. Do you believe to be using your mobile phone for person-to-person payments in five years time? *** • 1: I don't believe at all – 6: I strongly believe
18. Uskotko käyttäväsi matkapuhelinta maksuvälineenä kaupoissa viiden vuoden päästä? * • 1: En usko lainkaan – 6: Uskon vahvasti	**18. Do you believe to be using your mobile phone as a payment instrument in shops in five years time? *** • 1: I don't believe at all – 6: I strongly believe
19. Haluaisitko mahdollisuuden maksaa henkilöltä henkilölle välisiä maksuja myös anonyymisti siten, ettei maksunsaaja saa tietää henkilöllisyyttäsi? * *Tällä hetkellä tämä on mahdollista käteisellä olettaen, että maksunsaaja ei tunnista sinua.* • En käyttäisi palvelua ilman tätä ominaisuutta • Ominaisuus olisi minulle hyvin tärkeä • Ominaisuus olisi kohtalaisen tärkeä	**19. Would you like to pay person-to-person payments also anonymously, so that the payee would not know your identity? *** *Currently this is possible with cash assuming that the payee does not recognize you.* • I wouldn't use the service without this feature • This feature would be very important for me • This feature would be somewhat important

• Ominaisuus ei olisi kovin tärkeä • Ominaisuus ei olisi lainkaan tärkeä • En tarvitsisi tätä ominaisuutta lainkaan	• This feature is not very important • This feature is no important at all • I wouldn't need this feature
20. Kumpi on tällä hetkellä sinulle tärkeämpi / kiinnostavampi? * • Matkapuhelimella maksaminen henkilöltä henkilölle • Matkapuhelimella maksaminen kaupassa	**20. Which one do you consider more important / interesting at the moment? *** • Mobile person-to-person payments • Mobile payments in shops
21. Perustele halutessasi vastaustasi edelliseen kysymykseen.	**21. If you want you can explain your answer to the previous question.**
22. Oletko kiinnostunut tekemään henkilöltä henkilöille välisiä maksuja matkapuhelimella? Miksi / miksi et? *	**Are you interested in mobile person-to-person payments? Why / why not?**
23. Anna vielä muutama esimerkki, millaisia henkilöltä henkilölle maksamistilanteita sinulla on ollut viimeisen vuoden aikana? Mikä oli maksun syy, kuinka paljon suunnilleen maksoit ja olisitko voinut suorittaa maksun kyseiselle henkilölle myös käteisellä (eli olitteko samassa paikassa, kun maksamistarve tuli)?	**23. Give a few examples what kind of person-to-person payment situations you have had during the past year. What was the reason for payment, how much did you pay approximately and could you have made the payment with cash as well (i.e. where you at the same location when the payment need occurred)?**