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<input type="checkbox"/>	Licentiate's thesis
<input type="checkbox"/>	Doctor's thesis

Subject	Information Systems Science	Date	31.10.2017
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		Number of pages	104 + appendices
Title	Mobile payment as a multi-sided platform: Success factors and IT governance practices		
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Abstract

The aim of this research was to discover factors that lead to mobile payment platform's success in the Finnish market. Mobile payment research has been ongoing for the past 20 years but no solution has made a clear breakthrough. Research has focused on technological factors, factors concerning consumers and adoption of mobile payment solutions and the majority has been exploratory, early research. Because of the rise of mobile technology and popularity of mobile content, flexible use of mobile phones and growing amount of non-cash transactions is a turning point now possible for mobile payment solutions. Along the success factors this research aimed to consider governance practices and to examine the perceived roles of the ecosystem participants.

This is a qualitative study based on a case, MobilePay, a mobile payment platform provided by Danske Bank. Eleven semi-structured interviews (conducted in January 2017) with mobile payment ecosystem participants, industry experts, served as the research data, along with literature and publicly available information. The importance of nine success factors (choice of technology, choice of features, size of the ecosystem and openness, security, service pricing, reliable platform provider, guidance, training and support, successful implementation of service changes and sales and marketing of the platform) was evaluated. Because IT governance has been considered successful in the field of IT, two structures, three processes and three relational mechanisms were chosen to be evaluated to see their suitability in a mobile payment ecosystem. To create a better picture of the ecosystem, the perceived roles and responsibilities of the ecosystem participants were examined.

All nine success factors were considered greatly significant for the success of a mobile payment platform. The successful implementation of service changes, the choice of technology and marketing of the platform were seen as the most important factors. User support was perceived the least important. Four success factors, user experience, ease of implementation, ability to use in all channels and loose competition and authoritative control, were added by the interviewees. Both cooperation between the ecosystem participants and clearly defined roles and responsibilities were perceived as critical for success. Solutions should also be based on existing standards. Identified contact persons in the participants' organizations and a defined development plan were considered well-suitable for governing the mobile payment ecosystem.

Key words	Mobile Payment Platform, Success factors, IT Governance, Ecosystem roles
Further information	





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Pro gradu -tutkielma
Lisensiaatintutkielma
Väitöskirja

Oppiaine	Tietojärjestelmätiede	Päivämäärä	31.10.2017
Tekijä	Ella Iivanainen	Matrikkelinumero	505133
		Sivumäärä	104 sivua + liitteet
Otsikko	Mobile payment as a multi-sided platform: Success factors and IT governance practices		
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Tiivistelmä

Tämän tutkimuksen tavoitteena oli saada selville mobiilimaksualustojen menestystekijät Suomen markkinoilla. Mobiilimaksamista on tutkittu jo 20 vuoden ajan, mutta merkittävää läpimurtoa ei markkinoilla ole vielä tapahtunut. Tutkimus on keskittynyt tekniikkaan, kuluttajiin ja ratkaisujen omaksumiseen liittyviin tekijöihin ja suurin osa on ollut eksploratiivista, uutta kartoittavaa tutkimusta. Mobiiliteknologioiden yleistymisen, mobiilisisällön suosion, matkapuhelinten ominaisuuksien ja korttimaksujen yleistyttyä on mobiilimaksamisen käännekohta nyt mahdollinen. Menestystekijöiden lisäksi pyrittiin tutkimuksessa selvittämään sopivia hallintomalleja mobiilimaksamisen ekosysteemille ja selvittämään ekosysteemin toimijoiden rooleja.

Kyseessä on kvalitatiivinen case-sovellukseen (Danske Bankin MobilePay-sovellus) pohjautuva tutkimus. Aineisto kerättiin haastattelemalla yhtätoista mobiilimaksamisen asiantuntijaa MobilePayn ekosysteemistä. Haastattelut toteutettiin tammikuussa 2017. Tutkimuksessa hyödynnettiin myös julkisesti saatavilla olevaa tietoa ja kirjallisuutta.

Tutkimuksessa arvioitiin yhdeksän menestystekijän (teknologian valinta, ominaisuuksien valinta, ekosysteemin koko ja avoimuus, turvallisuus, palvelun hinnoittelu, luotettava palveluntarjoaja, koulutus ja tuki, onnistuneet palvelumuutokset ja alustan markkinointi) merkitystä maksualustan menestykselle. Hallintomallit on todettu toimivaksi lähestymistavaksi informaatioteknologian tutkimuksessa, joten tässä tutkimuksessa arvioitiin lisäksi kahden rakenteen, kolmen prosessin ja kolmen yhteistyömekanismien sopivuutta mobiilimaksamisen ekosysteemiin. Toimijoiden roolit ja vastualueet selvitettiin, jotta saatiin parempi kuva ekosysteemin toiminnasta.

Kaikki yhdeksän menestystekijää todettiin erittäin merkittäviksi menestyksen kannalta. Onnistuneet palvelumuutokset, teknologian valinta ja alustan markkinointi nähtiin kaikista merkittävimpinä tekijöinä, kun taas käyttäjien tuki oli vähiten merkittävä. Lisäksi haastatteluissa nousi esille neljä uutta menestystekijää: käyttäjäkokemus, käyttönoton helppous, monipuoliset käyttömahdollisuudet ja löyhä viranomaisvalvonta. Toimijoiden yhteistyö, selkeästi määritellyt roolit ja vastualueet nähtiin kriittisinä tekijöinä menestykselle ja niitä ei löytynyt olemassa olevasta ekosysteemistä. Menestyäkseen ratkaisun tulisi myös pohjautua olemassa oleviin standardeihin. Kehityssuunnitelma ja tunnistetut yhteyshenkilöt koettiin toimivimmiksi keinoiksi hallita ekosysteemiä.

Asiasanat	Mobiilimaksaminen, menestystekijä, tietohallintomalli, roolit, ekosysteemi
Muita tietoja	





Turun yliopisto
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MOBILE PAYMENT AS A MULTI-SIDED PLATFORM: SUCCESS FACTORS AND IT GOVERNANCE PRACTICES

A qualitative study in the Finnish market

Master's Thesis
in Information Systems Science

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The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

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1 INTRODUCTION

Mobile payment is the payment method of now and of the future. It means paying by using a mobile device (Karnouskos 2004, 44). Mobile payment (also called m-payment), mobile commerce and contactless payment are often used to mean one thing but the definition is much broader. In this thesis, mobile payment is defined as a payment, which is performed, activated and/or accepted by using a mobile device. (Karnouskos 2004, 44.) Mobile devices are defined as devices with a small form, network access, local built-in data storage, an operating system (which is not a fully developed desktop operating system) and access to applications through different methods (Souppaya & Scarfone 2013, 2). Mobile payment is not restricted to mobile phones but also smartphones, tablets, PDAs and other mobile payment devices can be used for payment (Karnouskos 2004, 44). Mobile payment combines aspects such as mobility and technology and thus involves many different stakeholders. Consequently, aspects of mobile payment are multifaceted which makes the discussion interesting but also complex and difficult. The landscape of mobile payment is also everchanging because of continuous introductions of technologies and business models. (Au & Kauffman 2008, 142.)

In this study, mobile payment solutions are considered as platforms. A platform is a group of technologies that is used as a development base for applications, technologies and processes (techopedia.com/platform). Every platform is a part of an ecosystem. An ecosystem is a group of actors working cooperatively and competing to create value to customers, each actor and the group as a whole (Dahlberg, Bouwman, Cerpa & Guo 2015b, 5). A platform should be viewed as a part of an ecosystem that crosses several industries not only as a part of a single industry, as defined by Moore (1993, 76). These platforms create an ecosystem which is defined by Moore (1996, 26) as

an economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem.

Mobile payment is expected to be successful in the future because there are several factors that make mobile devices particularly useful for payment activities. Firstly, the rise of mobile technology has enabled mobile phones to become more common (Mallat 2007, 414). In TNS Gallup Oy's (2016) Gallup poll in Finland in 2016, 78% of the respondents owned a smartphone and almost half of them a tablet. A similar poll was conducted in 2012 and by then, the usage of mobile devices was significantly lower as only 50% of the respondents of the study were using a smartphone. Secondly, mobile phones are closer to the user and easier to access compared to computers, which eases the saving of personal information such as banking credentials and thus, paying (Mallat 2007,

414). The timely and local flexibility of mobile technology are unique features compared to other digital channels. The user is mobile because the device can be carried and mobility is increased by the fact of being able to be localized, identified and reachable anytime and anywhere. (Picoto, Bélanger & Palma-dos-reis 2013, 297.) Thirdly, the adoption of some of the early mobile content indicates that consumers are used to using their mobile device as a means of payment. (Mallat 2007, 414.) In addition to the above-mentioned special characteristics, mobile payment offers the same services as the existing payment methods and offers a protected, quick and easy-to-use transaction (Chaix 2013, 280).

Users are becoming more accustomed to non-cash transactions. The number of global non-cash transactions are growing at a 10% rate which meant over 400 billion transactions in 2015. Economic growth, the global EMV (Europay, MasterCard, Visa) standard for credit card authentication, biometrics and the increased penetration of smartphones are reasons for this growth. (World Payments Report 2016, 6.) In Finland, Nordea expects cash payments to decrease by 5-6 percent yearly (Nordea.com/uutiset-jalohdistotiedotteet 22.07.2016). Finland has an evolved and modern banking system where up to 75% percent of adults use mainly electronic payment methods (Privacyshield.gov; Suomen Pankki 2015). The usage of contactless payment increased tenfold in 2015 (profit.lindorff.fi/maksaminen-muuttuu).

Along the lines of this development, the value of mobile payment transactions has been expected to be over 800 billion US dollars by 2017. Growth has mostly been driven by developing countries and emerging markets, and there are local success stories from Japan and South Korea. (Duvaud-Schelnast & Born 2015, 1-4.) According to a KPMG (2011, 17-18) study only 9% of responding companies evaluated that mobile payment would have been a mainstream technology in 2011. Up to 9 out of 10 of the respondents believed it to become mainstream by this year, 2017, or earlier. On the other hand, respondents believed more in mobile wallets and specialist online systems rather than other payment solutions.

For over 20 years, since the first mobile payment solutions surfaced at end of the 1990s, mobile payment has been expected to make a breakthrough. Mobile payment is a rising research topic in quantity and quality (Dahlberg, Guo & Ondrus 2015a, 275) and it is gaining popularity in Finland and in other parts of the world. Unfortunately, there has not been any genuine signs of a breakthrough because customers and merchants are so strongly used to using the existing payment options, mobile payment technologies are only partly adapted, there is such rivalry in the ecosystem and regulation has both harmed and protected actors. (Dahlberg et al. 2015b, 1-2.)

The main driver for banks and other financial institutions in Finland to develop mobile payment systems is to better meet customer needs, to create an additional channel to the

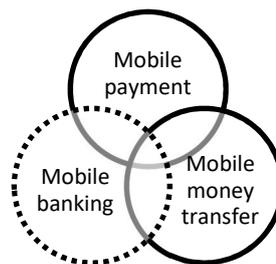
banking services but to protect their core business area according to a study by Huurros (2007, 134-138). Huurros (2007, 134-135) expected mobile payment to gain success because she considered combining the payment process with a mobile device a successful solution. The study estimated (in 2002) that mobile payment would be in use by most of mobile device users in Finland in 2007-2022 based on previous experience in launching payment methods. (Huurros 2007, 134-135.)

The changing ecosystem, creating a successful mobile payment solution and the security risks were considered the challenges faced by mobile payment in a previous literature review by the researcher, Iivanainen (2014, 24-25). The Arthur D Little consultancy suggests that a turning point from failure to success is possible now because of the maturity of the technologies used for mobile payment, the availability of mobile devices to the different parties and the grown awareness (Duvaud-Schelnast & Born 2015, 1-4).

1.1 Overview of Mobile Payment

Mobile payment enables new channels for the payment of goods, services and other forms of economic exchange. Mobile payment is considered to be “sitting at the heart of mobile commerce” and intersecting with “the value chains of the payments, mobile, retail and technology industries”. (Kemp 2013, 175.)

A differentiation can be made between three types of mobile financial services: 1) mobile payment, 2) mobile money transfer and 3) mobile banking.



Mobile payment includes consumer-to-business remote and proximity transactions, payment acceptance on mobile devices and peer-to-peer (P2P) payments. (ITU-T 2013, 2.; Kent 2012, 316.) During a remote mobile payment transaction, customers do not have to be physically present whereas proximity payments are made locally with a mobile device on point-of-sale terminals or unmanned locations. Payment acceptance on mobile devices is primarily offered as a solution for merchants. This enables the seller’s mobile activity. (Karknouskos 2004, 49; Raina 2014, 190; Kent 2012, 318.) *Mobile money* or e-money has been defined by the European Union as a “monetary value as represented by a claim on the issuer which is stored electronically and issued on receipt of funds, for the

purpose of making payment transactions” in the article 4 out of 5 of Directive 2007/64/EC (COM (2008) 627 final; Article 1(29)). Mobile money transfers are those made between two individuals (ITU-T 2013, 2). Mobile payment and mobile banking are two different solutions. *Mobile banking* allows, according to ITU-T’s (2013, 2) report the “users to manage their bank accounts remotely from their mobile devices”. It can also be a service by a credit union, brokerage, or other financial services provider (Smart Card Alliance 2011, 6). In mobile payment, the mobile device is used for paying purposes, on premise or remotely whereas mobile banking is purely used as an interface and is thus not considered in this study.

Mobile payment solutions can be differentiated according to location, transaction value and the used technology. Table 1 shows the spectrum of mobile payment solutions as contributed by ITU-T (2013, 3) and Smart Card Alliance (2011, 8). Over the years there has been a change in what is considered as mobile payment. Previously, mobile payment was used through special account systems or operators charged with their billing system. Newer solutions were enabled with the developing and generalized technology such as smartphones and the mobile internet. Now mobile payment applications serve more as an access channel to payment services. The products are independent creating their own ecosystems regardless of the telecommunication provider or other players that were connected to the solutions before.

Table 1 Mobile payment solution technology, transaction value and location

		Payment technology		
		SMS/STK/USSD/WAP*	Applications /Browser	Contactless, NFC, Barcodes
Transaction value	Macro	P2P International remittances Donations Bill Payments Mobile Top-up	Bill Payments Mobile Commerce Mobile Rewards	Payments at POS Mobile Rewards Transport
	Micro	Domestic Remittances P2P payments Parking Ticketing		Coffee Shops Parking Vending Ticketing
		Remote		Proximity
		Location		
*SMS= Short Message Service; STK= SIM Application Toolkit; USSD= Unstructured Supplementary Service Data; WAP= Wireless Application Protocol				

Mobile payment can be categorized into micro (small, usually under 25 USD or EUR) and macro payments which are worth more than 25 USD/EUR (Raina 2014, 189-190). Mobile payment is enabled through WAP, Bluetooth, Network (including GSM, GPRS and 3G), mobile payment software, smart card and SIMs (Kadhiwal & Zulfiquar 2007, 13; Song 2001, 3-4). Contactless payment can rely e.g. on Near Field Communication (NFC) technology or cloud services (Kent 2012, 318). NFC technology has been defined as a sub-category of RFID (radio frequency identification) technology for remote sensing with which data transfer is enabled through physical contact (Liikenne- ja viestintäministeriö 2010). Cloud based services require an application and the point of sale (POS) needs a software for accepting these payments (Kent 2012, 318). The identification information is saved in an online server rather than onto the mobile device (Isaac & Zeadally 2014, 41).

Mobile payment solutions can have different funding mechanisms: through a telephone bill, mobile phone associated prepaid account (typically SMS-based), virtual account, traditional bank account, debit, credit or prepaid card (Smart Card Alliance 2011, 9). The solution used in this thesis is an example of the bank centric business model where the bank, Danske Bank, serves as the financial service provider. It could also be another financial institution. (Fun, Beng & Razali 2013, 324.)

1.2 Previous research and research gap

According to Dahlberg, Mallat, Ondrus and Zmijewska (2008b, 178) the mobile payment research area is fragmented but has focused on the technological factors and the factors concerning consumers and adoption of mobile payment (Dahlberg et al. 2008b, 178). The majority of the existing academic research is exploratory, early research. Cultural or social factors and the comparison of traditional and mobile payment methods are areas with no research at all.

In the later article published by Dahlberg, Guo and Ondrus (2015) the research domain was still dominated by technology and consumer adoption research but also by mobile payment strategy and ecosystems research. Mobile payment research is considered complex since the services and markets are evolving, and one-time studies that have dominated the field, do not offer enough insight. (Dahlberg et al. 2015, 275-6.) Isolated studies consider only one aspect at a time and do not provide enough understanding on mobile payment. “Ecosystem characteristics, technology features and adoption factors impact each other” and should thus be considered. (Dahlberg et al. 2015, 276.) This will be done in this study where numerous factors and their importance for the success of a mobile payment platform are taken into account.

The diffusion theory by Rogers¹, Davis’s² technology adoption model and hybrid models have been used and validated in the mobile payment literature (Zmijewska & Lawrence 2005, 204). These models concentrate on explaining success with mobile payment characteristics perceived by the user such as ease of use, usefulness and compatibility. This is not enough to explain the success of a mobile payment platform because this research is lacking the infrastructure traits of an innovation such as the cooperation between actors, regulatory and legislative issues, business models network externalities and standardization. (Zmijewska & Lawrence 2005, 204.)

Especially a gap exists in the research of analyzing multi-dimensional success factors. Ondrus and Lyytinen (2011, 6) suggested that the success factors of mobile payment solutions still need to be unveiled and development is at an early stage. With new players, the field becomes more complex thus further research is needed in order to identify the factors leading to success.

According to Pousttchi, Schiessler and Wiedemann (2009, 364) mobile payment platforms fail because of the unusually high interdependency of market, technical and human factors. Platforms are in continuous interaction and do not exist in a vacuum. Issues such as strategy, economics and software engineering are especially germane to information

¹ Rogers, E.M. (1995). *Diffusion of Innovations*, fourth ed. Free Press, New York.

² Davis, F.D., 1989. Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 319–340, vol. 13 (3)

systems (hereafter IS) since considering solely one factor can mislead to overlooking important interactions. (Tiwana, Konsynski & Bush 2010, 677.) According to Eisenmann, Parker and Van Alstyne (2010, 14) more attention should be devoted to platform-mediated networks by scholars of strategic management. Networks (or ecosystems as they are called in this research) play an important role in the global economy. They represent one of the three constituent value creation configurations of a company: the value network. These networks link customers and create value through these links. (Stabell & Fjeldstad, 1998, 414-415.) Therefore, this study also looks deeper into a mobile payment ecosystem and its stakeholders and their different perceived roles concerning the success factors identified in this research.

There is no previous research on IT governance structures, processes and relational mechanisms for a mobile payment ecosystem or the possibility of this leading to success. Therefore, these governance implications are examined in this research.

1.3 Study aims and research problem

This research and thesis addresses research gaps of scientific research on mobile payment ecosystems and platforms. Firstly, there is a lot of research on mobile payment platform success but these success factors have not been mapped to the various stakeholders and their role in the mobile payment ecosystem. Secondly, there is a limited number of studies which consider what mechanisms support and enable the achievement of these of mobile payment platform success factors. This thesis focuses on mobile payment platforms, taking MobilePay, a mobile payment solution provided by Danske Bank, as an example. The target of this thesis is to reveal the importance of several factors for the success of mobile payment platforms, especially of MobilePay, according to the ecosystem participant. The aim is to create a clear picture of the ecosystem, in which MobilePay acts, in order to identify, how the participants perceive their role in the ecosystem and regarding this, which IT governance practices are considered necessary for the success of a mobile payment platform. Success factors, as introduced by Rockart³, are necessary conditions for success in a given market. Success is the “accomplishment of an aim or purpose” (oxforddictionaries.com/success), in the case of mobile payment the intention to continue using a solution.

The aim is also to provide Danske Bank with feedback gathered from Finnish experts and key market actors. In this study, MobilePay is considered as a multi-sided platform. A business ecosystem consists of companies working cooperatively and competitively to

³ Rockart, J.F. (1979) Chief executives define their own data needs, Harvard Business Review. Vol. 57 (2), 81–93.

develop capabilities around an innovation. Platforms are basically technological constructs but for the sake of this research are ecosystems more of interest. This is because ecosystems are more complex and more difficult to model.

This research is limited in scope to aspects concerning the mobile payment platform, MobilePay. This limits the regarded mobile payment technologies to contactless payment in stores, payment in online stores and peer-to-peer payments. In this research, mobile devices are limited to smartphones and tablets equipped with a telephone subscription. The scope includes only Finland and the Finnish payment market.

The research problem is formulated as follows:

- Which factors make multi-sided platforms, such as mobile payment platforms, successful?

Answers to this question will be provided with the help of the following sub-problems.

- Which factors do mobile payment platform ecosystem participants perceive as the success factors of a mobile payment platform out of the chosen factors?
- Which role do mobile payment platform ecosystem participants perceive to have regarding the mobile payment platform success factors?
- What IT governance practices do mobile payment platform ecosystem participants perceive to be related to the success factors of mobile payment platforms?

2 THEORETICAL BACKGROUND

2.1 Mobile Payment as a Multi-Sided Platform

2.1.1 *Multi-sided platforms*

A platform consists of different components that can be reused and shared across several implementations but also of rules or tools that are used to coordinate participants' activities and facilitate development (see Boudreau 2008, 4; Henderson & Clark 1990, 10; Franke & von Hippel 2003, 1204; Spulber 2008, 939; Gawer 2009, 45). Fundamentally the architecture behind all platforms can be divided into the *core* and *peripheral* components (Tushman & Murmann 1998, 260). Reusing or conserving components lead to economies of scale while reducing the cost of the development of a variety of complementary components. The platform can be adapted to new features, needs or respond to changes at low cost without losing its design continuity. (Baldwin & Woodard 2009, 24.) Platform concepts can be found inside a single firm, in clusters, ecosystems or in multi-sided markets which is the case for mobile payment. (Baldwin & Woodard 2009, 19.) Mobile payment platforms are products, services or firms that mediate transactions between actors (Rochet & Tirole 2003, 990). Buyers and sellers coordinate efforts around the platform's standard components (Bresnahan & Greenstein 1999, 3). Consequently, in this research the roles and governance practices of the actors are of special interest. It is important to see what the roles are in MobilePay's platform but also how well the efforts are coordinated and transactions mediated between actors.

Mobile payment solutions can be considered as digital multi-sided platforms (Staykova and Damsgaard 2016, 2). Multi-sided platforms facilitate the direct interactions between various partners or sides (see Evans 2009, 102; Hagiu & Wright 2015, 162; Kazan & Daamsgaard 2013, 5; Ondrus, Gannamaneni & Lyytinen 2015, 260). Each side is affiliated with the platform. (Staykova & Damsgaard 2016, 5; Hagiu & Wright 2015, 163.) Mobile payment solutions are mostly launched as one-sided platforms and evolve over time towards a multi-sided solution. A one-sided solution enables interactions between participants of one distinct group whereas two-sided and multi-sided solutions interact with two, respectively, multiple groups. (Staykova & Damsgaard 2016, 2.) Multi-sided platforms create value by enabling interactions that happen with high frequency. (Staykova & Damsgaard 2016, 5.) The more a mobile payment platform is used, the more it offers value to the users. The most important goal of a platform is to increase the

frequency and the type of interactions. (Huurros 2007, 45; Staykova & Damsgaard 2016, 5.)

2.1.2 *The mobile payment ecosystem and its participants*

In this research, the ecosystem is described on two levels: the platform level and the ecosystem level. The platform level shows the main actors that are directly connected to the platform. The ecosystem level considers all participants who influence the platform and are involved in the ecosystem.

Platform-mediated networks, such as the mobile payment ecosystems, are composed of users on the demand and supply side, the focal platform provider and platform sponsor (Eisenmann et al. 2009, 131-135). A two-sided platform mediated network is depicted in Figure 1 combining Eisenmann et al. (2009, 134) and Tiwana et al. (2009, 676) figures of the elements of a platform-mediated network and platform-centric ecosystem. *Users* transact with each other: the supply-side offers complements (directly or indirectly offered services (Tiwana et al. 2009, 681)) to the demand side. They simultaneously affiliate with the platform provider. Examples of two-sided networks are credit cards (cardholders and merchants) and video games with consumers and game developers as user groups. (Eisenmann et al. 2009, 131-135.)

The platform *provider* serves as the users' primary point of contact and mediates their transactions. The platform *sponsor* holds property rights, determines who can participate in the network and is responsible for the development of the technology that the platform utilizes. A single company can play both roles, provider and sponsor, in which case it is a proprietary platform. A shared platform has multiple sponsors who collaborate on the development of the platform. (Eisenmann et al. 2009, 131-135.)

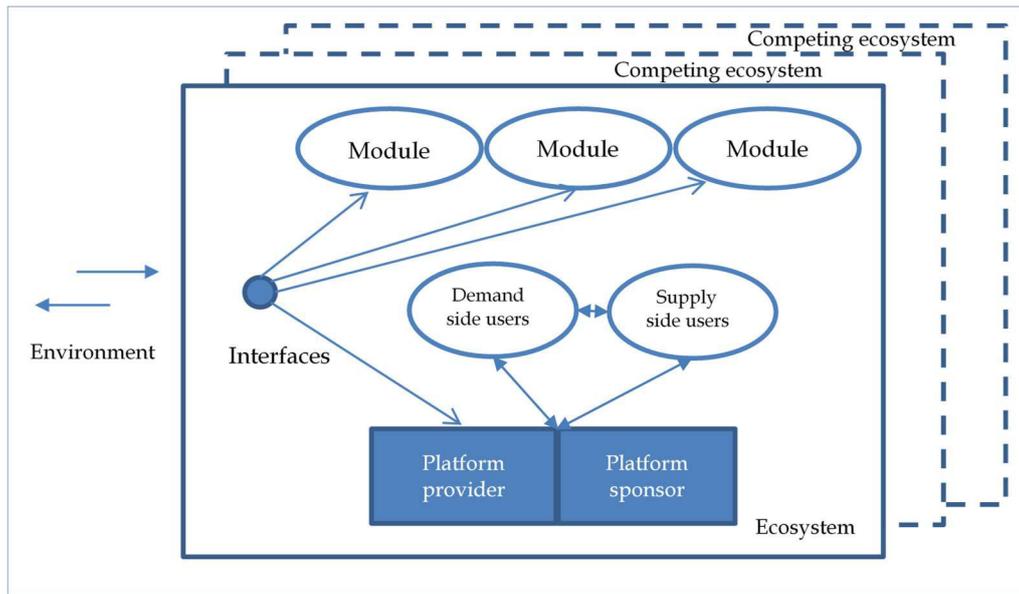


Figure 1 A two-sided platform mediated ecosystem

Modules are connected to the platform and add functionalities to it in a platform-centric ecosystem. In a mobile payment platform, these are the different functionalities the application or system offers such as online checkout or NFC supported payment. *Interfaces* specify how the platform interacts and exchanges information with the modules. The platform environment influences the evolution of the platform and the modules positively and negatively. The technological development and emergence of complementary and substitutive technologies, multi-homing costs and the influence power of complementors such as service suppliers and regulatory agencies affect the platform's evolution. (Tiwana 2010, 675-681.) Homing costs are the costs involved with the adaptation where the user decides to use several platforms, such as several credit cards or combinations of payment methods (Staykova & Damsgaard 2016, 5; (Rochet & Tirole 2003, 990-993 & Au & Kauffman 143).

A mobile payment ecosystem has several participants (Au and Kauffman 2008, 142) and many classifications have been done (Hagiu 2014, 73-74; Fun et al. 2013, 323-324; Liu, Kauffman & Ma 2015, 379; Kemp 2013, 176). These participants influence the ecosystem but are not necessarily in direct contact with the platform. Kauffman and Au (2008, 147) group participants into

- producers of the disruptive technologies
- users, consumers and buyers
- sellers (merchants) and business intermediaries
- government agencies, regulators and public-sector entities.

The business intermediaries are according to Au and Kauffman (2008, 147) standards organizations and industry-sponsored government lobbying groups. The public-sector

entities track, monitor and regulate market activities. Liu et al. (2015, 379) offers a similar classification with customers, merchants, regulators but also with the telecommunications provider and banks. These actors are shown in Figure 2, which depicts Liu et al.'s (2015, 378-379) view of a generalized NFC enabled mobile payment platform.

The mobile payment solution *provider* or the mobile payment solutions vendor is in contact with the terminal manufacturers, POS, the consumer's device, banks and credit card manufacturers. *Customers* are involved in the ecosystem through their mobile device, the application on the mobile device and the secure element (SE). The SE is "a secure microprocessor to facilitate transaction authentication and security, and provide secure memory for storing payment applications" (Smart Card Alliance 2011, 19). In the NFC enabled mobile payment ecosystem mobile network operators (hereafter MNOs) and the mobile device manufacturers provide the smartphones with the SE. The merchants offer the correct payment terminals and the POS outlets. Also, online POS should be considered. *Telecommunication* providers are represented by the trusted service managers (TSMs), MNOs and the technology providers. TSMs enable mobile payments by managing "the range of contractual and technical connections" to the other participants (Kemp 2013, 176). Gateway service providers help to process and secure transactions (Liu et al. 2014, 8). *Banks* are included in the card schemes with card associations and other banks. These also include payment networks which authorize payment processing and settle bank card transactions such as payments technology companies. (Smart Card Alliance 2011, 20.) *Regulators* include governmental and independent authorities supervising the payment industry.

Furthermore, value-added service providers such as financial and payment service providers (FSP, PSP) and software developers are also involved in the ecosystem. These provide the application and services required for the application delivery. (Smart Card Alliance 2011,22.)

In order to be successful in mobile payment, the stakeholders need to participate and cooperate in a cross-industry alliance to establish common "operational, process and technology standards" (Liu, Kauffman & Ma 2014, 5). The success also depends on the efficacy of the collaboration between stakeholders (Liu et al. 2015, 379). According to Au and Kauffman (2008, 154) economic theory suggests that interorganizational investment in IT is challenging because of incomplete contracts as in the sharing of the benefits but also the financial and operational risks.

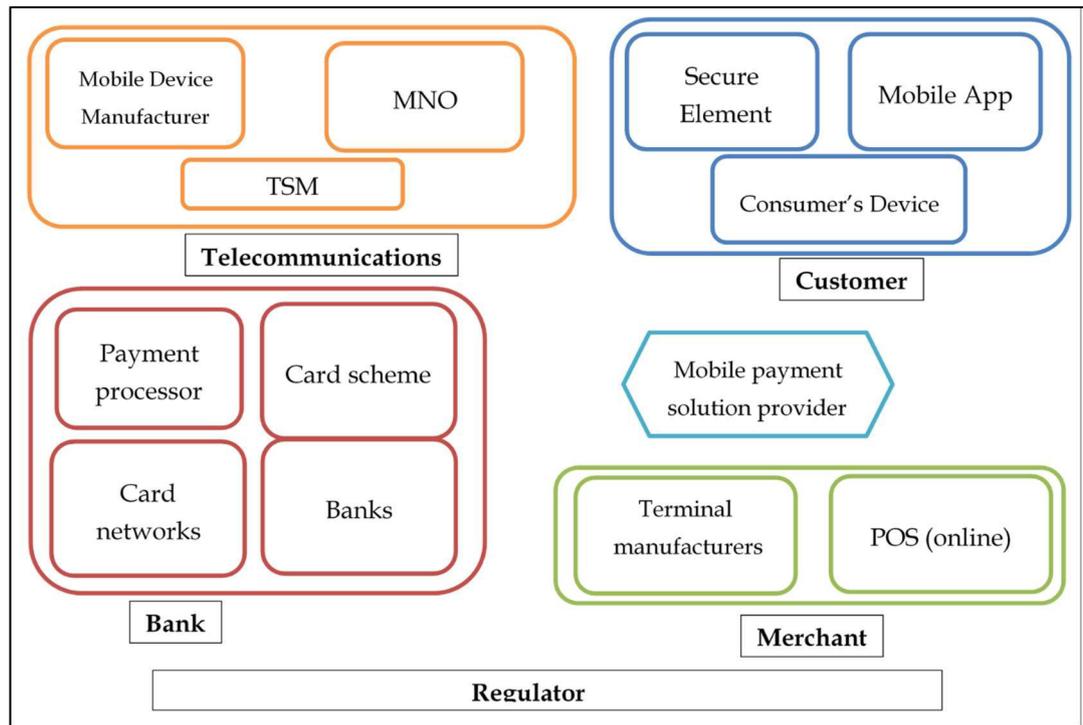


Figure 2 The mobile payment platform ecosystem

2.2 Key success factors in the Mobile Payment ecosystem

2.2.1 Research on mobile payment success

According to the contingency theory of adoption, there is no single model for creating a successful mobile payment solution (Au & Kauffman 2008, 146; Ondrus, Bui, Pigneur, Krogstie, Kautz & Allen 2005, 272; Dennehy & Sammon 2015, 52). Mobile payment has been discussed in numerous studies but the phenomenon raises complex questions, which call for multi-perspective analysis (Ondrus et. al 2005, 272; Gannamaneni & Ondrus 2013, 9). The success but also failure of information technology products is driven by consumer expectations, the underlying value of the product and luck (Huurros 2007, 49). These factors are among the once used to explain the success of mobile payment solutions and these have been listed in table 2 referencing to the previous research made on this topic. These factors have been used in mobile payment to explain mobile payment success. The research was based on Dahlberg et al.'s (2015a, 271) overview of ecosystem research. Also, articles from 2016 and 2017 were considered as well as articles that had been cited to in Dahlberg et al.'s (2015a) article.

Table 2 Previous research on mobile payment success factors

	<i>Success factor</i>	<i>Comment</i>	<i>Source</i>
1	Achieving network effects	The more a mobile payment platform is used, the more it offers value to the users and this creation of value is called the network effect.	Madureira (2017)
2	Added value	An added value or relative advantage compared to competitors or other payment solutions	Gannamaneni & Ondrus (2013); Gannamaneni, Ondrus & Lyytinen (2015); Hayashi (2012); Lai & Chuah (2010); Mallat & Tuunainen (2005; 2008)
3	Adoption externalities	Interdependence between the consumers and merchants' adoption, adoption of either leads to added value of the whole ecosystem (Hunt 2003, 84)	Hunt (2003)
4	Factors affecting user adoption	Complexity of user interface	Apanasevic (2013)
5		Quality; system, information and service quality lead to continuance intention	Zhou (2013)
6		Critical mass and initial adopter mass	Apanasevic (2013); Guo (2016); Guo & Bouwman (2016)
7		Ease of use	Antovski & Gusev (2003); Chen (2008); Jayawardhena & Foley (1998); Shon & Swatman (1998); Teo Fraunholz & Unnithan (2005); van der Heijden (2002)
8		Low switching costs	Apanasevic (2013); Au & Kauffman (2008); Mallat (2007)
9		Privacy	Chen (2008)
10		Service complexity	Apanasevic (2013); Mallat (2007)
11		Trust	Chen (2008); Mallat & Tuunainen (2005; 2008); Oney, Guven & Rizvi (2017); Zmijewska & Lawrence (2005)
12		Users intention to use	Alshare & Mousa (2014)

13		User experience	Lai & Chuah (2010); Mallat & Tuunainen (2008); van der Heijden (2002)
14		Perceived security and risk	Chen (2008); Goeke & Pousttchi (2010); Lai & Chuah (2010); Mallat (2007); Moth (2013); Oliveira, Thomas, Baptista & Campos (2016); Shin, Lee & Odom (2014); van der Heijden (2002); Wu & Wang (2005)
15	Bank involved	A bank involved in cross-industry alliance	Au & Kauffman (2008); Gaur & Ondrus (2012)
16	Business model	A clearly defined, innovative business model with defined added value, architecture of network and revenue model. The effective alignment between a business model and physical environment is seen to lead to success.	Apanasevic (2013); Au and Kauffman (2008); de Reuver, Verschuur, Nikayin, Cerpa & Bouwman (2015); Mason & Spring (2011); Ondrus, Lyytinen & Pigneur (2009); Ozcan & Santos (2015); Pousttchi et al. (2009)
17	Conditions and support	Institutional support (regulatory, normative and social-cognitive)	Dahlberg, Huurros & Ainamo (2008a)
18		Country-specific institutional conditions	de Reuver & Ondrus (2017); Magnier-Watanabe (2014); Miao & Jayakar (2016)
19		Country-specific market conditions	de Reuver & Ondrus (2017); Magnier-Watanabe (2014); Miao & Jayakar (2016)
20		Organizational support	Dahlberg et al. (2008a)
21	Competition		Au & Kauffman (2008); Kauffman et al. (2014)
22	Complementary resources	Complementary assets / complementarities	Dahlberg et al. (2008a); Gaur & Ondrus (2012)
23	Cooperation	Network or ecosystem cooperation and collaboration between participants (such as cross-industry partnerships)	Apanasevic (2013); Au & Kauffman (2008); Balocco, Ghezzi, Bonometti & Renga (2008); de Reuver et al. (2015); Ozcan & Santos (2015); Gannamaneni et al. (2015); Gannamaneni & Ondrus (2013); Gannamaneni, Ondrus &

			Lyytinen (2015); Hallingby (2016); Hedman & Henningsson (2012; 2015); Kauffman, Liu & Ma (2014); Pradhan, Lawrence & Zmijewska (2005); Zmijewska & Lawrence (2005)
24	Cost	Cost and transaction fees relative to substitutes	Antovski & Gusev (2003); Jayawardhena & Foley (1998); Kauffman et al. (2014); Mallat & Tuunainen (2005; 2008); Shon & Swatman (1998); Teo et al. (2005); van der Heijden (2002); Zmijewska & Lawrence (2005)
25	Independence	“Independence refers to the degree to which the system requires specialized hardware and software.” (van der Heijden 2002, 434)	Van der Heijden (2002)
26	Infrastructure	Availability of ubiquitous infrastructure	Apanasevic (2013); Van Hove (1999)
27	Intention to recommend		Oliveira et al. (2016)
28	Interoperability	The solution is interoperable, cooperative and standardized. There are agreed, industry wide standards.	Apanasevic (2013); Chaix (2013); de Sena Abrahão, Moriguchi & Andrade (2016); Gannamaneni & Ondrus (2013); Hurros (2007); Ok, Aydin, Coskun & Ozdenizci (2011)
29	Merchant support	Merchants support the solution.	Gerpott & Meinert (2017)
30	Openness		de Reuver et al. (2015); Madureira (2017)
31	Promotion		Gannamaneni et al. (2015)
32	Regulation		Kauffman et al. (2014); Zmijewska & Lawrence (2005)

33	Information security		Alshare & Mousa (2014); Antovski & Gusev (2003); Böhle, Krueger Herrmann, Carat & Maghiros (2001); Hayashi (2012); Jayawardhena & Foley (1998); Khraim, Al Shoubaki & Khraim (2011); Lai & Chuah (2010); Mallat & Tuunainen (2005); Obaid, Bayram, Saleh (2017); Oney et al. (2017); Raina (2014); Shon & Swatman (1998); Teo et al. (2005); van der Heijden (2002); Vrechopoulos, Constantiou, Sideris, Doukidis & Mylonopoulos (2003)
34	Technical feasibility	Integration effort, interoperability, scalability, remote access	Antovski & Gusev (2003); Böhle et al. (2001); Jayawardhena & Foley (1998); Shon & Swatman (1998); van der Heijden (2002)
35	Technology standards	Standards are established and available.	Balocco et al. (2008); Gannamaneni et al. (2015)
36	Timing		Madureira (2017)
37	Universality	Critical mass, transferability, divisibility, standardization and comprehensiveness of the solution	Antovski & Gusev (2003); Böhle et al. (2001); Clemons, Croson & Weber (1996); Jayawardhena and Foley (1998); Shon & Swatman (1998); van der Heijden (2002)
38	Usage externalities	Possible benefits created using the payment system to merchants and consumers.	Hunt (2003); Rochet (2003)
39	User support		Gannamaneni et al. (2015); Jayawardhena and Foley 1998; van der Heijden (2002)

Based on previous research and Table 2, the table in Appendix 1 could be created. Through discussions with this works supervisor Dahlberg and the literature review finally nine factors were chosen that were deemed to best describe mobile payment ecosystem success. The relation between the above mentioned 39 success factors are mapped to the chosen factors in Appendix 1. The chosen factors are: 1) choice of technology 2) choice of features, 3) size of the ecosystem and openness, 4) security, 5) service pricing, 6)

reliable platform provider, 7) guidance, training and support, 8) successful implementation of service changes and 9) sales and marketing of the platform. These are listed in Table 3.

Table 3 Success factors chosen for this research

SF1	Choice of technology
SF2	Choice of features
SF3	Size of the ecosystem and openness
SF4	Security
SF5	Service pricing
SF6	Reliable platform provider
SF7	Guidance, training and support
SF8	Successful implementation of service changes
SF9	Sales and marketing of the platform

The choice of technology and business model connected to it is crucial. Consequently, it was chosen as the first success factor (SF1). The second and third factors (SF2, SF3) were chosen based on research by Kauffman, Liu and Ma (2014, 26) and Staykova and Damsgaard (2016, 14). Kauffman et al. (2014, 26) discovered that mobile payment solution success for banks relies on four aspects: 1) joint participation from multiple stakeholders, 2) the nature of government regulation, 3) technology innovations in the future which mean new competition through disruptive innovations and 4) the cost of technology. Based on these aspects the choice of features is going to be reviewed as a success factor for a mobile payment platform to see if this has impact on the competition or cooperation of the participants. Joint participation and competition are also considered in the third success factor where mobile payment is seen as a MSP where the question of sides, reach and the size of the ecosystem arise. The crucial factors for digital payment platforms are the balancing of the reach and range on each of the platform's sides and between the participants (Staykova and Damsgaard 2016, 14). Range is considered in the second and reach in the third success factor.

The next success factors are based on initial key conditions for mobile payment growth researched by Huurros (2007, 116). These are in line with research conducted by Ondrus and Pigneur (2006, 253-254), Zmijewska (2005, 359), Dahlberg & Mallat (2002, 653) and Mallat (2007, 426). Interviewees were asked about four success factors; security, wide acceptance and use, ease of use and ease of registration, and they were all considered relevant. Security and the perceived security that affects the user adoption, are seen, unsurprisingly, as the main factors to lead to success in previous research. The security aspects are considered the fourth success factor (SF4). Wide acceptance and use are integrated in the third success factor. The ease of use and need for user support were chosen as the seventh factor (SF7). Zmijewska and Lawrence (2005, 204-208) criticize

previous literature for not taking infrastructure aspects of innovations into account. They have created a multi-perspective framework and added the aspect of trust and cost to the possible success factors along with usefulness, cooperation between actors, regulatory issues, chosen business models, network externalities and standardization. The costs and pricing questions are considered as the fifth factor (SF5) and trust in the platform provider as the sixth success factor (SF6).

The topic of service changes is seen critical in IT and in other areas and timing is seen critical for success as can be seen from Table 2. Therefore, the successful implementation of these changes was chosen as the eighth success factor (SF8). The last factor, marketing of the platform (SF9), has also been discussed in literature by Gannamaneni et al. (2015, 1166). They saw promotion of the platform as a failure factor because banks should be more proactive participating in payment initiatives. Competition is seen as a factor leading to success and a solution could, with competitive sales activities, stand out from the competition.

An important aspect to consider is that success factors are local and dependent heavily on economic, social and technological aspects. Asian mobile payment solutions, especially in Japan and South Korea, have been relatively successful showing the ability to design business models fitting to their environmental settings. European, as in Finnish, market constraints are fundamentally different and importing a business model directly risks a misalignment. (Gaur & Ondrus 2012, 171.) Mobile payment success factors are strongly connected to the industrial environment but also to the internal organization and business logic (Ondrus, Lyytinen & Pigneur 2009, 2). Banks play an irreplaceable role in the mobile payment markets success and development. In order to achieve e.g. high market penetration, financial institutions need to take learnings from the critical success factors (Gross, Fleisch, Lampe & Müller 2004, 5). Banks need to consider the uncertain actions of other participants, the technological risks and dynamic market conditions while planning mobile payment solutions (Kauffman, Liu & Ma 2013, 4167). Liu et al. (2015, 387) suggest that central and commercial banks should be involved in open dialogue and collaboration with mobile payment solution providers. They should discuss the risk and uncertainty mitigation in order to foster a new business model for mobile payments.

2.2.2 Choice of technology

The choice of technology is one of the most important decisions for a mobile payment platform. This success factor is about how technologies are chosen and by whom. According to Suarez (2004, 271) scholars have been studying technology battles for decades under labels like *dominant designs*, *technological trajectories* and *platforms*.

These dominance battles have in the past defined the winning and losing technologies and companies but also the fate of the complementary goods and services. In the case of mobile payment, the choice of technology includes the choice of access interfaces, software of the online store, security technology, data terminal equipment, identification/authentication method, POS terminal (information network, NFC, QR or Bluetooth), the mobile device and its operating system (Android, iOS and Windows) and the choice of the integration method.

The emergence of a dominant design has been viewed as a *black box* process, which involves the interaction between technological and non-technological factors (Lee, O’Neal, Pruett & Thomas 1995,4). The dominant design is a concept of identifying the key technological features that become the dominant, de facto standard (Suarez 2004, 272). Innovations may become the dominant design in the given field for reasons that have little to do with the design itself (Lee et al. 1995, 4). Ondrus, Lyytinen and Pigneur (2009, 10) discovered through their “dynamic model of the diffusion stages of a mobile payment solution” that technological factors (technology value, changes in technological environment) were dominant in the diffusion phase, which concentrates on interoperability and scaling the offered system. Interoperability means that users need to be able to pay in the place of their choice independent of their bank, operator, mobile device or the operating system. A payment system cannot be interoperable without a user network and users will not take it to use without interoperability. (Chaix 2013, 285; Huurros 2007, 118.)

2.2.3 *Choice of features*

Mobile payment platforms are developed continuously with new or existing services. The ecosystem participants are able to influence these decisions. The more complementary goods (products that increase another product’s demand and vice versa) are available, the more consumers are interested in the product. These goods can also create lock-in effects. (Au & Kauffman 2008, 144.) Lock-in is the situation in the market where one technology has been able to dominate the market because of increasing returns. The chosen outcome is “not necessarily superior to alternatives, not easily altered, and not entirely predictable in advance”. (Arthur 1989, 128.)

Staykova and Damsgaard (2016, 19) found that to succeed, mobile payment platforms tend to follow a particular evolutionary path that guarantees a high adoption rate among the participants of the platform. The key to manage this transformation is determined by the platform owner’s ability to leverage a number of participants and the features of the platform.

Questions that a mobile payment solution provider needs to answer are the ability and possibility to offer features: how the platform is affected by the added features, the number of offered services and if all the users are offered the same features. According to Finnish key mobile payment industry actors, interviewed in 2002 for a doctoral study, it would not make sense to transfer the existing payment business model into internet but to create something additional to payment features with added value. These features could be the number of different services attached to the payment service or the independence of location and time. (Huurros 2007, 119-120.) This success factor has been defined by Staykova and Damsgaard (2016, 5) as the *range* of a multi-sided platform. The definition includes the features as well as the functionalities of one or several sides of the platform “offered for one or several distinct customer groups”.

Through designing new innovative features that enable cross-side interactions, the platform’s range is extended. With an enhanced variety of offerings, the platform can benefit from the complementors’ innovative potential and prevent possible envelopment attacks (Staykova and Damsgaard 2016, 4-6.) Because of frequently overlapping user bases of different platforms, platforms are at risk to be enveloped by adjacent platform providers that enter the market. The overlapping relationships can make it easy and attractive to overtake the network of another. (Eisenmann, Parker & van Alstyne 2006, 8-10.) The overtaking requires entry by one platform provider into another platform provider’s market. This can be done by bundling functionalities together to leverage the shared user base and commonly used components. (Eisenmann et al. 2010, 1). The choices of standalone businesses are to sell out to the attacker, exit the field, to change the business model, partner with more established companies or to sue the enveloper. (Eisenmann et al. 2006, 8-10.)

The most difficult design decision on multi-sided platforms are the trade-offs that are created by features that create conflicting value for different user groups. Options to solve these situations are sacrifices with direct short-term revenue impact or solve conflict by concentrating on the participant group that is more important for long term success. (Hagiu 2014, 74-75.)

Designing the functionalities of the solution, it is important to keep in mind what competitors offer. Switching costs need to be taken into account from the user’s point of view, they can have a positive or negative impact. Switching costs are (according to Beggs⁴) created when the consumer finds that switching from the product they already have invested in to the competitor is expensive although the products are identical in characteristics (Au & Kauffman 2008, 144).

⁴ Beggs, A. (1989) A note on switching costs and technology choice, *Journal of Industrial Economics*. Vol. 37 (4), 437–440.

Staykova and Damsgaard (2016, 8-10) studied the range of MobilePay. The app allows money transfers with solely a phone number. Five months after the initial launch new features such as transactions with higher amounts and “split the bill” were added. These steps were made to increase the range and to attract more interactions, new users and achieve lock-in effects.

2.2.4 *Size of the ecosystem and openness*

This success factor is multifaceted concerning the size of the ecosystem, the choice of sides and reach and openness. The size of the ecosystem depends on the amount of ecosystem participants (users, merchants, service providers, payment operators, means of payment (debit or credit payments, mobile money)). The choice of the sides of the platform has to do with the adding of merchants, financial and payment service providers (FSP, PSP), consumers, device manufacturers, regulators, MNO and other banks to the platform and the decision on the number of sides of the platform. The choice is usually restricted by the choice of industry. (Hagiu 2014, 73-74; Fun et al. 2013, 323-324.) Staykova and Damsgaard (2016, 5) define the number of participants of separate affiliated user groups as the *reach* of a multi-sided platform. A platform’s *inter-side reach* as in the reach between the different sides relates to enabling cross-side interaction and the features linked to these interactions. An example of the inter-side reach could be functionalities that execute customer-to-business interactions. Imitating and adding functionalities provided by other similar platforms is a way to expand this reach. (Staykova and Damsgaard 2016, 6; Eisenmann et al. 2006, 8-9; Eisenmann et al. 2010, 15.)

On one hand can the attraction of more sides be positive and create larger cross-side effects, scale and varied revenue sources. Platforms can have positive or negative network effects (or network externalities) and they can be same-side or cross-side effects. *Same-side network effects* mean the situation where users are drawn to one side and this attracts more users to the same side. *Cross-side network effects* (also called indirect network effects) work when attracting users to one side of the ecosystem, the number of users of the other side increase or decrease because of this action. Same-side network effects tend to be negative and cross-side effects positive. (Eisenmann et al. 2006, 3-5.) On the other hand, with fewer sides you can avoid the risk of complexity and the conflicts of interest between the sides. The general downside of having many sides is the loss of flexibility and need to please all the different parties. (Hagiu 2014, 73-74.)

A multi-sided platform is characterized by its high ability to evolve and the transformation from one-sidedness to two-sidedness, and diversification through external complementors. There are different challenges faced on each stage of the evolution, firstly

to gain critical mass (sufficient number of adopters to drive further growth) and later dealing with platform recurrence, meaning “the ability of the platform to achieve significant cross-side network effects”, need for lock-in effects and variety of offerings. (Staykova & Damsgaard 2016, 4.) Ondrus et al. (2009, 10) discovered that stakeholder identification, interested organizations and key market actors were important success factors in the early phases of the of a mobile payment solution. This was especially important when building alliances between network operators and financial institutions. Collaboration and co-operation of all the relevant participants on a platform is a major concern. Since mobile payment platforms involve multiple interdependent actors, can the complexity create misalignment with the different stakeholders. (Guo & Bouwman 2016, 57.) There is an interrelationship between competition, cooperation and regulation in the field of payment systems (Kemppainen 2003, 10-11). Competition is needed for the efficiency of the market and cooperation helps to achieve economies of scale and critical mass. The regulator needs to figure out what sort of competition would lead to the most efficient market situation. The competition can be either the competition for the market meaning the competition between the systems or the competition in the market referring to the service competition using same system. The regulators’ goal is to maximize social welfare while ensuring safe and efficient systems. (Kemppainen 2003, 10-11.)

Selecting the optimal level of openness is a crucial success factor for companies creating and maintaining platforms according to many scholars (see Gawer & Cusumano 2002, Gawer & Henderson 2007, Boudreau 2008) (Eisenmann, Parker & Van Alstyne 2008, 131; Parker & Van Alstyne 2009, 133). Openness can be seen as the allowance of “participation in the platforms development, commercialization or use” and as the uniform, reasonable and non-discriminatory application of restrictions to all potential participants (Eisenmann et al. 2009, 131). The effects of the openness decision are structural, it can increase potential market size, reduce rivalry but also lead to loss of architectural control (Eisenmann et al. 2006, 8). Therefore, the decision on openness is a strategic decision and must be made in an early development phase. (Madureira 2017, 138). Ondrus, Gannamaneni & Lyytinen (2015, 261) distinguish, in line with Eisenmann et al. (2009, 131-132) three levels of openness: provider, technology and user level. Ondrus et al. (2015, 267-270) proposed opening the platform at provider level to intra-industry and inter-industry firms, opening the technology level and the user level in order to gain success. Opening at user level leads in most cases to success, but at other levels the connection between opening the platform and success is not as straight forward. At technology level, the platform needs to work together with all rival platforms to reach the maximum market potential and these platforms should be able to combine 100% of the shares. At provider level, all actors should join their market shares which is in reality not feasible since they might be competitors.

The framework from Iyer and Henderson (2010) adopted by Kazan and Damsgaard (2013, 6-7) can be used to analyze the openness of platforms. This is depicted in Figure 3. Whether the system development is considered open or closed (in the y-axis) is determined by the degree of involvement by third parties in the multi-sided platform. Closed systems, such as Apple, exclude third parties from modification compared to Android mobile operating system, which allows third party modifications. The other dimension (on the x-axis) determines how complementary software can be integrated with the system. As a comparison, Windows allows software to be developed without permission which makes it free but Apple moderates its complementary software and requires a permission to be on the platform.

Development <i>Platform provider</i>	Open	Salesforce.com	Linux
	Closed	Apple's App Store	Windows
		Moderated	Free
		Usage <i>Third Party Developers</i>	

Figure 3 Openness of platforms in regard to development and usage

Staykova and Damsgaard (2016, 8-10) studied the reach of MobilePay, which has targeted both customers and non-customers of Danske Bank. Up to 70% of the users are non-Danske Bank customers and Danske bank has invested significantly into efforts to grow its user base. Critical for the success of MobilePay was to reach a critical mass upon the launch and reaching as many users as possible.

2.2.5 *Security*

It is crucial that users of the mobile payment platform are able to trust the functionality and reliability of the platform. In table 2, information security is listed as a success factor but also privacy and trust are important factors for user adoption that lead to success. Therefore, it is important to prevent malpractice, ensure the security and straightforward handling of payment cancellations. Fun et al. (2013, 325-326) state that security is a fundamental, critical success factor of mobile payment platforms.

Security, trust and stability of the monetary system are the most common themes in mobile payment regulation (Dahlberg et al. 2015b, 6). Security is considered challenging,

but a platform should not even be introduced without an acceptable level of security. Eight security requirements should be considered: authentication, integrity of payment data, confidentiality, anti-replay protection, anonymity, privacy protection, authorization and non-repudiation. (Fun et al. 2013, 325-326.) According to Linck, Pousttchi and Wiedemann (2006, 7) consumers see confidentiality (especially data protection), encryption, security and transparency and traceability (including the feature of confirmation) as the most important factors to build a secure mobile payment solution. Other factors mentioned were fraud protection, a secure infrastructure, liability, cancellation issues and the risk of loss, third party certification and technical reliability.

Au and Kauffman (2008, 156) argue that the high level of privacy and anonymity that mobile payment provides, can facilitate money laundering, tax evasion and fraud. One of the important security issues is indeed the security of the mobile device, which can be achieved through user authentication mechanisms, secure data storage and security of operating system. WLAN and Bluetooth operating in the unlicensed band do not provide security and is an easy target for attackers. Service security and transport layer security mechanisms are crucial for mobile payment. (Kadhiwal& Zulfiquar 2007, 14.)

Establishing a secure and homogenous ecosystem, also including new participants, is fundamentally important. In this ecosystem, it must be considered that responsibilities are assigned, security issues are addressed, payment transactions are secured, comprehensible and reliable but also that privacy is respected. (European Payments Council 2016, 24.)

Not enough research has been made under the topic of refunding and cancellations of payments as a success factor for mobile payment platforms. According to Mallat (2007, 424) transaction errors were seen to affect the adoption of mobile payment platforms and perceived as risk. This proves that this issue needs to be researched further and empiric evidence of the impact on success needs to be gathered. Errors could be caused by the platform or by the user and the concern was whether the correct amount would be credited and sent to the right account. (Mallat 2007, 424.)

2.2.6 Service pricing

One of the factors affecting the emergence of successful platforms is “an adequate pricing strategy to generate momentum behind a platform” (Suarez & Cusumano 2009, 77). The decision is about the service pricing for consumers, merchants and service providers. The pricing needs to be able to compete with other solutions and payment methods. In competitive industries margins tend to be thin and price is determined by the marginal cost and in industries with high entry barriers prices are determined by customer’s willingness to pay (Eisenmann et al. 2006, 3).

Multi-sided platforms have potentially several revenue and profit streams because they serve multiple customer groups but the reality is quite different (Hagiu 2014, 75). For multi-sided platforms, it is a more difficult considering they have to choose a price for each side and consider the impact of the pricing decisions for the other side (Eisenmann et al. 2006, 3). Many markets are multisided, which demands the choice of not only a price level but also a price structure. In two-sided markets platforms see one side as a *profit center* and the other as a *loss leader* or as Eisenmann et al. (2006, 3) formulated it *money side* and *subsidy side*. (Rochet & Tirole 2003, 1017.)

The ability to capture cross-side network effects, same-side network effects, user sensitivity to price and quality, output costs and user's brand value are factors that should be considered when making pricing decisions (Eisenmann et al. 2006, 5-7). The chicken-and-egg problem plays along also in the pricing decision. In markets with network externalities, which usually are two-sided or multi-sided, platforms can use profits from one activity to cover costs from another user groups nonprofitable actions (*cross-subsidization*) (Rochet & Tirole 2003, 1017; Dictionary.cambridge.org/cross-subsidization). Eisenmann et al. (2006, 3-4) discuss that in this scenario the number of subsidy side users is crucial for creating network effects and that the goal of differentiated prices are the generated cross-side network effects. These cross-side network effects attract both sides but the challenge lays in the correct pricing. Because of coordination of the purchases by each side of the market, the redistributive impact of money transfers between sides or the neutralizing effect of VAT on the prices, platforms may be unable to cross-subsidize (Rochet & Tirole 2003, 1018).

Pricing is complicated also by the same-side network effects, called the snowballing pattern, where users draw even more new users to the same side (Eisenmann et al. 2006, 4). Multi-homing creates a situation where the prices on one market depend on "the extent of multi-homing on the other side of the market" (Rochet & Tirole 2003, 990-993).

Suggestions made for pricing strategies are firstly to charge a higher price of a user groups with lesser price sensitivity. Secondly, the side that extracts more value from the presence of the other side, should be charged more in a transaction that is not priced. Thirdly, during a transaction, it suggested to charge more to the side who profits more of the transaction. (Hagiu 2014, 76.)

2.2.7 *Reliable platform provider*

The question of a reliable platform provider is interesting. The goal is to find out if it makes a difference that the provider is a reliable and well-known actor in the field and if it is of importance that the provider is able to react to possible disturbances according to

an agreed level. Trust is highlighted in mobile payment because of the request for personal information in transactions separated by space and time. Trust in vendors and payment systems affects the customers' willingness to conduct mobile transactions, is a determinant of mobile commerce success and impacts customer loyalty and satisfaction positively. Consumers are concerned with authentication, confidentiality, secondary use of data and unauthorized access to payments. (Mallat 2007, 417.) Mallat (2007, 425) discovered the trust in the mobile payment solution provider to reduce the perceived risk of mobile payment. Consumers were more willing to conduct payments with the most established banks but also with credit card companies, and telecom operators, all of which were seen as *trustworthy transaction parties*. Her findings suggest that incumbent, "reliable and well-established payment service providers", are preferred over unknown smaller providers.

The need for trust by the consumers translates to the need of a reliable and stably functioning platform provider. One of the banks' most important resources is, according to Gaur & Ondrus (2012, 174), their brand image, which is positively related to customer trust. Customer trust plays an even larger role when macro payments are concerned. Customer loyalty is difficult to duplicate and provides an advantage, a strategic asset, to banks. (Gaur & Ondrus 2012, 174.) Trust in the payment provider is one of the subjective security factors found by consumers which speaks for using a bank or other provider who is already seen as trustworthy (Linck et al. 2006, 8).

Ensuring stable functionality was discovered to be a common concern among consumers by Mallat (2007, 424). They were worried about unreliable mobile network or devices when paying mobile transactions.

2.2.8 Guidance, training and support

User adoption and acceptance has been researched extensively. There have been survey-based studies of relevant mobile payment application characteristics, development of a user-orientated taxonomy of mobile payment solutions and group interviews on factors contributing to the acceptance of mobile payment solutions. Consumers prefer simple, easy to use, useful and trustworthy solutions. (Linck et al. 2006, 7-8; Zmijewska, Lawrence & Steele 2004, 276; Dahlberg et al. 2003, 217; Mallat 2007, 426.) Users seek compatible solutions that fit their behavioral patterns and the solution allows for individual mobility (Schierz, Schilke & Wirtz 2010, 210). Mallat (2007, 416) applied relative advantage and complexity as characteristics affecting adoption in her research based her choice on the most consistent explanations found in previous research and Rogers' diffusion of innovation theory. Users wished for solutions where it would be

possible to make payments ubiquitously, simply and independent of time and place. (Mallat 2007, 421-423.)

The key of launching a mobile payment solution is to establish network externalities, which then create connectivity and convenience for customers and efficiency for merchants (Au & Kauffman 2008, 154). New payment systems should not be more complex to use than the current solutions and should not require several PIN codes. Ease of use relates to the use of only one payment account. (Huurros 2007, 119.)

Mobile payment being such a new topic, little research has been conducted in the field of guidance, training and need for user support as a success factor for mobile payment platforms. Van der Heijden (2002, 434) examined user support as one of the requirements for internet payment systems. According to this approach by Jayawardhena & Foley (1998) success was determined by the degree of fulfilling the requirements. This factor was de-emphasized in the interviews because it is considered a hygiene factor but also because it is seen as something that the interviewee can control themselves (Van der Heijden 2002, 440).

From previous research on acceptance a clear need for simple solutions arise. The question to be answered is whether the solution must be self-explanatory or not. This success factor was chosen as one of the factors used in the empiric research with the guidance of an expert in mobile payment research who also acts as the supervisor of this study. Because of lack of extensive previous literature this factor was chosen to see if offering user support affects the success of mobile payment platforms.

2.2.9 Successful implementation of service changes

There is a gap in the research concerning successful implementation of service changes in mobile payment platforms and defining these as success factors for mobile payment. This factor was, alike the previous, chosen to be examined in the light of empiric research based on discussions with the work's supervisor. When the technology changes (e.g. new software for the payment terminal or changes in the smartphone operating systems), new services are taken to use and/or services are updated or developed, it is important that the communication about these changes and the deployment are effortless and successful.

Mobile payment can be considered a service technology that automates business processes. The processes need to adapt to changes thus services need to be kept up to date continuously. Services are "subject to constant adaptation and variation adding new business rules and regulations, types of business-related events, and operations" (Papazoglou 2008, 2.) Changes can be structural, policy induced and operational behavior changes and changes in business protocol. Papazoglou (2008, 3) differentiates shallow

changes where the change only affects one service and its clients and deep changes which affect more than just the customers of one but rather the whole value chains service.

The need for management has been noticed in IT services. Utilizing IT service management (hereafter ITSM) activities in the concept of mobile payment could help create an entity of actions that are needed for faultless implementation of service changes. ITSM is the process of managing and implementing IT services that fulfill business needs through the deployment of a correct mix of people, processes and IT (ITIL glossary 2011). According to Galup, Dattero, Quan and Conger (2009, 124) ITSM concentrates on service delivery and support. The Information Technology Infrastructure Library (hereafter ITIL) is a *framework of best practices*. Its goal is to facilitate high quality IT service delivery at a justifiable cost. ISO/IEC 20000 defined “shall” requirements for service management as depicted in Figure 4: service delivery, release, resolution, control and relationship processes (ISO/IEC 20000-1: Part 1, 2005, p.1). All these processes should lead to smooth service delivery what is also what is sought with this factor for mobile payment success.

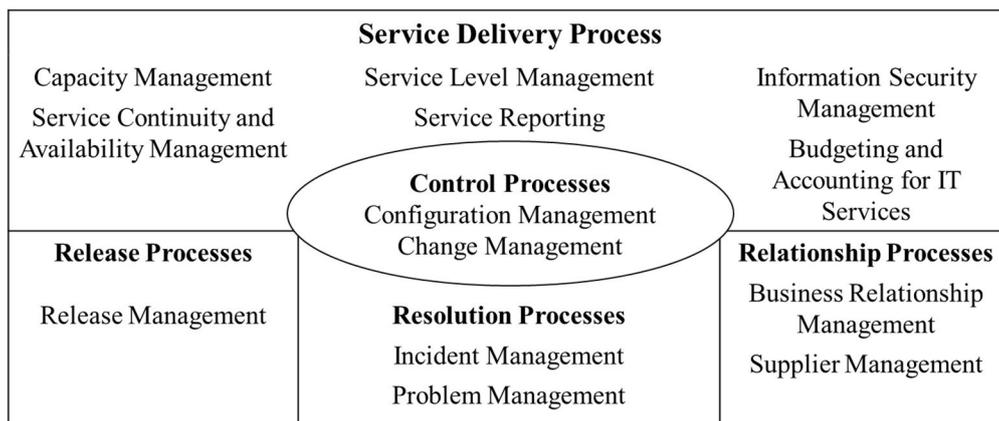


Figure 4 ISO/IEC 20000 Service Management requirements

2.2.10 Sales and marketing of the platform

Only a large user group will make the use of a payment method profitable. Network effects are closely connected to the adaption of a payment system and to the limited scope of the users. (Mallat & Tuunainen 2008, 45.) When the number of users increases, even more users benefit from the use of the payment system. These factors but also the cross-side network effects, the chicken-and-egg problem and user acceptance are topics that need to be considered when discussing sales and marketing of a platform. The topic of sales and marketing has been taken into consideration only little in previous research and therefore it is chosen for further observation in this research. The goal is to see how the marketing and sales of the platform affect its success. It is important to see if the

responsible participant markets the platform actively, involves other participants in these activities and whether this as an impact on the success of the platform.

Gannamaneni et al. (2015, 1167) address this issue by stating that merchants should promote the solution at the POS since they are closer to the customer. This is also why the merchants should be involved in the implementation of the solution. Cross-side network effects come from the increase of the participating customers on one side of the platforms. This typically leads to customers' increased value on the other side. The dilemma with cross-side network effects is that on the one hand they can develop high entry barriers, and on the other the creation of this barrier can be difficult. (Hagiu 2014, 72.)

The so-called chicken-and-egg challenge is connected to this since no participants are interested to join unless others have joined the platform (Hagiu 2014, 72). Customers accept a platform if already sufficient retailers are utilizing it. The solution needs to attract customers in order to attract retailers. (Carton, Hedman, Dennehy, Damsgaard, Tan & McCarthy 2012, 16.)

Customers are ready to accept a new service, such as a mobile payment solution, when the benefits are proportional to the efforts. Because these services usually are complementary, the supply side needs to be careful to fit into the zone of acceptance of consumers. This is special for mobile payment solutions because they are multi-sided platforms where this acceptance zone needs to be coordinated by several partners. Resources need to be well coordinated, as well. (Gaur & Ondrus 2012, 172.)

2.3 IT Governance Practices

IT governance is seen as a link between IT and business and is a part of enterprise governance. It should be seen as a much broader domain than IT management. (Van Grembergen, De Haes & Guldentops 2004, 4-5.) In this research, IT governance is seen as ways in which stakeholders cooperate and participate in decision making in the mobile payment ecosystem. These processes include organizational and leadership structures and processes which ensure that IT supports corporate strategy and objectives (Van Grembergen et al. 2004, 1).

In the modern knowledge-based economy, where IT is in an essential role, IT governance is highly important. The dependency on IT creates major vulnerabilities but also possibilities to stand out and achieve competitive advantage. All the previously mentioned facts point out the criticality of IT governance practices for IT to create the required business value and mitigate risks. (Van Grembergen & De Haes 2009, 1-3.) In Van Grembergen & De Haes's (2009, 7) definition three other aspects, 1) strategic

alignment, 2) resource and 3) performance management, are added to aspects of IT governance that companies should consider. Considering that mobile payment solutions are platforms, the most challenging aspect is to retain control to ensure an integer platform but to also relinquish control to drive innovations by other participants (Tiwana 2010, 679).

In the past 20 years IT governance has become a practical but also academic established concept. The practical side has developed the international ISO 38500 standards and best practice IT governance methods (ITIL, CMMi, COBIT). The latter describe the objectives of IT cooperation, in the case of mobile payment ecosystems. This objective, given the cooperation, would be how the ecosystem would become successful and how the payment service could be developed, operated, managed, and governed. (Dahlberg & Helin 2017, 1539.)

De Haes and Van Grembergen (2009, 123–124) discuss that IT governance can be applied by utilizing different structures, processes, and relational mechanisms, and this approach has become well established in academic research (Dahlberg & Helin 2017, 1539). Therefore, it is important to take a holistic approach. De Haes and Van Grembergen (2009, 128) created a list of 33 IT governance practices in the Belgian financial sector. This list suggested that these minimum mechanisms play a significant role in implementing IT governance in a specific financial sector such as mobile payment. A similar list of 46 practices was created by Almeida, Pereira and Da Silva (2013). Ali and Green (2009 & 2012) researched IT governance practices used by organizations and how these affect the performance. (Dahlberg & Helin 2017, 1539-1540.)

For this research eight practices have been selected. The aim is to investigate how suitable participants of the MobilePay ecosystem find these practices for the governance of each success factor as seen in 2.2. This list of selected IT governance practices can be seen in Table 4. The selection has been made with regard to literature on the subject but also based on the knowledge and experience of an expert of mobile payment who also acts as the supervisor of this research.

Weill and Ross (2004, 115-116) suggest five principles to design effective sets of IT governance mechanisms. Mechanisms should be chosen from all 3 categories and implemented in multiple levels in an organization. In decision-making, structures should be limited and alignment mechanisms should be favored instead. Decision-making bodies should have clear roles, and act as a connection between business and IT. Lastly confusion of each responsibility should be avoided by clarifying the accountabilities. These steps are also followed in this research. As seen previously in 2.1 can mobile payment ecosystems be complex with several participants. Therefore, a clear definition of the roles according to the ecosystem participants is created and thereafter their opinion on the

suitability of the chosen structures, processes and relational mechanisms for IT governance is investigated.

Table 4 Structures, processes and relational mechanisms used in this research

Structures	Processes	Relational mechanisms
Written agreements with clear definitions of roles and responsibilities (ITG1)	Development plan (ITG3)	Identified contact persons (ITG6)
Steering committee (ITG2)	Feature development process (ITG4)	Advisory board (ITG7)
	SLAs (ITG5)	Informal meetings (ITG8)

2.3.1 Structures

IT governance structures are formal instruments and ways to connect business to IT management functions (Peterson 2003, 63). For this research two structural aspects have been chosen: 1) a management model with clear definitions of the roles and responsibilities of the participants (in a written agreements) and 2) steering committees for the platform development.

The first structure aims to integrate governance tasks into the roles and responsibilities of the participants, business and IT personnel, through documented agreements. This is a prerequisite for an effective IT governance framework (Van Grembergen & De Haes 2009, 26.) The steering committees are composed of business and IT people at executive level and they steer the IT projects' development (Van Grembergen & De Haes 2009, 34). The committee is assigned and there can be drafting or working groups to prepare proposals. Steering committees typically oversee major projects or IT priorities, which the mobile payment platforms, mostly are. (Van Grembergen et al. 2004, 23.)

2.3.2 Processes

IT governance processes include monitoring procedures and the formalization of IT decisions (Peterson 2003, 63). Three processes are taken to focus in this research: 1) a development plan for the payment platform (roadmap), 2) a development and choosing process of the new features for the payment platform and 3) a service-level agreement on the platform's functionalities.

The first process includes the definition and updating of the plans made for the platforms development - a detailed plan to guide progress toward a goal (Merriam-webster.com/roadmap). Features are seen as a success factor and the second process indicates a common, agreed-upon process for choosing and/or developing new features for the platform. Service-level agreements (SLAs) are formal agreements between IT and business departments about the service levels, indicators of service quality, development and IT operations (Van Grembergen and De Haes 2009, 47).

2.3.3 *Relational mechanisms*

Relational mechanisms contribute to the cooperation between the platform participants and collaborative relationships. The participation of different stakeholders is important in order to solve problems or differences. (Peterson 2003, 65.) Three mechanisms discussed in this research are 1) having identified contact persons between sides and participants, 2) an advisory board for the payment platform and 3) informal meetings between members/participants.

Contact persons are an important part of relational mechanisms which are “characterized by their participative and shared nature” (Peterson 2003, 65). The advisory board consists of individuals whose task is to advise the platform owner, board of directors and management in different business topics. They do not have the right to be involved in the decision making but they solely give advice. (Entrepreneur.com/advisory-boards.) The last mechanism is having meetings with no agenda. In this case, participants discuss general activities and directions. (Van Grembergen and De Haes 2009, 131.)

2.4 Participants’ roles

IT governance is seen as participation in decision making and one of the most important question that arises when discussing ecosystems is, how the profits are divided. There are several stakeholders who participate in building, enabling and supporting the mobile payment solution who want to leverage the platform. Previous research (Hedman, & Henningsson 2015, 308; Hallingby 2016, 1125) shows that the ecosystem benefits from the stakeholder relations in a positive (or negative (de Reuver et al. 2015, 342-343)) way. This means managing resource dependencies, sharing the revenues and risks between participants is crucial. Those controlling important resources are able to benefit or a larger part of the revenues.

The uncertainty of the future regulation and ownership of the customer accounts hold back mobile payment adoption. The marketing value of customer data is exceptional. Because of the need to share data and thus the need to negotiate the ownerships of the customer relationships, uncertainties arise. Regulatory authorities have, different from country to country, fragmented regulatory responsibilities, which causes confusion in the field. It is expensive for the companies to follow fragmented regulations. (Kauffman, Liu & Ma 2014, 3.) Mobile payment ecosystems that follow regulations are likely to succeed if the actors are able to agree on clear and natural roles (Dahlberg et al. 2015b, 6).

Therefore, the roles of the different ecosystem participants are of highest interest. These roles can be documented in several ways. For this research, a matrix-based approach has been chosen. The RACI matrix or chart is a grid that shows the roles divided into responsible, accountable, consulted and informed. The RACI matrix is useful for projects with internal and external resources. This matrix will be used to get a clear picture of the participants' roles, their expectations and their effect on each of the success factors (A guide to the Project management body of knowledge, 2000, 261-262.)

The resources will be pictured as individual parties of the platform. In this research, the interviewees represent these parties and have their own column in the chart. The activities represented in the rows are the nine success factors identified in 2.2. The roles are described in more detail below (Cabanillas, Resinas & Ruiz-Cortés 2012, 59):

- Responsible (R) is a role whose task is to finish the actual work and receive an approval from the accountable. In most cases there is one single responsible person for one activity, and in this re-search, the success factor.
- Accountable (A), also called approver, is responsible to approve the work of the responsible (R) and takes over the responsibility of the task after the approval. This role cannot be distributed since there must only be one accountable.
- Consulted (C), or also called counsel, a person whose opinion is requested during the work process. There is an ongoing dialog with the consulted.
- Informed (I) is a role based on one-way communication. The informed is being kept updated on the progress and/or results of the success factors. There can be several informed persons.

2.5 Research Models – Drawn from the Theoretical Background

Mobile payment solutions are multi-sided platforms that act in an ecosystem with several partners. Research has been conducted to find out the factors that lead to success in these ecosystems but no true breakthrough has been made.

This thesis considers nine selected success factors to find out whether these are seen as important according to different mobile payment ecosystem participants in Finland. Interviewees were asked to consider these factors importance verbally and numerically. Based on these results the table 5 was created to find out the importance of the success factors.

Table 5 Importance of the success factors according to the interviewees

<i>Interviewee</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>Sum</i>
Choice of technology												
Choice of features												
Size of the ecosystem and openness												
Security												
Service pricing												
Reliable platform provider												
Guidance, training and support												
Successful implementation of service changes												
Sales and marketing of the platform												

The roles of the different ecosystem partners are taken into account as they perceive them and this thesis evaluates which roles these participants have regarding each of the selected factors. Having several partners that work in cooperation but also separately, it is interesting to see how they see their roles depending on the success factors. The roles can then be considered comparing each interviewee as a participant and through all the factors but also to see which actors consider themselves responsible, accountable, consulted, informed or at all involved in the cooperation concerning the factor. The results will be shown in a matrix that will be analyzed. This matrix is shown in table 6.

3 METHODOLOGY

The following part of this thesis explains how the empirical part of the research was conducted and how the received data was analyzed. The design of this research was chosen according to its target to reveal mobile payment's success factors, the roles of the ecosystem participants and the IT governance practices the participants perceive to be related to the success factors. The design includes the procedures and methods used and measures taken to achieve the goal of the research as in to find answers to the research problem and gain additional information about mobile payment.

First step in the design was to formulate the research problem in cooperation with the work's supervisor. This thesis is continuance on mobile payment research in Finland. The main theme for this research is to reveal which factors make mobile payment platforms successful. Nine factors were selected through an extensive literature review and with the help of the supervisor's expertise and experience in the field. Secondly, the research contributes to mobile payment ecosystem research looking at the participants and their roles in each of the success factors. Lastly it considers the IT governance practices of mobile payment ecosystems. Based on the research problem a research plan was created, submitted to the supervisor and discussed together. At this point a literature review was conducted and the theoretical framework was built.

The next step was to interview Danske Bank's mobile payment expert to get a better understanding of Danske Bank's needs, of the field of research and especially MobilePay's ecosystem in Finland. Danske Bank provided a list of possible interviewees. Interviews were planned and performed together with Eero Nummela from Aalto University. He has published a thesis with a similar research design under the supervision of Tomi Dahlberg at Aalto University. He interviewed OP Bank's expert and part of the interviewees were selected from this list. Interviews were planned and the possible interviewees were contacted.

As the third step interviews were conducted in January 2017 and the data was analyzed. Conclusions were made based on the analysis. The writing of the thesis, finalizing and revising were the last steps.

3.1 Research approach and strategy

Qualitative research was chosen as the research approach for this study on mobile payment. Qualitative studies can be conducted in many ways but the overarching factors are viewpoints of the subject's background, meaning and purpose (koppa.jyu.fi/laadullinen-tutkimus). Qualitative research underlines the subjective nature

of information, concentrates on individual cases and on phenomena, which are based on interaction (Puusa & Juuti 2011, 48-49). The premise of qualitative research according to Hirsjärvi et al. (1997, 161) is the portraying of the real world and the comprehensive examination of the subject. It is noteworthy that the researcher cannot resign from his/her values. Personal values shape the way we understand the research problem. (Hirsjärvi, Remes and Sajavaara 1997, 164). In this research, the focus was on mobile payment ecosystems and the importance of the factors leading to solution success. Payment is an interactive process and MobilePay is considered as an individual case and was approached through the theoretical background. The qualitative interviews create the empirical data.

The aim of qualitative research is to reveal unexpected matters through inductive analysis and through elaborate and versatile inspection of the research data. (Hirsjärvi et al. 1997, 164). This research aims to chart a phenomenon not yet well known by consumers. The research looks at the current situation in Finland and seeks new aspects to mobile payment. On the one hand, this research is explanatory, it aims to explain the success factors of the mobile payment platforms, and on the other hand figure out the causes of the decisions on the success factors. The aim also is to produce accurate descriptions of the platform participants' roles which would classify the research as descriptive. (Hirsjärvi et al. 1997, 138.)

The research strategy refers to the fundamental choices of conducting a research (Koppa.jyu.fi/tutkimusstrategiat). It defines the methodological choices of a research. Strategy and the single methods of the research are chosen depending on and suiting the research problem. (Hirsjärvi et al. 1997, 132.) The research problem calls for a closer look at one solution which is why the strategy is based loosely on case research. The topic on hand is complex and has multiple aspects that work together. Consequently, a comprehensive, detailed and exact description based on a case is a suitable strategy (Amk.fi/digma.fi). A case study looks in-depth at the case and the goal is to highlight features of social life. (Hamel, Dufour & Fortin 2011, 2). Piekkari & Welch (2011, 185) refer to Yin (2009, 18) who is the classical father of case studies. He describes case studies as empirical research investigating contemporary phenomena in-depth in a real-life context. In case studies, the object of the study is approached with different methods and in this research interviews, literature and publicly available information is used to look at the case company and solution (Amk.fi/digma.fi). Case studies do not aim to receive generalizable results and since there are several limitations to our subject and the case company, either does this research. As a research strategy is a case study very loosely defined and many different analysis methods can be used. (koppa.jyu.fi/tapaustutkimus.)

3.2 Case: Danske Bank

Danske Bank was chosen as the case company because it has one of the most popular current mobile payment solutions in Finland. The contact to Danske Bank was made and an approval was received for such research. The goal was to take a closer look at MobilePays ecosystem and to ask participants about their views on the factors that lead to mobile payment success. In addition, the goal was to describe the ecosystem participants' roles and their opinion on the governance practices of mobile payment platform ecosystem.

3.2.1 *Danske Bank Oyj*

The Danske Bank Group operates in 16 countries and offers comprehensive banking services for personal, business and institutional clients. They serve 2,7 million personal customers in their four core markets Denmark, Sweden, Norway and Finland. It acts in personal and business banking, wealth management but offers also “funding, risk management, investment services, corporate finance advisory services, and transaction banking solutions” for corporates and institutions. (danskebank.com/about-us.)

In Finland, they serve up to 1 million private customers, being the third largest bank, and employ 1800 persons. (danskebank.com/about-us). In addition to the sheer Danske Bank concentrating on retail banking, there are two subsidiaries operating in Finland. (Danskebank.fi/tietoa-danske-bankista.) Danske Capital offers financial management services for institutions and home market retail clients (Danskeinvest.com). Danske Invest is a fund management company offering mutual funds to investors (Danskeinvest.fi/About_us).

Danske Bank Oyj has been registered to the Companies Register of the Finnish patent and registration office. Danske Bank Oyj has a license of a certified credit institution. (Mobilepay.fi/sopimusehdot.)

3.2.2 *Functionalities of Mobile Pay*

Danske Bank offers MobilePay, a payment feature application for smartphones, available for iOS, Android and Windows phones. Downloading and using MobilePay is free. MobilePay has over 400 000 downloads in Finland and altogether over 3,5 million in the Nordic countries. There are over 27 000 business accounts. One fourth of the 180 million

transactions expected in 2016 come from stores. (Danskebank.fi/MobilePay-yhteistyohon.)

The application can be used with payment card details and is open for customers of any bank. The user is required to have a Finnish mobile phone number, euro bank account and payment card, either MasterCard or Visa (debit or credit card). MobilePay limits the money transfer to 5000 euro per year and 100 euro per day which can be lifted through banking identification. With MobilePay one can (www.mobilepay.fi/faq)

- send money to a receiver who has a the MobilePay application (peer-to-peer)
- ask another person to send one money
- make payments in over 4000 webstores (MobilePay Online)
- share a bill
- pay at a point-of-sales or cash register using Bluetooth or NFC technology
- make in-app purchases
- check the activities and receipt that the money has been sent and
- change settings such as phone number or payment card details.

When money is transferred with MobilePay, first an electronic money transfer to the payer's application is made from the payment card. From the sender's application, the money is transferred to the recipients' application from where it is moved to their bank account. (Mobilepay.fi/sopimusehdot.) The recipient receives the money, if he/she has a Danske Bank account, immediately, if transmitted before 16:30 during the same day or then the next working day (www.mobilepay.fi/faq).

MobilePay offers a solution for the POS payment with smartphones (MobilePay Point of Sale) including the options for digital receipts, a bonus system for small businesses and loyalty programs for chain stores. MobilePay offers the possibility for customers to pay in a business's online store (MobilePay Online) or application (MobilePay AppSwitch). (Danskebank.fi/MobilePay-yhteistyohon.) With the Software Development Kit, businesses can integrate the MobilePay solution to their application and manage the payments with MobilePay's Application program interface. With MobilePay MyShop small enterprises can accept payments by using MobilePay and their mobile device without needing an external checkout terminal.

3.2.3 *Mobile Pay's ecosystem in Finland*

MobilePay was launched in 2013 as the first mobile payment solution launched by a bank in Denmark (danskebank.com/about-us). The application is since 2016 available for all Nordic banks and aims with this cooperation model to develop the application towards an even better solution for companies and consumers. Because of the new partnerships, the

solution will be available to more consumers and the cooperation will accelerate product development. The goal is to become the leading Nordic mobile payment solution provider. MobilePay is to be transformed into a subsidiary of Danske Bank. (Danskebank.fi/MobilePay-yhteistyohon.) MobilePay was launched as a one-sided platform for interactions between users of one distinctive group. These users have interchangeable roles. The platform evolved into a two-sided platform by attracting small businesses, and later larger retail chains, with its large user base. (Staykova and Damsgaard 2016, 8.)

The mobilePay ecosystem is based on the descriptions provided in 2.1.2. Participants include: merchants, regulators, value-added services and business intermediaries, banks and technology providers.

MobilePay is available in Finland in stores, web-stores and in other mobile applications such as McDonalds, Boozt, BR-Lelut, Formwerk, Kotipizza and Tiketti. These merchants are stakeholders in the MobilePay ecosystem (Mobilepay.fi/maksa-verkkokaupassa).

Danske Bank Oyj's actions are supervised by the European Central Bank (ECB) and its national subsidiary, Finland's Financial Supervisory Authority (Fin-FSA, *Finanssivalvonta*). Consumer-related issues of the bank are supervised by the Finnish Competition and Consumer authority (*Kilpailu- ja kuluttajavirasto, KKV*). (Mobilepay.fi/sopimusehdot.) The Finnish payment regulation is influenced by decisions made by the European Union. Other regulators consist of the bank of Finland and *Finanssivalvonta* (the Finnish Financial Supervisory Authority, Fin-FSA). In Finland payments are regulated by the law of payment services (*maksupalvelulaki 290/2010*) that was accepted and came into force in 2010 (Finlex.fi). Fin-FSA demands that new payment services are presented to them before market launch and the service provider needs to make a risk assessment as defined in the regulations. Fin-FSA runs checks on the payment services and service disruptions have to be reported to them. (Finanssivalvonta.fi.) The challenge is that not all new actors are under the supervision of Fin-FSA (Nisén 2012, 35). Thus, a truly level playfield does not exist in Finland.

Danske Bank Oyj currently accepts MasterCard Debit and Credit cards as well as Visa Electron and Visa Credit cards as payment cards (Mobilepay.fi/sopimusehdot). This means MasterCard and Visa are included in the ecosystem. Because of the openness of the solution, offering payment services for clients for any bank, other banks are also participants in the payment ecosystem. MobilePay Online payment method is supported by four payment service providers: Checkout, Maksuturva, Solinor and Nets (Mobilepay.fi/mobilepay-online). The mobile device technology is provided by mobile phone manufacturers such as Apple, Samsung and HTC.

3.3 Data collection

Data for this research is collected with qualitative interviews. In an interview, a researcher can flexibly control the situation and interact with the interviewee (Hirsjärvi et al. 1997, 205). Decisions on what research strategy to use depends on the type of research problem, the extent of control the investigator has over behavioral events and the focus that is put on current, contemporary events (Yin 1994, 4). Interviews were seen as most suitable because the research problem called for investigating one particular ecosystem and a current phenomenon. Because the goal is to find the factors for success interviews gave the research the flexibility to ask further, clarifying questions and motivate the respondents to participate in research. The research called for expert opinions on a specific topic in a well-defined environment. The limited number of experts also made it possible to perform the research as individual interviews. The most important aspect of interviews is to receive as much information about the topic as possible (Tuomi & Sarajärvi 2009, 73).

The interviewees were chosen purposefully and not through a random sample. To receive a basic understanding on the research topic from Danske Bank's perspective an introductory interview was conducted in December 2016. Also, Eero Nummela interviewed OP Financial Bank's mobile payment expert. Both were asked for lists of ecosystem participants that were important in the mobile payment ecosystem in Finland. According to lists of contacts received from Danske Bank and OP Financial Bank, 18 individuals were contacted. Five contacts directly rejected the invitation and one did not respond. Table 8 introduces the participants, which were interviewed for this research. Interviewees were given abbreviations from I1 to I11 to reference to the correct interviewee and to restore their anonymity. The interviewees represent a heterogeneous group with various roles in their organizations and with variable influence power and knowledge on mobile payment. Interviewees represent all three major groups (telecommunications, merchants and regulators) introduced in 2.1.2, which leaves out the fourth major group, consumers, and the bank as the mobile payment platform provider. Consumers were excluded from the study because they do not as a group participate to the development and the operations of the MobilePay platform and ecosystem. Therefore, it would not have been possible to create an adequate and generalizable overview of the users' views with only a limited number of interviews. The goal of this study is to find out the perceived success factors and the practices that enhance the cooperation in the ecosystem. Therefore, the views of the ecosystem participants were considered of higher interest than the banks themselves.

In total 12 semi-structured interviews were conducted for this research. 11 interviews serve as the raw data. One of the interviews was dismissed because the participant did not

have enough time and resources to answer to the interview questions and refused to do so on a later date. Each interview was conducted in the same order and the same questions were asked from every interviewee. The interview questions were formulated based on the preliminary structure and literature review on the subject. Structured interviews are one of the most common research techniques used in business research. Using structured interviews secures the consistency in the data across the interviews and minimizes the differences between interviews. (Maylor & Blackmon 2005, 183.)

Ten of the interviews were conducted face-to-face and one via an online conference-call. All interviews were recorded with an audio device. The recordings are important in order to ensure that the results are accurate (Maylor & Blackmon 2005, 185). The interviewees received the interview material in advance in order to prepare themselves. This is justified by to objective to collect as much information as there is available, and it is also crucial for the success of the interview. It is also a question of ethics to tell the interviewee the topic of the interview. (Tuomi&Sarajärvi 2009, 73.) Most participants had had the time to familiarize themselves with the questions and consider their answers. In the beginning of the interview the research problem was introduced and the questions were gone through in more detail. The context of the interview was explained and the confidentiality of the answers was discussed and ensured. This is why the interviewees are kept anonymous in this research. They were also asked to give some background information on their role and knowledge on mobile payment.

The interview was designed based on the research problem and literature review. The structure follows the research questions and the goal is to fill in the gaps of the research problem and issues discussed in the literature review. The interviews comprised two parts. The interview design can be found in Appendix 2. The first part included the nine chosen success factors and the interviewees were asked to analyze their importance and the interviewee's and the organization's role in each of the success factors. The interviewees were also requested to give a numeric value for their answer according to the Likert scale as follows: 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat disagree, 4 = Neither agree or disagree, 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree.

The second part comprised an analysis on the different IT governance structures and their compatibility to the success factor decisions. The interviewee was advised to choose if they found the IT governance practice suitable, non-suitable or could not comment on the suitability. They were advised to use either 1, 2 or 3 or then cross those they found suitable. The interviewees were asked to fill in a table of 72 options during the interview or afterwards (found in Appendix 2). One interviewee had already filled in the table in advance, six filled it in during the interview and three sent it by email later. The interviewee 10 did not fill out the table. The interviews resembled real-life conversations

as the interviewees' participation was active and the researcher could ask for clarifications for specific answers. The interviews lasted on the average for an hour.

After the interviews, scripts of the answers were created and sent to the interviewees for their approval. Interviewees were given the chance to comment, change and disapprove of the data. These commented versions of the interview scripts are used as the raw data for this research.

Table 8 Interviewees

	Participant	Description	Date
0	Bank		<i>29.12.2016</i>
I1	Payments technology company	An American global payments technology company facilitating electronic funds transfers. It offers products that companies use to offer credit, debit, prepaid and cash-access programs. Interviewee is Finland's country manager.	<i>26.1.2017</i>
I2	Financial supervisory authority	Authority for supervision of Finland's financial and insurance sectors. Responsible for regulating mobile payment solutions. Interviewees responsible for this topic.	<i>18.1.2017</i>
I3	Independent trade association	A global industry association helping banks and other financial institutions in mobile payment topics. The interviewee is the CEO.	<i>19.1.2017</i>
I4	Merchant	A Finnish retailing conglomerate. Interviewee the business representative of payment solution in the cooperation. The interviewee acts as Development Manager for customer payment.	<i>18.1.2017</i>
I5	Merchant	A Finnish oil refining company and renewable energy producer with a large network of gas stations in Finland. Interviewee works as payment service manager.	<i>25.1.2017</i>
I6	Merchant	A ticket sales company with online store and mobile payment possibility. The interviewee is the owner and CEO.	<i>27.1.2017</i>
I7	Merchant	A global fast food restaurant chain. The interviewee was responsible of Finland's IT functions which includes payment methods. The interviewee is head of IT in Finland.	<i>19.1.2017</i>
I8	Payment Service provider	A Finnish payment institution offering payment solutions for brick-and-mortar and web stores. Interviewee the founder and CEO.	<i>27.1.2017</i>

I9	Payment Service provider	A Finnish company specialized in payment transfer, owned by a bank. Solutions from brick-and-mortar to web stores. Interviewee Head of Business unit.	17.1.2017
I10	Software developer	A Finnish company offering digital services and digital business development. The interviewee is the Chief business development officer.	19.1.2017
I11	Technology provider	South Korean multinational conglomerate/electronics company offering own mobile payment solution. Interviewee is responsible for the payment solution on Nordic level.	25.1.2017

3.4 Data analysis

In the analysis of the data, the aim was to understand the data. According to Hirsjärvi et al. (1997, 182), in qualitative research, the data analysis is not aiming for generalized conclusions. Inductive analysis, where conclusions are based purely on data that was received, has been challenged because a new theory cannot be based on observations (Tuomi & Sarajärvi 2009, 95). In this type of research, the main stress is on the data and the units of analysis are not predetermined. The conclusions are drawn based on the data and the observations. (Eskola & Suoranta 1998, 83.; Fsd.uta.fi/menetelmaopetus.) The research is not conducted purely inductively but partly based on previous research. This research is conducted in a theory directed way where the theoretical concepts are previously known and taken from the theoretical framework (Tuomi & Sarajärvi 2009, 117).

Ruusuvuori, Nikander and Hyvärinen (2010, 12) have described seven phases of interview analysis, which were followed in this research. Firstly, the research problem was formulated and adjusted and the data collection method was decided based on that. After that the data was collected, in the case of this research by interviewing industry experts. Then began the familiarization with the data, its organization and outlining of parts of the data.

The data was then thematized, characterized and analyzed. This step is done to understand the data, to find relations between issues and to be able to interpret it later. Thematization is the collection of typical topics and their compression (Fsd.uta.fi/menetelmaopetus/tyypittely). In this case each success factor, possible other factors leading to success and the roles of the participants were considered themes in the analysis. The data is approached in the way Eskola and Suoranta (1998, 153) describe where the data is coded based on the literature and theoretical review of the issue. Coding

is marking passages about same issues or themes with remarks or highlighting them (Jolanki & Karhunen 2010, 399). Coding and afterwards thematization helps to identify the research problem from the raw data. To succeed in thematizing the data, the theoretical material and empiric results must be combined and tied together. Passages can be used to reason the interpretations, describe an example, enliven the text or in a condensed form as demonstrating narratives. (Eskola ja Suoranta 1998, 175.)

Jolanki and Karhunen (2010, 396) discuss the use of analytical programs in the analysis of qualitative data. They praise these programs to ease the analysis process by helping organize text or finding important passages and specifications. In the case of this research such programs were used to code the text to find subjects that came up frequently. Firstly, as Jolanki and Karhunen (2010, 399) discussed, the foundation of the coding, the code names and what is supposed to be coded from the data were decided. Codes were based on the success factors, IT governance practices and the roles of the participants. The following codes were used: Bluetooth, ecosystem, infrastructure, banks, NFC, missing success factor, QR, SF1-SF9, standard, future and the importance of the technology choice.

The last steps defined by Ruusuvuori et al. (2010, 12) include the collection and interpretation of results and testing them against the data. Interpretation means that the researcher debates the results of the analysis and makes his/her own conclusions based on those. Syntheses combine the main points from the analyses and give clear answers to the research problems. (Hirsjärvi et al. 1997, 224-225.). Tuomi & Sarajärvi (2009, 101) discuss Laine's⁵ approach of collection and presentation of the results. The essential parts according to the research problem are described in the results after which units formed by special meanings are formed. Finally, the practical implications and the need for future research is identified. These steps are gone through in the following chapters.

3.5 Validity, Reliability and Trustworthiness of this Research

Measuring validity, reliability and trustworthiness of qualitative research is seen more difficult than in quantitative research where the research can be repeated. These concepts have been created for quantitative research. (Tuomi & Sarajärvi 2009, 136.) The validity and reliability of qualitative research can be measured with systematic analysis to evaluate choices and principals guiding the analysis. Also, the trustworthiness of the interpretations should be considered. To convince the reader of the reliability of the research, the reader is showed what the entirety of the data is composed of and on which

⁵ Laine, T. (2001) Miten kokemusta voidaan tutkia? Fenomenologien näkökulma. In: *Ikkunoita tutkimusmetodeihin II*, Eds. Aaltola & Valli, PS-kustannus, Jyväskylä. 26-43.

parts the main results are based on. (Ruusuvuori et al. 2010, 27.) The choices guiding the analysis are described and discussed in 3.4 giving transparency to the analysis and validity to the choices made by the researcher.

The rating of the qualitative research's validity is about checking whether the data and the conclusions are valid. Explaining the analytical criteria used for the conclusions, using analytical programs, creating data summaries and visualization strengthen the validity. It is important to also point out the limits of the research. (Ruusuvuori et al. 2010, 27.) The limitations of this research are discussed in 6.2. Data is visualized and summarized in chapter 4 and exceptions are taken into consideration.

The discussion of the possibility to generalize the results and their transparency is important. Through generalization the research phenomenon is not expected to be true in a larger concept but rather if the found structures, categories or plans are connected with parts of the phenomenon or can explain the phenomenon on a larger scale. (Ruusuvuori et al. 28.) Although case study results are not expected to be generalized, can, as a conclusion, a model of one mobile payment ecosystem be formulated based on this research. The data has been described in a transparent manner and the conclusions are justified based on the empirical data.

On top of the reliability and validity, Tuomi & Sarajärvi (2009, 140-141) suggest discussing the research subject of the research, the researcher's engagement in the issue, the data collection, choice of interviewees, the length of the research, analysis of the data and the reporting of the research. The subject was chosen out of interest in the issue and the researcher saw this topic as current and novel for the mobile payment industry. Since this is a master's thesis the data was limited to 11 interviews. Nevertheless, as a result success factors were identified and a representation of the mobile payment platform ecosystem were created successfully. Three issues that need to be taken into consideration concerning structured interviews are the consistency, completeness and accuracy of the interviews. It is important that all the questions are asked in the same order that they are clearly formulated and none is left out by accident. (Maylor & Blackmon 2005, 185.) The interview design and order was reviewed together with the professor and Eero Nummela in order to perform the interviews successfully. The fact that the interviews were performed with two interviewers ensured that mistakes were minimized in the interview situations.

The choice of the interviewees was reliable but limited to OP bank and Danske Bank and their mobile payment platforms' ecosystems. The interviewees were given the chance to review the notes made by the researchers and comment and remove parts of these and the interviewees used the opportunity to comment rather well. Interviews were performed on a tight schedule during two weeks, which gives an accurate state of the time period and there were no major events during those weeks in January 2017 in the mobile payment

business. The research results are reported by this thesis and will be publicly available to interested readers at the university of Turku and online.

Triangulation could also add to this research's validity. Tuomi and Sarajärvi (2009, 144) call the triangulation linked with the data as one of the main types of triangulation. This would validate this research because the triangulation is based on receiving information from several informant groups, which in this research is represented by the different ecosystem stakeholders.

4 RESULTS

The results presented in this chapter are based on 11 interviews conducted in January 2017 and represent views of six different stakeholder groups: the payments technology company, the financial supervisory authority, the independent trade association, merchants, payment service providers and the software developer. The interview had two parts and in the first part of the interview, interviewees were asked to evaluate and describe their knowledge and experience with mobile payment. Firstly, this chapter introduces the attitudes the interviewees had towards mobile payment. Secondly, interviewees were asked to rate each success factor based on the statement: “this is a significant factor for a mobile payment platform’s success”. Hence, the summary of the numeric results and the interviewees’ comments on each success factor are presented in 4.2. Thirdly, the interviewees were asked to give opinions on their roles based on the RACI matrix which will be introduced in 4.3 and lastly the viewpoints on IT governance practices are laid out in 4.4.

4.1 Attitudes towards mobile payment

The overall attitude towards mobile payment and its future success as a payment method was positive – as is logical to expect. The payments technology company strongly believes in mobile payment. The leader of the trade association sees it as a high risk not to be involved in mobile payment. All the merchants and the payment service provider (I9) strongly agree that the merchants must be involved in mobile payment. Merchant (I6) believes that mobile payment will quickly develop into a noteworthy payment method. The PSP (I9) has noticed customers to choose the service according to their ability to accept mobile payments. According to the financial supervisory authority Finland is lagging behind other countries and companies should prepare themselves for the turning point that will happen in three to five years. The hope for the future is that new methods of identification would be available.

Merchants adoption of mobile payment solutions was seen a critical factor in mobile payment success. Merchants I5 and I7 were for the adoption of mobile payment solutions. I7 argues that merchants must listen to the customer and act according to their wishes.

It is irrational not to be involved in mobile payment because a merchant that does not accept money, is foolish. It is wise for the merchant to follow what is going on in the world and then the customer also considers the company to be “up to speed” (Merchant I7)

If the new payment method makes the payment easier, faster and safer and is not significantly more expensive, it will become interesting to the merchant (I5). In order to adopt a mobile payment platform, it must be able to compete with the existing payment methods and offer added value to the consumer or make the merchant more attractive according to merchant I5. The current requirement that merchants need to fulfil currently is comprehending the new payment method to keep up with the changing payment industry according to merchants I4 and I5. Merchant (I6) and payments technology company representative argue that merchants can currently survive without mobile payment solutions but may need to change their views according to customer needs.

-- But it is a part of the business's service that they offer different kind of payment methods but the number of payment methods must stay in control in a way. The business must offer payment methods that are preferred by to customer. – Accepting the customers preferred payment method is part of good customer service. (Payments technology company I1)

4.2 Success factors

The interviewees gave numerical and verbal comments on the nine chosen success factors. In the following subchapters, each success factor is examined in more detail. An overview of the numeric results is portrayed in table 9.

overall, all interviewees agreed that the chosen factors would lead to success. No interviewee disagreed with the factors. According to the sum of the numeric responses, the successful implementation of service changes (SF8) was the principal factor for a successful payment platform. The choice of technology (SF1) and sales and marketing of the platform (SF9) were similarly significant. These three and the decision on service pricing (SF5) were the factors that received the most “Strongly agree” answers in total.

The least significant factors among were the guidance, training and support (SF7), choice of features (SF2) and size of the ecosystem and openness (SF3). The amount of different answers per success factor is indicated in Figure 5. The interviewees only responded with 5 = Somewhat agree, 6 = Agree, 7 = Strongly agree to the question of the success factors' importance. The figure shows that success factors SF1, SF3, SF4, SF5, SF6, SF8 and SF9 received a similar amount of answers where the interviewees strongly agreed on the importance. The choice of features and user guidance stand out. The choice of features caused the most variation in the answers where “Strongly agree”, “Agree” and “Somewhat agree” received an equal amount of answers. None of the respondents strongly agreed that offering user support would lead to platform success and the most common answer was the respondent agreeing to some degree. It is noteworthy that I3 did

not give a rating for SF7 commenting that this factor should not be considered. According to the interviewee (I3) no-one will use a solution that requires user or merchant training. The significance of openness and the decision on service pricing either was strongly agreed on or found only somewhat important. On the other hand, the choice of technology and successful implementation of service changes was mostly strongly seen as important and only two respectively one chose the lower level answer.

Table 9 Numeric results of the success factor importance

<i>Interviewee</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>Sum</i>
Choice of technology	7	6	7	7	7	7	7	6	7	7	7	75
Choice of features	7	5	7	6	5	5	6	6	6,5	7	7	67,5
Size of the ecosystem and openness	7	5	5	7	5	7	7	7	7	7	7	71
Security	7	7	6	7	7	7	7	6	5	7	7	73
Service pricing	5	5	7	7	7	7	7	7	7	7	7	73
Reliable platform provider	5	7	7	7	7	7	7	6	5	7	7	72
Guidance, training and support	6	6	0	6	5	6	6	6	5	6	6	58
Successful implementation of service changes	7	7	7	7	7	7	6	7	7	7	7	76
Sales and marketing of the platform	7	5	7	7	7	7	6	7	7	7	7	74

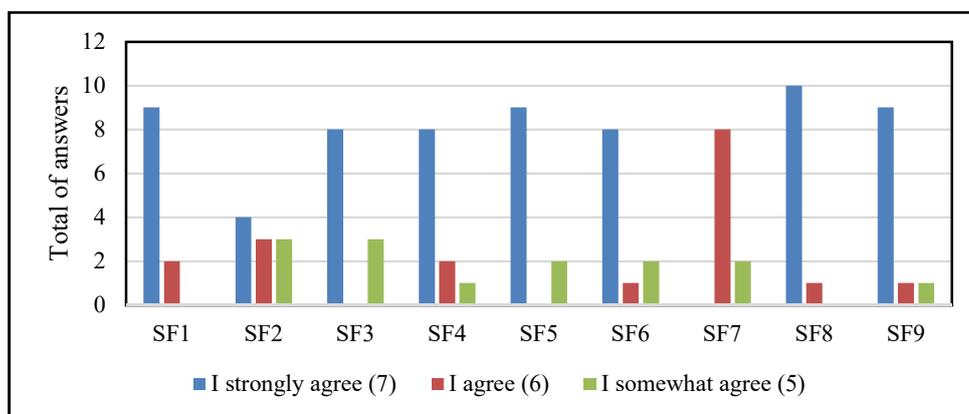


Figure 5 Total of different answers given for each success factor

4.2.1 *Choice of technology*

The choice of technology is regarded as a critical success factor. Nine interviewees strongly agreed and two mostly agreed that the factor is significant for mobile payment platform's success, which leads to 75/77 points in total. The choice depends on the

- mass the provider wishes to reach and the existing infrastructure
- choice between NFC, Bluetooth, QR codes and the degree of standardization
- payment terminals used by the merchants
- payment situation
- risk of investing in the wrong technology
- usability and
- security aspects.

The choice of technology depends on the mass the provider wishes to reach. The payments technology company manager argues that if the network of use locations is limited and the user base is already available, the choice of technology is not of high importance. The selected platform needs to be compatible with the current infrastructure according to merchant (I4). The chosen payment transfer method and the support available for the operating system are significant for reaching the critical mass. This is the most important success factor mentioned by the PSP (I9). With the critical mass, a solution can reach commercial potential. A choice has to be made if the solution is offered for all operating system of the mobile device (Android, iOS or Windows). The choice of operating system and how the payments are transferred are critical for reaching a critical mass according to PSP (I9).

The choice between NFC, Bluetooth or the QR code was discussed. NFC was chosen by the merchant (I4), the payments technology company and the technology provider and merchant I5 is aiming to take it into use. The payments technology company had chosen to invest in NFC because it is becoming a universal standard and it enables card payments but also face-to-face mobile payments. The fact that NFC is a standardized solution aids in service changes and makes them easier according to the trade association. According to merchant (I4), the technology should be standardized in order to avoid overlapping functionalities and investments. The further development of the service is beneficial and easy because of the standardization according to merchant (I5). Bluetooth is appealing to the merchant (I4) since iPhones do not support NFC technology. QR codes are simple enough for payment purposes and users have varying knowledge about the use of QR codes according to the merchant (I4).

The payment terminal technology also affects the choice of technology according to PSP (I9). The merchant (I4) agrees that having several payment terminals to accept all kinds of payments is the worst-case scenario. This is important if the mobile payment

solution provider wishes to have locations of use in brick-and-mortar stores according to the software developer (I10).

The payment situation differs according to the type of business and it relates to different concerns. The merchant (I5) points out their need for the authorization hold because they need to make sure of the customers solvency and questions what the payment limits should be (the limit in Finland currently 25 euro (Korttiturvallisuus.fi/Lahimaksaminen)). Ensuring a pleasant payment experience is as important to the merchant.

Merchant's limited scope of resources limits their choice of the technology. I1, I5, I6 and I8 agree that currently it is not possible to foresee what technology is going to become the dominant design. Since it is not rational for a merchant to offer all payment methods, they do not have the resources to invest in all of them and they do not know what method will become successful. These issues limit the choice of technology according to the credit card provider. In their role as an enabler of the ecosystem, they have invested in several technologies to ensure the chances of choosing the winning technology. Their business requires special payment terminals on all POS and updating decisions are thus made with more caution. According to I11, the chances of success are higher the fewer changes are needed to the mobile device using the payment solution.

The chosen technology should be easy to use, provide a great customer experience and be trustworthy. The financial supervisory authority sees that the chosen technology influences success through the platform's usability. Merchant I7 agrees that the technology should be easy to use so that the use of a new payment method does not influence the user experience. The technology provider comments that if the solution aids to improve the customer experience, it would spread automatically and would not need to be based on existing standards. According to the PSP (I8) the technology should be stable in order to succeed because the choice has to do with functionality and performance of the mobile payment platform.

Security is the main concern for the financial supervisory authority in mobile payment solutions. The technology choice affects the mobile devices and back end systems communication and data security solution. The PSP (I8) agrees that the question of the sufficiency of data security is connected with this factor.

4.2.2 Choice of features

The choice of features was regarded as a slightly less critical success factor. Only four interviewees strongly agreed, four mostly agreed and three somewhat agreed that the factor is significant for mobile payment platform's success, which leads to 67,5/77 points

in total. The choice of features divided opinions on if features should be added and at which point of the development they should be added. Correspondingly, the interviewees commented on the participants who should be involved in the development of the features and what features would need to be added to a mobile payment solution.

The interviewees argued on what features a mobile payment solution should offer. One merchant (I6) trusts that a payment functionality is sufficient for a successful mobile payment platform whereas the representative of the trade association (I3) completely disagreed arguing that the payment functionality is not enough and many more features are required. According to the payments technology company provider (I1), the payment method as such is not necessarily significant for the consumer but rather the services that can be used and their available to a consumer. The added features make mobile payment a competitive payment method. The new payment method should attract new customers, add value to the existing ones and make the merchant more attractive in the eyes of the consumer because existing payment methods enable the customer to pay with a payment method of their choice according to the merchant I5.

The interviewees commented also on the question at what point the different functionalities should be added to the platform. According to the payments technology company, the added features play a key role especially in the beginning of the development. Offering all three options (payment in online and brick-and-mortar stores and peer-to-peer payment) as early as possible is the key to success according to the PSP (I9). Developing the service to offering all payment options is important according to the PSP (I9). The technology provider disagrees and comments that in the early phases it is important to concentrate on basic functionalities. According to the software developer (I10), it can be difficult to make a mobile payment solution financially successful directly. Attracting a mass of users first with peer-to-peer payments eases the way towards more lucrative business models and helps get the attention of merchants. If the initial investment has been remarkable, it is of higher importance that the solution evolves and brings new customers according to merchant I5. On the other hand, if the solution is based on a standard (as the NFC technology is), the development is positive but not necessary.

Development should happen in cooperation with consumers, providers and merchants adjusting the features to local needs. New features should be developed according to feedback received from the market (PSP I8) in cooperation with the users (PSP I9). As users are resistant to change, the user's adoption is crucial (I8) and acting on feedback helps implementing the solution to the market (I9). The merchant (I4) requests development to happen in cooperation with the provider and the merchants. Features need to be adjusted to local needs in case the solution is available globally, comments the technology provider (I11).

Interviewees suggested additional features to a mobile payment platform such as keeping the purchased goods in the same application (I6), receiving discounts, scanning prices, additional information on products, having the ability to compare prices (I3, I5), adding a customer loyalty program (I5) or following customer behavior which is crucial for merchants' business (I4).

4.2.3 *Size of the ecosystem and openness*

This factor was regarded slightly less critical, as well. Eight interviewees strongly agreed but three somewhat agreed that the factor is significant for mobile payment platform's success, which leads to 71/77 points in total. The size of the ecosystem is important if it is of interest to the platform provider answers the payments technology company's manager. The interviewee sees this as their advantage because they act internationally. The consumer should be able to pay with the same payment method while travelling or online.

The size of the ecosystem is of such importance because a larger clientele enables greater value creation to the consumers according to the technology provider (I11). It is not profitable for a merchant to choose a solution with little users, unless it is easy to implement, according to merchant I7. Also, merchant (I6) considers the easy integration of the platform to external services as important. On the other hand, it is sensible to take to use a solution that is easily implemented even though it has a small user base. According to I5, investing in a solution is not feasible in any situation if it does not reach and attract a large clientele.

The mobile payment platform should be easily accessible, based on a standard and accepted by merchants. A solution needs to have locations of use and users in order for the solution to be successful according to the software developer (I10). Building a network of locations of use is cumbersome in brick-and-mortar store but easy online. The challenge of MobilePay currently is the missing locations of use in Finland. The network of use locations for bankcards (=bankcard tellers with credit and debit options) is close to perfect, which is, why the compatibility with the EMV standard of the mobile payment platform is crucial. This will make it possible to use all the POS terminals as locations of use that accept credit card proximity payments. Correspondingly, the technology provider (I11) agrees on the fact that the payment solution needs to rely on existing standards in order to become successful. The ease of access furthers the success of the platform overall. Interfaces can be challenging for the spreading of the platform because other external services (where the solution could be used) are not standardized e.g. public transport (I11).

Better cooperation is requested by several interviewees. On the one hand, merchant I7 wishes that merchants would be more involved in the development of the solution. On the other hand, I5 hopes solutions to further cooperation with other merchants by offering discounts or shared loyalty programs, from which the customer benefits. According to merchant I4, the ecosystem should be uniform and based on contracts. It is crucial, according to the PSP (I8) that all players are involved in the ecosystem, not only stakeholders with decision power. Bigger players have capital but they will not succeed alone.

Openness is a clear advantage for the payment solution comment I1, I4 and I6. It is important that a customer of any bank can use the solution. This is connected with the integration aspect as well. The solution needs to have interfaces that are easily integrated to the merchant's systems, like web store says merchant I6. Interfaces used by the payment platform need to be compatible with existing systems because the payment process needs to work automatically according to merchant (I4). In the ideal case, according to I7, the solution is accepted by many merchants. The PSP (I9) sees the openness and existing interfaces as a prerequisite for success as it enables the fast growth of the ecosystem. The trade association representative predicts that early solutions are closed and developing towards open systems. Eventually there will be an ecosystem of joined platforms coordinating their growth. MobilePay is an open solution only to some degree comments the representative of the trade association (I3). The solution for example does not cooperate with other banks offering their services through the application. In comparison, has iPhone a closed system according to the trade association.

4.2.4 *Security*

Security and privacy aspects were regarded highly important. Eight interviewees strongly agreed, two mostly agreed and one interviewee somewhat agreed that the factor is significant for mobile payment platform's success which leads to 73/77 points in total.

The security of the platform was even considered as a prerequisite for the platform by the payments technology company, financial supervisory authority and the trade association. According to the trade association security is a prerequisite only for large enough players. An actor cannot count security as an advantage because security issues need to be intact in order to be active in the market according to the payments technology company. The financial supervisory authority points out that even one transaction with malpractice can be fatal for a small company. The security aspect relates to trust which is, according to a PSP (I8), difficult to achieve. Morals towards security need to be strict

because malpractices cannot be afforded. The payments technology company comments that the consumer needs to be able to trust the service.

For the financial supervisory authority security and trustworthiness of the solution are the most important success factors. All other factors were discussed based on the assumption that a secure solution will be the successful one. The two aspects that must be taken into consideration and are monitored by the authority are the consumer protection and prevention of funding of money laundering and terrorism.

Consumer's acceptance and trust in the solution should be taken into consideration with the security aspect. It should be considered that a novel, unknown service can seem less trustworthy as one that is well-known and therefore influence the views of consumers as is pointed out by the software developer. On the other hand, the consumer may consider a solution's security aspects complex and slowing down the service use according to the supervisory authority I2. Preventing malpractice can affect the usability and customers are accustomed to simple payment solutions (especially in online stores) but according to I4 security is more important than creating simple solutions. The PSP (I9) would not put too much emphasis on this factor. The prevention of malpractice can weaken the networks ability to grow fast, if the mobile payments added value and financial profit are based on the size of the user network. On the company level, even a small fund management company (I8) has to follow rules and laws and it takes time and effort to be observant. The pressure and expectations to keep up with security are high for merchants, according to I4, and security needs to be taken care of and expectations need to be held up to.

Functionality and reliability are important aspects. The merchant (I5) thinks if the solution is marketed under their own brand, they are more concerned about the security aspects and if not then it is up to the consumer to decide which provider to trust. Security is important for merchants because if malpractices occur, such as credit card fraud, it is the merchant that is eventually responsible, according to I6. The PSP (I8) says that malpractices are common in card payment, which is why a small fraction of them are allowed. According to the trade association, if the promised value mobile payment is high enough, are security issues tolerated even in mobile payment and mentions issues M-Pesa has faced. In the Finnish ecosystem malpractice is not tolerated although the representative of the trade association predicts that mobile payment will have more issues than traditional payment methods. In the end, it is the merchants and other actors who lose their money, not the consumer.

The issue of returns is important because these processes should not take too long but are not vital and can be processed manually if necessary I7 and PSP I9. The returns are not as important as preventing malpractice and security and considering taking commercial risks, can this factor be disregarded.

4.2.5 *Service pricing*

The decision on service pricing was regarded as a critical success factor since nine interviewees strongly agreed that the factor is significant for mobile payment platform's success. Two interviewees somewhat agreed which lead to 73/77 points in total.

An important aspect of service pricing is to be aware which participants are charged by the platform. According to the PSP (I9) it is currently the merchant who pays the fees whereas merchant I6 comments that it is, in the end, the consumer that pays. Especially I6 mentions this because they take profit from exchanged product and not from their own products. Because no service currently charges consumers, the price differences only show to merchants, according to PSP (I9). Merchant I4 states that merchants' costs of payment solutions have risen, the more payment methods and technologies have become available. The large transaction volumes make payment methods expensive in I4's business. The software developer I10 thinks it must be the merchant paying the fee because consumers are not used to paying extra for a payment method. According to two merchants (I5, I7) is pricing a question of negotiation.

Finding a correct price level is challenging, and the PSP (I8) sees pricing as extremely critical. Pricing decisions are difficult to make because these cannot be easily altered but all other actors are competing against each other so the pressure to change is significant. Finding the correct price level is hard and this creates situations where the price level is trodden down. According to the payments technology company currently companies and banks are offering mobile payment as an unprofitable service but in the future the platform must have a price to guarantee a certain quality to the consumer and be profitable to the provider to cover their investment. The supervisory authority argues that the factor is important for the service provider because the pricing has to cover the costs even though consumers are unaccustomed to paying for a payment method.

Service pricing is selection criterion for the choice of the mobile payment solution according to the trade association representative. A solution cannot be too costly or it will not be accepted. Merchant (I5) confirms this since their business has low coverages compared to other merchants and a costly payment method would not be chosen. The payment method should, if it adds costs, offer added value such as clientele growth or higher coverage. In practice, the idea of a mobile payment solution based on credit cards is intolerable because fees would have to be paid to both credit card providers and mobile payment platforms (I5). The payments technology company agrees that the pricing must be competitive.

4.2.6 *Reliable platform provider*

The reliability of the platform provider was seen as a less critical success factor. Eight interviewees strongly agreed, one payment service provider mostly agreed but two somewhat agreed that the factor is significant for mobile payment platform's success. This results in 72/77 points in total.

Reliability is a concept that is not connected with the size, age or solidity of the platform according to PSP I8. Reliability is built by keeping promises, continuous operations and canvassing. For merchant I5 reliability means the ongoing service even if the mobile network connection is compromised. The financial and technological preconditions need to be filled by every actor but can be proportioned according to size of the company. The externalized services must be checked for their trustworthiness according to the supervisory authority.

Previously larger, more established companies were considered more reliable. Today, the company's size can be considered a burden and the concept of reliability has changed according to the PSP (I8). Even large companies or banks can be unreliable and go bankrupt according to PSP (I8) and merchant (I6). Estimating a provider's reliability is difficult, according to merchant I6. Even working together with reliable providers has merchant (I6) encountered significant issues that were not cause by the merchant which would indicate that reliability does not assure faultless cooperation. Still, reliability in a platform provider is appreciated by I1, I2, I5, I6, I7, I10 and I11. Recognition and reliability are required because mobile payment solutions involve money. The provider does not necessarily have to be a bank according to the merchant (I7), PSP (I9) and the software developer.

Merchant (I5) and the software developer are certain that a larger, established actor furthers the platform's success and the software developer agrees that it could be difficult for a small actor to become successful. A known actor can easier promote the platform and is thus easier to implement, according to the financial supervisory authority. Merchant (I4) finds the continuity of smaller actors such as start-ups uncertain in comparison to established actors.

Added value or innovative services can weaken the need for a reliable provider. Merchant (I5) could consider a newer provider if it can offer added value. The trade association representative believes that the value proposition is more important than the recognition or the brand of the company. On the other hand, the payments technology company claims that the provider does not necessarily have to be a big player but even for a smaller provider an eminent brand can offer credibility. The trade association agrees that reliability is important but a transition is ongoing. Smaller actors can reach reliability by offering revolutionary technology innovations, agile and niche solutions. And if the

unknown provider is able to provide a superior customer experience can it be considered as a partner or become successful agree merchant (I4) and PSP (I9).

The platform provider can also be a technology provider. The mobile payment provider does not have to be a bank but the service can be provided by another company, such as Apple or Google, comments the software developer. On the other hand, the technology provider believes that consumers still trust a bank rather than a technology company. For young people banks do not represent reliability as an institution such as for older generations, the software developer and technology provider agree.

4.2.7 *Guidance, training and support*

This factor was regarded the least important. None of the interviewees strongly agreed, eight mostly agreed and two somewhat agreed that the factor is significant for mobile payment platform's success. The trade association did not rate this factor at all. This leads to 58/77 points in total. The main message from the interviewees was that user training should not be necessary. This was stated by I1, I2, I3, I5, I7, I10 and I11. The trade association clearly states that no user or merchant will use a solution that requires training or guidance. PSP (I8) says that this factor cannot be ignored but little guidance can be sufficient. With the growing popularity of mobile payment also the need for user support declines, says one of the merchants (I7).

The consumer can, according to the payments technology company, easily renounce the use. Merchant (I4) has as well seen a connection between user guidance and user acceptance. The interviewees call for good usability in solutions. The solution should be easy to take to use and there should be no barriers to use, according to the software developer. According to the payment service provider (I9) the use should be intuitive and the customer experience good or otherwise it is not accepted by consumers. The consumers need to be educated on the ease of use but not on the actual use, according to the technology provider, and this is only during launch and marketing of the platform. The user needs several repetitions in order to adopt the solution according to the technology provider. The PSP (I9) believes customer guidance to be more important than guidance and help for merchants or providers.

Especially in the case the platform works faultily, consumers need to be supported, the payments technology company argues. These errors should be minimized with e.g. piloting even before the launch but the consumer must be supported if he/she cannot solve the error themselves especially in a new type of service.

All merchants (I4, I5, I6 and I7) wished for training for them in implementation, practices, processes, error messages and processes involved in the monetary transactions.

I6 claims that a platform must offer support for the merchant like a service desk. Merchants need to receive training to be able to help customers with the payment method (I1), to be able to keep their knowledge on all the available payment solutions and to ensure a fast and effective customer transaction (I4). Implementation training, staff and user guidance has to be provided according to regulations of the financial supervisory authority (I2). The authority checks the customer materials of every new actor entering the market. According to the authority, it is the provider who is supposed to guide the consumers, other actors and all the externalized services.

4.2.8 *Successful implementation of service changes*

The successful implementation of service changes was seen as the most critical success factor for the success of a platform where ten out of 11 interviewees strongly agreed on the importance of the factor. In total, it received 76/77 point since one of the merchants agreed only mostly that the factor is significant. Service changes are perceived as critical because of the possible consequences of unsuccessful changes and business impact. PSP (I9) considers the successful service changes rather a prerequisite than success factor. If changes are not performed well, can consequences be significant for the consumer.

Service changes are time-consuming and challenging and are connected with the software platform and payment terminal (I8). Service changes are challenging because errors are frequent, changes are made in the complex back-end systems and because changes affect many ecosystem participants. Errors occur frequently during changes and because a mobile payment platform only is an interface and the changes affect the back-end system, it is highly important that the change process functions well according to the financial supervisory authority. According to the payments technology company (I1), the number of actors involved in payment services, time-consuming processes and the complexity of systems, especially with larger enterprises, are reasons that make service changes challenging. Getting actors involved requires from the actor besides money also appreciation, expertise, innovative technology and a respected brand, argues the PSP (I8). Smaller actors have connections, knowledge and trust compared to large companies who want to force changes into a platform and have difficulties with service changes. On the other hand, smaller actors might not even have the possibility to comment the changes or their timing but, according to the payments technology company (I1), changes do not usually affect the whole ecosystem.

Service changes are time consuming. According to merchant (I5) service changes take up to a year, according to the PSP I8 up to two years. Changes have to be taken notice of a year in advance because payment terminals are updated with version updates that need

to be well planned and tested. Service changes in online solutions are also more agile than the ones made in brick-and-mortar stores, claims the software developer (I10). According to merchant (I5), this success factor depends on the change itself (affecting payment terminal or backend process) and if something new is added or not. They own a multitude of payment terminals, which are not according to industry standards and changes are rare. For merchant (I4) the difficulty of service changes is caused by their ten POS systems and one payment terminal that they support.

Service disturbance and errors have to be taken seriously. It is, according to the payments technology company, critical that service changes do not disturb the service. Merchant (I7) comments however that service changes do usually not fully interrupt work. Errors and mistakes in systems are crucial and need to be fixed immediately (I1). Merchant (I6) expects to be informed of changes. This is often forgotten and appreciates partners who ensure information delivery and comprehension.

The trade association representative highlights the importance of standards and cooperation. Many actors must cooperate to successfully implement changes and with standardized solutions such as NFC this is straightforward compared to unstandardized technologies.

4.2.9 Sales and marketing of the platform

This factor was seen as critical for a mobile payment platform's success. Nine of the interviewees strongly agreed, one merchant mostly agreed and financial supervisory authority somewhat agreed that the factor is significant. This results in 74/77 points in total.

Marketing has an important role in market acceptance. Because mobile payment platforms are service products, their success depends on how the market accepts it, says merchant (I4) and according to the software developer marketing has a significant role in this. The role and need for marketing depends on the brand, service quality and the solutions life cycle. A well-known brand with a good service does not require marketing but an unknown brand with a bad service cannot be helped with only marketing activities according to merchant (I4). According to merchant (I7), marketing plays a more vital role in the beginning and then the merchant can also be involved in promoting the solution.

A payment feature is not enough to make a mobile payment solution successful and the use of the solution needs to be encouraged in order for the gaining success, states the trade association. The payments technology company agrees with this saying that there is currently a multitude of services available and it is crucial that a new service is promoted. Marketing is important to inform customer of a payment method and because a merchant

has invested in it, it is of importance that customers are aware and use it, states merchant (I6). If marketing is done effectively can it be a success factor for a platform, argues the payment service provider (I9). The solution should be present in many interfaces so consumers become familiar with it and the platform gains users.

There ought to be an ecosystem participant who takes the responsibility for marketing activities. The supervisory authority interprets this as a crucial factor for the provider. Misleading marketing is forbidden as well as the use of misleading terminology. The authority is responsible for consumer protection. Merchant (I5) suggests that one ecosystem participant should be responsible for the marketing, communication and promotion of the platform and the other participant can then make their decision of participation. The main stress of marketing for the technology provider is based on implementation and use guidance and training.

This is an important factor for business-to-business platforms but rather unimportant for business-to-consumer (B2C) platforms, comments the trade association. Many platforms market themselves peer-to-peer therefore promotion does not play a role in B2C business cases. Consumers might not bite into promotion activities even though a company is invested in their idea, comments the PSP (I8). More important than platform promotion is the creation of an ecosystem and the individualized marketing to each actor to create an image of the service, argues the PSP (I8).

4.2.10 Additional factors

Interviewees were encouraged to add success factors they see as significant and were missing from the list. These were: user experience (SF10), ease of implementation (SF11), number of use cases and ability to use in all channels (SF12), loose competition and authoritative control (SF13). These are listed in the Table 10.

Three interviewees, merchant (I6), payment service provider (I9) and technology provider (I11), added user experience as a significant success factor. According to the merchant (I6) the lure of the service plays a key role in gaining new users and thus a good user experience plays an important role. Even if everything else is well planned and considered can a poor user experience have an impact on the success of the platform. According to I11, the user experience has to be equally good if not better than in card payment.

According to merchant (I5) the ease of implementation leads to success of the platform. Merchants are ready to implement a new payment method only if it offers a clear added value such as an uncomplicated way of identifying customers and a channel

between the merchant and customer that is lacking in their business. This would offer information about the customer and the possibility to create allocated services.

The PSP (I9) added the number of use cases to the success factors. The technologies are sufficiently mature so the mobile payment wallet should have several use cases and the service should cover all three current ones: online payment, payment in brick-and-mortar stores and peer-to-peer payment. The more common the use of the payment method becomes, the bigger the chance is that the user takes the solution to daily use.

The other PSP (I8) added the control of competition and authoritative control as a success factor. Legislation and control enable but can also limit the platforms actions and act as barriers to the market.

Table 10 Additional success factors

<i>Additional success factors</i>	<i>Suggested by</i>
User experience (SF10)	Merchant, payment service provider and technology provider
Ease of implementation (SF11)	Merchant
Number of use cases and ability to use in all channels (SF12)	Payment service provider
Loose competition and authoritative control (SF13)	Payment service provider

4.3 Participants' roles

The success of a mobile payment platform is dependent on the cooperation of the participants of the ecosystem and on the quality of the alliances. On top of that the roles of the participants need to be clearly defined because responsibility of the risks and also the share of the benefits needs to be divided fairly. The interviewees were asked to describe their role in the mobile payment ecosystem concerning each chosen success factor. The roles were divided into responsible, accountable, consulted and informed based on the RACI matrix to give a framework for the roles and help with the analysis. The interviewees were given the option of not having no role or not being involved in a success factor.

- Responsible (R): I perform the given task or I am part of the execution team
- Accountable (A): I supervise that the task will be finished.
- Consulted (C): I can be consulted with advice and directions.
- Informed (I): I am informed about the execution of this task.
- No role or no answer (-): This issue is not of importance for the organization and no role is needed.

The result of the interviews, the finalized RACI matrix, is depicted in Table 11. The interviewees considered their role not as an individual but as the organization's role in the ecosystem. Overall, most the respondents saw their role as responsible or consulted. Sales and marketing of the platform was the factor where up to four interviewees did not consider participating in any way. The payments technology company did not consider to be involved in the marketing of another providers platform and the payment service provider only sees themselves in building the ecosystem but not promoting the solution.

The majority of the interviewees considered themselves as responsible for the openness and size of the ecosystem, decision on service pricing and service changes. The payments technology company (I1), merchants (I4 & I7), PSP (I8) and the technology provider (I11) considered themselves responsible for the size of the ecosystem and the openness. Service pricing was considered the key factor to further platform success and over half of the interviewees thought to be responsible for it. Similarly, the same interviewees (the payments technology company (I1), merchants (I4 & I7), PSPs (I8 & I9) and the technology provider (I11)) saw themselves responsible for the successful implementation of service changes.

Interviewees saw their role mostly as an advisor or consultant for the choice of technology and features. Only the payment technology company and the technology provider considered themselves responsible for these features. The security aspect was the factor where the most respondents saw their role as accountable. The interviewees did not choose informed as their role apart from the merchants. Especially merchant I6 considered their role to be informed concerning the success factors.

Table 11 The given results of the participants' roles

<i>RACI matrix</i>	<i>Interviewee</i>										
<i>Success Factor</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
Choice of technology	⁶ /R	⁷ /A	C	C&I	C	-	C	A	C	A&C	R
Choice of features	R	S	C	C	C	C	C	A	C	A&C	R
Size of the ecosystem and openness	E/R	S	C	R&C	C/I	I	R	R	C	A&C	R
Security	R	A	C	R	A	I	A	R	A	A&C	R
Service pricing	R	S	C	R&C	C/A	I	R/C	R	R	C	R
Reliable platform provider	R	S	C	I	A	-	R	R	C	C	R
Guidance, training and support	R	S	C	C	I/A	I	I/C	R	C	-	R
Successful implementation of service changes	R	S	C	R&C	A/I	I	I/R	R	R	C	R
Sales and marketing of the platform	-	S	C	⁸	-/R	R	C	-	C	-/R/C	R

4.3.1 Role of merchants

Merchants, interviewees 4 to 7 (indicated in grey in Table 11), had differing views on their roles. Most saw their role in the choice of the technology and features and in service pricing decisions as consulted. In choosing the technology I4 sees their role between consulted and informed when working with an external service provider. They also inform consumers about the technology. I5 claims that they are able to influence the service provider and their own choice of payment terminals, which is why they see their position as an adviser. I6 did not consider having a role in the choice of technology. All the merchants agreed that their role is to consult the service provider in the choice of features. I5 comments that their role would be responsible if the product would be offered in partnership or the platform would offer the merchants loyalty program services. Merchant I4 saw themselves responsible for pricing because they make their own contracts but also that the service provider should consult them about the pricing. Merchants I5 and I7 point out that they are able to choose the payment methods that they implement, have negotiation power towards the platform provider and are responsible for an acceptable pricing level. Merchant I6 consider themselves as informed because they do not have any influence on the pricing.

⁶ Enabler (E)

⁷ Role of a supervisor (S).

⁸ Offers visibility for the payment platform by adapting it

Two merchants considered to be responsible for the third factor, openness and the size of the ecosystem, because of processes that they are involved in (I4) and because they are able to decide to accept the payment method (I7). The other two considered that they are informed or consulted and I5 says they have no voice in the factor but to decide to be involved. The prevention of malpractice was perceived as the merchant's responsibility whereas merchant I6 saw their role as purely informed. Their reasoning behind the choice of role was however the same. They comment that merchants are responsible to provide security to consumers and be aware of risks independent of the payment solution and are therefore responsible. Having a reliable platform provider had the most variation in the answers where every merchant had another role differing from no role at all, accountable, informed to responsible. The reasoning for the choice of role was that they are responsible for customer contact in error situation (I5) and responsible for choosing their cooperation partners (I6 & I7). User support was a topic where most of the merchants wished to be purely informed. Merchant I5 considered them also accountable which is logical them being in close customer contact and having information on customer behavior. For the same reason two merchants considered themselves consulted about user guidance. The successful implementation of service changes was seen partly as their responsibility but also as something to inform and be informed about. The merchant I4 considered the changes in their own systems and I7 their fluency their responsibility but saw their role as informed about the timing.

In sales and marketing of the platform two merchants saw themselves as responsible. I4 and I6 commented that they offer visibility for the platform since they offer the payment service and I6 saw her/himself therefore partly responsible for the marketing. Merchant I7 saw that their task is to advise the service provider in the marketing of the platform. Merchant considers only to have an active role if they have invested in the payment solution in question and the responsibility grows the more the company is involved with their brand or efforts in the solution. Interviewee 6 saw their role as informed in most cases whereas the others as the one giving the consultation to others or even being in charge.

4.3.2 Roles of payment service providers

The payment service providers, interviewees 8 and 9 (indicated in white in table 11), saw their roles very differently. They agreed only on being responsible for service pricing and service changes. The PSP (I9) comments that they are responsible because they price their service and PSP (I9) considers that it is important to take responsibility and stay active so that pricing stays at the correct level. I8 says that they are responsible for service changes,

for controlling their network and aiding new payment solutions enter the market whereas their software partners are responsible for updating the payment terminals. They find managing error situation critical. I9 is responsible for changes made in the web store payment systems.

Interviewee 8 saw their role as mostly responsible and concerning the choice of technology and features as accountable. Especially for user support the company aims to offer a superior user experience than established companies can. In the case of marketing they did not have a role. The payment service provider (I8) sees creating a working ecosystem more valuable than marketing communications. Their role is to act as an expert organization and spot pain points in order to create a working ecosystem. On the other hand, interviewee 9 assumed the role of consulted in all other factors except for being accountable for security issues.

4.3.3 Roles of other participants

The financial supervisory authority (I2) did not find a fitting role in the RACI classification. Only in the choice of technology and security issues they saw themselves as accountable. Concerning the other factors, they added a new role, the role of the supervisor. According to them there should be one responsible actor in the ecosystem. This actor needs to an approved license and is liable for the payment solution. Other actors are then in relation to this actor through contracts. The payment field is changing and larger ecosystems are being built. The ecosystem must have a responsible actor that possibly only offers the platform or application and for example payment processing and marketing can be outsourced.

The payments technology company (I1) assumed their role mostly as responsible. For the choice of technology and the openness they saw themselves as the enabler in the ecosystem. For the latter, they are also responsible for creating industry standards. In marketing functions, they did not see any role. Service changes rely on standards according to them and this is why they are responsible but do not see their role as important or critical. Similarly, the technology provider (I11) considered their role as exclusively responsible for all the success factors.

The software developer (I10) saw themselves as accountable and consulted for most topics. For user support, they did not see any role, neither for marketing in brick-and-mortar stores. Online they market the solution in cooperation with the customer. In decision about service pricing, ensuring stable functionality and successful service changes, they saw their role as consulted. The trade association (I3) saw that their role to

be consulted in every success factor. For them the most important topic is the size and openness of the ecosystem.

4.4 IT Governance practices

The second part of the interview aimed to provide answers to the suitability of IT governance practices for each success factor. Table 12 describes the results of the suitability of the IT governance (ITG) practices. The table shows the number of responses per IT governance practice that indicated the suitability. Not all practices suit the given success factors but because of the nature of the interview and the research a choice of the interview method had to be made. This is also why the interviewee could choose not to comment the suitability.

Overall, most success factors had practices the interviewees found suitable and not suitable. Choice of features, choice of sides and the security aspects were the success factors where the interviewees indicated the biggest number of suitable IT governance practice options in total. For the choice of technology and service pricing interviewees found the least suitable cooperation models. Two participants, the merchant I6 and the technology provider, indicated that for the choice of technology they were unable to find any suitable or unsuitable governance practices. Merchant I5 found only an advisory board suitable.

Table 12 Suitability of the IT governance practices

	ITG1	ITG2	ITG3	ITG4	ITG5	ITG6	ITG7	ITG8
Choice of technology	4	7	4	3	3	3	7	5
Choice of features	5	7	10	7	2	5	8	7
Size of the ecosystem and openness	7	7	6	4	5	6	7	8
Security	10	3	6	6	8	8	5	6
Service pricing	7	7	4	3	7	5	3	4
Reliable platform provider	8	7	6	5	7	8	2	5
Guidance, training and support	9	3	5	5	7	9	3	5
Successful implementation of service changes	7	5	9	7	7	5	4	4
Sales and marketing of the platform	8	6	8	3	7	8	5	5
Total	65	52	58	43	53	57	44	49
ITG 1: Written agreements with clear definitions of roles and responsibilities, ITG2: Steering committee, ITG3: Development plan, ITG4: Feature development process, ITG5: SLAs, ITG6: Identified contact persons, ITG7: Advisory board, ITG8: Informal meetings								

The blue fields in Table 12 indicate the practices that were found the least suitable. Only two respondents considered service level agreements suitable for the choice of features and an advisory board suitable for having a reliable platform provider. Considering the suitability of the options, these could be considered unsuitable in general. The service level agreements could measure the level of added features per year or the success of added features. This would be challenging and finding the correct indicators could be impossible. The reliability of the platform provider could be discussed in the advisory board and this could give advice on issues in reliability.

The green fields in Table 12 highlight that over half of the participants agreed that this IT governance practice suited the success factor in question. The management model with clearly defined roles and responsibilities in written agreements (ITG1) were regarded an especially good structural approach to the sales and marketing of the platform and the fact that a reliable provider would lead to platform success. It was indeed commented during the interviews that there should be one actor that is responsible for the marketing of the platform. The reliability of the platform provider would be clearly seen if the roles and responsibilities are clearly indicated. A steering committee (ITG2) was found suitable by

over half of the respondents for all other factors except security and user support. A development plan (ITG3) was also found suitable for the marketing of a platform. A feature development process (ITG4) was seen suitable for five success factors by over half of the respondents. The factors that most agreed on were the development of new features and service change delivery. These are the factors where an efficient process would come most to use. Interesting, but rather unsurprising is e.g. that service level agreements (ITG5) were seen suitable by almost $\frac{3}{4}$ of the respondents for every success factor from SF4 to SF9 but not suitable for the choice of sides, features or technology. The suitable success factors can be easier measured to and indicators for service quality can be found easier than for choices concerning the actual solution. Identified contact persons (ITG6) were seen especially suitable for security aspects, for presenting a reliable platform provider but also for the sales and marketing of the platform. An advisory board (ITG7) was seen suitable for the choice of features. Informal meetings (ITG8) were considered most suitable for the size of the platform and the openness.

The yellow fields in Table 12 indicate the IT governance practices that were found suitable by the majority (over $\frac{3}{4}$ of the interviewees). Only three practices were regarded this suitable: a clear definition of roles, a development plan/roadmap and identified contact persons. These were indicated for four different success factors. All respondents found that a development plan (ITG3) was a suitable IT governance process for the choice of the features for the platform and all but one for the successful implementation of service changes. A clear definition of roles and responsibilities (ITG1) was seen by all respondents as a suitable structure for security issues and all but one for guidance, training and user support. Identified contact persons (ITG6) were seen as a suitable IT governance relational mechanism for user support.

In conclusion, having a model of clearly defining roles and responsibilities (ITG1, 72,2%), a development plan/roadmap for the platform (ITG3, 64,4%) and having pre-defined contact persons for the ecosystem participants (ITG6, 63,3%) were the most suitable IT governance practices. Choosing and developing features with a predetermined governance model (ITG4, 47,8%) and an advisory board or user group combining different participant (ITG7, 48,89%) were seen as the least suitable. Structures were all in all seen as the most suitable among structures, processes or relational mechanisms.

5 DISCUSSION

This section offers interpretation of the results and conclusions based on these and provides answers to the research questions based on the results presented previously. This research was set to answer which factors make a mobile payment solution successful. The subproblems (perceived success factors, perceived roles and IT governance practices) will be discussed in this chapter. This thesis is the response of the researcher to the research question.

5.1 What are the perceived success factors for a mobile payment platform?

According to research, the success of mobile payment has been explained to need several factors to be successful. Previously creating a successful new payment system has been difficult in the Western countries and the success stories of Asian or Latin American countries cannot be taken into consideration considering the environmental differences. This research examined nine success factors and their importance according to ecosystem participants in Finland for a mobile payment solution's success. Table 13 shows these success factors in order from the most significant factor to the least significant. As can be seen, all factors were held rather significant and seven factors reached a rating of over 90% which means that respondents gave an average overall rating of 6,3/7. This would mean that on average they strongly agreed on these success factors to be significant. In the following the factors that received a rating less than these 90% are discussed separately.

Table 13 Success factors according to rating

<i>Success factor</i>	<i>Rating</i>
Successful implementation of service changes (SF8)	99%
Choice of technology (SF1)	97%
Sales and marketing of the platform (SF9)	96%
Security (SF4)	95%
Service pricing (SF5)	95%
Reliable platform provider (SF6)	94%
Size of the ecosystem and openness (SF3)	92%
Choice of features (SF2)	88%
Support, training and guidance (SF7)	75%

5.1.1 Most significant factors

The most significant factors according to the interviewees were the successful implementation of service changes, the choice of technology, sales and marketing of the platform, prevention of malpractice, decision on service pricing and having a reliable platform provider and size of the ecosystem and openness and in comparison, to the other factors in the Finnish ecosystem.

Service changes (SF8) affect the platform for example the application and the payment terminal and are perceived as challenging and time-consuming. This is seen in literature because many issues can cause service changes, only for the one service or with larger consequences for the whole value chain. Therefore, well-performed changes are seen to make a mobile payment solution successful. Both, the application and the payment terminal need to be updated simultaneously. Online mobile payment is thus more agile. It is also argued that smaller actors are more flexible although they do not have equal power to influence which changes are made and if something new is developed. Service changes need to be planned a year in advance and involve a multitude of actors, complex systems, cause errors and therefore can disturb the customer experience. A merchant suggested that more information should be given about possible changes. Standardization and cooperation are suggested to help with changes and make processes smoother.

The choice of technology (SF1) seemed to be significant to success but currently still an issue of debate. The debate which technology will become the industry standard and lead to success of the mobile payment platform, makes investment into a solution risky. The debate or also called dominance battle was seen also in literature and usually the factors that lead to success have little to do with the design itself. The chosen technology, be it NFC, Bluetooth or QR, should be able reach a large mass with its widely spread use locations. The critical mass would lead to commercial potential of the platform which was seen to be missing from mobile payment solutions. NFCs advantage was that it is a standardized solution, Bluetooth, unlike NFC, is compatible with Apples mobile devices and QR codes were considered as insufficient. According to research technological factors play a significant role in the phase of an innovation where interoperability and scaling are decided on. The interviewees agreed on this saying that the payment limit, usability and security influence the success of the chosen technology.

The sales and marketing of the platform (SF9) is seen significant for the platform's success but the factors importance in B2C business is argued. Literature disagrees by saying that merchants are not ready to take a solution to use if the solution does not have a user base. Therefore, marketing activities also B2C need to be intact. On the other hand, consumers will not use a solution that is not widely accepted by merchants. The importance of a working ecosystem and peer-to-peer use of the solution are highlighted.

Market acceptance is important and the use should be encouraged to gain awareness by the consumers and presence in the market. This aspect is also seen in literature as the increase of the number of users in a payment system benefits the other users. Whether marketing activities are necessary, was seen to depend on the brand, quality of service and if it is a new solution. According to a merchant one ecosystem participant should be responsible for the marketing of the platform and according to Gannamaneni et al. (2015) it should be the merchant.

Security aspects (SF4) were seen as a prerequisite for a payment platform and its success by the interviewees. Merchants but also other actors feel pressure for well managed security solutions. Preventing malpractice becomes more important if the own brand is connected to the payment solution. Trust in the service provider is pointed out by scholars but also by interviewees. Especially difficult is the building of trust. Au and Kauffman (2008) are concerned that mobile payment facilitates money laundering and fraud and these aspects are considered by the Finnish financial supervisory authority. Unfortunately, users can see security measurements as cumbersome and slow according to a merchant, the supervisory authority's experience and the software developer. Not all security issues can be protected against and interviewees expect to have issues with security, perhaps even more than with traditional payment methods. The trade association commented that the costs fall on to the merchants and other actors and it is not a risk for the consumer. Badly controlled payment returns can affect the mobile payment adaption and were seen as risks by Mallat (2007). Similarly, a merchant and PSP see that returns need to be successful but according to the other payment service provider can this factor be disregarded considering its low impact.

The decision on service pricing (SF5) is significant because it is not clear which ecosystem participant is supposed to pay the fees. Currently the download and use of MobilePay is free for users but the fee is charged by the merchants in the price. Fees for merchants have risen with the grown number of available payment solutions. Setting a correct price level is crucial but also extremely challenging because of the competition and currently mobile payment is offered as a non-profitable service. The pricing needs to be competitive compared to other payment solutions according to literature and the interviewees. Merchants or users will not choose a service which is too costly or it has to provide added value. Literature suggests that user groups would be priced differently and the participants that benefits more of the transaction should pay a higher price. Price is determined, according to Hagiu (2014) by the marginal cost or the user's willingness to pay. Mobile payment solutions need to determine a price for each participant and distinguish a price level and structure.

The reliability of the platform provider (SF6) was seen as significant for success by most of the interviewees. Trust in the service provider makes consumers more willing to

conduct mobile payment transactions and improves customer loyalty and satisfaction, according to Mallat (2007). It was also discovered that a trustworthy provider reduces the perceived risk of the transactions. According to the interviewees, what is considered reliable is changing and large, established companies and banks have been previously considered as reliable. Well-known providers can easier promote their platforms and these were discovered to be preferred by consumers in Mallat's (2007) research. Banks, credit card companies and telecom operators were considered trustworthy transaction partners. Banks' standpoint has changed according to the interviewees, especially among younger generations for whom banks do not represent as a reliable institution as previously. Gaur and Ondrus (2012) found especially that a bank is seen as reliable because of their brand image which relates to customer trust. Trust is even seen as a subjective security factor by Linck et al. (2006) why having a bank as a provider is seen advantageous. A reliable provider can also be a technology provider or a smaller company. Newer providers need to offer added value, better user experience or agile solutions since a strong value proposition is considered more important than a strong company brand. For one merchant reliability meant an ongoing service, which also Mallat (2007) discovered to be a major concern.

The size of the ecosystem (SF3), especially a large clientele and the number of merchants accepting mobile payment, makes investing in the payment solution more profitable and enables greater value creation. This was also seen critical for MobilePay in the launch phase. Merchants can consider solutions with fewer users if they are easy to integrate into the existing infrastructure. The number of use locations is important and using a standardized technology furthers this. Cooperation is called for by the interviewees. Interfaces should be compatible, the solution provider should work together with merchants to provide services to the consumers and every actor, independent of power or size, should be involved in the ecosystem. Literature revealed that having many participants is less flexible and requires more effort to please all the participants. The complexity also creates misalignment between participants but cooperation helps to achieve economies of scale and critical mass. Openness is seen to further success according to scholars, two merchants and the payments technology company. Opening the platform at user level to all customer independent of their bank, what MobilePay has done, is seen to lead to success by Ondrus et al. (2015). The trade association representative comments the issue of openness on the provider level and shows that MobilePay only is open on the user level. The openness can, according to Eisenmann et al. (2006), increase market size and reduce competition. The interviewees comment that the available interfaces prerequisites to platform success because these enable fast growth. It is predicted that all solutions aim towards an open solution.

5.1.2 *Less significant factors*

Factors that were held less significant were the choice of features and guidance and user support. Only user support can be considered as truly being less significant scoring 58/77 in total when asking if the interviewees considered this as significant for success. The choice of features only scored 88% of agreed importance.

Interviewees argued whether a payment feature is enough for a successful payment platform in comparison to added features (SF2). According to the trade association, the payments technology provider, a payment service provider, a merchant and Au and Kauffman (2008) do add features lead to success and provide consumers with added value. According to Staykova and Damsgaard (2016) the adding of features provided by similar platforms increases the number of participants of the platform. The additional functionalities can make the solution stand out from competition and lead to market dominance. Features should be developed according to feedback from the consumers, including merchants with the service provider. Staykova and Damsgaard (2016) considered the added features to lead to a larger offering between ecosystem partners that can help prevent envelopment attacks. The software developer suggested attracting a peer-to-peer user audience can help convince the merchants of the potential of the payment method. Staykova and Damsgaard's (2016) research proves that this is what MobilePay has done in the past.

User support and guidance (SF7) was seen as the least important factor. Extensive literature on user acceptance and adoption call for simple and easy to use solutions that fit their behavioral patterns. It was also considered a pure hygiene factor and does not further success because it is easy to control. The interviewees agreed on this saying that user guidance should not be necessary since the use should be easy. The users only should have support available when the platform works faultily. Merchants wished to have training regarding several issues to be able to support customers and run the payment method smoothly.

5.1.3 *Additional factors*

The list of success factors was completed by a satisfactory user experience (SF10), ease of implementation (SF11), number of use cases and ability to use in all channels (SF12) and loose competition and authoritative control (SF13).

The solution provider can create a competitive edge with a superior user experience. With it can entice consumers and compete against other payment methods like card payment. User experience is sensitive because a negative experience can be easy to

produce but also have a major impact on the solutions image. User experience has been seen as a factor to gain success in mobile payment solutions by van der Heijden (2002), Lai & Chuah (2010) and Mallat & Tuunainen (2008).

The solution should be easy to implement but also offer clear added value such as a method of identifying the customer and thus offering data to the merchant. This is why the ease of implementation is seen crucial to platform success. Added value and technical feasibility were seen as success factors in previous research which supports the merchant's argument.

Number of use cases and ability to use in brick-and-mortar stores, online and peer-to-peer makes the solution more available to consumers. The more satisfied the consumers are with the platform the more eager and likely they are to use it. For example, interoperability and universality of the solution are factors supported by previous scholars that lead to payment systems success.

Loose competition and authoritative control does not hinder competition and set boundaries to it. Regulations enable payments but they should not hinder innovations and thus the success of the new payment method. Zmijewska & Lawrence (2005) and Kauffman et al. (2014) have discussed the significance of regulation for mobile payment success.

5.2 How do the ecosystem participants perceive their role regarding these success factors?

Decision-making bodies should have clear roles. Confusion of each responsibility should be avoided by clarifying the accountabilities. The perceived roles differed from participant to another and between success factors. Most interviewees considered themselves either in charge, accountable or as an adviser. Only merchants considered to be informed on some of the success factors. The supervisory authority saw their role clearly as a supervisor in the ecosystem and accountable for the prevention of malpractice. The prevention of malpractice evoked the most accountability among all the other participants. The trade association saw their role as purely consulted and the technology provider as responsible.

The openness and size of the ecosystem, decision on service pricing and successful service changes had the most participants who perceived themselves as responsible to some extent. Both payment service providers perceived service pricing and service changes as their responsibility which it also should be in the ecosystem. Security issues were seen as their responsibility and as they provide the ecosystem with the payment services are these issues critical also for their individual success which would then lead

to the mobile payment solutions success. Although the interviewees seem similar representing the same participant in the ecosystem one considers to be responsible for more factors and the other assumed more a role of a consultant. This is interesting to see that one of the two considers having power to influence the ecosystem and responsible for it.

The merchants mostly perceived themselves as consulted and as they receive feedback from the market can they use this information to further the ecosystem and its success. They are able to influence the provider by choosing a certain solution and taking it to use across Finland. Merchants perceived their role to protect the consumers and this was the more important the more the mobile payment solution was connected with their brand. The protection can be seen from their perceived responsibility in the security issues as well as their accountability or consultation they offer for user support. Two of the interviewees also perceived themselves as responsible for marketing activities.

The technology provider considered their role as responsible for all the success factors. Together with the payments technology company they took responsibility for the choice of technology, which is logical considering their field of expertise. All the other participants on the other hand hoped to be consulted or informed in these matters. The payments technology company saw their role even as an enabler since they are creating industry standards. The payments technology company considered to have a minor responsibility in the implementation of service changes because they create the standards that the changes rely on. The software developer considered to be consulted on important issues in the ecosystem such as service pricing and the service changes.

5.3 What IT governance practices are perceived to be related to these success factors?

According to literature should practices be chosen from all three categories (structures, processes and relational mechanisms) and implemented in multiple levels in an organization to have effective sets of IT governance practices. Cooperation between the participants is important for the success of a mobile payment platform. The clearly defined roles and responsibilities, preferably in written agreements, was seen as the most suitable IT governance practice overall. This is also one of the easiest to apply to any concept and offers clarity on tasks in the ecosystems and does not lead to the situation that is currently in the ecosystem. The roles seem very unclear at the moment with many responsible participants in the ecosystem. The defined responsibilities were seen especially fitting for preventing malpractice and for user support. The security aspects were seen very important for the success of the platform, with little variance in the

answers and most interviewees strongly agreeing to the importance of this factor for the future success. Defining responsibilities makes the protection easier and also the risk of missing important details in the prevention more difficult. Even though, interviewees were unsure of the necessity of user support and preferred a self-evident, easy to use solution, they commented that users need support especially in error situations and this requires a clear definition who takes the responsibility in these situations.

The second and third most suitable governance practices (roadmap and predefined contact persons) follow the similar logic providing simple and easily implemented practices. The development plan was seen as suiting for the choice of the features and the successful implementation of service changes. Both, the development of new features and the service changes, need a clear vision. There was much discussion on the additional features for the platform and this was the factor that divided the opinions the most. A plan and strategy to develop new features is important to understand which features should be added and with what timeline. Service changes were seen as challenging because of the many participants and complex systems and therefore also time consuming. A development plan that is communicated to all ecosystem participants would help the success of the service changes and further the success of the payment platform. Identified contact persons were seen suitable user support. The merchants considered this as important during the interviews because in the end it is the merchant that is contacted or present when the user needs support. It is critical that the offered user support is available and for these situations a clearly identified contacts are important.

The choice of technology and pricing structure seem to be sensitive issues where the ecosystem participants did not find suitable cooperation models. These were the success factors where the least correspondence was found amongst the suggested IT governance implementations. On the other hand, this also would proof why for the choice of features, size of the ecosystem and the security aspects more appropriate practices were found – especially working together on the security issues. The least suitable practice, a feature development process, most probably is difficult to implement suiting the success factors. It was considered most suitable for the development of new features but even for this factor not all respondents agreed upon. Many respondents saw an advisory board suitable especially for the choice of technology, which is a topic where expertise is needed but all in all it was considered one of the least suitable governance practices. Although there were differing opinions on the need for marketing and that the platform should be offered for peer-to-peer payments first and therefore already have a user base, was a development plan seen as appropriate.

6 CONCLUSIONS

The aim of this study was to continue on mobile payment research and understand factors that make a mobile payment solution successful. Mobile Payment has been researched for the past 20 years but it has concentrated on factors concerning the technology, adoption and consumers. Previously a need for a multi-factor analysis of the mobile payment success factors has been stated. This research continues the research on the success factors and especially how cooperation and the ecosystem participants roles affect it.

In this study, nine mobile payment success factors were investigated in the Finnish payment ecosystem taking MobilePay as an example. The chosen factors for success were revealed in the literature review based mobile payment literature and in discussions with the works supervisor, Dahlberg. Since IT governance has been considered successful in the field of information technology, it was extended and interviewees were asked about their views of the suitability of these practices in a mobile payment ecosystem. The aim was to reveal best ecosystem governance practices that would lead to mobile payment solutions success. The ecosystem participants were also asked to describe their roles in the ecosystem to see how they perceive the ecosystem and their position in that. Also, these roles reveal the responsibilities in the ecosystem.

Eleven qualitative interviews were conducted with Finnish mobile payment ecosystem participants and this served as the empiric data. The interviewees represented merchants, payment service providers, a software developer, a technology provider, a payments technology company, a supervisor and an independent trade association in MobilePay's ecosystem. The interviewees added a satisfactory user experience, ease of implementation, number of use cases and ability to use in all channels and loose competition and authoritative control to factors that further the mobile payment solutions success.

All nine success factors were seen as significant for success. Implementing service changes successfully was seen as the most important factor since these are considered complex, time consuming and they require the participation of several ecosystem participants. In order to make the changes successful should solutions be based on standards and cooperation. This factor was also among the factors where the most interviewees saw themselves responsible for it. Especially the technical partners (payment service providers, payments technology company, the technology provider and software developer) saw themselves as responsible for the service changes whereas merchants wished to be informed and consulted about the changes. A detailed development plan for the platform was seen the most appropriate governance practice for the service changes. The choice of technology is still being debated because no single technology has risen to success which makes investing in mobile payment risky in the

ecosystem. Security, usability and that the solution is based on standards limit the choice of the technology. Only two platform participants claimed to be responsible for the choice of technology and the participants did not find well-suited cooperation models for the choice, either. This would suggest that the choice of technology is left to the technology companies. The need for sales activities depends on the quality of the service, the novelty and its brand. A solid user base and market acceptance were seen as factors that enable the solution's success and this is why sales activities are so critical. Yet, only two merchants and the technology provider claimed to be responsible for the marketing of the platform and this was the factor where the most interviewees did not consider having a role at all. It was seen as a superfluous activity that can be outsourced or left out if the ecosystem works well. Also for this factor clearly defined roles, a development plan and identified contact persons were seen as the most suitable governance practices. Offering a secure solution was considered rather a prerequisite for the solution. Building of trust was seen difficult and trust was also connected with the reliability of the platform. Both these factors were considered very similarly important. Trust was seen to reduce the perceived risk of the transactions, lead to customer satisfaction, loyalty and trust makes consumers more willing to conduct mobile payment transactions. The security aspects become more concerning for the merchants if their own brand is associated with the system. Security measures were discussed to affect the user experience making it slower and more difficult. All in all, the notion of a reliable platform provider is changing and it does not necessarily be a bank or an established company but also a technology company or a newer, smaller company that can offer innovations, added value to the consumer and an ongoing, undisturbed service. The prevention of malpractice called for governance practices that clearly define the responsibilities and roles and this was also the factor among all of the factors where the most respondents considered them accountable or responsible. The reliability of the platform provider confused the interviewees, clearly defined roles and contact persons where, once again, seen as most suitable to integrate governance into the ecosystem but the given roles were difficult to fit to the success factor. The decision on service pricing was considered very important by most of the interviewees. If the price is set wrong, it affects the competition, consumers' and merchants' willingness to use the platform and if the service is not developed further since it currently does not profit the providers. The interviewees did not find any highly suitable governance practices for the service pricing decisions although it was one of the factors where most respondents saw to be responsible for. The size and openness of the ecosystem was not considered as important as the other factor but this is caused by the variability of the answers. This factor affects the investment decisions which are driven by the number of users, use locations and merchants who accept a new solution. Merchants seem to prefer an easily integrated solution that is based on standardized

technology. Ready interfaces further the openness and the solution has to be available for all possible consumers. The cooperation in the ecosystem brings economies of scale and helps attract the critical mass and interviewees found that every actor should be involved in the ecosystem. Informal meetings were indeed found to be the most effective IT governance practice for the openness of the platform. Most interviewees considered themselves responsible for the size and openness for the ecosystem.

Two least important factors, choice of adding features and user support, stood out from the rest. The importance of adding features was seen as variably important and none of the interviewees strongly agreed that user support is an important factor for success. Most of the interviewees commented that added features lead to success and add value to the service. These additional features can lead to market dominance if they are developed in cooperation according to market feedback. Starting off with a peer-to-peer user base is suggested to be a good strategy. The technology provider and payments technology company take responsibility for the development of features and a road map and a feature development plan were considered the most suitable cooperation practices. User support called for clearly defined roles and persons to contact but otherwise it was seen as pointless because studies and the opinions show that solutions should be simple and self-evident so that training or support for consumers would not be needed. On the other hand, there was a demand for merchant training. Merchants hoped to be consulted on these matters the actors involved in the technological issues took responsibility for the support activities.

These findings shed light to the Finnish mobile payment ecosystem, especially looking at MobilePay's ecosystem. The interviewed industry experts represent a multitude of actors and provided this research with data about the current situation. The findings represent a view based on one country but are for that area significant. Especially the evaluation of the success factors can be used in further research but also in the ecosystem to further a solution's success.

6.1 Theoretical and practical implications

This research provides an overview of thirteen factors that are considered to further the mobile payment solution's success in the Finnish mobile payment ecosystem. These findings can be used to explain why previous mobile payment solutions have failed and how current providers can concentrate their development activities on certain issues. Especially noteworthy is how the clear division of roles and responsibilities is seen critical and should be taken into consideration. This research also gives suggestions on

cooperation practices that can be considered. Collaboration in the ecosystem has been previously and in this study proven to lead to mobile payment platform success.

Danske Bank should consider all nine chosen factors when developing their solution further. On top of that, the added factors as in a great user experience, ease of implementation and ability to use in all channels should be taken into consideration. The superior user experience is needed to compete with card payments but also to achieve customer acceptance, make a provider more reliable and make the diffusion of the solution easier.

Especially they should concentrate on basing the technological choices on standardized solutions and making sure that the service changes run smoothly. Since these are seen also as the pain point of ecosystems should roles and responsibilities be clearly defined, preferably with written agreements.

6.2 Limitations and Future Work

Several limitations exist to this study. This is a single case study. A better overview would have been received by looking at several case solutions in Finland or abroad. Piekkari and Welch (2011, 192) suggest that larger multi-case studies have had 4-62 cases. They (2011, 185) discuss how Yin's ⁹ classic view on case studies prefers a comparing style of research.

This study is limited to the Finnish payment ecosystem because interviewees and the case bank are both located there. This was the focus of the research and therefore, as seen in the theoretical part, the results cannot be used in another economical or geographical environment.

Furthermore, conducting this research several participants were contacted and a preliminary interview was held with Danske Bank. Findings fail therefore to portrait the opinions of the mobile payment platform provider. Also views of the users and non-users were neglected.

MobilePay also limits the aspects of types of mobile payment considered in this research. The research is based on the payment abilities of this solution and does not consider all possible mobile payment options available.

Future research is necessary because this research was conducted in Finland based on one mobile payment solution. Similar studies in different economic and social environments could be done to see the similarities in success factors, roles of the participants but also the IT governance practices that seem to be missing. But then, the

⁹ Yin, R.K (1984) Case Study Research: Design and Methods. Sage Publications, Beverly Hills, California.

picture of mobile payment ecosystems in Finland could be expanded with a multi-case study.

IT governance in mobile payment is still unexplored in mobile payment research and mobile payment ecosystem research should include the IT governance practices and their influence on a successful mobile payment solution.

Although mobile payment ecosystems have been studied before studies with more participants could be conducted to find out the important participants and the actual size of the ecosystem. Furthermore, ecosystem studies should include the users' and service provider's point of view which was lacking from this research.

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APPENDICES

Appendix 1: Success factor mapping

		<i>Success factor</i>
1	Achieving network effects	SF3
2	Added value	SF1
3	Adoption externalities	SF3
4	<i>Complexity of user interface</i>	SF1, SF3, SF7
5	<i>Quality</i>	
6	<i>Critical mass and initial adopter mass</i>	SF1, SF3, SF7
7	<i>Ease of use</i>	SF1, SF7
8	<i>Low switching costs</i>	SF1, SF3
9	<i>Privacy</i>	SF4
10	<i>Service complexity</i>	SF1, SF7
11	<i>Trust</i>	SF4, SF6, SF4
12	<i>Users intention to use</i>	SF1, SF7
13	<i>User experience</i>	SF1, SF7, SF9
14	<i>Perceived security and risk</i>	SF1, SF7, SF4, SF6
15	Bank involved	SF3, SF6, SF8
16	Business model	SF1, SF7, SF8
17	<i>Institutional support</i>	SF1, SF3, SF8
18	<i>Country-specific institutional conditions</i>	SF1, SF3, SF8
19	<i>Country-specific market conditions</i>	SF1, SF3, SF8
20	<i>Organizational support</i>	SF1
21	Competition	SF1, SF3, SF9
22	Complementary resources	SF1, SF2, SF5
23	Cooperation	SF1, SF3, SF5
24	Cost	SF1, SF5
25	Independence	SF1
26	Infrastructure	SF1
27	Intention to recommend	SF9
28	Interoperability	SF1
29	Merchant support	SF1, SF7
30	Openness	SF3
31	Promotion	SF9
32	Regulation	SF3, SF4, SF8
33	Information security	SF4
34	Technical feasibility	SF1, SF2, SF3
35	Technology standards	SF1, SF2, SF3, SF8
36	Timing	SF8
37	Universality	SF1, SF7
38	Usage externalities	SF3

39	User support	SF7
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Appendix 2: The interview design

Osuus 1: Mobiilimaksamisen menestystekijät tai edellytykset menestykselle.

Olemme valikoineet seuraavat 9 tekijää merkittäviksi mobiilimaksualustan menestymiselle. Tämän osion tarkoituksena on keskustella kustakin menestystekijästä ja arvioida niiden merkittävyyttä mobiilimaksualustan menestykselle. Samalla arvioidaan oman organisaation roolia kyseisessä menestystekijässä.

Kunkin menestystekijän merkittävyyttä arvioidaan valitsemalla parhaiten kuvaava vastaus seitsemästä vaihtoehdosta väittämään: ”Tämä on merkittävä tekijä mobiilimaksualustan menestykselle.”

1. Täysin eri mieltä
2. Melko paljon eri mieltä
3. Jossain määrin eri mieltä
4. Ei samaa eikä eri mieltä
5. Jossain määrin samaa mieltä
6. Melko paljon samaa mieltä
7. Täysin samaa mieltä

Oman organisaation rooli kussakin menestystekijässä valitaan seuraavista vaihtoehdoista:

1. Vastuullinen (responsible): Suoritan annetun tehtävän tai olen osa suoritustiimiä
2. Vastuussa oleva (accountable) - Valvon, että tehtävä tulee valmiiksi
3. Neuvoja (consulted): Minulta voidaan kysyä ohjeita ja neuvoja
4. Tiedotettava (informed): Minua tiedotetaan tehtävän suorittamisesta
5. Tämä asia ei ole tärkeä organisaatioille, jossa työskentelen eikä mitään roolia tarvita

- **Alustassa käytettävän teknologian valinta**

Esimerkiksi mobiilimaksualusta ja siihen liittymisen rajapinnat, älypuhelin/päätelaite ja sen teknologia (NFC, QR vai Bluetooth), kaupassa käytettävä päätelaite ja lukija, verkkokaupan ohjelmistot ja integraatio, tietoturvatekniikat.

- **Uusien ominaisuuksien ja palveluiden kehittäminen mobiilimaksualustaan**

Mobiilimaksualustaa kehitetään jatkuvasti uusilla palveluilla tai olemassa olevia palveluita kehittämällä ja ekosysteemin eri osapuolilla on mahdollisuus vaikuttaa tähän.

- **Ekosysteemin koko, osapuolet ja avoimuus**

- a. *Ekosysteemin koko: Maksajat, kauppiat ja palveluntarjoajat, varmentajat ja muut maksupalveluoperaattorit, maksuvälineet (debit-maksu, credit-maksu, mobiiliraha ja maksupalveluoperaattorien maksuvälineet).*
 - b. *Alustan avoimuus kunkin ekosysteemin osapuolen liittymisen osalta.*
 - c. *Alustan rajapinnat mahdollistavat helpon liittymisen (alustalla on valmiina tekniset rajapinnat).*
- **Väärinkäytösten estäminen, tietoturva sekä virheiden ja perumisten mutkaton hoito**
Mobiilimaksualustan käyttäjät voivat luottaa palvelun luotettavuuteen ja toimivuuteen.
 - **Palveluhinnoittelu (kuluttajilta, kauppiailta ja palveluntarjoajilta ja maksupalveluoperaattoreilta perittävät palkkiot mobiilimaksuista)**
Palvelun hinnoittelu on kilpailukykyinen verrattuna muihin maksutapoihin sekä vastaaviin kilpaileviin palveluihin.
 - **Alustan luotettava tarjoaja ja toiminnan turvaaminen**
Mobiilimaksualustan tarjoaa luotettava ja tunnettu taho, joka reagoi mahdollisiin häiriöihin sovitun luotettavuustason mukaisesti.
 - **Käyttöönnoton ja käytön neuvonta, opastus ja koulutus (käyttäjät, kauppiat ja palveluntarjoajat)**
Palvelun käyttäjille tarjotaan tarvittaessa käytöntukea.
 - **Palvelumuutosten käyttöönotot sujuvat onnistuneesti**
Teknologian muuttuessa (esimerkiksi kassapäätteiden ohjelmistot, älypuhelinien käyttöjärjestelmämuutokset) ja/tai uusien palveluiden tullessa käyttöön ja/tai palveluita parannettaessa palvelumuutosten julkistus ja käyttöönotto sujuvat vaivatta.
 - **Alustan ja sen palveluiden markkinointi, jälkimarkkinointi ja myynti**
Ekosysteemistä vastaava osapuoli markkinoi aktiivisesti palvelua ja ottaa ekosysteemin osapuolet, etenkin kauppiat ja palveluntuottajat mukaan tähän toimintaan.

Osuus 2: Ekosysteemissä tapahtuvan yhteistyön ja ekosysteemin hallinnan menettelyt
Olemme valinneet kahdeksan alla kuvattua yhteistoimintamenettelyä.
Tarkoituksena on arvioida mitkä yhteistoimintamenettelyt soveltuvat kunkin menestystekijän hallintaan. Arviointi tapahtuu laittamalla seuraavalla sivulla olevaan taulukkoon rasti ruutuun, jos yhteistoimintamenettely sopii mielestäsi tietyn menestystekijän hallintaan.

1. Maksualustan osapuolten roolit ja vastuut on sovittu selkeästi, esimerkiksi kirjallisessa sopimuksessa

2. Maksualustan teknologian ja palveluiden kehittämistä ohjaa nimetty ekosysteemin ohjausryhmä, jonka alaisuudessa työskentelee tarpeen mukaan valmisteluryhmä- tai ryhmiä
3. Maksualustan kehittäminen tapahtuu sovitun suunnitteluprosessin (roadmap) mukaisesti.
4. Maksualustaan ehdotettujen uusien piirteiden ja ominaisuuksien valinta tapahtuu sovitulla menettelyllä
5. Maksualustan palveluita tuotetaan palvelutasokuvauksessa ja – sopimuksessa (vastaava) kuvatulla tavalla
6. Ekosysteemissä tapahtuvan tiedonvaihdon turvaamiseksi osapuolilla on nimetyt yhteyshenkilöt
7. Ekosysteeminen menestyksen edistämiseksi sillä on osapuolista koostuva advisory board, user group tai vastaava yhteistoimintaa edistävä menettely
8. Ekosysteemi tukee epävirallisia tapaamisia ja kokemusten vaihtoa osapuolten kesken

