MASTER THESIS

Aspects to consider when introducing Mobile Payment

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1. Abstract

There have been many attempts over the last 20 years to introduce Mobile Payment, as a replacement where we physically use payment cards or cash, but no product has yet been a success.

All these attempts have cost a lot of effort and resource, some have been cancelled. With our research, we want to see if we can get some answers that could make the introduction of NFC based Mobile Payment by other Banks and Finical Institutions to Consumers more successful when it comes to getting Consumers to adopt the technology.

We interviewed five respondents from four Bank/Financial Institutions that had introduced such products to its cardholders, to learn from their experience in the process.

We found that the focus had not been to give the Consumers a product that was better then what they currently were using and that these products were complex to install and start using. Introducing NFC Mobile Payment must be easier to install, faster to use, add value and be an advantage for the end-user.

2. Preface

This master Thesis and final paper marks the ending of our 3-year MBA program in Technology Management, Campus Helgeland at the Nord University in Norway. The program has been very exciting and inspiring. We have built networks and we have gained new "tools" in our professional life, as well as made new friends.

We would like to thank the following for their contribution to this Master thesis:

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The respondents of our interviews:

Karl-Richard Floer, Director of Cards and Payments at Eika Kredittbank AS

Kristian Luoma, Head of New Business Development at OP Financial Group

Tarje Melau Sørensen, Head of Business Development and Analytics at Eika Kredittbank AS

Joanna Erdman, Director, Card Business Development at w mBank S.A

Øystein Lysvik, General Manager Cards at SpareBank1 Gruppen AS

3. Summary

In this Paper, we start by introducing the reader to payment technology and mobile payment technology, to better understand and gain a platform of knowledge as we move into theory, method and analysis. Many companies have been working with Mobile payment for many years and there have been many attempts/projects. The industry is still highly focused on this, and other big companies are getting involved. We are intrigued to see why this has not been a success and will try to scratch into this in the light of innovation adoption theories.

We have tried to give an insight in different technologies and products as a basis/platform to understand the history of mobile payment in general.

We have focused our studies on NFC Mobile Payment, where the mobile emulates a contactless Payment Card, as this is industry standard for Contactless Payment and Mobile Payment. We have interviewed five respondents from four different Bank/Financial institutions that have introduced such products, in order to understand their challenges in getting users to adopt the product. We have used theories of innovation adoption to understand why these projects have failed to bring the product to a majority of the customers and contactless transactions.

4. Abbreviations and Terms list

NFC - Near Field Communication, contactless communication

POS – Point Of Sale, a payment terminal you find in shops, restaurants and other places

EMV – (short for Eurocard, Mastercard, VISA) a payment card industry standard

OEM Payment – Original Equipment Manufacture Payment is to describe Mobile Handset Manufacture moving into payment. ApplePay, SamsungPay, LG Pay among others.

MST – Magnetic Secure Transmission, wireless signal to emulate a magnetic stripe on a card

MNO – Mobile Network Operator

HVL – High Value Payment, term used for payment over 20£/€

LVP – Low Value Payment, term used for payment under 20£/€

P2P Payment – Person-to-Person Payment

BLE – Bluetooth low energy, contactless communication standard

HCE – Host Card Emulation

TSM – Trusted Service Manager

RFID – Radio Frequency Identification

HSM – Hardware Security Modules

SE – Secure Element

OTA – Over the Air

NOK – Norwegian Krone

CNP – Card Not Present

PFM – Personal Finance Management

Token – Sensitive data substituted with a non-sensitive equivalent

DMU – Decision making unit

5. Background

Mobile Payment is intended to replace the cards and function as a payment card. It is important to understand payment cards and their history and development. Including some of the different products and technologies that have been experimented with and have been used for mobile payment.

The founding of Diners Club in 1950 is probably the start of the payment card as we know it. It was a card made out of paper that could be used for payment at restaurants that accepted the Diners Club Card. It contained information about the cardholder, his/hers signature and an account number.

Image source: http://www.dinersclub.no/privat/kontakt-oss/om-diners-club/presse/

Later other payment cards were introduced such as MasterCard, VISA, American Express and more. The paper card was after a while produced in plastic to be more durable, and was embossed to be able to copy the card number in a mechanical card reader on to carbon paper, to make payment faster.

Illustration photo: Rolf Skogvold

The payment card was subsequently produced with a magnetic stripe to make it electronically readable so payments could be made even faster. Because this magnetic stripe is possible for fraudsters to copy relatively easily, the industry introduced a smartcard chip to the payment card which made it virtually impossible to copy the card. The Payment card then had 3 interfaces;the embossed card number, the magstripe and the chip. The POS (Point Of Sale) terminals were updated to read a magneticstripe and a chip.

Illustration photos: Rolf Skogvold

Another interface was then added: a contactless interface, where an antenna inside the card body was connected to the chip. These cards are also known as NFC (Near Field Communication) cards. The POS terminals were enabled to read the cards with a contactless reader and this contactless interface really made it interesting for mobile phone producers and the telecom industry to enter the world of payment cards. Everyone has a mobile phone and if the phones are equiped with an NFC antenne, it is possible start to issue virtual cards into mobilephones and cut down on the production and distrubution of plastic cards to the cardholders.

6. The Problem Statement and Research Questions

We have heard about the mobile taking over as means of payment, but very little when it comes to the place where most transactions (payments) are made; The POS at a store, gas station or restaurant (amongst others). We aim to explore why it is not common for Consumers to use the mobile phone as method of payment where we normally use card or cash, for instance at a cash register/POS terminal in a shop, vending machine or ticketing machine. There were several interesting aspects and we thought about different angles of researching why this particular use of the phone has not gained success. People use the phone more and more and the mobile keeps taking over more and more functions. We used to have a separate GPS, a separate camera and MP3 player. Now the phone does all that. The phone keeps track of our calendar, peoples birthdays our phone book and our need for social interaction. Seems logical then that the phone should start replacing the bankcards and cash. Especially since, we pay for things like games, music and travel with the mobile. So why then not pay for the groceries, gas or the restaurant bill? The banks wants us to pay with the

mobile, the mobile company too, as well as the phone producer's and an array of other powerful commercial forces. Cash and card is seemingly popular, one rarely hears people complaining about the hassle of paying with either. However, there are drawback of both means of payment, from the payer's point of view, the point of sale, and the banks and to some extent the government.

We could research from different angles; should we ask the public in general, should we look at prior research or maybe we should look at some actual services of mobile POS pay. Since we are interested in the technology behind, in adoption in general and we had access to relevant sources – We concluded that we wanted to base our research on actual attempts at getting people to paying with the mobile at POS. It was also relevant that we had strong reasons to believe people did not care so much about paying with the mobile, as many industry stakeholders would like to think. Therefore, we did not believe asking the public would give much interesting answers. We did look into the research, but found very little. Therefore, we narrowed it down to researching mobile pay at POS by looking at four actual solutions for that purpose.

One approach could have been to look at the functionality and user friendliness of the products in use. However, we knew already that getting the user started was a big issue. Therefore, we wanted to start with the technical view and the effort to getting potential users to try. From that, we looked at pros and cons on both technical issues and user experience issues in getting the user to try. We know getting people to try and making it successful is imperative to adoption, both for the end user and for the solution provider. It was natural for us to use adoption and Rogers as primary theoretical focus.

Arguably mobile pay at POS has not been adopted, even though it has been available for some time and there are, and have been, many attempts by companies that has the resources, will and the competence needed. What is slowing down adoption then? In addition, what could be done to accelerate adoption?

We needed to narrow the research down and could not research all aspects of adoption. Therefore, we tried to pick one research question grounded in the literature reviewed that points to specific factors. Secondly, we wanted a broader research question, also grounded in the literature review. Given the little amount of prior research on mobile pay at POS, in particular we accepted that other factors would be more important than those we initially assumed would be. This notion that many factors where uncertain led us to believe that we

should choose a very flexible method, which gave freedom to make changes underway. We were inspired by the advantages in case study as research design and method.

Based on reviewed literature we found strong indications that Relative advantage and Compatibility would be important to our research. Literature shows that these two factors are strongly linked to successful adoption. This led us to our first research question,

Our second research question is broader. Literature argues that adoption is a social process where potential adopters are influenced by people-to-people interaction, mass media and observations amongst others. Therefore, we wanted to know if social factors influenced adoption, positively or negatively. We had an open mind about what social factors this could be and how they would influence. We assume different factors influence different people indifferent ways. Media focus can led both to embracement and to rejection of a product. Practically we wanted to know more how success of mobile payment as an attractive alternative to cash and plastic cards largely depends on the ability to change people's behaviour and attitudes towards their established habits - more so than the objective benefits, features, costs, security and such. We believe that how the banks go about trying to influence the individual and collective behaviour specific to the payment situation and to the whole payment context will be most important to the success or failure of their mobile payment solutions.

We adjusted the research question several times as we adjusted theory and tuned our cases. We had an assumption that the banks ability to persuade the end user to adopt would be an important explanation. The idea was to look at how the banks had convinced their customer both from a technical standpoint and marketing standpoint. On issues like serviceability and security. This is reflected in the questionnaire we used the interviews. After concluding the interviews we got confirmation that persuasion phase is important, but that the banks had failed in that phase and that the end-user did not adopt at the planned rate. We were still focused on the persuasion phase, and what went wrong in this phase. We also wanted to go a step back and look if there where issues in the knowledge phase and the prior conditions of the end-user that could help explain the lack of adoption. That is why our research on social factors are concerned with factors prior to deciding or during the decision process, where the end users seem to pay little interest in the NFC Mobile Payment at POS option.

RQ1: Theory indicates that relative advantage and compatibility are the two factors that best explain successful adoption. Can they explain the success or lack of success of mobile pay at POS?

RQ2: Theory indicates that adoption is very much a social process. Are there social factors that can explain the success or lack of success of mobile pay?

7. Introduction to mobile payment

Mobile payment as a phenomenon
This introduction will give some insight to the history and background of mobile payment in general, as this is important to understand how mobile payment has evolved, matured and been on the agenda for many years. The payment industry, the mobile handset manufacturers, merchant and Mobile Network Operators among others have used great resources over the years to make mobile payment happen.

The idea of using the mobile phone as a payment instrument is not new. The first mobile payment was done in 1997 when Coca-Cola enabled soft drink vending machines in Helsinki, Finland to except payment via SMS.

Some historical milestones in Mobile Payment:

- In 1997 what is considered the first mobile payment was made in Finland where a Coca-Cola vending machine was able to accept payment from a mobile handset trough an SMS
- In late 2002 in South Korea the two largest mobile network operators, SK Telecom and KTF launched mobile payment through infrared technology
- In July 2004 Japan's largest Mobile Network Operator NTT DoCoMo launched mobile payment through their FeliCa, short for Felicity Card. FeliCa is RFID similar to NFC, and NFC devices are typically compatible with FeliCa systems
- In 2007 M-Pesa was launched in Kenya. It is a system that gives users the possibility to deposit, withdraw, and transfer money with a mobile device with SMS and PIN codes. It has since spread to other countries Tanzania, Afghanistan, South Africa, India and other countries and have millions of users.
- 2011 Google introduced Google Wallet with NFC payment
- October 2013 Google introduced Android v4.4 also known as KitKat with the support of Host Card Emulation (HCE). Where you in could emulate an NFC card.
- October 2014 Apple Pay was the launched in US.

Illustration photo: Rolf Skogvold

Since 1997 there have been many different projects with different services and versions of providing payment functionality through the mobile phone.

Projects have covered regions and countries; no solution has been available worldwide for all. This is because the party offering the mobile payment mechanism is either a bank or institution not covering the whole world, or because the acquiring bank or financial institution who is processing the mobile payment on behalf of a merchant (person who sells or buys goods) does not support the mechanism. Merchants also choose which payment mechanisms they offer their customers, as each payment method will cost money and is an expense for the merchant.

Mobile Payment with different technologies.

There are many solutions and technologies used for mobile payment, some more successful than others. All are interesting in the evolvement of mobile payment. We will share some details and give some examples.

One alternative is to use QR-Codes (Quick Response BarCodes) for mobile payment. It can be implemented in a mobile payment App where if you register a payment card in the App on your phone and at the POS terminal, you scan a barcode on a screen in the payment app and your card is charged for the goods you buy.
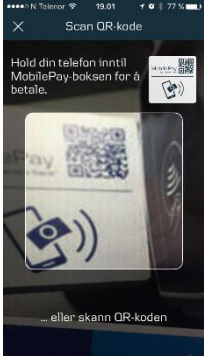
Illustration photo: Rolf Skogvold

SMS (Short Messaging Services) is also used for mobile payment. For instance, you send a text message/code to a vending machine enabled to accept payment by SMS and the payment is subsequently charged to you phone bill.

Illustration photo: Rolf Skogvold

Another alternative is to use Bluetooth/Beacon (Wireless radio communication standard for exchanging data) for Mobile payment. It can be done through an app you have installed on your smartphone, where you have registered a credit card that is charged when you read a Beacon/Bluetooth spot.

Illustration photo: Rolf Skogvold

What is probably considered the most standard mobile payment technology is NFC (Near Filed Communication, short-range radio communication) it is also the technology used by standard contactless EMV Cards. It can be implemented through an app or a wallet app on your phone provided by your bank/financial institution where you download virtual payment cards to the phone and the phone works as a contactless card.

Illustration photo: Rolf Skogvold

Another is Magnetic Secure Transmission (MST), where the phone transmits a signal to emulate a magnetic stripe from a card to the magnetic stripe reader of a POS (Point of Sale) terminal. This was the invention of a company called LoopPay and was acquired by Samsung in 2015 and is now their technology to be used with Samsung Pay.

Illustration photo: Rolf Skogvold

NFC

There are many reasons why NFC is considered the preferred technology for mobile payment, and there were different opinions in the industry as to whether NFC was the best alternative. The fact that a big player like Apple introduced mobile payment with NFC, more or less put a closing to that discussion and NFC is now considered the "Industry-Standard". NFC and RFID are both wireless technologies, the difference between them is mainly range and security. NFC is used at a shorter range and can be secured. RFID has a longer range but supports minimal security. NFC can be used for payment and RFID is used for more simple applications, such as tracking packages and goods.

The NFC Logo, which is found on equipment that has an NFC chip and supports NFC.

Some of the benefits of NFC technology:

- The usage is intuitive, and requires a simple touch.

- The technology is versatile and can be used for many different industries, environments and operations.

- NFC uses less energy compared to Bluetooth, which was an alternative to NFC for payment.

- Open and standards-based technology International Organization for Standardization (ISO), European Computer Manufacturers Association (ECMA), and European Telecommunications Standards Institute (ETSI) standards

- NCF can be used to enable other technologies for instance Bluetooth, Wi-Fi.

- NFC supports encryption and has built-in capabilities to support secure applications.

- NFC is interoperable and works with existing contactless card technologies.

- Works within short range, approximately 4 centimeters which makes it more challenging to tap into the communication.

NFC supports three modes of operation:

Card Emulation Mode

Card emulation mode enables NFC devices to act like smart cards, allowing users to perform transactions such as purchases, ticketing, and transit access control with just a touch.

<u>Peer-to-Peer Mode</u>

Peer-to-peer mode enables two NFC-enabled devices to communicate with each other to exchange information and share files, so that users of NFC-enabled devices can quickly share contact information and other files with a touch. For example, users can share Bluetooth or Wi-Fi link set-up parameters or exchange data such as virtual business cards or digital photos.

<u>Reader / Writer Mode</u>

Reader/writer mode enables NFC-enabled devices to read information stored on inexpensive NFC tags embedded in smart posters and displays, providing a great marketing tool for companies.

Some historical milestones for NFC mobile payment:

- 2002 Sony and Phillips joined forces and released NFC (Near Filed Communication), a new standard for RFID. NFC has since been the standard for proximity mobile payment. With the support of NFC a smart phone has the potential of doing a contactless payment towards a POS (Point Of Sales) terminal, in the same way as a contactless payment cards.

- 2005 Nokia Announces the World's First NFC Enabled Mobile Product for Contactless Payment and Ticketing NOKIA 6131

- In 2009 the city of Nice in France won government funding to become the 'city of reference' for a pre-commercial phase of NFC testing, involving local transport operators, mobile operators and banks.

- In Spain in 2010, CaixaBank launch Europe's first real-world mobile payments pilot in the Spanish town of Sitges.

- September 2011 Google launched Google Wallet with support for mobile payment through NFC.

- In October of 2012 Turkey's largest telecoms company Turkcell launched its Cep-T Para Wallet and with support for NFC-based payment

- Ocktober 2014 Apple launched iPhone 6 with Apple Pay, mobile payment through NFC.

Mobile Payment.

In the beginning of NFC Card Emulation Payments, credentials had to be securely stored in hardware called a SE (Secure element) to be safe. Later in 2014 HCE (Host Card Emulation) was embraced by the payment schemes as a secure method, the payment details is stored in a Cloud Based Server secured by HSM (Hardware Security Modules), a tamper proof secured hardware.

Secure element (SE) is an essential part of mobile payment. It is where the actual payment details are stored and protected. It can be compared to the Chip on a payment card. These details had to be secure hardware, it could be the SIM card (controlled and owned by the Mobile Network Operator), an Embedded chip in the mobile (controlled by the HandSet manufacturer) or a SD-Memory Card with a secure chip inside.
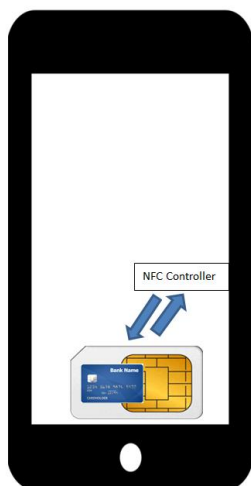
SIM Based Secure element   Embedded Secure Element

HCE (Host Card Emulation) was introduced by Android in October 2013, this opened functionality in the Android OS to store the payment details of the payment card in software in a Cloud Server instead of hardware. HCE adjusted the absolute previous requirement of storing the payment details in secure hardware, and in the beginning the industry in large and the payment schemes (VISA, MasterCard and others) considered the security insufficient in HCE, but in April 2014 both VISA and MasterCard opened for HCE for Mobile Payment solutions in their network.

Contactless terminals

Here are some VISA statistics on contactless cards and terminals (source

www.visaeurope.com, London, 6 July 2015):

Country	Cards supporting contactless	Terminals supporting contactless	Number of contactless transactions march 2015
UK	49.6 million cards	410,000 terminals	52.6 million
France	20.3 million cards	405,000 terminals	49.7 million
Poland	14.5 million cards	354,000 terminals	
Spain	11.5 million cards	593,000 terminals	

In Europe, there are approximately 131 million contactless cards and approximately 2.6

million terminals. By 2020 all terminals are to be contactless enabled.

It is difficult to get accurate numbers on how many contactless terminals there are in different

countries or a total figure. The above numbers are more than a year old, and we know there

has been a significant increase since then. A terminal with contactless interface is essential for

mobile NFC payment.

Contactless Payment

Our Mobile Phone or smart phone has adopted many technologies and today serves us

multiple purposes; Photo, video, gaming, GPS, Bluetooth, internet and multimedia among

others. Our Mobile Phones are not primarily used talking to each other; we use it for

entertainment, as a tool, and for and other forms of communication through social media. It

has been a goal for the mobile phone industry to include the service of payment.

Illustration: Rolf Skogvold

The introduction of contactless payment cards added contactless functionality to POS (Point Of Sales) terminal. The contactless functionality on POS can be used by smartphones with NFC to make contactless payments.

Originally, contactless payments were intended for paying small amounts and reduce handling of coins and small bills. You were to use the contact chip on your card for larger amounts and the contactless interface on your card for small amounts. Contactless payments were for amounts below 20€/£/$, a so called LVP (Low Value Payment), and could be conducted without using your PIN code. For HVP (High Value Payments) you would use contact interface with a PIN code.

As the smartphone could not be used as a contact payment object and at the time only supported LVP, mobile payment could not replace payment cards. HVP support was then added to contactless objects previously not able to perform contact payment, such as Smart Phones, Payment Stickers, Payment dongles/key rings, watches and other items.

Illustration photo: Morten Hagh

Some of these payment objects were considered "bridging technology", objects only in use until the smartphone could be considered a full replacement for the payment card. By making HVP available for all payment objects without contact interface, these products are now seen to co-exist with cards and smart phones.

8. Short introduction to Mobile Payment Solutions

M-PESA

M-PESA (Pesa means money in Swahili) it is considered by many the most successful mobile payment solution in the world. It started in Kenya in 2006 and offers payment and transfers via the mobile phone and SMS. 70 % of the households in Kenya did not have a bank account in 2006 when M-PESA was launched, so the solution made it easier to transfer money, hence it large success, with more than 37000 outlets, 15 million users and approx. 700 million USD in circulation a month.

MobilePay

MobilePay is a payment solution provided by Danske Bank and Nordea in Norway for customers with a norwegian bankaccount and a VISA or MasterCard. You download an app for Android, windows or IOS, and MobilePay can then be used for paying in a POS terminal using Bluetooth, QR or NFC. The NFC is not Card Emulation, it is "NFC read mode" where information read from a NFC tag. It is limited to merchants that offer this solution, such as REMA1000, Narvesen and 7-Eleven. It also has person-to-person money transfer functinality between norwegian bank accounts. By November 2016 there has been 300000 downloads of the app in Norway.

Illustration photo: Rolf Skogvold

mCASH

mCASH is a Norwegian Payment solution that through QR codes offers mobile payment using an Android or iOS app for customers paying in POS-Terminals. Customers must have a Norwegian bank account and a VISA or MasterCard. mCASH is limited to merchants that offer this solution such as Bunnpris, Burger King, G-Sport and Moods of Norway. 600 merchants and 100000 customers were using the solution when it in October 2015 was sold to SpareBank1. It also has functinality to be used by small businesses and volunter organisations for selling goods, lottery and services. It also has person-to-person money transfer functinality between norwegian bank accounts. mCASH has given rewards of 50 NOK to recruit customers. By November 2016, there were 440000 downloads of the app.

Vipps

Started out as a P2P Mobile Payment solution available for customers who have a Norwegian bank account in any Norwegian bank and a Norwegian VISA or MC card. By November 2016 there were more than 1.9 million downloads, with an average of 160 000 daily transactions and 55 million NOK transferred per day. Vipps has also introduced online payment in different Web Shops in Norway, payment on the Train (Flytoget) from Oslo to the main Airport in Norway (Gardermoen) where, based on BLE Beacon position, your ticket is automatically charged when entering the Train. There are also possibilities for Small Businesses, Sport Clubs and Organization to use it for purchases done at events and for invoicing. Vipps has been a huge success because it offers functionality that makes daily life easier for its users.

Illustration photo: Rolf Skogvold

ApplePay

ApplePay is a mobile payment service launched in October 2014 that works with iPhone 6, 6s, 6 Plus, 6s Plus, iPhone SE and iPhone 7. These phones contain a NFC controller and a secure element where the payment credentials are stored. It was first Launched in US, then later made available in UK, Canada China, Singapore and Australia.

In April 2016 ApplePay was available in more than 10 million contactless locations worldwide, and 2.5 million in US. The same month the Apple CEO revealed that the service is growing rapidly with 1 million new users per week.

To recruit customers ApplePay, in collaboration with MasterCard, offered customers free traveling with the tube in London when the service was introduced in the UK

Android Pay/Google Wallet

Android Pay/Google Wallet is a mobile payment service for Android Handsets with NFC capability. Originally launched in 2011 under the name Google Wallet the service was relaunched in 2015 and renamed Android Pay. The service is available in the US and the UK for cardholders that are customers of the participating banks.

Samsung Pay

NFC and MST payment in POS-Terminals. Available in US, South-Korea, Spain, and China. Samsung Pay had announced that they would launch in more countries and have high focus on expanding. To recruit customers Samsung Pay has offered rewards in the form of gift cards of 100$ to customers starting to using the service

IBM Pay

IBM announced in October 2016 that they will launch a Mobile Payment product. Few details are available, but it is interesting to see that so many big corporations consider mobile payment an important business.

Microsoft Wallet

Microsoft announced a Mobile Payment product in June 2016 starting in the US with some Microsoft Mobile Phones running Windows 10. Althought a newcomer to Mobile Payment, Microsoft is a huge technology supplier and will probably be a major contestant in the Mobile payment market. Few details are available on the solution yet.

9. Limitation of the research

It is customary to elaborate on the known limitations on one's own research. We want to give a more in-depth description of the limitations. We found a paper, Tornatzky, L.G., and Klein, K.J. (1982)", "Innovation characteristics and innovation adopUon-implementation" that criticized adoption research in particular, and that same text incorporated criticism from other researchers. This section is a good introduction to adoption research and it puts our research into context.

Tornatzky and Klein claims that a great shortcoming with the reviewed research was a lack of an agreed-upon paradigm for gathering evidence. Tornatzky and Klein referees to Kuhn (Kuhn 1962) who points to such consensus on method and approach as important when engaging in scientific work. Tornatzky and Klein proposes some ideal innovation attribute study design, as a «methodical and conceptual yardstick against which existing studies may be compared« (Tornaztky and Klein1982, P29). They suggest seven features that will collectively help researchers design research that can predict adoption and implementation. It is interesting to note that Tornatzky and Klein emphasizes prediction of implementation. We do not try to predict, but our paper is concerned with the future in a greater degree than much of the literature we have read. This long-time challenge might be present in adoption of mobile pay because many cardholders who try to adopt will abandon or decrease usage of mobile payment as time passes. We believe Tornatzky and Kleins features would be very useful for research in predicting adoption and implementation of mobile payments, but unfortunately we do not have the chance to make such a study due to our time constraints. However, our hope is that someone will undertake such a study in the future and use our paper as one of many background references. Given our knowledge about the «ideal» study, we do try to incorporate these tips into our paper to get as close as possible to our goal of accurately analyzing success criteria for mobile payment. Which ideally would incorporate some advice or predictions and some data on actual implementation. In addition, our analysis should ideally be based on data gathered over a longer period.

This next section is devoted to our own extract of Tornatzky and Kleins paper, where we include the parts we feel are most relevant to our paper. Much has been excluded because of limited space in our paper.

The meta-analysis consisted of 75 articles concerning innovation characteristics and their relationship to innovation adoption and implementation. The paper acknowledges the merits of past researchers Rodgers, Shoemaker and Rothman, but states that even though these are comprehensive researches, they lack in-depth analysis of the reviewed papers' methodological

and conceptual rigor. The toughest critics have been Downs and Mohr. They criticize past research for not paying attention to the distinction between primary and secondary attributes of innovation. We only analyze secondary attributes, which are closely linked to the adopter themselves and their subjective opinions.

Primary attributes are more factual and inherent to the innovation itself. Tornatzky and Klein criticizes Down and Mohr for downplaying the subjective factor in the primary attributes. Cost, as an example, is an attribute that turns from an objective number to something subjective when a given person evaluates the cost and its impact on the person's finances. To talk of the impact of cost and to say something is cheap or expensive is subjective. The same applies to the adopter's subjective reasoning about an innovation being worth the price. The secondary attributes are subject to different contexts and the personal differences off the adopter. Tornatzky and Klein claims Down and Mohr ignore the social science of psychology and the field of perception studies, which states that things argued as factual and objective in reality always will be subject to social influence. Tornatzky and Klein uses group conformity studies from Asch as an example. However Down and Mohr admit that most, if not all, attributes related to adoption of innovation turn out to be secondary. They go on to say that any given attribute is unlikely to have the same relationship to innovation, adoption and implementation across many different organizations. Tornatzky and Klein claims that perception is always evaluated in reference to some internalized system of values or cognitive framework. Fact then becomes subjective «fact». Compatibility probes further into the need for an adoption to be in line with the adopter's values, etc.

With individual adoption it might be even harder to construct typologies of innovation based on perceived characteristics. It is a point we take to heart since we look at the individual. It might be exponentially harder to find answers as the population in question grows larger. That is a methodical point, as we must presume our conclusions are most valid to cases that share similar characteristics; country of origin, sociocultural factors, demography and such. We must also keep in mind that much of the papers we read were based on organizational research, and some are based on research in countries where there may be cultural factors that influence. This is a potential limitation in our paper. We did have this in mind when choosing papers to be reviewed and believe the papers we have chosen are more relevant then others.

Tornatzky and Klein propose that better designed studies can investigate, if Down and Mohr's skepticism and notion that a unitary theory of innovation does not exist, is true. If instead such

ideal study design could show a fairly consistent relationship, then innovation attributes still have some use as an integrating concept.

We will briefly state the seven attributes that make out the ideal research design here.

1)   Prediction is first priority and this demands studies over a long period of time. Furthermore, retrospective studies are particularly suspect. Since many psychological factors happen once a decision has been made. Tornatzky and Klein refers to Festinger, who claims people tend to rationalize their decisions and feel more favorable about their choice once they have made it, and therefore retrospective studies can be distorted.

2)   Implementation should also be measured, not just adoption. To what degree an adoption is actually implemented, in the long run, can vary greatly across a set of people or organizations. «in this sense, adoption becomes an extremely insensitive measure of innovation» (Tornatzky and Klein P29, 1982) Implementation helps explain behavioral variations, making the research stronger than when just researching adoption\non-adoption.

3)   Quantitative methods are preferable; studies that are reliable, replicable and have some statistical power are recommended. Single-site qualitative case studies and theoretical pieces are not recommended.

4)   In short, this emphasizes the importance that data are based on the participant's perception. In addition, studies should be replicable.

5)   Just one innovation characteristic is not enough. This one is very self-explanatory.

6)   Several innovations should be measured at the same time. Findings might be applicable to just that one innovation if only one is measured.

7)   Adoption by organizations is what is important, not individuals operating alone. Individual processes and organizational processes are different. Within an organization the individuals who are the most involved will be the most informed respondents.
Our paper has several limitations in regards to the ideal study, but these are acknowledged and we have tried our best to work around these shortcomings. We are not alone in our shortcomings, for instance almost none of the reviewed studies measured adoption and implementation. We will not go in to detail but most of the reviewed literature was criticized and only very few where deemed satisfactory. None of the 75 had all seven design features, two had six, and five studies had five. Tornatzky and Klein does not present Mohr correctly.

It is poorly designed studies, not the inherent nature of innovation processes, that cause inconsistency and lack of generalizability.

Tornatzky and Klein in relation to Rogers adoption attributes:

Compatibility and relative advantage were the two most frequent characteristics, with complexity at number three. A total of 30 different characteristics had been studied across the reviewed articles. Tornatzky and Klein questions this large number. Compatibility was the most popular characteristic, but the actual degree of compatibility, practical or value-based, were by and large inferred. It would have been wise to measure the adopters' or expert judges' actual perception, not base the level of compatibility mainly on the researchers' reasoning.

Tortnatzky and Klein emphasizes statistical qualities in findings, criticizing other research for using deductive reasoning to find differences or similarities between adopters and then attributing that to, for instance, compatibility issues. Whilst statistical methods are best at stating facts, compatibility is a subjective issue and its research cannot be based purely on statistical methods. This is especially applicable to compatibility in the sense of a person or group's inner values, such as ethics, code of conduct, group mechanisms, tradition and culture. We believe such compatibility issues will be most important to the adoption off mobile payment. As opposed to more practical compatibility issues, since people already use the mobile for so much and already many use the mobile as a purchasing gateway for online shopping, buying tickets for instance. Paying in stores with cash or cards is very much an act of habit. Changing this behavior will be a great challenge for mobile payment. We will rely on our expertise on the area, patterns that emerge, and on third party knowledge from informed sources.

Relative advantage is referred to as the «garbage pile characteristics in innovation characteristics studies into which any number of innovation characteristics are dumped» (Tornatzky and Klein, 1982, p 34). Tornatsky and Klein are very negative to the variety of characteristics included in the definition of relative advantage, calling it a «hodgepodge» (Tornatzky and Klein, 1982, p34). The problem is that relative advantage usually translates to some more objective advantages, like why not just measure the actually advantages which relative advantage covers. On the other hand, sticking to the definition that relative advantage is «the degree to which an innovation is perceived better than the idea it supersedes" (Rogers and Shoemaker, 1971, p.138), is generally useful. Problems are particularly related to lack of conceptual strength, reliability and prescriptive power.

The advantages will be relative to using todays payment methods, and we already have some idea about the direction of those advantages. It is likely that there will be issues concerned with time, convenience, cost, security, incentives and added-value. We do not see a problem calling all these relative advantages, since they are also part of the advantage of using today's payment methods. For However, to try to rate them or find how much better it must be in the different areas will be unnecessarily time consuming, since we expect people to rate the advantages differently themselves according to specific situations. For example, security will be more relevant in some situations while convenience will be the most relevant at other times. This is already the case with using today's payment methods.

The choice of mobile payment solution is arguably a choice of habit, and habit is not particularly easy to measure statistically, at least not how to change a habit. We believe our research design is well suited for the research problem, even though it is not ideal according to Tornatzky and Klein. We have however considered Tornatsky and Klein and others' advice and tried to conduct our research as validly and reliable as possible, given the limitations.

10. Theory

To start of the theoretical part, we want to address the social and subjective part of adoption. Regardless of theory, one cannot exclude the fact that adoption happens in a social context. The social aspect is at the very core of diffusion of an innovation amongst smaller or larger parts of a population. If there is to be any usefulness to research on adoption and diffusion, one must consider the adopters' behaviour and attitude about themselves and the world outside.

Social and interpersonal factors play a large role in diffusion. For an in-depth analysis of how external influence and opinion leadership channel the diffusion of innovations, we recommend the paper « Social network thresholds in the diffusion of innovations, Social Networks, Volume 18, Issue 1, January 1996», by Thomas W. Valente. In this section we briefly describe the most important points he makes and how they can be transferred to our research.

Other research on collective behaviour we looked at are critical mass research (Macy, 1990; Oliver and Marwell, 1988) and threshold models (Granovetter, 1978; Macy. 1991). We will concentrate on Valente, who refers to other research, so we feel that the research is adequately covered. For instance, his definition of a social network is taken for other sources; A social network is the pattern of friendship, advice, communication or support which exists among the members of a social system (Burt, 1987; Wellman, 1988). Just by looking at the definition we would assume that the social system will play a significant part in the discussion if a technology is of great importance to the individual and which holds a great deal of risk. This is certainly the case for innovation regarding payment and banking, which directly and instantly affects people's finances and their ability or inability to perform financial transactions. Concerns about security are also evident when it comes to products and services that directly deal with the safekeeping of people's money. This is comparable to medicine, which also greatly influences a person's life and therefore is a very serious matter.

It is for instance interesting to read findings and analysis about how new medicine spreads and adopts. How doctors use their network and how they are perceived in their networks influence their ability to promote diffusion. Most people want to look to others and wait a while before taking the risk of adopting something new. This is not just the case when deciding to adopt or not, but also in the phases preceding, where people either are exposed or not, then either perform a trial or not. People differ in their scepticism or curiosity to innovations; some rely on close confidants when considering something new. Others seek validation and information from far outside their personal sphere. Our perception of other

people's opinion, and what we think is the accepted norm and the majority view, will to some degree influence adoption. This applies both on a personal level and when considering influencing others about an innovation.

The success of mobile payment as an attractive alternative to cash and plastic cards might depend on the ability to change people's behaviour and attitudes towards their established habits - more so than the objective benefits, features, costs, security and such. We believe that how the banks go about trying to influence the individual and collective behaviour specific to the payment situation and to the whole payment context will be important to the success or failure of their mobile payment solutions.

Our knowledge of the market suggests our findings will support this, both in the interview data and in the research into secondary data sources. We assume that people's adoption of the behaviour of using the mobile to pay will increase or decrease decided by the adoption, or lack of adoption, by other people.

This is in line with the Threshold definition; « an individual engages in a behaviour based on the proportion of people in the social system already engaged in the behaviour» (Granovetter, 1978). Other research thus supports our assumption that the individual's willingness to change their behaviour with regards to payment will be a function of the behaviour of others. The influence can come in a variety of forms, and some people will be more easily influenced than others. People with a lower threshold will engage in the collective behaviour before people with a high threshold (Valente, 1996). Valente looks at personal networks as opposed to a bigger social system. His research also adds a new component, most significant to us, the influence of non-adopters to the diffusion process.

We believe non-adopters; adopters who do not want to try or make trials and then turn down the adoption completely or partially will affect the diffusion of mobile payment greatly. This is partly because mobile payment does not hold any «need to have benefits» and it does not solve a problem. It is perceived by some as an innovation launched to benefit commercial interests, not the users themselves.

We assume that if the banks do not launch services and solutions with greater benefits and ease of adoption, they will have a hard time convincing high threshold users to try, and they might turn low threshold adopters to non-adopters, due to an unimpressive trial experience. Thus turning low threshold adopters to non-adopters, negatively influencing high threshold adopters, and effectively stopping the adoption of the desired behavioural change. It will be very interesting to see how the banks solve the problem of getting low threshold adopters more positive and getting them to influence others. Also, it will be interesting to see how the

banks will tackle the challenges of getting high threshold adopters to try, and hopefully adopt, if there is much negative influence from non-adopters. One would also logically think that different influences will have different impacts on people. Like micro influence and macro influence. Influence by someone a person looks up to as opposed to someone whose opinions the person does not trust. Or if the person does not believe the influence comes from someone with actually expertise. We cannot go in depth here, but suffice to say, influence is a complicated research area with a variety of possible explanatory factors. Due to the high level of interpersonal, informal and verbal nature of influence specifically and micro and macro social systems in general it is very difficult to analyse and trace what actually happens. Using it to predict the future is even harder, due to all unknown direct and indirect factors.

Also, exposure to the mobile payment innovation we look at is not limited to an individual's network. Exposure will happen in random places from random people, like in different shops . Exposure is also heavy from non-personal channels, like those found in marketing and public relations. However it is argued that exposure not necessarily leads to adoption (Marsden and Podolny, 1990), in accordance with people's personal thresholds for adoption. This is an important point to take into consideration when looking at the solutions provided by the banks. To see if they rely too much on an assumed link between exposure and adoption. Meaning they may think that if they just market the solution, get PR and facilitate discussions about the solution, people will adopt; first low threshold individuals, then high threshold individuals. High exposure may be counterproductive as people might turn down the solutions and influence their network on a micro level, thus resulting in adoption stalling on a macro level. To understand why some people adopt earlier than others, two external factors are highlighted. Those factors are the level of cosmopolitanism and the level of media consumption, which facilitates awareness and is a prerequisite to choose to try an innovation (Fischer, 1978; Weimann. 1982). Being cosmopolitan and being exposed to different media also frees a person for potentially inhibiting norms (Menzel,1960), which could otherwise stop a person with an inclination to try an innovation.

We assume creating a positive trial experience for the low threshold individuals, and creating positive influence by word of mouth and observations by people not connected to the same personal network will be much more important to successful adoption than massive exposure to a large group of people with both low and high threshold individuals. The latter may have a negative trial experience and cause negative observations by members and non-members of their personal network. However, attracting cosmopolitan individuals to try to endorse the product could boost adoption. Cosmopolitan individuals generally relate more than others to

the outside world and provide a link for outside information to float between social systems (Merton, 1968;Gouldner 1958 & 1957). It will be interesting to ask how the banks' solutions are rolled out. Are they tested by a selected group of individuals, and are they targeting cosmopolitans so that they can influence their personal network or is the product released to mass market? Alternatively, will the banks choose something in between? And how do the choices made affect the success or lack of success?

As mentioned above, although external influences are generally responsible for making individuals aware of innovations, it is often interpersonal influences by friends, family and neighbours that lead to actual adoption. The long-standing theory of diffusion has been that the media, sales people and campaigns, targeted literature and other factors make individuals aware of innovations, but interpersonal persuasion is necessary to convince individuals to adopt (Ryan and Gross, 1943; Rogers, 1983). Thus, the two-step flow hypothesis was created (Katz, 1957; Weimann, 19821), which stated that the media informs opinion leaders who, in a second step, influence opinion followers. Social network thresholds can now be distinguished, i.e. whether individuals are innovative with respect to their personal network or innovative with respect to the social system. One of the primary research findings of diffusion research was that early adopters had more sources of external influence. Low threshold individuals will influence high threshold individuals to adopt, however threshold lags occur where people observe their peers before adopting (Valente, 1996). One reason for the slow adoption of NFC Mobile payment may be that observation does not lead to adoption, low threshold adopters do not influence adoption and media is not having the informative role in adoption. Can social factors explain the lack of adoption, more so than technical and commercial factors? Valente (Valente 1996) points to pluralistic ignorance (O'Gorman and Garry, 1976) and the spiral of silence (Taylor, 1982; Noelle-Neumann, 1984) as areas where threshold theory could be applied. From our point of view, pluralistic ignorance could play a part in the adoption of NFC Mobile payment. Pluralistic ignorance shows that people make assumptions about what others think and are affected by them. The story about the emperor's new clothes is a good example of pluralistic ignorance. The spiral of silence is based on people's fear of isolation, social ridicule and social rejection. People or groups of people who believe they hold a minority voice are inclined to stay silent or be cautious. Whereas it is opposite for those who believe they hold a majority opinion or an opinion that will be accepted, complimented and followed. It is easy to see how pluralistic ignorance and the spiral of silence work together and enhance each other. Obviously, the use of cash and cards at the POS is a strong behavioural pattern and even though people might not raise their voice as advocates, some

people will be inclined to try new and disruptive behaviour. People using the mobile phone at the POS might feel that the majority are sceptical, quick to ridicule and critical to the value of using the mobile phone. This may cause pluralistic ignorance resulting in a spiral of silence as people are reluctant to try mobile payment in front of people and are reluctant to speak their mind about it due to fear of social repercussions.

We hope to shed light on this and other factors that facilitate and halt the adoption of mobile payment. For instance, should the commercial interests behind mobile payment do more to inform the public about its benefits, giving fuel to opinion leaders and giving «back-up» to people suffering from pluralistic ignorance and the spiral of silence?

Diffusion according to Rogers' theoretical platform

Looking at the low consumer adoption of NFC mobile payment, we were interested in whether Rogers's theories on "Diffusion of technology" could give us some understanding of why consumers do not adopt mobile payment more eagerly. Could we, by reading Rogers and his theories, find some explanation or answers to why consumer have yet to adopt the mobile as a replacement for the card?

Rogers has several factors and theories related to adoption of technology. The innovation decision process is where the consumer actively searches for information of the advantages and disadvantages of a product/innovation.

Rogers's model of the Innovation-Decision Process has five phases:

1.   Knowledge; an individual learns of the existence of the innovation and gains understanding of how it works.

2.   Persuasion; the individual forms an opinion of the innovation, either a favourable or unfavourable.

3.   Decision; the individual starts activities to either adopt or reject the innovation.

4.   Implementation; the individual starts using the innovation.

5.   Confirmation; the individual either seeks reinforcements on the innovation decision already made, but can also reverse the decision of adopting the innovation faced with conflicting messages.
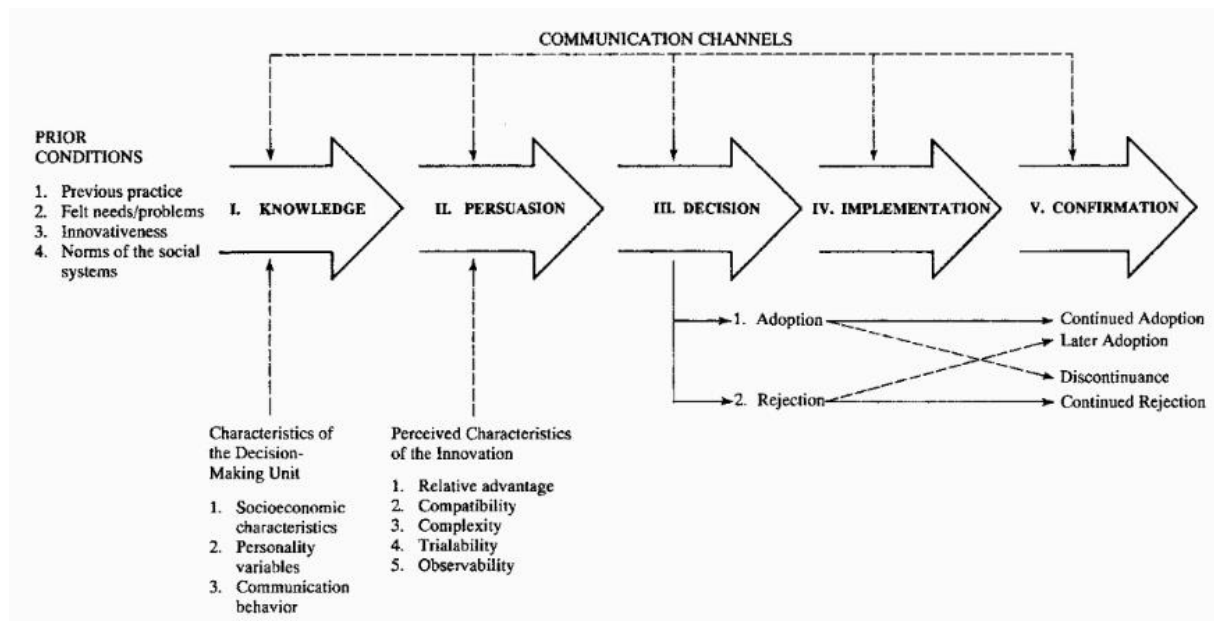
Illustration source: Rogers M. Everett, (2003) Diffusion of Innovations ,page 159

Rogers gives us five characteristics:

1.   "Relative advantages", describes the advantages to the product or innovation it replaces. What matters here is that the user perceives the innovation as advantages and the more advantages that are recognized, the faster the rate of adaption will be.

2.   "Compatibility", describes how the innovation meets the values, experience and needs of potential users.

3.   "Complexity", describes how difficult it is to understand and take advantage of the innovation.

4.   "Trialability", describes if the innovation is possible to test and experiment with before it is adopted.

5.   "Observability"- is the use of the innovation visible to others. If the result of the innovation is visible to others, it is more likely to be adopted by others

Roger's states that in "the innovation decision process" the adopter asks him/herself some essential questions in the "Knowledge" phase;

"What is the innovation?"

"How does it work?"

"Why does it work?"

"What are the innovation's consequences?"

"What will its advantages and disadvantages be in my situation?"

Roger states in his book «We see that the diffusion of technology is a social process, even more than a technical matter." An innovation tends to be adopted based on recommendation from friends, media, blogs, social media and others. Could there be aspects of EMV NFC Mobile payment that leads those who try it, not to recommend it to others?

Compatibility and Relative advantage
Many studies have shown that Compatibility has significant positive impact on adoption and diffusion (Kimberly 1981; Tornatzky and Klein, 1982; Cooper and Zmud 1990; Etdie and Vellenga 1979). The adoption should be a good fit with the adopters already established beliefs, values, habits, preferences and procedures. The innovation should not create dissonance, discomfort, social and internal challenges for the adopter. A good fit will increase the likelihood of adoption. It will be interesting to analyse whether compatibility issues have been considered by our cases and what, if any, active steps have been taken to assure that mobile payment solutions are compatible with the adopter. Relative advantage shares the positive impact on adoption (Tornatzky and Klein, 1982). One would expect relative advantages to be predominant and easy to spot in mobile payment. However, we believe our analysis of the cases will show that the providers struggle to deliver relative advantage in their mobile payment services. It will be useful to see if the relative advantages are supported by weak incentives. Weak incentives can be incentives linked to "buying" a customer, by giving discounts or other benefits as a reward for using the mobile payment solution. In such cases the relative advantage might be there, but it will be strongly linked to a reward and without the reward there would be no or little relative advantage. Arguably, the reward is most of the relative advantage, not the mobile payment solution itself.

Social factors
Whereas compatibility and relative advantage apply to the persuasion phase, social factors apply to the knowledge phase. Also we include the social aspect of prior conditions. We focus our research on the knowledge and persuasion phase. Knowledge comes first and is concerned with the decision making unit, the end user in our research. Communication behaviour and socioeconomic characteristics are the factors we believe will hold most explanation to adoption or none adoption for us. As we have shown in other references, the way people seek information and interact with others have proven to be significant to the way they adopt. Cosmopolitanism is a socioeconomic characteristic that have been shown to be significant in adoption explanation. Communication behaviour and cosmopolitanism is linked, because cosmopolitan people have more contact points with the outside world. We also know that at

least one of our cases have a distinct socioeconomic profile on their user base, with their users being predominantly young, urban people with high innovativeness. One other case we have might have a slightly different profile being a group of banks mainly consisting of small, rural savings banks. Their customers could be different than those of the more digital bank. These are some reasons we believe social factors will be important. Also we know that all banks are concerned with reaching volume and getting quickly to critical mass, to accomplish this, they need success with social factors facilitating or slowing spread. This is where prior conditions and personality can be a factor. Examples are the spiral of silence and pluralistic ignorance, as explained earlier.

11.   **Method**

We want to study the new and complex situation emerging with the more and more widespread introduction of NFC mobile payments at POS terminals. We want to see this in the context of NFC mobile payment in general. Given one definition of case study; «a phenomenon of some sort occurring in a bound context. The case is, in effect, your unit of analysis" (Miles and Huberman, 1994, p. 25). We found that to be descriptive to what we want to explore. For us it is important to explore and understand how the product process started, executed and evaluated. Our understanding of the phenomena and the contexts surrounding them makes us certain the contexts will influence the actions undertaken. We believe there will be no universal rules or boundaries between our research phenomena and its relevant contexts. We believe these considerations cover Yin's recommended considerations before deciding on a case study design (Yin, 2003)

With several interviews and an abundance of potential secondary sources we must think through what the case is, meaning what the unit of analysis will be. We want to analyze the product from the respondents view, even though the respondent does not necessarily speak on behalf of the whole organization. In addition, their opinions may, and probably will, change with time. Our respondents have relevant positions in their companies and very relevant positions in regards to the phenomena we want to analyze. Therefore they de-facto represent the organization, with some additional data from secondary sources. Therefore, we land on wanting to analyze the behavior, action and decisions by the organizations and naturally we will compare what the organizations and the respondents represent. However, it is important to point out that it is the actions, strategic and tactical, that are most important so we will not analyze the organizations statically, but will analyze the actions, processes and decisions undertaken by the organizations.

To ensure the study stays reasonably in scope we will create some boundaries as advised by the two main academic experts on the case study; Yin (Yin, 2003) and Stake (Stake, 1995). Our boundaries indicate the breadth and depth of the study, thus separating it a bit from determining exclusion and inclusion criteria in quantitative studies, even though both are used to determine what not to include. The boundaries we have considered are these:

1) Time \ Place (Creswell, 2003):

2) Time \ Activity (Stake, 1995):

3) Context and definition (Miles & Huberman, 1994):

We also need one or more propositions to guide and fence in our research (Yin, 2003,Miles & Huberman, 1994). Our tentative questions are:

The solutions providers we have studied have not made a "killer app" in regard to Practical and behavioral compatibility

The solutions providers we have studied have not made a "killer app" in regard to relative advantage, relative to card payment.

The solutions providers we have studied have not succeeded in addressing social factors concerning behavioral change, from card to mobile.

We have the research well covered with the work we did with the interview itself, which was a rigorous, methodological undertaken.

In our research into case study design, we place even emphasis on Yin and Stake, and base our decisions on what we believe appropriate for our research. So in the work with propositions we do not mix in Stake's "issues". It seems more applicable to social science studies, since its emphasizes, for instance, personal and social contexts (Stake,1995).

We had some relevant knowledge, but wanted to explore the processes, relationships and choices and deconstruct and reconstruct the phenomenon in question; NFC mobile payment at POS. We investigated on a company level, but also on an individual level through some in-depth interviews with key people. Using in-depth interviews as the cornerstones of our paper fits well with the constructivist paradigm. This is because we will base much of our report on the respondent's individual perspective and their relative understanding of truth, the collaborating interview process between the interviewed persons and us will help them tell their story (Crabtree & Miller, 1999). This will help us better understand their actions (Lather, 1992; Robottom & Hart, 1993). This gives us an understanding of the social construction of reality (Searle 1995) Since the paradigm does not reject the notion of objectivity, we will try to incorporate some objective data, if relevant .We did not want a too wide variety of sources, even though a case study opens up for a vast number. We used interviews and some second hand sources to make the material manageable and to avoid a too broad perspective in our analysis, so it becomes too general. We balance the benefit of revealing and understanding the phenomenon through a variety of lenses with the need to keep the report on track and to the point. Giving room to pluralism will be important and we will emphasize that. We will also look for examples of circular dynamic tension between subjects and object (Miller & Crabtree, 1999, p.10)

Initially we only wanted to conduct interviews and analyze those. Case studies were recommended, amongst other things because the use of different sources strengthens the data credibility (Patton, 1990; Yin, 2003). Additional pieces of the puzzle will be provided from companies' own information, from web pages, media and such. In addition, we will add

pieces from other sources, at the discretion of our research team members within the industry network. In this way, we will find first-hand or second-hand data other than that published and controlled by the companies being researched. The various trends of data, which originate from the company and others, will create a synergy that gives a better understanding of the phenomenon than just by analyzing the interviews. The purpose is merging the other data with the interviews to analyze it as a case, not analyzing the different sources of data separately.

Another reason to use case study is the complexity and the different interesting contexts, therefore we decided to use the case study methodology instead of just interviews. There are several designs to choose from, some taken from Yin (Yin, 2003) and some from Stake (Stake, 1995. Generally, Yin distinguishes between explanatory, exploratory or descriptive, adding that the researcher can choose between a holistic and multiple case studies design. Stake (Stake, 1995) distinguishes between intrinsic, instrumental or collective. We are not seeking to explain any effects, mainly because the results are not yet in effect. We could use the exploratory design outlined by Yin. We do not simply wish to describe the phenomenon, mainly because it is in constant development and a simple description would be outdated and irrelevant before the report is finished. Given the contextual differences between banks in Norway, Finland and Poland, we would miss a lot of interesting in-depth and comparative analysis if we treat banks from all three countries like one case. Anyway, we see a multi-case study as most interesting. An option is single case with embedded units. We believe that it makes the design overly complicated and we run the risk of going too deep into the embedded units without getting the broader single case perspective. We are mostly interested in the overall phenomenon; NFC mobile payments on POS terminals. Given our data material, with strong interviews, we believe a several-case design serves the purpose best. We have made great effort in identifying the primary sources so that a comparison between cases can and will show both great differences and similarities. We expect the similarities to be greater between the Norwegian companies given the contextual proximity; therefore, it could be tempting to combine the two. However, we may lose some interesting differences if we do. We will keep in mind Stake's design choices (Stake, 1995), which are intrinsic, instrumental and collective (similar to multi-case studies). We are very interested in the phenomena and one of the researchers work in the payment card industry, so if we labeled our case as very special we could choose the intrinsic design. However, we do hope and believe that our case(s) can be used to understand the phenomena in other aspects than just in the phenomena and context we write about. We have different contexts and different data from the interviews,

so we do not believe our data sources can be seen as one particular situation or phenomenon. The phenomenon of Mobile NFC payment at POS is developing differently and is prioritized and used differently among the companies we have looked into, so we do not feel that an instrumental design is the best design. We believe the case(s) and their contexts are best served using a multi-case design.

We believe our design will give a robust and reliable report. A prerequisite for the success will be logic linking the data to the propositions and the criteria we use for interpreting the data (Yin, 2003).

For the purpose of guidance and overview, we follow Miles and Hubermans (1994) recommendations regarding a conceptual framework as an anchor. A conceptual framework is good at identifying who will and will not be in the study. For us this is clear when it comes to the primary sources, but we must also consider which secondary sources to use. We will use the concept of intellectual "bins" (Mile & Huberman, 1994 p. 18). Because we do not want to be too deductive or driven by the framework we will keep the framework as a loose guide along with the propositions to keep us in track, but we will treat the process as a dynamic process and not be restrained by propositions or frameworks. However, a framework is helpful in keeping track of themes and ensuring the right scope and structure. There is no point in having a rigorous framework, since one of the big advantages of qualitative studies is that we can gather data and analyze in parallel, which is another reason to use a loose framework, so we do not get lost along the way. Returning to the framework and the proposition during the analysis phase will benefit the report. It will keep us from being tempted to stray off course whenever something interesting surfaces. Addressing rival and different propositions will strengthen the confidence in the report and will be important in the analysis phase, trying to find different explanations to the phenomenon.

There are many options in the analysis phase. Yin gives five; pattern matching, linking data to propositions, explanation building, time-series analysis, logic-models and cross-case synthesis. Stake gives two; categorical aggregation and direct interpretation.

We choose qualitative instead of quantitative because we wanted the flexibility and openness associated with qualitative research. Additionally we found little research on our topic so we expected that writing the report and doing the research would go in parallel for some time, so qualitative method was the only option. In addition, not that many units for research were available; few products were launched. Many companies were working on "something", but getting them in on a quantitative research project seemed unlikely. However we did have some contacts, and due to these few good contacts we saw a qualitative project where we

could utilize their opinions as the best option. Whether or not our findings are transferable to a greater population will be left for others to explore. For our research to be relevant it needs to be trusted. We will build trust in our research by being open and honest about our preconceptions, assumptions and choices. Every researcher brings their own personal baggage into their research, and in qualitative research - and in interviews in particular - the results will in some way be affected by the researchers themselves. Not necessarily by conscious action, but a person's subconscious will affect selection, affect (positive or negative) prioritization, analysis and argumentation. It is important for us as researchers to try to discover when and how we ourselves influence the research and its outcome and interpretations. We have tried to avoid influencing the interviews too much by having a semi-closed interview, using a set of questions and having limited interaction with the respondents during the interview and very limited ad-hoc questions during the interview. We also described in the questionnaires what the intent of the question was, to guide the answers from all respondents in the same direction.

We wanted to use qualitative data to confront some ideas, assumptions and beliefs we had. We expect some to be disproved and some to be confirmed, but for the greatest part we will be happy with revealing some new knowledge, without giving any absolute answers. The goal is greater insight for us and for the readers.

The research issue was set, and then changed, and could be changed again as our research moves into new phases. We will not stray too far from our original research issue. We have been doing implicit refinements ever since we started working on the topic and we discuss more openly and explicitly within the group and with our mentor. We challenge our implicit refinements and mold our research questions to be in line with our data and the theories we want to apply. The target had been, and will still be, to describe something relatively unknown and new.

Usually one wants do describe something that has happened or that is happening (observed). The main purpose though is to look forward, towards the unknown future, outlining some successes and failures uncovered, and in that way say something about what we can see happening in the future related to our topic of interest. We will off course not offer a recipe for success or failure, nor will we try to foresee the future, but we will offer insight that can be used to analyze the future, when and after it has happened. So the aim is to tell the story about the choices made, the opinions and expectations, results and actions to this day. Some respondents even say outright that their answers will not be the same in two months as it was on the day they were interviewed. Hopefully, someone will compare our research with actual

events in the future and analyze what occurred and what did not, maybe also answering "why". We facilitated this future research by asking the respondents about their thoughts about the future, and what led them to the decisions made to date.

We started the data collection process by discussing who we wanted interview and how many interviews we would conduct, so the selection was mostly by convenience. However, due to the team members extensive and first-hand knowledge of the potential respondents we did select some of the most relevant respondents available. If we had no, or little, first-hand relations to the potential respondent pool and we were looking at respondents regardless of nationality, we might have ended up with a somewhat different group. We do acknowledge this bias and the bias that our knowledge and experience has on the actual data collection, but the actual research itself and the respondents are well thought out and made with reliability and validity in mind, not our personal preferences and convenience. We are also aware of the pitfall if we customize the questions, other sources, theory and analysis to fit the respondents and/or what we expect and maybe even want to find. We do try to keep an open mind and facilitate surprises and unexpected outcomes.

One respondent was picked partly because of his status as a renowned speaker on the subject. All four products represented are European, two are Norwegian. We did the Norwegian interviews in Norwegian, the rest in English. We transcribed in Norwegian, but when we use the data in our research, it will be translated to English. For the product Eika Safe, two people participated in the actual interview. In the other cases, just one person represented each product\company. We emphasized that we wanted the respondents' personal opinions, and they did not have to be representative to the official company opinions. The respondents were given the choice to be anonymous, but they all declined. All respondents were informed about what course we were taking, when the report is due and who we are. It was a point that both of us work full time, and one of us actually works in the payment industry. We were asked not to disclose any information before the release date for our paper and we were asked to treat the information with discretion, given the fact that we were given sensitive information about the companies and their partners. We did offer to sign non-disclosure agreements, but that was not deemed necessary.

Everyone got the questions in advance and had time to prepare. One respondent wanted to answer in writing. We granted that and had a follow up call to clarify and elaborate where needed. We used under an hour for each interview. The interviews went well with good sound quality and good rapport between the respondent and us. We used Skype meetings, without video .We were very happy with the results and it gave good transcribed material. We did not

interrupt much and took little active part. All respondents opened up and spoke very freely, some more than others, but overall we got data far greater in depth and "behind the scenes", than we could wish for, and incomparable to what could be gained from other data collection methods. We did have the option to follow up questions to all respondents, either by Skype or mail.

The richness of the research will be mostly gathered from qualitative sources and if we have to remove something, we will most likely remove the quantitative data. Even though triangulation with qualitative data could be interesting, we believe the actual understanding of the phenomenon is best triangulated with qualitative data; the quantitative data is more as a "nice to have" opinion. We will try to make our data representative by encouraging the respondents to give their opinions. We will also look at secondary sources outside the companies associated with the products, like suppliers, industry spokespeople, media, customers, critics and endorsers. With the broad approach we encouraged the respondents to give their personal view. Having already done the interviews we did achieve this goal; none of the respondents acted like a spokesperson, even though one respondent was more cautious about the role as company representative. Obviously the respondents are not objective, they will defend their choices and actions and they will argue for themselves. However, this is not a problem, but an advantage, as it gives clear and concise data for us to analyze.

In addition to the interviews we will research secondary sources, mainly documents in print and digital. There are several important aspects of secondary sources to be aware of and it is in many ways very different from our interviews. Since we do not have actual access to the person behind the information we have to be extra critical. Poor secondary data can be distorted, false, have alternate motives and be based on poor sources. Good secondary data can provide the opposite, with the potential of being well thought out and well-grounded insight and information, as the biggest benefits for us. The more informal the source the more we must be critical. Also, if we do not know the actual author or the author is not a trusted party, we have to be very critical. Additionally, content might be intended for other use and other audiences and in different context. Examples are content made for sales and internal use or content supplied by people with good intent but little or wrong knowledge. Also, we must consider the linkage between sources, so we do not have too much content from sources with a common linkage, that will make our data one-sided, even though the sources might appear independent. Public and private sources will also be treated differently where public usually hold greater objectivity, although the knowledge behind the content might be flawed. These are some factors to be aware off when considering secondary data.

11. Cases

Inspired by case studies, we conducted interviews with four banks/financial institutions between January and March of 2016 that had started to offer NFC mobile payment to its customers. We decided that four or five cases would give us enough details and experience from the implementation, without being too much, given the time we had available. Through our contacts, we were able to get interviews with two domestic (Norwegian) candidates and two candidates from two other European countries we knew had experience with mobile Payment. We wanted to get an interview with someone who had experience with ApplePay as it would be an interesting case and because ApplePay was at the time, and still is, a prominent topic when it came to mobile payment discussions. At the beginning of 2016 ApplePay was only available in the US and UK. We contacted three people in the US that we found, through searches in LinkedIn, had worked in projects implementing ApplePay. Only one answered our inquiry to get more details and we never heard more from that candidate. Then we approached a potential candidate working for a major UK bank to try to setup an interview, but we got no feedback. This led us to believe that those who had implemented ApplePay were not able to share information from their projects.

The candidates got a list of questions in advance of the interview. The list had seventeen questions that we believed could be a basis for them to talk about their projects. We talked for about one hour with each of them. One of the interviews was postponed several times, so in the end the candidate provided answer to all the questions in writing, and then we had a half an hour call where we went through the questions to elaborate some of them. We used web searches to obtain more information through websites and articles on all the cases.

During the months of January, February and March of 2016 we interviewed five people (see table below) that were working for banks/financial institutions that all had started to offer NFC card emulation mobile payment to their cardholders.

Bank/Financial institution	Product/Mobile Payment Solution	Respondent, title/position	Country
Eika Kredittbank AS	"EIKA Safe"	Karl-Richard Floer, Director of Cards and Payments,	Norway
Eika Kredittbank AS	"EIKA Safe"	Tarje Melau Sørensen, Head of Business Development and Analytics	Norway
w mBank S.A	"mBank MasterCard Orange Cash" and "mBank T-Mobile"	Joanna Erdman, Director, Card Business Development	Poland
OP Bank	"PIVO"	Kristian Luoma, Head of New Business Development	Finland
SpareBank1 Gruppen AS	"ValYou"	Øystein Lysvik, General Manager Cards	Norway

The Questionnaire we sent to our respondents:

Our focus and limitation in this Master thesis paper for "Mobile payment" is the services using a smartphone to pay with NFC instead of using coins, bills, checks or payment cards. The basis of our question are introduction of payment and NFC, though there are many other functions and options when it comes to mobile payment that are interesting. If you have additional information, not covered by any of our questions, that you think is essential when it comes to introducing mobile payment in the market, please feel free to tell us☺

Number	Question	Frame, explanation to the question
1	Can you please tell us about the process that led to the decision to offer your customers mobile payment? If possible from the initial idea, the discussions, to the final "go".	The history behind the decision to offer mobile payment.
2	Can you describe the technical solution for your mobile payment?	We would like a high level description of how the solution works
3	What were the main reasons that made you decide on this solution?	Why did you chose this technical solution rather than another solution
4	Briefly state the strengths and weaknesses of your solution?	High level
5	To call the project a success, what goals were defined? What critical user mass was needed and when?	What numbers was set in the beginning as targets
6	How many of your customers/cardholders (by percentage) have installed the mobile payment solution? In addition, how many use it?	Percentage of potential users that can use the solution limited to handset, OS on handset, MNO, card products available etc.
7	How is the trend? Increasing\decreasing installation and use?	Numbers
8	Are there functionality or aspects of the chosen technical solution that you consider important for the success for the end-user experience?	What is particularly good for the end-user with your product?
9	Are there functionality or aspects of the chosen technical solution that you consider bad or even a "show stopper" for the end-user experience?	What is "bad" for the end-user with your product?
10	How do you inform the end-user regarding security for the product, so that these concerns will not prevent an end-user trying it?	We have seen that safety concern is a reason for end-user to not adopt mobile payment.
11	How has the focus been on making the product user friendly? Can you give examples from an enrollment perspective and usage perspective?	If the barriers are low and end-users have good experiences, the word will travel and people will recommend others to try

12	What are the additional needs you want to create, to amplify or uncover, in the minds of the users?	These can be future needs that are to be introduced after payment functionality.
13	Concerning the customers «reasons to use», what are the inconveniences or problems you offer to solve for the customer?	
14	What research have you done to verify what you are offering is what the customer wants? Do you have a process to change future versions and update the product according to customer demands? Do you keep track on what competitors are offering?	High level
15	How many POS terminals (in percentage), have been upgraded to support NFC, where your customers are paying?	Nationwide, in the big cities, where you have your major customer's base.
16	Approximately how many people were involved from your company in the project?	
17	How many other companies where involved and approximately how many external people where there?	

We will give a brief overview of the solutions that our respondents had first-hand knowledge of, and the bank/financial institution that had been part of the implementation.

"PIVO"

OP Financial Group is the largest financial service group in Finland. The group consists of approximately 180 banks and the group has a staff of 12,000 employees and 4.3 million customers. OP started using contactless NFC cards in 2012.

Their product PIVO is a smart wallet that launched in 2013. In the beginning, the wallet had functionality such as displaying banking information, current balance, and transactions on the account. It also contained loyalty cards, special offers, vouchers and favorite shops. After introducing this functionality and gaining customer mass, approximately 500,000 downloads, the PIVO wallet is now available for mobile payment with OP Visa debit and Visa Electron cards. The technology used for EMV NFC mobile payment is HCE. It requires that you have a mobile telephone with Android version 4.4 or newer.

OP decided, after a wide customer research, to focus on functionality that provided information to the customers and brought value to them. They discovered that mobile payment was not a good starting point as the penetration of smartphones equipped with NFC was fairly low, the payment terminals were not supporting NFC payment and all was not in place to challenge the payment card which was fast and simple to use. PIVO also displays statistics on spending and status in different loyalty programs. "OP wants to be on the

forefront of payments in brick-and-mortar shops, on the Internet and mobile devices. We aim to produce the best and smoothest methods of payment for Finns in all situations, making daily routines easier", says Hanna Äijälä, Pivo's Managing Director. Further, Hanna Äijälä states, "By using the NFC technology merchants can offer the mobile payment option to their customers without extra investments in parallel payment methods. It suffices that the merchant has a payment terminal that can receive contactless payments".

"ValYou"

ValYou was a payment solution started by Telenor (the biggest MNO in Norway) and DNB (the biggest bank in Norway) in 2013 and terminated on 30th of November 2015. It was a sim-based secure element. It was available for customers of Telenor and Talkmore (2 MNOs) and DNB and SpareBank1, compatible with a limited set of android phone models, at all contactless terminals that accepted contactless VISA worldwide.

The information manager at Telenor, Atle Lessum, said to www.digi.no in October 2015, when it was announced that ValYou was terminated, that there were 2,000-3,000 users and approximately 3,000 contactless terminals in Norway. This is less than one user per terminal.

mBanks *"MasterCard Orange Cash and MyWallet by T-Mobile"*

Both mBanks' cooperation with T-mobile and MasterCard Orange was introduced in October of 2012.

The MasterCard Orange was available for customers using one of these nine handsets:

HTC One X

Nokia Lumia 610

Nokia 808 Pure View

Sony Xperia S

Sony Xperia P

Sony Xperia T

Samsung Galaxy S III

BlackBerry Bold 9900

BlackBerry Bold 9790

The customers would receive a SIM card with a preloaded prepaid card, and the first 20,000 customers to register would get it preloaded with 15 zloty. During the first three months, the

customer would get a 50% bonus on refilling the prepaid card with a limit of up to maximum 50 zloty. T-Mobile was a debit MasterCard through mBank in a service called MyWallet. The wallet was offered free of charged and supported NFC phones and was offered at a reduced price to increase the number of users.

It was announced in March 2016 that both the Orange and the T-Mobile project with mBank had been terminated, and mBank after this launched a new HCE Mobil Payment product called Blik.

EIKA "EikaSafe"

In the autumn of 2014, Eika Gruppen (an alliance that consist of approximately 70 Norwegian local banks), NETS (a major Nordic supplier of digital payment services) and Oberthure (worldwide supplier of payment technology) started a project to introduce mobile payment for the cardholders of EIKA Gruppen. It would potentially be available for approximately 100,000 cardholders. That solution required that the user had a specific model of the Samsung mobile phones that were equipped with an SE (Secure Element) embedded in the hardware of the phone. It was made available for Harstad Sparebank, Høland & Setskog Sparebank, Oppdalsbanken, Rørosbanken, Skue Sparebank and Sparebanken Narvik as a BETA trial. Eika Safe is (14.11.2016) still in BETA version according to Google Play where you download it from, and it is also stated that some services may not be available 24/7.

12. Discussion and analysis

mBank Analyses and Discussion

In March 2016 mBank announced that they would withdraw the debit card mobile payment solution with MNO T-Mobile and Orange and instead focus on an HCE service called Blik. Before the interview we explained the purpose; mobile pay with NFC at POS. As with all the other interviews the respondent had received the questions in advance and had clearly made an effort to have good answers. This was the interview with the longest transcript, and in very strong contrast to the PIVO interview, which was very short. It is relevant to see what the respondent actually chose to answer on a given subject. Their priority and understanding of a question and subject is part of the analysis. This is also the case for all the other interviews. She stayed true to the questions; therefore we clearly state the beginning and end of the questions she answered. Where applicable we analyze how the respondent's answers could be relevant to our paper. Before answering the questions she explained what kind of products they already had implemented in the area in question. They have 3 products. Firstly, the NFC prepaid card together with Orange. Secondly, they implemented as part of a different project also on NFC, with T-mobile. It was a debit card on the sim card. The third one is also a debit card but together with Orange. So these are 3 different implementations that they had. The prepaid projects were a little bit different than the other ones. None of the three are HCE, but they have projects on that as well.

Q#1 Answer:
The Polish market did become very active a few years ago on NFC card issuing and on terminal deployment. That led to a situation where most of the polish marked was contactless-ready. This was a joint initiative of banks that invested in this technology and of course, Visa and MasterCard supported it on the polish marked.

Relevance to us:
The fact that most terminals are ready for the banks' contactless mobile pay is assumed an advantage. However not a relative advantage because, relative to cash and plastic, merchants have been ready for a long time. Cash is not directly comparable since cash transactions are not made through a POS terminal. However, we do compare relative advantages to cash, in some degree. Comparing paying contactless via card or phone, with cash or swiping a card or plugging it into a POS, will arguably give contactless a relative advantage. It is more

convenient and slightly faster, in most cases. Compatibility is assured however when the customer do not have to change their payment behavior much or go out of their way to find a compatible POS. As with social factors the pure availability will reduce the feeling of radicalness and not draw negative attention to people paying with their phone, since it quickly becomes a commonplace and visible act, not something "strange" and "new" that some odd people go out of their way to do, at some select places. Even though people do not use it everywhere, the fact that it is available virtually everywhere makes it a common sight faster, reducing skepticism.

The bank decided to issue many NFC cards. The next step was based on the same technology but using mobile phones. For years there were discussing with mobile operators to determine when it will be time to start such a project. Mobile operators were not ready to invest money at that time. There was no strategic decision on their European or global level in the mobile companies, so they did not want to do it as a pilot in Poland. They wanted to wait until the markets were ready, and assumed that the companies would be ready when that happened. First out was T-Mobile in Germany and other markets like Poland. Orange followed soon after.

Relevance for us:

NFC cards came first, before paying with the phone. They were issued in vast numbers. This prepares the customer and makes them comfortable with the contactless method of paying. Paying with the phone can be said to have some degree of relative advantage to cards that are non-contactless, to contactless and to cash. We believe this small and questionable relative advantage becomes greater in favor of paying with the phone if the user already has the habit of paying contactless. Compatibility and social factors are influenced positively when contactless use is established.

They started a project with T-Mobile to implement this NFC technology. Orange asked for a similar project, but they were not ready to implement such a sophisticated solution as a debit SIM Centric card. mBank found something much more simple; a prepaid card, uploaded on the SIM card just before the distribution of this card to customers and MNO's and so the product was pretty simple from the bank's perspective. On the bank side, the main goal was not to implement the NFC technology but to get the relationship with the MNO as one of the first banks in Poland. There are many banks competing with each other so they wanted to be one of the first ones to cooperate with this MNO and to get access to the MNO customer database. mBank had two objectives; to introduce NFC technology but also to expand in

customer acquisition. mBank looks at mobile pay from a very commercial aspect, wanting to gain customers and get a better relationship with key partners, who have huge customer bases.

The prepaid cards they were personalized strategically, by personalization of the sim card and at the same time, or at the next stage, their partner personalized the payment card on the same SIM card. All produced in the same factory in Poland. Then they could be activated when the customer wanted to start using it. The situation now and for the future is that the prepaid card is still on the market, but they are not issuing new cards. Many cards that have been issued previously are in customer's hands and in customer mobile phones, so they do exist. The project with T-Mobile is still active on the market and the debit card is offered to customers. T-Mobile will probably be finished when they start with HCE. The debit card with Orange has grown into a big project. Orange came to mBank and decided to found a joint venture agreement between mBank and Orange. mBank is now providing the banking services to Orange in the whole of Poland. Orange has not yet decided what they will do when HCE becomes more widespread.

Relevance to us:
mBank have tried to make the logistics of onboarding easy for the customer, having sim cards and payment cards made ready for use in advance, at the same factory. This could be a relative advantage, whereas the logistics required to get a new plastic card are more cumbersome and time consuming. Having had as much as possible ready and predefined is important to make the service easy to use and easy to start using. The user threshold is lowered.

Q#2 Answer:

Debit card is the most complicated solution right now and there are many involved. Banks, MasterCard, which is the brand on the card, TSM and MNO (Orange and T-Mobile). These parties cooperate to deliver the final product to customers. The personalization of the card is pretty simple, if they already have the NFC phone, if the customer is of one of the 2 operators and a has an NFC SIM Card. So if all these conditions are set it is easy to activate this product from the mobile application and the card is OTA personalized on the SIM card on the phone. The only problem is sometimes with communication or invalid combinations of customer's telephone, but usually it works in a few seconds.

Relevance to us:

Being able to access the phone and activate the card over-the-air (OTA) is a relative advantage. Banks cannot access a physical plastic card over the air in the same way. The relative advantage, however, is limited since it requires certain conditions about the phone, network and phone company. Which again leads to potential relative disadvantages.

Q #3 Answer:
The respondent did not have much to add here. Rolf asked a verifying question;
"You were kind of ready to move in to mobile payment and Orange decided to join as an MNO and then it was a TSM Solution?"
The respondent confirmed and moved on to question four.

Q #4 Answer:

The strength is the NFC technology, which is very smooth, very easy to use and very much appreciated by the Polish market. Polish customers "tap" a lot. The relationship and cooperation with MNO is also a strength from the customer's perspective because of the easiness of activation and use. For mBank in particular a big strength was the integration with the mobile banking. There are two ways to implement the solution; one is as a separate stand-alone payment app. Some banks do it this way so they introduce a wallet and keep the NFC card in a separate wallet.

Relevance to us:

The fact that Polish customers "tap a lot", indicates high compatibility in use and in habit. Tapping is seen as a modern and digital behavior. With a great social acceptance and social consensus about adopting new ways of using technology, which tapping is. This high acceptance of technology should be transferable to make easier adopting a new payment way, like contactless POS mobile pay. Ease of use and activation is mentioned again here. They implemented the solution with their mobile banking, not introducing a separate NFC wallet. They see this as a relative advantage, in comparison to having a separate wallet. We have also noticed in our research that there is no consensus about what is best, integration into the mobile bank or as a separate wallet. However, that feel that this is best for them and their customers. They elaborate in the section below.

The T-Mobile version was introduced in a separate T-wallet. Orange became integrated with the mobile banking application. The Orange way brought much faster adoption and much more use of the product. Because the customer already has the application, knows how to navigate, what to do and so on, the whole experience becomes simpler. On the other side there are so many parties involved in the technical process that sometimes, if anything wrong happens, they spend too much time investigating when it happens, trying to fix it. The complication of the business model is huge and a weakness.

Relevance to us:

Orange, integrated with the mobile banking application, brought much faster adoption and more usage. Compatibility is key to that success. As stated above, customer familiarity with the surrounding application was the success factor. T-Mobile, that was a separate wallet, did not reach the same success. Without any other factors attributed to the relative failure one must attribute it to not being integrated into the mobile banking solution. Which again leads us to believe that lack of compatibility is an issue. The business model is huge and complicated, with many parties involved. This could be a factor why more companies choose not to integrate the solution into their mobile banking application.

The change of technology is a problem: Whenever new versions become available, for example Samsung's NFC phones, that will work differently with this product because it has something special in its software, they would have to put time and effort into checking the software against their solution. So the complication of the technology and the fast changes of phone versions, android versions and so on, requires a lot of resources to follow up on all the changes.

They are not able to do testing on all mobile phones that are on the market. When new mobile phones are coming on the market they ask T-mobil or Orange to test it. If the customer bought the phone abroad and just wanted to use it as a regular NFC phone, that caused some disturbances in the software. This is rare but they spend a lot of time trying to investigate what the problem is. It is not so easy to find out how to solve it, and sometimes they have to tell the customer that it will not work.

They did not get prototypes, but shared some testing phones with mobile operators. They tested the bank side because they wanted to test various functionality in the mobile app related with NFC. In addition, they tested some functionality related with mobile operators and some other functionality that they wanted to have on the telephone. They need to be very

flexible and very market oriented on the IT side to keep it updated and operative at all times. Because even though they test, changes sometimes have to be made after a phone is launched into the market.

Relevance to us:

The issues above are purely technical, but could translate into difficulties with making theoretical success factors a practical reality. Even though the bank might have a clear idea about what the customer wants and needs, they might not have the resources or it might not be commercially sound to execute the idea due to technical issues. For instance, issues with new cell phone models that require testing and tweaking. This is very resource demanding, and takes a lot of time. In addition, it might make one solution and design that the customer likes and that works great on one phone model, impossible or poor on a different phone model.

Q #5 Answer:

They had two goals, one goal was related to NFC customers and NFC cards uploaded on mobile devices. The second was related to new customer acquisition. They won the deal with Orange and T-Mobile.

They expected to sell at least 1,000 cards per month. At the very beginning they managed to do so, but after 2 months it stopped. The innovators were the first to upload this card, then the followers. But the other customers did not. When it comes to further details about their goals they do not share it externally. They were also interested in the critical mass of the users needed, without elaborating on that.

Relevance to us: it seems the innovators jumped on the new service, but there were insufficient numbers to gain critical mass or any ripple effect to other potential customers, who were more reluctant or uninformed. Social factors are supposed to help the spread and highlight other benefits, like relative advantage and compatibility. Early mBank saw that the Polish market was very technologically mature and positive. Still, the diffusion stopped and adoption from new customers became slow after innovators and early adopters came on board.

In terms of NFC cards issued they have been below expectations and there are a few reasons for that. First of all, customers complained that T-Mobile and Orange is the only option. Other reservations were, for example ; "I need to have a special phone ", "I need to replace my SIM card" and "I'm afraid that I will lose my data" etc..

From the customer perspective mobile payment is not something that drives them to change the operator, to replace their mobile phone or to replace their SIM card. The customers are afraid of losing something else, losing what they have, or what can be obtained through other options. Also, replacing the phone and SIM card usually has a cost. Other times the customer replaces the phone, gets the new NFC sim card, but does not replace the old with it. They cannot control the customer journey and they do not force sim card change.

Relevance to us:

we see that outside factors limit the success. Even though social factors are there, it comes down to relative advantage and compatibility. The service has limited success due to factors outside the bank's control. Then on the other side, taking the road mBank did, relying on two mobile companies, which they must have known do not have 100% market share, is walking straight into a problem. One could argue that their contactless pay solutions are incompatible to customers' preference to choose bank service without having to consider mobile company at the same time. The relative advantages initially gained with being so dependent on mobile companies are overshadowed by the relative disadvantages caused by the same situation. Also, many aspects of the customer journey are unmanaged and they potentially loose less technology savvy customers along the road. Innovators and early adopters can be trusted to navigate more independently, but the vast majority of those less interested or knowledgeable about technology need more guidance through the customer journey.

Calling it a success or not depends on how you define the business case for the particular project. mBank believes sometimes, especially about the innovation, the business case on NFC service is not positive. The initial investment is considerable, and if it does not bring enough customers that will generate additional POS volumes they will not get their money back.

They are not preparing a break-even business case. They are looking not only for the profit and income on the particular service like NFC. More important maybe are the opportunities that such a service brings, which is, for example, additional acquisition, additional transactions generation, account openings or any services that may be linked together.

Relevance to us:

The fact that these services on the market are not launched purely on a commercial basis might inhibit the focus on making it a customer success. Alternate motives might underplay the need to look at success factors from a customer point of view, since the services have

different success criteria than those directly connected to success from a customer point of view.

And on the other hand they are also looking on the negative part of this business case: what would happen if they do not introduce innovative solutions. As a market leader and innovation leader they have to meet certain expectations. They are building the business case in different scenarios just to find additional justifications for go or no go on a project. An important factor is the relationship with the MNO, because MNOs on the Polish marked can are few. Amongst the banks on the Polish market, there are larger groups of companies that would fight for their relationship with MNOs. These are additional considerations that are worth taking into account from a business standpoint. mBank continues developing products also even if they do not bring in income, because they need to learn the technology. They are working in a very competitive environment so they are also very oriented on competitors' moves.

Relevance to us:

As noted above, income on the service is not the only priority, learning is just as important. Also, they felt obligated to launch an innovative service to their modern and tech-hungry customer base. With the initial surge in use, with subsequent halt, we can only speculate if they should have researched the actual needs of their customer base further. Instead of launching some services just because they felt obligated to.

Q #6 Answer:

The percentage of customers that have installed the service is below 1 percent, but one cannot compare the total database with total installations because it would not be a proper target group for the service. If one defines the target group as mBank customers that also have all additional prerequisites like an NFC phone, an NFC SIM card and are customers of T-Mobile or Orange. Then the percentage will be different but they are not able to check it very precisely. The product is very heavily used by customers if they installed it and went all way through the steps; new telephone, new SIM card and your new card. Looking at the statistics and comparing to the regular behavior of those customers before, we see that the POS spending is even 30 % higher than on the old card that the customer had before. The customer treats this product, or mBank in general, as their preferred choice. Because at some POS you are not able to pay with contactless, so in such a case the customer still uses regular EMV

card. mBank is looking at the total spend. They looked not only at the NFC card, which is on the mobile phone, but the total customer activity before NFC and after NFC.

Relevance to us:
Again we see that the potential user base to reach critical mass seems unrealistic given all the limiting prerequisites. This has resulted in the very interested innovators and early adopters using it, but the disadvantages and challenges seems to outweigh the reasons for use. Actual implementation seems successful for those who have the service, with high and loyal use. This could lead us to believe that the service is a success for those who, for other reasons, have all the required prerequisites. So the problem is not with the service directly.

Q#7 Answer:
mBank cannot show the numbers. They explain some trends though. At the beginning, the numbers were growing very fast. Practically a huge explosion of installation of NFC cards which mBank interpreted as the customer expected such a service. Now it is a stable trend, with day-to-day installations. They see some peaks if they have special promotions or some additional benefits that they propose for the installation of NFC.

Relevance to us:
Most of this has been commented on earlier, but we note that there are peaks in installation when they run campaigns. This indicates that when the customer is given some additional relative advantage they have the will and ability to overcome the practical challenges of installation. It would be interesting to know if the peak comes from customers who already have all the prerequisites, but have not bothered to install or did not know how. Or if the peak actually gets people to go out of their way and make an effort to get the service, which might include changing phone, phone company or SIM.

Q#8 Answer:
There are, as mentioned before, technical challenges regarding phones, and they do not control or influence the whole customer journey. With their "own" products\services like card accounts, credits and investments, they can encourage customers to buy it. In those cases they control the whole selling process. In the case of NFC with MNO they do not, because before the card may be installed, there is a process with the MNO. This part is out of their control and they cannot even access it because it is completely separated from the banking business. If the customer calls the bank and claims that he cannot install something or he cannot replace the SIM card properly they are not able to help him. So the end user experience is

complicated because it is not controlled by the bank. Their goal is that the HCE version will be much more controlled by the bank. That means they can assist the customer on every stage of the customer journey.

The simplicity of the mobile app, and the two versions of wallet or integrated banking app. I would say that this is also very important from the end user experience because. If you already have it implemented within your mobile app, that you are currently using, it is much simpler than, you know, learning, uploading and opening new applications

Q#9 Answer

Pretty similar to #8 but enlighten if there is a technical part of the solution that you consider bad for the user experience or even a showstopper.

The showstopper can be the replacement of the SIM card and telephones. Customers that wanted to have the service declined use when informed about the many steps they had to take, and what it meant from their personal perspective. Like transferring their contacts from one telephone to the other, replacing photos and data. They were sometimes not ready to go for it. It was too complicated to start using the NFC product. Apart from problems on the user side, they also had technical problems. For a long period of time because they could not identify how the problem was caused. The problem was with personalization, not finishing. They could not cancel the card either and upload it again, or finish the personalization on the phone. It was unknown if it was caused on the MNO side, or the bank side or on the TSM side. They had some critical issues like that and could not help the customer. In effect, the customer could not use the service at all.

Relevance to us: this just adds to what we already discussed.

Question #10

The security precautions are pretty much the same for card and mobile. They are not saying that mobile payment is something very different from the customer perspective. It is very similar to the card payment but using the mobile phone. Users need to keep the same rules for security as for the regular card. mBank communicated that in general the NFC payment is secure, emphasizing that people should keep their mobile phone secure, and keep their password or PIN to the mobile phone secret. Very similar to the educational activity that we do with any regular card or any other services like mobile banking or internet banking.

Relevance to us: Security information seems designed to reassure the customer that the service is compatible with existing services with regards to security.

Question #11:

With T-Mobile they started with a card application that was done on the website. Then instructions on your mobile phone followed. The registration process started with PC and ended on the phone. It was complicated from the customer's perspective. They lost customers on some steps in this process because the customers did not identify all the steps one after another, because they did not read all the instructions. So they decided to change it to avoid losing the customers in the application process stage. They changed the application process to a fully mobile one, which was done for the Orange version of the card. They made some changes, integrating the card with the mobile banking app. When they implemented the mobile version of the process they sold as many cards within one month as were installed in half a year with the previous process. It was also a lesson learned that you need to keep the process simple. Only using one channel just to have the acceptance rate higher.

Relevance to us:

It shows that ease of use is key, especially to get started. Complexity and hassle must be kept at a minimum.

With regard to PIN, the customer has a separate PIN code for the NFC card and a separate PIN for the plastic card. They wanted to keep the service similar to the physical card so they decided not to go for the M-pin (mobile pin). Keeping the same customer experience during the payment, which means that for the NFC card you also defined a regular PIN and during the payment you are putting the PIN on the POS device. The payment is the same as for a regular card. If the pin is needed you put the PIN on the POS device. If the PIN is not applicable because the amount is lower than the limit, you are not required to enter any pin.

Relevance to us:

This is another example of the importance of keeping things as similar to the existing usage habits as possible.

Question #12

We would like to address some HCE project, because in such a version no MNO is required, which means that we can propose the service to all the customers that have the proper

telephone and Android system, 4.4. Because at this time many of the bank's customers are not either T-Mobile or Orange customers, mBank also want to increase the simplicity and the control of the process with an HCE project. The integration with T-Mobile banking is already done and it works quite well for the Orange project. So they are not changing the user interface, just simplifying the process in the back office and offering the service via HCE to a wider group of customers.

Relevance to us:

This is a consequence of the challenges they had with MNO-based solutions, and they saw that better control and better design of the customer journey is key to get the majority of users onboard. Also, this will increase the potential market giving them a bigger chance of getting critical mass.

One thing they are doing to encourage an application for a card is to give the customer a benefit just for uploading and using the NFC card. They also have an internal loyalty program for their customers, based on negotiated deals between the bank and external partners. If customers use the NFC card with these partners they get some special benefits like discounts or cashback, or anything else that was negotiated. This is applicable to many services, not just the NFC card. Interchange regulations in Europe make merchants more open to discussing big data sharing, and more open to special deals for customers and sharing more information about customers whom are shopping with a particular partner. mBanks benefit is that they see all the other customer behavior, while the individual merchant just sees limited transactions. The merchants see the detail of a transaction, but they do not know if the customer went to another shop which is their competitor. Geolocation is another functionality that telephones bring for such deals. Geolocation means that when customers pass by a shop they can inform that there is a special deal waiting for them at that particular store. mBank has that, not as a part of NFC, but as a part mobile banking.

Relevance to us:

These benefits are for all mBank customers and do not push people over to MNO or HCE mobile pay, from plastic. If they tune their benefit program to encourage people over to mobile pay, that could be a relative advantage. The connectivity available to phones are in general better for data sharing, gathering and use as compared plastic and definitely if compared to cash. So pushing the customer over to mobile will facilitate and accelerate cooperation with the merchants. This should prove to be a relative advantage. Linking mobile

pay to the geo functionality will for instance be a way to give merchants and customers a better, more dynamic and personal shopping experience.

Question #13:

There are a lot of customers who are using mobile phones every day, and not necessarily using the wallet every day. There is a lot of research suggesting that if you went out and left your wallet at home you will probably not notice it for a few hours, if you left home without your mobile phone you will notice immediately. So there is a trend that many customers would like to have more and more functionality in their mobile phones, and not have to carry a lot of other stuff with them when going out shopping or going out to dinner. This is one reason for use, another reason is contactless. Contactless is faster and simpler. Contactless works not only for small amounts, but also higher transactions. It is a universal way of paying with in Poland, and works in gasoline stations, restaurant and small shops. mBank has many innovators in their database, as a result of it being the first virtual bank in Poland, back in 2000. The customers then were high internet users. Their customers are still statistically younger than the average customer in the Polish market. They believe their customers are more innovative and more technology oriented. As an innovation leader we need to follow the trends since their customers want to be ready for the future.

Relevance to us:

Using the phone to pay is in theory more compatible with the users behavioral pattern than using cash or card. People are very attached to their phones and use them a lot more throughout the day and see them much more as part of life than, for instance, a bank card. A bankcard is an accessory one uses to pay and not much more. While the phone is a phone, camera, web browser, calendar, GPS, social platform, gaming platform and it should, I think, easily become the preferred payment platform. But even in Poland where contactless (card and phone) is practically universal people stick to their old habits. The transition to paying with the phone has not reached critical mass. The old ways are internalized in people's habits and even though mBank and others believe people want more functionality on their phone, the same people stick to the old ways when paying. This leads us to conclude that that both psychological and social factors inhibit the adoption, as well as some technical difficulties. The relative advantages are not big enough yet.

Q#14 Answer:

They keep track of competition following testing and new solutions that they introduce, and especially how the customer experience is implemented, communicated, sold and presented. They also rely on "live" data, which includes observation and asking the users direct questions. Updates are tested first on their own employees and then on customers. In terms of changing the versions and updating the product, they get very active feedback through the forum on mBank's website. This is just for the customers so they can share experience and discuss between themselves and with the bank. They also have a call center, so if they want to research some specific issues they target a group of customers to participate in the research. They also have a control group. When talking about improving the mobile app, they do a lot of individual interviews, to see how exactly they are using the app and how they are following instructions. It is important to follow the customer journey from the beginning to see if they start at the beginning or do totally different things. They want to have a rapport with the customer using the application on different devices, so they can improve it. They also want to find out why and for what the customer uses the application.

Relevance to us:

All their market surveillance and market research efforts are targeted at understanding the customer needs and behavior. As discussed earlier they initially did not focus much on what the customer needed and how to get the customer onboard. Their answers indicate a greater focus on compatibility issues and relative advantages, to create a stronger service that can cater to a wider customer base than today's solutions do.

Q#15 Answer:

In Poland around 90 % of the POS machines are already upgraded to contactless as a result of a program co-founded by the banks, Visa and MasterCard on the Polish market. Visa and MasterCard regulations also play a part because they force POS owners to replace terminals by a certain date. The last 10% of POS machines might never be upgraded because they are rarely used or not used at all. When looking at turnover the contactless availability is virtually 100%. A POS terminal in any supermarket will have a lot of transactions and will already have been upgraded. The same goes for terminals in bus stations, restaurants and so on. Very small shops or shops outside big cities are not upgraded and contribute to the total POS turnover only marginally. The bank's customers are located in big cities and surroundings.

They did not have branches at the very beginning, but now they have branch networks in the bigger cities and are much closer to a universal bank. They do not compete with such big banks like PKO BP (PKO Bank Polski) which has a branch in every small town.

Relevance to us:

This is just a further elaboration on the fact that the Polish market is virtually contactless ready, which should pave the way for contactless mobile pay. Most other countries have far less penetration of contactless POS. Interesting to see that a country with the infrastructure ready have so little use of contactless mobile pay.

Q #16 Answer:

The project with T-Mobile is quite complicated and lasted one and a half years. Some people changed jobs, then they were replaced, so they see it as a life project. When it comes to who was involved there were 2-3 people from the business side, one person from business analysis? and three people from IT, typically involved in these NFC projects. Different departments internally are consulted along the way, but are not counted. Many parts of the project are done outside; TSM is outside, personalization is outside, and all the regulations are on MasterCard. About 6-7 companies were involved; Trafica, is the processing company owned by MasterCard and they were the interface between the bank and Morpho, so it is Trafica, Morpho, MasterCard, Mobile operator and the TSM of the mobile operator and each mobile operator had its own company. Probably 3-5 people in each company were involved.

Epilogue:

At the end of the interview we asked about HCE, which is big with other companies, but not much discussed by mBank.

Because of a new standard they can address the NFC technology on mobile phones differently. This gives more control on the bank side. Additionally they want a service for those who are not customers of Orange and T-Mobile. Lastly, mobile operators decided to introduce banking services on the Polish market, which means that they become direct competitors to mBank and other banks. This means that mBank looks differently at them now. Of course they have the deal with Orange and are going to continue it. With T-Mobile they do not see any additional value to continue this operation, but still carry the cost of keeping this functionality alive for the customers. They decided to use HCE technology and build newer

solutions more open to the customers and independent of the mobile operators. They plan to launch it to customers in Q2 2016.

Relevance to us:

They hope that the new technology (HCE) will solve the problems addressed in the interview. Creating a smoother customer onboarding and experience is key. Having greater control is also key. Cooperating with other partners as they please, not being locked in a limiting service with MNO is key.

Eika Safe Analyses and Discussion

When analysing the interview with the Norwegian bank group, Eika, it is clear to see that they look at mobile pay from a technical viewpoint. Secondly, they see their work with mobile pay as an experience gathering process, while they wait to see what happens when the bigger companies start moving to mobile pay. Only marginally do they consider the customer, and when they do, they focus primarily on convenience for the user. They do not expect their solution to be a commercial successes and they are promoting it very lightly, mostly relying on internal users. However, they do try to be innovative it their whole organisation and would like to engage in partnership with the big companies directly, even though they are a small bank in a small country. In this section, we will further outline the relevant findings from the interview.

Eika emphasises convenience for the customer. They saw early that convenience matters to the customer when paying. This realisation began all the way back when they launched contactless bankcards. Contactless cards are now standard and the experience they got with launching them is brought into the work with mobile payment. They did not investigate much what the customer wanted, instead they relied on experience with payment solutions in apps, internet banking and plastic card. They also relied heavily on international trends. They only asked customers at the start of the project with mobile pay. Practically all other user feedback has come from employees using the mobile pay solution. The exception being some enthusiastic bank customers and the feedback from field tests in some towns in Norway. The bank trusted their knowledge about convenience and built their service around that. This meant that their goal is that the customer only has to use three or four clicks to get started using the app. They identified getting started as the big leap for the user. Since they relied heavily on intelligence from trends in the market they noticed that other services were difficult to get started with. This gave their technical providers some difficulties, but Eika

firmly believes getting the user going as easily as possible will be the key success factor in the future. Therefore, it is not without risk they go forward, very much without dialogue with the customer. However with no "BankAxept" (Norway's national payment scheme, used for 9 out of 10 domestic card payments) available, user convenience is low, hence it is extra difficult to deliver a value proposition to the user. This realisation is seen as a window of opportunity to try different angles since the market in Norway will not move until BankAxept is available. Eika does actually try; they have launched their service on full-scale contactless cards in several communities. The most successful was in the popular ski resort town of Geilo. This was due to some innovative key influencers, which got the local businesses on board. Since they started early with this kind of service, they got much free press and lots of word-of-mouth. This is an example of how important it is to gain momentum in a small place (or user group) so that one reaches high involvement from POS and key influencers and media at the same time. This shows the importance of social factors in general and the importance of getting a high density of places where people can use the service. This gets the new behaviour internalized and strengthened from purchase to purchase.

Overall, they focused very much on the technical aspects of the service. The talked a lot about challenges with suppliers and about turf wars going on between different big companies. These turf wars are believed to be growing and it seems as though Eika believes the tactics and strategies of big companies like Google, Apple, Samsung, MasterCard, Visa as well as the big mobile companies, will decide the market for mobile payment. They believe in two years' time their service will be different and they will be competing with and cooperating with different partners than today. The introduction of BankAxept will be a game changer and greatly enhances the value for the end user. Adding to the motivation to use mobile payments in many different aspects. Eika partner with Samsung and have secured a position where they are in the forefront of development. They actively, and at the time surprisingly, abandoned technology that depended on mobile operators. This was due to technical reasons and their wish to bet on technology and solutions that would give them the best payoff. Payoff in terms of long-term knowledge and experience in developing and managing mobile payment solutions. They also jumped on the bandwagon of trends in Europe, where mobile payment solutions dependent on the mobile network owner had little success. Their hesitance to seek information from the customers might be due to the fact that they believe time-to-market is a success factor. So they rather develop a service themselves that can be launched quickly, rather than researching for a long time what the customer wants. This could be a good strategy since first movers often have an advantage in persuading the market and getting

actual user feedback. At the same time setting the standard somewhat with their presence. There is off course the risk of failure and loosing trust among the potential customers.

An example of their eagerness to try to learn is that they have their service as an separate app instead of in the mobile bank, which many have. They believe that what is the norm today will be different in 2-3 years so they mainly just "do something" while they look at the market evolve, and study change. This might jeopardize the relative advantage of being early and the potential loyalty of long time usage. Also planning to do many changes might disturb the customers in the sense that people rarely like change and one would presume that to be extra true when dealing with purchase and personal finances. These considerations might be the reason why the service is not marketed and its majority user base is the company employees. They also stated clearly many times that they are after experience at this stage, not commercial success. In the short term, they look at services transferring money from person to person (P2P) on the mobile, without going through the online bank as a more mature market. Where one Norwegian company in particular (DNB with Vipps) have gained great commercial success. Their success it attributed to marketing and branding, not their technically superiority. In Norway, this market is much hotter than mobile pay at POS, right now.

They do, however, hope for commercial success in the future, by focusing on integrating mobile pay with personal finance management and reward systems, customer loyalty programs and added value, to enhance the user experience. When they talk about the future they are customer centric, and when they talk about the present they are techno centric. This leads us to believe they do not see mobile payment today as a mature enough product ready for diffusion beyond some early adopters. Strengthening this impression is the fact that even though customers wanted contactless pay from their cards, they did not request mobile payment. Therefore, Eika launched mobile payment for their own learning, because they see this as a long-term trend and they want to be ready when (someone else) solves the code for successful roll-out of mobile payment. This is because they believe they learn more from trying something themselves rather than just reading about it. They want to be prepared for a changing market where outside companies come in and disrupt, causing insecurity about the role of banks. They see companies like Google entering the market to get a big share of customer data. Apple Pay and Android Pay market themselves as payment schemes, seemingly competing with Visa and MasterCard. This is seen as a step in building customer preference on behalf of Apple and Android, since their solutions in effect are Visa and

MasterCard. Eika is interested in how Visa, MasterCard and traditional banks respond and who wins the customer preference.

 Overall they are not very concerned about the individual customer needs and wants, they are concerned about technical issues and macro market issues. They see the battle as a battle of brands rather than actually making a killer service for the customer. They did not mention the possibility of a dark horse emerging, disrupting the market. Like Tesla in the car industry and Uber in the Taxi industry. It is interesting to note their conservatism in regards to new market entrants. They trust the customer will prefer solid well-known brands with big budgets and big impact. Even though they believe big business will decide who wins the mobile payment war, they believe standards at the POS terminal side and the user side is key. The more universal the standards on the terminal and user side, the better they think it is. One would argue that standards are beneficial for the user also, it would be a relative advantage for instance against cash, which usage differ between countries, and plastic cards that have some limitations and extra charges dependent on where it's used.

About other tangible advantages, they highlighted the speed and convenience of issuing and cancelling cards on the mobile phone, contrary to plastic cards. A customer can have their bankcard on the phone within 30 minutes, instead of a week for a plastic card in the mail. In addition, people can keep paying with their card on the phone even if their physical bankcard is lost. Faster, flexible and more customizable distribution around the cards is seen as a relative advantage against physical cards (and cash). Another advantage is that the user does not need WI-FI to update the token in the card. This is relative to HCE, not necessarily relevant when comparing to plastic card or cash.

 Unfortunately, what is convenient for the customer is not hassle-free for the bank. With the current strategy, they are dependent on the mobile phone producer, like Samsung. This is because there is a lot of integrating, updates and tweaking from phone to phone, and they have to wait until the producer gives them a phone before they can start the actual work on getting their mobile payment solution to work on that particular model. This causes time pressure, uncertainty about workload and a situation where they rely very much on outside factors. They are lucky enough to get Samsung phones at an early stage, but what the future holds is uncertain. Their success with opening doors with the big companies is attributed to greater ownership of innovation throughout the organisation, from CEO down to the product and solutions managers.

We argue that security is a compatibility issue when talking about mobile payment. Compatibility can be practical, but we believe the greatest compatibility barriers in mobile payment will come from more personal compatibility issues. Compatibility can mean that an innovation has to be in line with the customer values and preference. Protecting one's money is a core value for most people. Therefore, if mobile payment solutions do not deliver on security it cannot be said to protect people's money, which would make it incompatible. So convenience is good, but unless it is secure without too much hassle, it will not be in line with people's demand in a payment solution. People would then rather use cash or the plastic card. From a technical perspective Eika argues that mobile payment is more secure than plastic card. They, as a bank, are very concerned with the safe being of their customer's money. In Norway, banking is seen as very secure, and society in general is seen as a secure place to pay and do transactions. However, Eika does see security issues with, for instance, identifying the person making the purchase, as the person actually entitled to make that purchase. However, anything can be stolen already, cash has no ID and bankcards can be stolen or registered under false ID. Paying on the web with stolen plastic is easier than paying online with a stolen cell phone with a mobile payment solution installed. For Eika their customers already have contactless cards so the transition to contactless mobile pay is seen as small, and it is more secure than chip or PIN on the plastic cards. Eika has actually not had one single negative feedback about security. They see the success of mobile pay more as changing people's habit, making them accustomed to using the mobile will make them feel more secure about it. So repetitive use is a key factor.

Short summary of the interview

What is most relevant for us to take out of the interview is the focus on convenience and standards. Eika talks about how to be able to get started only using two or three operations. They are not satisfied with the number of operations yet and are working on it. We see that complexity issues and requirement to make the solution as easy as possible to get started with is the most important factor. Our biggest realisation in this interview is the complexity of getting the end user started might be the biggest issue for success. We saw this with mBank also and this leads us to look for more signs in the other interviews that point in favour of complexity as a decisive factor. The second important factor is the need for standard solutions amongst competing companies. This is especially relevant in Norway with BankAxept, but also in general.

OPBank PIVO Analyses and Discussion

The representative from OPBank, the dominant Finish mobile wallet, was very loyal to the questionnaire. He gave his answers in writing, followed by a short follow up call. That is why this analysis will be sectioned more in line with the questions. This is done both because this best captures the respondent's actual answers, also it shows the questions we used.

Number	Question & Answer	Relevance to our paper
1	Can you please tell us about the process that led to the decision to offer your customers mobile payment? If possible from the initial idea, the discussions, to the final "go". Answer: They employed a lean startup approach with an initial hypothesis about the business model. They made prototypes and released a pilot. The validated the progress by interviews and surveys. This led to a great success. This is how OPBank explained the essence of how they thought, in his own words: "That just delivering the technology is not enough, but obviously that's not the case. We always try to actively validate from the start, beginning with the user. We start the project with a user study, identifying the customer pain points. That is why we for some time did not focus on the payment at all. When we identify a certain feature, we build a prototype. Every step along the way we conduct other studies and check other experience, to understand usability. We have a friendly user base which helps during the pilot phase. We encourage them to try different features and see how that preforms and	They emphasize the commercial aspect with high priority on business model and dialogue with the users along the way. This leads us to reason that they look for relative advantages and look to ensure compatibility, from a user point of view. As opposed to looking inward at one's own organization, looking at what is technologically interesting or merely reacting to external trends and pressure.

	based on the feedback we adjust the direction. It is an unknown concept to us to put together a technical concept and see how that works out. "	
2	Can you describe the technical solution for your mobile payment? Answer: They chose NFC with Host Card Emulation, with "card-not-present" (CNP) payment possibility. CNP is payments where the merchant, like web or phone purchases, cannot examine the physical card.	N/A
3	What were the main reasons that made you decide on this solution? Answer: OPBank believed this solution to be the simplest and best solution available. Their solution avoids TSM. POS transactions where not the most important part of their technical solution. "Card-Not-present" payments where more important.	N/A
4	Briefly state the strengths and weaknesses of your solution? Answer: NFC HCE provides High Value Payment (HVP), but is not available in all POS terminals in Finland. The solution does not work with payments through Apple devices. CNP (Card Not Present) payments require online store integration.	Questions two, three and four tell of a strategic approach that goes far beyond a POS mobile payment solution. PIVO is a payment and personal finance management service, which includes many services. They look at the service as a whole and

		what it does for the user, instead of choosing necessarily the perfect, most robust or most flexible technical solutions. For instance, they chose a technical solution that potentially alienated apple users. POS sale, which we look at, is a peripheral service. So given the fact that they did have close contact with the users and still made those above choices would suggest that the customer have other preferences when it comes to relative advantage, compatibility and social factors regarding payments. The potential users do most likely not request POS mobile payments.
5	To call the project a success, what goals were defined? What critical user mass was needed and when? Answer: OPBank rates the services success by the number of daily active users. PIVO have an ok number of daily active users, but have not reached the target of critical mass. Accumulating critical mass target is a goal. They rate the users of the app,	Critical mass is important; this is to get the positive effects of social factors to adoption. Making the service a common service is seen as important to solidify the solution as the dominate solution. Average daily users is important to monitor in what way the

	not POS in particular, which, as stated before, is seen as a periphery part of their service.	service is becoming a habit and routine part of peoples life when making purchases and dealing with their personal finances. High return usage is seen as an indication of high compatibility with the user's preferences. That would also indicate the presence of some relative advantages as triggers to use in the first place.	
6	How many of your customers/cardholders (by percentage) have installed the mobile payment solution? In addition, how many use it? Answer: About 25%. This is one fourth. Hardly enough to reach critical mass. They see the service as a success although.	With high daily usage but low install rate amongst the user base. One would argue that the adoption spread advantages coming from social factors like visibility, word-of-mouth and peer-pressure is not reaching its potential. This number is installation of the PIVO Wallet, not NFC Mobile Payment.	
7	How is the trend? Increasing\decreasing installation and use? Answer: Usage is increasing slowly but steadily, little by little.	People adopt and implement, but the individuals positive attitude does not, as stated above, ignite a landslide of new users. Reaching critical mass seems slow and the	

| 8 | Are there functionality or aspects of the chosen technical solution that you consider important for the success for the end-user experience?

Answer:

Push notifications and simple visualization is key to sustained use. These are success factors for the payment app itself.

The most critical success factor is helping customers understand and control their spending. Visualisation is key, letting the customer see their spending, when it happens and they feel safe about it even though they have many different payment options. This is much more valuable than replacing the card. | social factors does not seem to have an effect on getting new users onboard.

Sustained usage is a key for PIVO. Sustained use is also paramount for general adoption, so it solidifies as implemented in the user's habits and minds. This is the first step to having an adoption spread through social factors. Push notifications and easy graphical user interface (GUI) are both advantages, if they are relative advantages one has to compare to something. We are not concerned with banking apps in general so we will not make that comparison. What is interesting to us is that none of the key success factors is in competition to the bankcard or cash, directly. As will be evident further down, OPBank sees the bankcard living in symbiosis with the mobile payment service for many years still. They do not see the need to |

			try to compete with the card on POS transactions.
9	Are there functionality or aspects of the chosen technical solution that you consider bad or even a "show stopper" for the end-user experience? Answer: When asked about the shortcomings only one aspect focused on the end user experience, which was that there is a difficult authorization logic. Other shortcomings is the NFC antenna placement. The BankAxept also expressed concern about High value payment HVP) vs Low value payment (LVP).		When asked about functionality aspects, we would, from a user centric point of view, expect the issues to be about what inhibits individual adoption and what inhibits the spread of the innovation, given that they only have 25 % of their own user base as users. As with others respondents, OPBank is more concerned about banking issues and purely technical issues. If a service has authorization issues that could lead to a concern about the security or make the service cumbersome to use. This could cause incompatibility concerns and cancel out other relative advantages the service has.
10	How do you inform the end-user regarding security for the product, so that these concerns will not prevent an end-user trying it? Answer: OPBank acknowledges that people are different and they think of security differently so obviously they have to address it. People trust		OPBank has gone to great lengths to ensure the customer is well taken care of and to ensure they easily get full benefit from the service. Ensuring customer satisfaction is a prerequisite

	them, but a small and declining demographic will always need extra security assurance. Mobile banking is actually safer, even though the other banking services are safe too. Pivo has a good concept around security. The concept around security was a part of teaching the users about the service and get them to use it with ease. OPBank is were very conscious about security and the need to reassure the users. Videos, FAQ's and tutorial gives good customer support.		for repeated use and so that social factors off visibility, word-of-mouth and peer-pressure can act positively between existing users and potential users. Also taking the customer seriously and helping them and making them feel safe is a good way to assure that the service is compatible with the customer values and preferred way of use.
11	How has the focus been on making the product user friendly? Can you give examples from an enrollment perspective and usage perspective? Answers: From the start of the project and all the way through until release, OPBank sought feedback from the user to get verification about every part of the service. PIVO has 50 % weekly active users. This is a good indication of the user-friendliness, that actually half of those who have the app actually uses it on a daily basis.		Again, the service OPBank talks about is their payment and personal finance management solution, which includes their app. POS mobile payment is a part, but it is clearly a marginal part of the service. User friendliness is seen on an overall basis on the app. User friendliness regarding POS mobile payment is not talked about at all. User friendliness assures compatibility and we must assume that the POS part of the service is user friendly as well. However, PIVO

		particular, has has not tested this far as we are told.
12	What are the additional needs you want to create, to amplify or uncover, in the minds of the users? Answer: OPBank wants to further enhance their service and usage in regards to loyalty program integration and more personal finance management. POS mobile payment is not a focus area.	Loyalty integrating and PFM (Personal Finance Management) are services that could enhance the relative advantages of the payment solution. If Mobile pay at POS starts to be a preferred means of payment loyalty integration and PFM will have great synergy with mobile payment at POS. This because both PFM and the loyalty integration is on the mobile app. Therefore, if the mobile is used for payment also, then one would argue that this integration of everything in one place is a relative advantage over using a plastic card or cash for payment, while the PFM and the loyalty programs are on the mobile phone.
13	Concerning the customers «reasons to use», what are the inconveniences or problems you offer to solve for the customer? Answer: The biggest pain is "I wonder if can by this and will I have enough money until salary day".	OPBank is not concerned about the means of payment, cash, card or mobile. They have not launched their mobile app to compete with cash or cards. They do not

	Connected payments are important, that is where the mobile can add value, by connecting the payments into the display of the mobile. That is the fundamental big thing. Given the changing legal and legislative issues for banks, the ones that are able to describe the consumers spending in a more convenient way are likely to be company that is more successful. Payment options like POS Mobile Payment, are not enough; you need to provide high quality information about the consumers spending. OPBank are only concerned about creating value for the customer. Mobile payments is not a goal, but it can be a vehicle. NFC Is only a part; it will not cover every payment need. They want to complete e-commerce with their mobile. A future need is the problem with loyalty. They have been doing a pilot and getting feedback that NFC could be so much more convenient if the loyalty would be integrated.	see cash or cards going out of date any time soon. Obviously when a potential facilitator of an innovation does not push the innovation in the forefront, can one even say that Pivo treats Mobile pay at POS as an innovation? It seem it is more just an added functionality, more though than an actual innovation supposed to suppress a prior product, service or idea. When that is said, the mobile payment service of OPBank seems very innovative and the service has potential for diffusion through social factors, it has advantages and arguably relative advantages. OPBank know the customer and is committed to delivering very compatible services.
14	What research have you done to verify that what you are offering is what the customer wants? Do you have a process to change future versions and update the product according to customer demands? Do you keep track of what competitors are offering?	With so much effort going into planning, and then monitoring, without POS mobile payment being raised as an important innovation. We must consider if mobile pay at

	Answer: OPBank did hundreds of interviews while working on the service. The service have real-time monitoring. OPBank is not very concerned about the competition, even though OPBank pay them some attention.	POS is a mature and relevant innovation at all, in the Finish market.
15	How many POS terminals (in percentage), have been upgraded to support NFC, where your customers are paying? Answer: Only 20-25% of POS in Finland are upgraded to support NFC OPBank are using mobile pay at POS to enhance the existing service. Enhance is more valuable. So that when more terminals are ready and users shift to using the mobile, their existing service will still hold.	This might be the factor limiting the spread of POS paying with the mobile. In addition, this number might be that fact that makes OPBank not invest in POS mobile pay. Their strategy is creating a broad service that is relevant for many people and create value. Given the marginal potential places to use the mobile to pay at POS, it is doomed to be a peripheral service lying dormant until outside factors make its potential usage greater than it is today.
16	Approximately how many people were involved from your company in the project? Answer: The project was not very large, less than 10 people were involved internally in planning. Now it's operating about 20-25 people are involved.	N/A

17	How many other companies were involved and approximately how many external people where there?	N/A
	Answer:	
	The project did not relay heavily any outside help, two companies where included, employing just in the excess of 10 people.	

Summary of the interview.

For PIVO, we found these factors to be most relevant to us: OPBank relied much on customer feedback. Encouraging the end user to try different functions and give feedback. PIVO was then adjusted accordingly. We interpret this as a way of eliminating complexity issues, finding advantages and trying to make the service as compatible as possible. This is in line with our assumptions, but we see OPBank emphasis complexity more than we had foreseen. All three cases (Eika, mBank and OPBank) have then focused on eliminating complexity as an issue. This further confirms our belief that dealing with complexity could be an important success factor.

OPBank are also concerned with making their solution a dominant solution. This means reaching a critical mass. As with all the other respondents, they are far from reaching critical mass and have problems with getting users started. PIVO has high daily usage from those up and running, but low new install rate for NFC function in PIVO. The big difference with PIVO is the fact that the payment solution is just a small part of their personal finance management solution. End users can have the PFM solution without enabling the mobile pay solution. The PFM is a success, but this functionality does not add NFC mobile pay too users in large volume. The OPBank respondent admits that how the end user pays is of little importance. The slightest sign of complexity of getting started might discourage even the most curious end-user. After concluding the analysis of 3 of 4 interviews we see that complexity for the end-user just to get started and challenging solutions makes trials difficult and includes many uncertain factors, as well as many opportunities for errors. Everyone is concerned with reaching enough users to get critical mass and establishing standard platform.

Intermediate case summary:

In line with the flexibility of case studies and the option to change design and research focus during the research, we treat the last case interview differently. We have analysed each prior case and made some comparisons. We have tried to keep what the respondents said and our analysis somewhat separate. Given our prior work with the other cases and the way the next respondent spoke freely, without much regards for the way the questions were asked, we found it best to use the next interview as a bridge to the conclusion phase. So in the next case we blend what the respondent said with our analysis, and we draw in the findings from other cases. In addition, we make some conclusions that will be elaborated in the conclusion phase. We feel this gives a good inter-case analysis and god analyse of this isolated case. It also makes a more natural transition to the conclusion.

SpareBank1 ValYou Analyses and Discussion

This is the analysis of the interview with Sparebanken1 Gruppen (SB1), and the ValYou project they were a part of. The interview was conducted in Norwegian so what the respondent said and the analysis are mixed together, since we have to translate the Norwegian transcription into English and blend it with the analysis part, which is in English. This respondent did not follow the interview questions, but rather talked freely about the subjects. We steered him back on track if he diverged from the subject. ValYou's owners terminated the product on the 30th of November 2015, a few months before our interview, but we wanted to look at ValYou as a case and "as it still was up and running". So we agreed to this approach before the interview.

Q#1 Answer:

ValYou was not to be a technical test project, but a pilot, the start of a rollout and then building volume. They wanted as many as possible banks to join, so all Norwegian banks were invited. Eventually only Sparebank1 Gruppen (an alliance of 16 banks) and DNB, which became a shareholder of ValYou, participated. They ran it as a typical project, starting with a pilot. This was not a pilot which would be evaluated and possibly shut down, but a pilot that was used to make the solution robust before rollout. The goal was that this should be a volume product and the start of NFC payment together with Telenor and DNB. As mentioned, especially the Norwegian banks want collaboration and create a standard. This is no surprise given the success of BankAxept.

Relevant to us:

The choices made by SB1 must be seen in light of collaboration tradition in Norway and the success with bank collaboration in particular. Unfortunately, the telecom business does not collaborate, as SB1 would learn. SB1 also emphasise volume as a prerequisite. They will learn fast that complexity is a problem with getting volume. We see the same at all four cases: They need volume and se benefits of the solution first at volume, but they encounter different complexity issues that makes volume difficult.

Q#1 Answer:

The world around SB1 almost forced SB1 to enter into mobile payment. They created a strategy for the next generation of card payment for SB1. Contactless cards and NFC mobile payment is in practice the same for SB1, both are NFC. It is about the handsets that has been equipped with NFC. The world moves towards mobile as the main form factor for payment and other purposes. SB1 had great success with mobile banking, so NFC contactless payment is just a natural next step in development and it fulfils the wishes and demands of customers. Ultimately, SB1 want to create that need. However, they did not believe the customers demand contactless mobile pay right now. SB1 believes that they should ask people what they want and what they think about credit card payments in the shop. Nobody will call for mobile pay if it is not brought up. Everyone is online nowadays and with mobile, the bank gets the opportunity to use that media to get out into the pocket of the customer. SB1 gets a two-way channel to the customer and can use that to do much more then they can with plastic cards.

SB1 acknowledge that today's solution with cards and cash is good. The customers are content and even though they already carry with them a potentially better way of paying, they are content with the status quo. The reason to pursue NFC mobile pay is due to them identifying at least all three of our characteristics. First of all the fact that people get more and more of their services and needs catered through the cell phone means that payment should be very compatible with people's habits, routines and practical preferences.

Relevant to us:

Many potential relative advantages are apparent as the bank can use the mobile on a much greater scale concerning communication, tracking and serving the customers, compared to

plastic or cash. There should be no social factors inhibiting this either, although, there might not be many social factors motivating contactless mobile pay either, since today's way of paying is one of the universal ways of doing something in the whole of society. Wherever it may be, city or countryside, developed or developing country, it is either cash or card. There are exceptions, with for instance Mpesa, but in developing countries, cash or card is extremely well rooted in all lifestyles, amongst all social classes and among all cultures and religions. Changing that will be quite a task. The respondent from SB1 has many reflections around the paradoxes and the challenges, further on in the interview. However, the biggest challenges came from a technical and practical place. Which is the subject below.

Q#2 Answer:

SB1 chose a partnership with DNB and Telenor and the main technical choice was the SIM chip as Secure Element. This means that they could store a full card in a safe manner. The choice was influenced by the fact that DNB and Telenor had started cooperation before they got into it. The collaboration appeared to be the most realistic, the most accessible and the most mature approach to mobile NFC. Today other technologies seem like a better alternative, but they did not think so at the time. The actual technical solution they went for needed a fully-fledged TSM service and that was chosen in the company (ValYou) already at the time they got involved. It was Gemalto's TSM, which ensures that one can download a fully-fledged card right down to the SIM in the phone.

Then there was the EVRY solution that lets the customer order the card quickly and get the card to the mobile in real-time. For all card production, the process is batch based. The SB1 solution is fast and it is the customer that initiates the process. Another important part is called VISA Mobile Gateway; it is the return channel one must have to keep track of the bank's risk. It is also used for resetting offline counters and it is used to block cards. In plastic cards, this happens between the card and card terminal, when the card is in the terminal. Offline parameters are set on the product in CAS (Card administration System). So that when the customer orders the card product, it has the appropriate offline parameters. When available offline purchases are used, for example, after making 10 offline purchases under 200 NOK, the customer must make a payment by entering the PIN. Since the card is not in a terminal, they contact the card through the Gateway solution. They get hold of the card via mobile internet and can control it.

Relevant to us:

Looking at the answers we got from SB1 it seemed reasonable for the bank to team up with Telenor (largest MNO in Norway) and DNB (largest bank in Norway) made sense, for many reasons. Technically, they also could do what they needed with the solution, but as the interview will show, there were obstacles that eventually would stop the whole project. First the respondent shares some more about the background for their actions and the choices that were made.

SB1 wanted to collaborate with other banks and make a de-facto market standard. The market share of SB1 and DNB is substantial enough to set precedency. This is in line with the theory that you need to gain critical mass as soon as possible to "own" the market. That will boost social factors, like leveraging peoples use of social media to spread news combined with the sense of something new (innovativeness). Making it a "standard" in the eyes of the consumer, competitors, partners and regulators. The urge to be first mover can make companies go for solutions that might not be the best or solutions. The idea that the banking industry agrees on some common technological ground and moves the market together seems logical. This has proven to work before, with common technology for mobile network for instance (GSM) and the classic example of VHS getting market standard, even though it was not the best solution. So moving fast, moving strongly in numbers and trying to agree on a platform before potentially confusing the public with different technology, was certainly at the time a good strategy. The fact that ValYou was based on a theoretically solid foundation and still failed, is very interesting. Many other POS mobile payment have failed due to lack of a proactive strategy. ValYou was a collaboration of very mature and competent companies, collaborating with a clear goal, building volume, sharing cost and establishing a standard. Next the respondents talk about the strengths and weaknesses of the solution.

Q#3 Answer:

What we were trying to achieve with mobile NFC is technically very complicated. Despite the fact that many have tried, only a few, if any, solutions are a success. It is so complex to get it to work with stability. They are vulnerable to the customer who owns the phone. The customer changes phones, upgrades software, changes the settings. The customer has so much control. The end-user does things the bank cannot spot or react to. So if problems occur they are hard to solve. It is easy to get the card to work on the phone and to arrange the actual payment, but there are still many factors that the bank cannot control or even know about.

The strength is a relatively strong handset independent solution. The security element is not owned by the handset vendor, but is owned by a telecom operator. They felt that telecom is the industry best at managing chip security and customer relationship through a chip. Everyone has a mobile with a SIM that is a chip. Both telecom and banking have strong authentication of the customer and high security. This means it is a full card into the phone that is not tokenized, nor based on HCE. Since they have a fully-fledged security element in the phone, they can provide full offline keys. The cards can be used for offline payments, with the bank holding the risk.

This technically complex solution is most challenging for a card issuer. The other technologies based on HCE require the handset being online and makes card downloading to the phone much easier. The card issuer has better control. It was a risk to go for the other, SIM-based solution. They thought it was important with offline payment, but in retrospect, they can see that it might not have been. Secondly, phones are more and more online these days.

There is a weakness in technical and commercial dependence on telecommunications as an industry, and in this case with Telenor. They struggled to get the other major telecom operator in Norway on board, without whom they did not achieve full coverage. They did not get access to the NFC antenna on the IPhone. IPhone bundled the NFC antenna with their own payment solution.

Relevant to us:

Dependency, control and the wish of providing the service as close to how the customer would use a plastic card (or cash), give some paradoxes and makes for some tough choices. Obviously cash is never "online" or "offline". In addition, plastic cards are not dependant on Wi-Fi or mobile coverage. Therefore, it is understandable that offline pay is rated as a more compatible mobile pay usage than needing to be online when paying with the phone. It is also logical to give the secure element responsibility to someone who is familiar with chip technology and security, the MNO. This reassurance should make the customer feel safe and feel reassured that the whole value chain of mobile pay is in competent hands. Everyone who wants to use mobile pay has to have a mobile, so they have a relationship with an MNO, usually a closer relationship than with the handset producer. They trust the MNO in a different way, so it should be a relative advantage to collaborate up with the MNO. Also in a social perspective, people trust the MNO with their personal information already, when

subscribing, so they should more easily trust them with payment issues, rather than the handset producer. In theory many factors encourage adaption when using MNO. In reality, there are control issues and dependency issues, as well as technical difficulties. The most important factor might be the distance and lack of two-way interaction between the bank and the customer, in the on-boarding phase. Too many people fall off before trial, they get annoyed with the complexity or they give up trying altogether. The customer is left too much on their own or into the hands of third parties, like their MNO. The problem with getting people to even try, which is a prerequisite to adoption, is apparent in the next paragraph. One should also not underestimate the negative impact failed visibility has in a trial phase. Visibility is positive for adoption in a social sense when people can see a successful use of the innovation. In addition, it will motivate the person using the innovation, if the action is successful. However, visibility will discourage onlookers from trying if they see the innovation as cumbersome, or if it fails. This will also make the person using the innovation feel some social stigma and be reluctant to try again. So "holding the customer's hand" throughout the initial usage phase is as important as getting them to make their phones practically ready. As we see below, even getting the most positive people to make their phones ready proved difficult enough.

Q#5 and Q#6 Answer:

To find the potential number of users they had to peel off those who have the iPhone, how many use another MNO thanTelenor customers and how many have android phones that do not have NFC? Through mobile banking service, they log some information about what phone and MNO customers are using. Based on that, they set some goals. For the pilot the target was 500 handsets, in full use. They had low expectations because there was no open market, where people are waiting to get mobile NFC. They needed to create that need. Therefore, they were unsure about people's willingness to adopt this first version of mobile NFC pay. They invited 500 pilot users, like employees in SB1 Oslo and a few external people who were interested parties such as people working at TSM Nordic, EVRY and such. Even then and even with a positive affirmation from them that they would participate in the pilot, they struggled. After half a year, they got 280 pieces. This shows that at that time, even people who we could call innovators and early adopters had little interest in mobile NFC, regardless of MNO or if it was HCE based.

After looking at what actually happened we asked about the potential benefits for the end user. The most obvious advantage for the end user is that they can simply pick a telephone up, hold it up to the terminal and pay. For Low Value Payment no PIN is required and the phone may be in sleep mode, with black screen. Just put it on the terminal, it goes "bip" and you have paid. Another benefit is that the front page of the solution shows the customers balance and last 10 transactions on the default account, which is very relevant to the customer, because this is what generates most logon to the mobile banking service. People frequently check just the past transactions and balances. Combining the card and the account means you get info when you need it. It is a simplification of everyday life and that is what the customer is interested in. Customers are not so concerned that we can use their electronic tracks to sell more insurance or loans. They just want something a little easier. Like seeing how much money you have in the account at checkout or after you have paid.

Relevant to us:

ValYou did want to give the customer some reasons to use the solution. They had some idea of what would make peoples life a bit easier and more convenient. Small practical benefits like making LVP easier could be a real benefit, and a strong relative advantage. People carry the phone anyway and grabbing the card or cash with a few items in their hand and the mobile phone in the other is slightly cumbersome. It is easier to just "bip" the phone, which many keep in their hand or otherwise easily accessible, instead of trying to find a small bankcard in a bag or pocket. However many have their cards in their mobile phone casing. In addition, many have contactless cards. Therefore, it could be just as easy to swipe the card as to "bip" the phone. People are also growingly concerned with preserving the power in their phones, so adding a power consuming process to the phone might not be so popular. People might also be concerned that thieves will steal their phone and go "beeping" all over town. It is theoretically a good idea to propose LVP "beeping" as a convenient and easy way of paying. Nevertheless, it could be wise to at the same time address the fear of theft and the concern about having power on the phone. Just proposing this slightly more convenient benefit probably will not win over many customers.

Q#7, not relevant since the product have been discontinued

Q#8 Answer:
Showing the balance and last 10 transactions is a good idea, but the question is if people really need that information as they stand in front of the POS terminal. This might be information a person needs prior to making a purchase choice, well in advance of them standing in front of the POS wondering if they should use cash, card or mobile to pay with. So linking this to a benefit of mobile pay is questionable.

Relevant to us:
However, the benefit of getting that info on the phone is good, but perhaps more as a mobile banking benefit than mobile pay benefit. Market research to check what the customers is absent. Anyway, the strengths proposed from Sb1 touches into compatibility issues, relative advantages and social factors and further strengthens the notion that these three factors have been considered as success criteria for mobile pay.

Q#9 Answer and relevant to us:
Sb1 where left making assumptions about customer needs, and preferences due to the low participation in the pilot. Therefore, the pilot did not supply the customer feedback one would want. The problem with the pilot illustrates a pattern we have seen on the challenges of getting people to even try mobile POS pay. These unfortunate circumstances could have been handled better. The bankcard must be downloaded to the SIM. This requires a certain type of SIM. From Telenor in this case here. Initially, no one had the right type of SIM. The pilot participants downloaded the app and then the app ran a technical check on the phone. A software that finds out if this handset is capable of receiving mobile NFC cards. Some factors have to be checked of; it needs to be a mobile with NFC, android and a SIM card that support it. Those who did not have the needed SIM got a message "click here so order your new SIM card" and then you will receive it. It is not just changing the SIM; they also need to reinstall Bank ID on the mobile, since it is connected to the SIM. It is a clumsy process and many did not follow through. Only after customers changed SIM and reinstalled Bank ID could they actually go into the mobile banking, order the NFC card and receive it on their phone. Therefore, even though the pilot participants had the right handset, NFC and were Telenor customers, they fell off due to the SIM changing. Keep in mind this was employees who were positive in advance, one can imagine what a regular customer would think when told that he or she will get the SIM card in the mail in about a week, along with a long letter with lots of

instructions. Issuing new SIMs is a big cost for the MNO and not something they do in a massive push without very god incentives.

People will wait and people will go to great lengths to get something, but only if it is worthwhile to them. So the fact that highly motivated people get thrown off by changing SIM and reinstalling Bank ID just shows that there either isn't sufficient reason to try or that the reasons aren't communicated and marketed to the would-be users. The notion that the benefits of mobile NFC pay are self-explanatory does not seem to hold.

Q#10 answer

When people do not see benefits, they might look for reasons not to try to use, and may stop because of security issues. Sometimes it is better not to bring security into the discussion at all. Which communicates that this is so safe; we do not even need to talk about it. SB1 has that approach. If there is any trouble with the security of a card, the bank takes responsibility. If someone asks about security, for instance on a blog, they respond. They maintain the security of cards and Norwegian bank customers trust banks. They do not want to make it an issue, discussing and comparing the security of one payment method against another. However, there are plenty of sceptics on Facebook and twitter who claim that contactless cards can be tapped via hand scanners and other. The bank answer that as best they can, but the general public are not concerned. Some people will never have a mobile NFC card; they can use a plastic card. The bank does not engage in a discussion and try to convince the sceptics. For the public in general they believe it's best not to talk about security, as they believe it won't make a difference to the decision to try or not.

Q#11 answer

More emphasis where made on making the solution user friendly. They tried hard to think of ways to simplify the process. The big challenge was simply to open your phone, remove the SIM, put in a new SIM, and reinstall bank ID. Other small details could not change that. They found the overall process impossible to simplify. If they had overcome the big challenge and achieved mass rollout, there had certainly been details in the solution that could have been a little more "Smooth" for the customer. One detail is that they could have pushed out cards instead of waiting for the customer to order it in the mobile banking solution. In addition, they could have given the customer an offer to get existing cards as a mobile NFC card for example, but the customer still would have to enter mobile banking to order it.

Q#12 answer:

They also had thoughts on more value-added services, like seeing transactions associated with the card. Bonus and loyalty, like every fifth coffee cup free, was an idea. Sb1 believes this is something everyone has ambitions for when they are doing mobile NFC. Providers can use the payment platform for so much more, but they need volume first. Starbucks is not so interested in 280 users from SB1, they are interested in tens of thousands of loyal customers who come and pay regularly. Whom then can give a cup of coffee now and then for free. They need to build volume before they have something to offer the merchant market.

Relevant to us:

The setup seems to be based on the volume just happening and people simply start converting to paying with the phone. Then when the volume is there, the bank can start using the volume to add services, connect with the customer, and partner up with other business. There is however, nothing unique in the services planned for the time when volume is there. If there is something unique, it is not communicated to the customer. It is just assumed that people will adopt, without much pressure, incentives or help.

SB1 elaborates further on how mobile pay is a trend that has been on the horizon for a long time, and something everyone thinks will happen, but no one really knows why should happen. Therefore, it does not happen, because the industry has yet to appreciate how tough it is to get people to pay with mobile. Many do not see the point themselves either.

Q#13answer

Mobile NFC has been talked about at trade shows everywhere for many years. It is a trend that has lasted too long and many consulting houses and expert are everywhere People in the industry think and talk about all the possibilities including added value. Additional services make this more attractive. Not everyone is optimistic about loyalty and bonuses in the Norwegian market. Some believe it is very American. Americans typically have 28 cards in their wallet to show some membership card and get 5% discount. This is not the case in Norway. It is "Coop", "Trumf", and retail chain memberships. Membership's cards can be integrated into the solution, but there are very few relevant membership cards. Membership cards and the bank can link up and share information, making new offers to customers. This is however best served in the backend systems and not tied directly to mobile pay at the POS. For instance Sb1 give customers 25% at Intersport when shopping with their credit card, but

they do it with their plastic cards and no app is needed. DNB has similar discount with XXL and do the same.

Relevant to us:

This sequence of questions finished with some thoughts of why loyalty cards and bonuses might not hold enough pull factor to get people interested in mobile POS pay, especially when they can get virtually the same benefits when paying with their plastic cards. There seems to be no relative advantage connected to the loyalty and bonus services available through mobile POS pay only. Payment method is not a differentiator when getting incentives from the bank.

Q#13answer

At this point, we venture back to some overall aspects of the Norwegian payment market and special factors present in this country. As stated early on they wanted to establish the standard for mobile POS pay and get volume so that it became an "every day" thing. One big obstacle was not taken into that goal and that is the fact that about 90 percent of all card payments in Norway are BankAxept (Chip or stripe). It takes three seconds for the transaction and there are never any queues anywhere attributed to BankAxept. If there are queues at the grocery checking line at Rema (Big grocery chain) on a Saturday morning; It is not the payment that does it, but registering the goods at checkout. People stand there with the plastic card ready waiting until the last item is registered. Then enter PIN at the POS terminal and wait for approval. It takes 3 seconds and it makes no queue. So as said before the relative advantage at the checkout point is for amounts below 200 NOK. There are quite a few amounts below the 200 NOK "floor limit" in Norwegian. It is an increasing trend; especially young people buy gum for 20 NOK and pay with Chip & Pin. Norwegians are the best in the world at not using cash. The LVP experience can be a notch easier to bip a mobile instead of getting the card and the PIN. Then it has a value, but is quite marginal. It will be hard to innovate and deliver something to the customer that the customer prefers to use instead of plastic cards. Precisely because plastic cards in Norway are such a success story, and they work so good. In addition, people can use cards everywhere. At this point, the circle is closed and the respondent thinks aloud if banks at this time should rush at getting the customers from plastic to mobile. Maybe it is premature and not really in neither the customer nor the banks best interest. At the same time, the fact is still that the future moves towards mobile with the threat from non-banking companies entering the fight and setting standards. So the motivation to pursue mobile POS pay might be more based on fear of not being on the train, than belief that it will make the

customer experience much better. Other areas of integrating banking with merchants might be more interesting.

The Respondents gave further thoughts on Mobile Payment:
We asked the respondent about the case where customers now register their goods themselves, in store or at the self-service checkout. In the future he can imagine a situation where the customer registers the goods and complete the payment, perhaps as an "in app' payment". The respondent uses a personal experience where he was with his girlfriend in a large department store. They were buying skies and walked in the store with a hand scanner to scan the barcode themselves. One can imagine a future where the hand scanner might be replaced by mobile and in the end make an "In-App" payment, instead of your NFC (Or plastic card for that matter). One may not need to submit the transaction physically via a physical terminal at a traditional cash register. Once you have done everything else digitally then you might do that also, "In-app". This could render the whole NFC payment irrelevant if the terminals as we know are replaced. This shows that the mobile pay POS innovation might be on its way to be surpassed by other innovations before it has even had its run of success. This is though probably far into the future and many stakeholders invest heavily in mobile NFC pay. Perhaps for other reasons than making the customer paying experience much better, because the paying experience is already good enough for most customers.
We were interested in hearing if they had asked the potential customers, through surveys, about their need for this service. In addition, how that need in that case should be met.
They have not done any special effort to get user input on mobile payment. They have done some research and concluded that customers are not waiting for something special, when it comes to mobile NFC payment as replacement for card payment, for that is what we are talking about then. Nor do SB1 think the customers were waiting for Vipps, Mcash or MobilPay either, but when a bank is smart and spend some tens of millions in marketing it becomes a success anyway, and then people think they need it, since it makes life a little easier. This shows that it is possible to market a decent service into something valuable and making it a success for the customer. Without making this a discussion about why Vipps made it. It is appropriate to point out that Vipps was born digitally and did not require any offline, physical changes to be made. In addition, it had a clear message and clear value proposition, directly at the heart of a customer pain.

SB1 did little research with potential customers, but follow what their competitors are doing. Especially DNB, Eika, Nordea, and Skandiabanken. They want cooperation on mobile NFC, when it comes to the platform and technology. There will be no market standard unless everyone gets it right in a joint effort, in one way or another. Therefore, the success of mobile NFC is something every Norwegian bank wants, and it will not succeed alone. Cooperation on platforms has been done already, with BankAxept. BankAxept is the card success in Norway until now. Concerning for instance compatibility, using BankAxept in Norway must be a prerequisite to success with mobile pay NFC. It will also be a positive visibility factor in the social system for curious potential users to see the familiarity of Bankaxept. This will lower the threshold. Visa and MasterCard are well known and trusted, but one cannot underestimate the importance of the "Norwegian" BankAxept, in Norway. BankAxept will be important to compatibility in Norway, given that it has 90% of the card transactions.

SB1 point to competitors to BankAxept, the competition between Norwegian banks. BankAxept competitors are VISA and MasterCard, Apple Pay and Samsung Pay, Google, and Facebook and the list continuous. If BankAxept does not move forward, it dies at the "root." VISA and MasterCard will eat it up. Eventually other players will enter the payment value chain and cash in on the opportunities, like PayPal. Apple Pay has managed to make a deal with VISA where they get a "cut" per transaction, for example. There are actors within the value chain who want a bigger share. Apple makes payment solutions for their iPhone customers. Therefore, IPhone owners have to be considered as (potential) bank customers, of Apple. They create a huge loyalty about their brand and can add services to their customer base. So now, their customers also may begin to pay with the phone. They set the conditions and invite the banks to participate. Apple and other giants are sitting on "meat weight," and take an active part and stake in these new payment solutions. Banks are about to be challenged by giants with a value proposition that perhaps is more important to the customers than the banks have. Those challenging the banks are software and high-tech companies. They are experts in B2C development and marketing. They know how to launch and succeed with innovative products and services. Many have strong customer bases already and some control the handset. Others control social media (Facebook), or have strong software capabilities (IBM & Microsoft). The banking industry faces deregulation and digitalization at the same time. Companies outside banking can integrate their own strengths to deliver relative advantages, and those who control the handset have even more advantage. Getting payment services integrated with familiar services like Facebook or Microsoft will probably be very

compatible with the user. These are familiar brands and familiar services, which to an increasing degree offer services outside their core, similarly with getting payment from the handset hardware or operative system provider. Social factors will also be in play. Many of the competitors are good at launching services that trend and that their customers identify with. This could result in some peer pressure, which could get the likes of Apple up to a critical mass fast, given their loyal customer base. We have also seen Vipps by DNB utilizing peer pressure to gain critical mass. A bank like Sb1 might be unfamiliar with the marketing strategies needed to facilitate peer pressure, and they might not have the kind of brand fit for such marketing strategies.

Q#15 Answer

There is a relatively large part of the terminals, which are technically upgraded to be able to serve NFC. The large grocery chains and many others have upgraded to the NFC terminal, and they are about to be marketed, not least because VISA and MasterCard is making it mandatory and have NFC terminals. Therefore, it is almost ready on the hardware side. However, the use of the antennas are not in place, since BankAxept is not in place. About 5000 terminals in Norway are upgraded also software wise. The total number is approximately 135,000 terminals. There is no quick development of NFC technology on Norwegian payment terminals, because many wait for BankAxept. There are not so many places than in percentage. ValYou had on their website a list of places to use NFC. The SB1 respondent states that most people are not that interested in NFC that they will go out of their way and track down a place to pay with their phone. The ability to pay is something people take for granted, without any other incentive; no one will change their purchasing decision from one store to another because the other offers contactless mobile pay. If we try to be creative about it, a person with no cash and no card would be forced to track down a place to pay with their phone, if they have a functioning card on it. This is hardly an attractive way of getting customers to use the service. So mobile NFC pay seems to be for the enthusiast or those unfortunate to be without other payment methods.

Q#16 and 17 Answer:

The next section is about the number of people and companies involved. SB1 had eight people in the project. There were many companies involved; EVRY, TSM Nordic / ValYou, Gemalto and Toro. Gemalto delivered TSM and Toro the wallet. Telenor and VISA. It was about five people at EVRY. ValYou had quite a few, but maybe not so direct. TSM Nordic

were eight, maybe 3-4 from Gemalto and 3-4 from Toro. Telenor had 2-3 people. VISA, difficult to say they are sitting in London and has the certification responsibility. Maybe 4-5 people there. In sum, about six companies, between 29 and 25 people.

The Respondents gave further thoughts on Mobile Payment:

The respondent made a point out that revenue from payments are declining to banks. This is partly due to the reduction of competition barriers. The EU is pressuring free competition in connection with payment in a Europe. It is the European Commission, which has created new rules for banks. Interchange rates go down, i.e. income per transaction for a card issuer. At the same time, banks have to invest in technology and new infrastructures. All these are new costs in project implementation and to carrying out the transaction. For example, the element with Visa Mobile Gateway, which is a new component. It is not payment transactions but other types of transactions. Therefore, card transactions, payment transactions will have to bear additional costs, both investment and running costs. A service like account balance and view the 10 most recent transaction on the phone are just given as a new service to be relevant to the customer. It is a survival strategy more than one business strategy. It is about being relevant and robust compared to when such companies as Apple Pay and PayPal or whoever launch their own services in the market. There are more cost and more people to serve on the transaction income and little more value to retrieve on it. Therefore, the bank experiences that they keep adding costs, without getting the sufficient return on their money.

Interview summary:

There was not a need in the market, but a wish to create a need by exploiting the opportunity given due to the fact that people use their phones all the time. SB1 wanted to create the need to further add revenue to themselves and to be more attractive to partners. There was no end-user demand. SB1 actively sought to avoid issues with complexity in choosing to go with ValYou and the MNO solution. They also felt MNO had relative advantages in offline pay. They also believed a MNO would be a god compatibility fit both in the sense that customers already trust their MNO with storing secure data in the chip and the MNO experience in dealing with the logistics around chip based consumer goods. The thought was to partner up with other to form a broad platform to launch ValYou as the standard, this was a good idea, because many partners would gain critical mass faster and could leverage different contact points with end-uses. They could also target demographics with favourable socioeconomic characteristics, that are high on innovativeness. More partners with a customer base would

give a larger pool of favourable end users.. However a theoretically good strategy meets technical and practical reality and encounters several unforeseen problems. Especially, too much of the process of getting started was left in the hands of others or under little control at al. Given little felt need for the innovation, no previous practice and no real relative advantage end-users where easily deterred by the complexity to get started. The bank had very little opportunity to adjust the complexity. Had ValYou managed to get more MNO's and more banks maybe they could have targeted only end-users with high probability to endure the complexity and start using the service. SB1 tried to get 500 such favourable users, but could not reach it. This is an indication that one would need a huge pool of favourable users, reduce complexity or give some relative advantages. Adding to the difficulties of all, not just SB1, is the denied access to the company with presumably the most tech. innovation friendly user pool like Aple Iphone users. We assume higher socioeconomic characteristics for Iphone users. Also losing out on all Netcom customers left them with few potential adopters.

13. Conclusion

It is difficult to advise and find definite arguments to what is the best approach to introducing new technology to potential users of the technology. There are so many factors and theories; social dependencies, economy, the goal of the entity introducing the technology, focus on user experience, benefits, country of origin, sociocultural factors, demography and others

We have found two valid arguments that we find it essential to mention. These two are the obstacle to be able to try out the technology must be low and the technology must make user's daily life easier/have a definite advantage for the user. If these two basic values have been in focus in the introduction of technology, there is a much higher chance for achieving high user adaption and that the user will recommend it to family and friends and the technology will achieve social adaption.

We did not expect the solutions to be so difficult to get up and running and start using. However it was clear during the analysis of the interviews that everyone faced complexity issues. Complexity is one of Rogers factor for adoption (Rogers 2003), and are negatively correlated with adoption and implementation (Tornatzky and Klein 1982).Complexity, in short is about how difficult an innovation is perceived to use. In addition, it is an important challenge to adoption if it is both perceived and actually is difficult to use and\or get started with. It's enough that the innovators think it's difficult, either because they come to that conclusion themselves, get the impression from others or observe signs of complexity when others use or try to use the innovation. One could think that social factors play in and shows that a very socially visible innovation could suffer more if it is perceived as complex. This means that people observe others not using the innovation, stating that the innovation is complex or observe first hand problems caused by complexity will withdraw from further adoption. However, complexity during use was not an issue with mobile pay.

The biggest issue with complexity was at the very beginning, actually even before the user could even try paying. There was nothing indicating that mobile pay was perceived as complex when the user had gotten started and started using it to pay. Therefore the complexity issue is prior to trial, prior to people even testing the potential advantages, prior to assessing compatibility and prior to any social factors really playing in (Other than recommendations and advice). Our research point to problems with technical issues, problems with peripherals, (SIM, phones, Terminals), logistics and step-by-step activation. It was not possible to really test the factors that should lead to adoption, like relative advantage and compatibility, when complexity issues prior to adoption trials cause many of the banks to give up or downplay mobile POS pay. Therefore, until complexity issues are solved at the very

beginning, so that people actually can try without a preconception that it is difficult, relative advantage and compatibility cannot have its effect. In addition, there was many technical difficulties

Technology introduction must be dedicated and done with a goal of high user adaption, and aim to make a difference to the better in the user's daily life. We believe Bank and Financial Institutions are more focused on entering Mobile Payment as a marketing strategy to try to stand out and pose as innovative.. Instead, Bank and Financial Institutions should focus on trying to replace cards and cash in the payment process with an alternative that is easier, faster, adds value and is an advantage for the end-user.

We advise future research by others on the subject of Mobile Payment to focus on user experience and ask those who have tried what the challenges has been and do more in depth coverage on what functionality and functions must be in place for users to really start using Mobile Payment.

To get high adaption of Mobile Payment, we think the solution has to be faster to use, faster to setup and have a robust payment functionality to be a winning product. Such a product would achieve recommendations and adopted by colleagues, friend and family by those who recommend it. This must be part of the basis Mobile Payment solution, and on top, you need value added functionality, which the Mobile Phone as a communication channel with its GPS location ability have huge potentials to achieve. On top of this base, there must be all the benefits normal Credit Card Programs and loyalty program offers with extensions facilitated by the communication and the GPS positioning functionality offered by a Smart Phone. Users also like to be able to check their spending balance and get digital receipts on purchases they have done.People are willing and able to overcome complexity if the reward is great enough. Nevertheless, with little marketing of the relative or absolute advantages, people do not see the point of going through complex steps to use this innovation. It is a nice to have service, not a need to have service. People use many nice to have solution, like fit bands and step-counters. However, these are easy to use and set up. So marketing advantages could have overcame real or perceived complexity issues, but there is nothing in our cases indicating that the banks themselves can find a real marketable pitch for mobile pay. They do not really give any incentives either to "pay" back people going the distance and trying mobile pay. Moreover, paying with the card (or cash) is such an internalized habit, people do the routine of getting their card and entering pin without thinking. It is a reflex. People will actively have to think about changing that behavior to using the phone to pay. In addition, if the terminals or merchants do not offer paying with mobile, people will soon lose interest and go back to

paying with card. Even in countries where virtually all POS terminals are ready, people do not change their behavior. Therefore, it is safe to say that people has to be educated to change their behavior well in advance of paying and they will need to be actively encouraged at using the mobile as first choice rather than the card. Therefore, even though we argued that using the mobile is a way of life and eat a growing amount of our chores and routine, it still cannot compete with the "hard wired" habit of card or cash. To assume that people will just start using their phone to pay at the POS just because they can is not supported in any of our findings. We are led do conclude that paying with the mobile at POS is not "… consistent with existing values, past experience and needs of the potential adopter (Rogers 2003. P15)". We have no data to suggest peoples values are either supported or not by mobile payment. Nevertheless, our current methods of payment is so rooted in our minds and reflexes that substituting it with the mobile seems difficult. Cards, cash and mobile are compatible with our needs; the need to pay. The mobile could be even more compatible as it has many added-value services and can be faster and more flexible at meeting the need to pay. Again; the providers seem to take granted people's ability to see these benefits, but our research indicates people need thorough persuasion to change their actions. Even if they have a positive attitude towards mobile pay and are inclined to use the mobile. They easily end up using the card or cash out of mere reflex. So just because we use a technology for many things does not mean we automatically will adopt it on new areas just because it is possible.

The process of interacting with the terminal at POS. Either with the chip inserted or swiping the stripe, is so much a learned behavior that people probably first must get used to tapping the card before they get used to tapping the mobile

14. Digital Sources

Apple Pay:

http://www.macrumors.com/roundup/apple-pay/

https://support.apple.com/en-us/HT204916

Diners Club:

https://www.dinersclub.com/about-us/history

Eika Safe:

https://www.ntbinfo.no/pressemelding/eika-lanserer-mobillommeboken-eika-safe---med-teknologi-fra-nets-og-oberthur-technologies?releaseId=6173002&publisherId=90104

https://eika.no/om-oss/nyheter/2015/eika-safe

https://play.google.com/store/apps/details?id=no.eika.safe&hl=no

Google Wallet/Android Pay:

http://www.engadget.com/2011/05/26/google-wallet-mobile-payment-service-google-offers-announced/

IBM Pay:

https://youtu.be/Ke2-XOdiqv0

http://bankinnovation.net/2016/10/ibm-launches-mobile-payments-platform-ibm-pay/

mBank:

http://www.nfcworld.com/2016/03/07/343110/mbank-cancels-nfc-sim-deals-in-favour-of-hce-and-bank-backed-blik-mobile-payments/

http://www.nfcworld.com/2012/10/22/320670/t-mobile-launches-nfc-in-poland/

http://www.nfcworld.com/2012/10/16/320536/orange-launches-nfc-in-poland/

NFC:

http://nfc-forum.org

OP Bank, PIVO:

http://www.nfcworld.com/2015/03/16/334586/finnish-banks-add-hce-payments-to-pivo-mobile-wallet/)

https://www.op.fi/op?cid=-66245

https://www.youtube.com/watch?v=W0QApvdjaQw

Samsung Pay:

http://www.nfcworld.com/2015/01/06/333388/looppay-signs-oems-embed-contactless-tech-products/

http://www.nfcworld.com/2016/08/24/346830/samsung-pay-hits-100m-transactions-in-first-year/

Valyou:

http://www.dinside.no/okonomi/derfor-dode-dnbs-mobilbetaling-valyou/61010303

https://www.dnb.no/valyou

http://www.digi.no/artikler/telenor-og-dnb-gir-opp-valyou/320376

Vipps:

http://www.dn.no/nyheter/2016/11/09/1854/Finans/berget-vipps-i-siste-sekund#

http://www.dn.no/nyheter/2016/11/14/1304/Finans/flere-banker-slutter-seg-til-vipps-utfordrer

VISA:

https://www.visaeurope.com/newsroom/news/1-billion-visa-contactless-purchases-made-in-last-year

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