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Critical Success Factors for a Mobile Proximity Payment Solution

An Overview and Evaluation of Enabling Technologies

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Abstract

The mobile payment market is a new and fast growing market, likely to have wide-ranging consequences on the shopping experience, consumers' expectations, the financial system, and all stakeholders involved. Mobile *proximity* payments are limited to transactions that occur at a physical point-of-sales. Presently, a number of solutions for mobile proximity payments exist, but with limited adoption. In this thesis, the driving forces and *Critical Success Factors* (CSF) for mobile payment solutions are explored, with the aim of finding the conditions for succeeding in the new market. Many perspectives are used to analyse the market, including different models for macro environment analysis, stakeholder analysis, and empirical data from interviews with merchants and focus group discussions with consumers.

The findings are boiled down and a CSF Framework for mobile proximity payments is constructed. The CSF Framework consists of the *Critical Success Factors* for consumers (Trust, Convenience, Added value, and Merchant adoption) and merchants (Costs, Convenience, Added value, and Consumer adoption) as well as other factors (Digitalisation, Knowledge, Regulations, Partnerships, and Scale). This framework is then applied to an evaluation of the current enabling technologies: Bluetooth low-energy (BLE); Magnetic secure transmission (MST); Near field communication (NFC); Quick response code (QR code); and Telecom solutions; where NFC and MST come out as winners in the short term, and BLE in the long term. Finally, preliminary predictions about the future of mobile proximity payments are made, including who the most likely solution providers will be, what will be needed for their success, and how other stakeholders are affected.

Preface and Acknowledgements

This master thesis was carried out during the spring of 2017 in Lund as an examination work by the two authors Johannes Larsson and Joel Oredsson, studying Industrial Engineering and Management, Faculty of Engineering at Lund University. We, the authors, are truly happy with our project and how we were confronted with challenges that in many ways summarized learnings from our education.

We would like to take this moment to firstly give a great thanks to our supervisor Carl-Johan Asplund for all the feedback and guiding discussions we have had during the project. It has truly been a pleasure to be able to have you as a supervisor — thank you!

We would also like to thank our respondents, both from the focus groups with consumers, and interviews with merchants. This project would not have been possible without your inputs. Also, a great thanks to our family and friends for your support and feedback.

Thank you,

Johannes Larsson

May 25th, 2017 *in the early summer sun*

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Executive Summary

Title	Critical Success Factors for a Mobile Proximity Payment Solution — <i>An Overview and Evaluation of Enabling Technologies</i>
Authors	Johannes Larsson and Joel Oredsson
Supervisor	Carl-Johan Asplund
Background	<p>The global payment landscape is transforming in a more rapid pace than ever and could best be described as a truly dynamic and fast moving arena. Hence the enormous potential of the market many players are involved in and even more are analyzing the future and present market of mobile proximity payments. Many consulting firms have their own projections and findings about the future with mobile proximity payments and they all have two things in common — the market is huge and it will be a reality to pay with your smartphone and in fact, it already is in some parts of the world. However, the winner is not yet crowned and the <i>Critical Success Factors</i> have not been established.</p> <p>Today, there are five main technologies for enabling mobile proximity payments: Bluetooth low-energy (BLE); Near field communication (NFC); Magnetic secure transmission (MST); Quick response Code (QR code); and Telecom solutions. Some of which are more alike and some of which are more unique. Different advantages and challenges with the enabling technologies are providing different opportunities for them to fulfil specific needs and wants (<i>Critical Success Factors</i>) from relevant stakeholders towards becoming the dominant solution.</p>
Purpose	<p>The purpose of this thesis was to explore and identify the most important key factors (called <i>Critical Success Factors</i>) for mobile proximity payment solutions, from several perspectives, including all relevant stakeholders (<i>e.g.</i> consumers, merchants, banks and other industry relevant actors) as well as the macro environment (<i>e.g.</i> economics, regulations, and social factors). These factors were then used to critically evaluate the different enabling technologies used to provide mobile proximity payments. Also, preliminary predictions about the future of mobile proximity payments were identified and discussed.</p>

Methodology

This thesis uses an inductive and iterative research approach, where observations are collected and corroborated against other observations in an iterative fashion. Observations come from focus group interviews with consumers, interviews with merchants, and a literature review of theory, business reports and technical information.

Conclusion

The *Critical Success Factor* Framework for MPPs consists of consumer adoption factors (Trust, Convenience, Added value, and Merchant adoption), merchant adoption factors (Costs, Convenience, Added value and Consumer adoption) and other factors (Digitalisation, Knowledge, Regulations, Partnerships and Scale). The evaluation of technologies results are: a likely short term success for NFC and MST, a long term success for BLE, and very limited success for QR code and Telecom solutions. Regarding the future, smartphone producers are the likely providers of MPP solutions, but are required to form strategic partnerships with other stakeholders, in particular banks and larger merchants, in order to succeed. Credit card companies should see MPPs as a serious threat that require a competitive response strategy. Major challenges include spreading knowledge of MPP solutions and ensuring regulations are up-to-date.

Keywords

Mobile proximity payment (MPP); Bluetooth low-energy (BLE); Magnetic secure transmission (MST); Near field communication (NFC); Quick response code (QR code); Telecom solutions; Critical Success Factors (CSF); and Point of sales (POS).

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Abbreviations and Definitions

Below follows a list of abbreviations and definitions that are used in the thesis.

List of Abbreviations

BLE	Bluetooth Low-energy
CSF	Critical Success Factor
DCB	Direct Carrier Billing
MPP	Mobile Proximity Payment
MST	Magnetic Secure Transmission
NFC	Near Field Communication
POS	Point of sales
PR	Public Relations
QR code	Quick Response Code
SMS	Short Message Service

Definitions

Critical Success Factor	an area in which satisfactory results will ensure successful competitive performance.
Mobile Proximity Payment	where consumers use their smartphone to pay at a physical point of sales, <i>e.g.</i> at the counter at a café.
Proximity	in near distance.

1 Introduction

In this section, an introduction to the thesis is presented by providing the reader with:

- Background to the study;
- Purpose;
- Target group;
- Contribution to knowledge;
- Delimitations; and
- Criticism of the sources.

1.1 Background to the Study

Today, smartphones are extremely common and well-integrated in people's lives. One of the main benefits of owning a smartphone is the ability to reduce the amount of things that you need to carry around without sacrificing functionality. A smartphone is a phone, a calendar, a camera, a calculator, and with the wide range of available applications, many more things. However, most people still carry their wallet with them. *Will the wallet be the next to be included in the smartphone?*

In this thesis, we investigate what requirements, *Critical Success Factors* (CSF), mobile proximity payment (MPP) solutions need to fulfill in order to be accepted. A fundamental difference from other functionalities that the smartphone has replaced is the interdependence of different actors. For an MPP solution to succeed, it needs to be accepted not only by the consumers (smartphone owners), but also by the stores in which payments are made, and other actors in the financial system, *e.g.* banks. There are many stakeholders involved, making it important to understand what their role in the MPP ecosystem is, how they relate to each other, and what their specific interest in MPP solutions entail. Who are the most important stakeholders? What power do they have to change the market? What strategic partnerships are necessary for a success?

Today, there is no unified standard for how MPP should be performed. There are many different technological solutions, offering different bundles of functionality. The main ones, discussed in this thesis, are BLE, NFC, MST, QR and Telecom solutions. Some of these are already in use while others are yet to be tested; some of them only work for very short distances, while others work for longer distances; some of them are limited to certain smartphone producers, while others are available for all smartphones. In order to be successful, a company that wants to provide an MPP solution needs to translate the functional requirements of the different actors into technological requirements for their solution, and evaluate what solution works best. Should one pick the technology that requires the least behaviour change of consumers, or should one

prioritize powerful functionality? Should one choose the technology that has the best security features, or the most convenient one? There are many compromises to be made, and a thorough analysis is required before one can strike the right balance. What do consumers really want? What do merchants, banks, the government, and other stakeholders want in order to adopt a solution?

In order to produce a successful MPP solution, certain capabilities are required. What are the most important ones? Does a solution provider have to have a large consumer base already, or are the technical capabilities more important? Are there any scale advantages, or could anyone challenge the position as the dominant solution provider?

The potential market size of MPPs is extremely large – imagine all the financial transactions that occur in society every day. Finding the best solution for MPPs and capturing a significant portion of this market therefore represents a powerful opportunity for companies. Controlling a big part of the financial transactions in society would generate a lot of power, and the current holders of this power are unlikely to give it up easily. What will the competitive response from banks and credit card companies look like, and what is the best way to handle them? Are strategic partnerships the answer, or will that result in a loss of revenue?

Some governments have expressed interest in reducing the amount of cash in rotation, creating cashless societies (Sheffield, 2016). Reduced cash handling costs and theft risk, as well as an easier way to track transactions are some of the societal benefits that could be gained from MPP solutions. However, regulations need to be up-to-date to accommodate this new change. What are the important factors to consider concerning regulations?

The challenges and problems that need to be solved are numerous. In this thesis, we approach the problem from a holistic perspective, striving to include as many perspectives as possible. While complex, this is the only way to make sure that nothing is missed and the most important factors are identified.

1.2 Purpose

The purpose of this thesis was to explore and identify the most important key factors (called *Critical Success Factors*) for MPP solutions, from several perspectives, including all relevant stakeholders (*e.g.* consumers, merchants, banks and other industry relevant actors) as well as the macro environment (*e.g.* economics, regulations, and social factors). These factors were then used to critically evaluate the different enabling technologies used to provide MPPs. Also, preliminary predictions about the future of MPPs were identified and discussed.

1.2.1 Research Questions

The following research questions were investigated:

1. **What are the *Critical Success Factors* for a *Mobile Proximity Payment Solution*?**
 - a. Who are the key stakeholders on the mobile proximity payment market?
 - b. What are the *Critical Success Factors* for acceptance among these stakeholders?
 - c. What other driving forces from the macro environment affect the acceptance of mobile proximity payments?

2. **Which enabling technology is most likely to become a part of the dominant solution?**
 - a. What are the distinctive technologies that enable mobile proximity payment solutions?
 - b. How well suited are these technologies to fulfil the *Critical Success Factors* established in question 1?

3. **What will be the future of the mobile proximity payments market?**

1.2.2 Goal of the Study

The goal of the study was to create a CSF Framework for MPPs, and to use this to evaluate the existing technologies. The goal was also to discuss what this could mean for the future of MPPs, and to make preliminary predictions about the development of the market.

1.3 Target Group

There are three main target groups for this study: people who are interested in the MPP market and want an up-to-date overview, students of business and technology who want to see how theories and empirical evidence can be used to create a framework for market analysis and predictions, and companies that want to know how to become successful in the new MPP market.

1.4 Contribution to Knowledge Development

With this study, we hope to contribute in the following ways:

- Provide an up-to-date overview of the MPP market, including stakeholders, players, industry logic, and technologies;
- Construct a CSF Framework for MPPs based on theory and empirical investigations of the stakeholders and the market;

- Evaluate the existing technologies with the CSF Framework; and
- Make predictions about the future of MPP solutions.

1.5 Delimitations

As previously stated, this study is limited to physical point of sales (POS) MPPs. This means in-person payments such as grocery stores, clothes stores, bars, night clubs, markets – essentially all transactions that occur between two people who are in close proximity of each other. It excludes online shopping, e-commerce, paying bills from home, and other transactions where the buyer and seller are not in close proximity of each other.

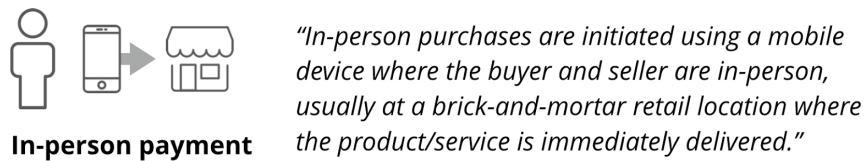


Figure 1. Definition of in-person payment (same as mobile proximity payment) from PwC (2016).

Therefore, the technologies studied are ones that enable a connection between the user (smartphone) and merchant (terminal) at a physical POS.

Furthermore, since this is a fast moving market with constant new developments and innovations, there is a risk that projections, reports, and other sources that are used will be outdated quickly. The reader should therefore be aware that the conclusions and predictions of this study might not be valid for a very long time. This study was conducted during the spring of 2017.

Another delimitation is the geographical scope: This thesis studied the global market and had no specific country or geographic region in mind. However, since the authors are located in Sweden and the empirical data was collected locally, the results are skewed toward the Swedish market. In order to ensure validity, a conscious effort was made to question in what ways the results would have been different in other countries. Reports, literature, and other data concerning the global market, enables us to draw conclusions that are not limited to Sweden or Europe.

2 Methodology

Research questions were developed from the authors' personal interest in the subject. This chapter describes the

- research approach and process;
- how data was collected and analysed, and
- an evaluation of the quality of the study in terms of validity, reliability, generalisability, and objectivity.

2.1 Research Approach

The purpose of this paper was to explore what factors might influence the success of different mobile proximity payment (MPP) solutions and get a deep understanding of the different attitudes of stakeholders, as well as evaluating the relevant technologies according to these success factors. The aim was not to quantify or explain the current state of the market, but rather to investigate what factors would play a significant role in the formation of the MPP market. Therefore, an exploratory research approach was used. Methodologically, an iterative process of induction was used, going back and forth between theory and interviews with stakeholders to find general rules from the observations. The reason for this was to continuously improve our understanding of the issue by confirming explanations from many different sources. By using this method, relevant factors were generated and evaluated, enabling a holistic understanding to be developed.

Induction is the process by which general principles are derived from specific observations. As such, the general principles are not guaranteed to be true by the observations. The problem of induction tells us that while conclusions made from many observations are probable, they can never be logically proven (Vickers, 2016). Since this thesis tries to find general trends and the most important factors for success, strict logical certainty is not required. However, in order to ensure the reliability of the conclusions, many different observations were used.

With relevant factors, and specific examples of what these factors entail identified, a framework of *Critical Success Factors* (CSF) was developed and used to qualitatively evaluate the different enabling technologies.

After having evaluated the different technologies, predictions about the future of the MPPs market was made, based on stakeholder analysis and the previous conclusions about technologies and CSFS

2.2 Research Process

The research process started with literature reviews in order to gain a general overview of the subject. This covered both theories regarding innovation and diffusion (presented in the theory chapter) and different forms of market data, including company and product descriptions, trend analyses, as well as technological information (presented in the market background chapters).

When a general overview and sufficient background information had been gathered, data collection in terms of interviews were performed. To get a holistic understanding, the main relevant stakeholders were interviewed: consumers and merchants. Consumer data was collected through online surveys and focus group discussions, while interviews with merchants were based on semi-structured interviews.

Since MPP constitute a multi-platform business model, success factors for the different stakeholders are interdependent. In order to investigate these connections, continuous contact with interview participants was required, going back to ask additional questions that arose during interviews with the other stakeholders. Additional analysis of the literature was also done continuously during the study. This iteration between theory and interviews with different stakeholders allowed a complete set of relevant success factors to be evaluated from different perspectives. For an illustration of the research process, see Figure 2.

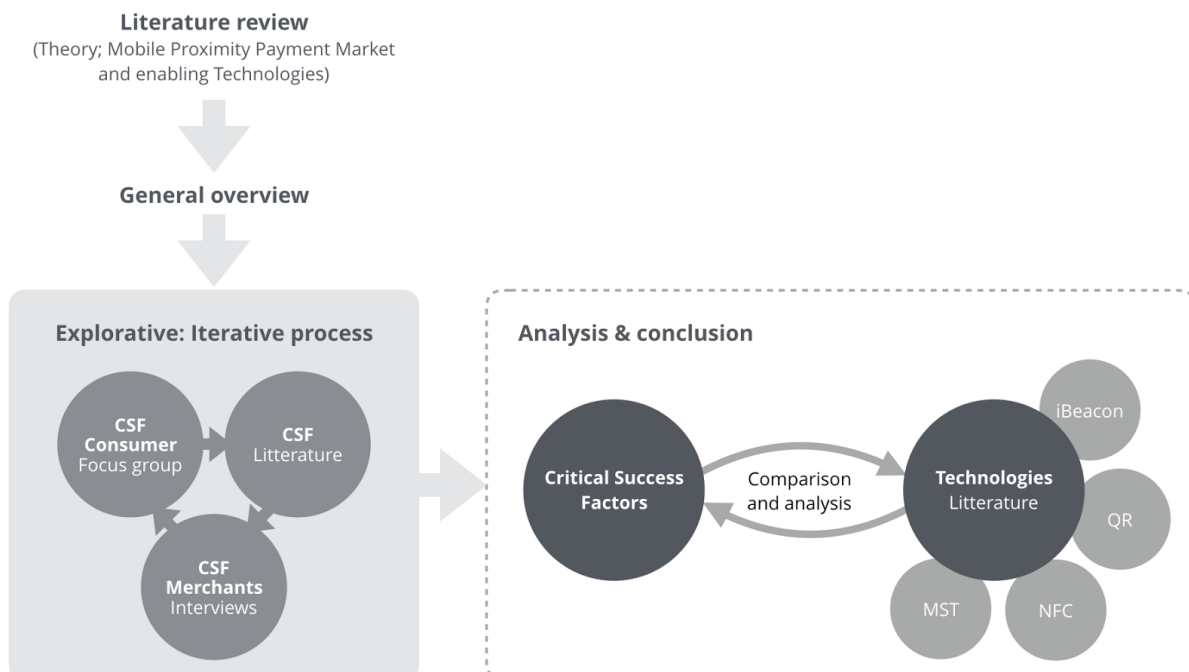


Figure 2. Overview of the research process.

2.3 Data Collection

2.3.1 Literature Study

Various literature sources were found through databases, internet searches, and through suggestions from our supervisor. The most relevant ones were chosen. Different kinds of sources were used: academic articles on innovation, diffusion, and MPP; market data on companies and products; business reports on trends and forecasts; and technical descriptions of the various competing technologies. A desk study of these sources was conducted to achieve a general understanding and a first set of success factors were generated. See Table 1 for a motivation of the main sources used.

Table 1. Motivation of literature sources.

Literature	Motivation
Critical Success Factors Disruptive innovations Multi-sided platform	<i>Basic concepts needed to understand the issue</i>
Diffusion of Innovations	<i>Needed for in-depth understanding of how new innovations spread through society</i>
The Innovation-Decision Process	<i>Needed to understand consumers decisions when choosing whether to use mobile proximity payments or not, and which one they choose</i>
Adopter Categories	<i>Needed to understand how different people adopt technologies for different reasons</i>
Rogers' Five Factors	<i>Needed to understand factors that influence the adoption rate of a technology, used to generate initial success factors to be evaluated by empirical studies</i>
Crossing the Chasm	<i>Needed to understand strategies for facilitating diffusion between adopter categories</i>
Stakeholder Theory	<i>Needed to understand all relevant actors that influence a company in the mobile proximity payments market</i>
PESTEL	<i>Needed for analysis of macro environment</i>
Porter's Five Forces	<i>Needed to understand industry logic and market conditions</i>
Stakeholder mapping	<i>Needed to understand the different stakeholders and how they interact in the mobile proximity payments ecosystem</i>
BCG-reports	<i>Consulting reports as industry experts</i>
BCG, 2015a	<i>A BCG survey of 5,500 consumers (France, Germany, the U.K., and the U.S.) with the goal of discovering why the adoption of digital payments has been relatively slow to date, identifying current consumer needs, preferences, and pain points in payments</i>

PwC-report	<i>Consulting reports as industry experts</i>
McKinsey-report	<i>Consulting reports as industry experts</i>

Later in the process, an iteration between the literature and the other data collection methods was used to continuously develop and evaluate the CSFs that had been found thus far. The conclusions are the results of many iterations of ways to fit the observations within the existing theoretical frameworks, and creating new frameworks.

2.3.2 Interviews

Semi-structured interviews (Appendix IV. *Preparation and guide for interviews with merchants*) were performed with the stakeholder group *merchants*. The interviews were semi-structured in order to cover a number of specific areas, as well as allowing the participants to voice their own concerns and opinions. Participants were chosen through convenience sampling: asking merchants in central Lund and Malmö if they were willing to participate. See Table 2 for merchants that were interviewed.

Table 2. Overview of the merchant interview participants.

Type/Merchant	Position/role	Interview kind
Large coffee house chain	Store manager	Face-to-face interview
Medium-sized restaurant chain	Owner and store manager	Telephone interview
Small café	Owner and store manager	Face-to-face interview

Interview guides and questions (Appendix IV. *Preparation and guide for interviews with merchants*) were developed based on the initial generation of success factors from the literature review and continuously adjusted when new observations were made. For instance, factors that were mentioned during the focus group meetings were discussed with merchants in order to obtain a multi-sided understanding of those particular factors.

2.3.3 Focus Group Discussions

For the stakeholder group *consumers*, a focus group discussion was held. Participants of the groups were chosen through convenience sampling: a poster asking people to participate was put up at LTH (Lund University, Faculty of Engineering). This spot was chosen to attract people who are interested in new technologies and who could be assumed to be part of the early adopters/early majority categories (see theory chapter). When a significant amount of people (7) had enrolled, a short online survey was used to gather individual information and ask

questions that would not be discussed in group discussions, see Appendix I. *Framework for the Focus Groups*.

One focus group discussion was held with seven participants, led by Johannes Larsson, while Joel Oredsson took notes. The discussion took one hour, covering areas such as knowledge of MPP, reasons for using MPP, and reasons not to use MPP. For a complete list of topics and questions discussed, see Appendix II. *Interview Guide and Questions for the Focus Groups*.

2.3.4 Participants

The participants were all young, well-educated, smartphone users with varying levels of interest in technology. A short survey was used to evaluate in broad terms what adopter categories they belonged to. The results indicate that all participants are either early adopters or early majority. See Appendix II. *Interview Guide and Questions for the Focus Groups* for the survey.

Although the participants were not representative for the whole population in that they were early adopters/early majority, this was a deliberate choice made in order to focus on the early development of the MPP market. If a more representative sample had been used, the results would have covered a more long-term view of the success of MPPs. However, the focus of this thesis is more towards the initial success on the market, and thus the authors believe the participants are accurately chosen.

2.4 Data Analysis

Data was collected continuously and an iterative process was used to draw conclusions from the data. It started with articulating the assumptions of the authors and a first draft of CSFs. This first draft was revised with each iteration of data collection and analysis. For example, after an initial literature review, the authors challenged all assumptions and CSFs that were part of the first draft, adding and subtracting factors according to conclusions from the literature. This process was repeated after focus group interviews, merchant interviews, and additional literature studies. When a sufficient understanding of the market and all relevant aspects had been acquired, the CSF Framework was constructed. It was based on all the previous data collection and analysis. In the development of the framework, stakeholder mapping proved to be a helpful analytical tool, resulting in a good overall understanding of how the different stakeholders interact.

The CSF Framework was then used to analyse and critically evaluate technologies. Before the analysis, criteria for what was considered fulfillment of the CSFs were discussed and determined. When all technologies had been evaluated, the conclusions from this evaluation was used to predict the future of the MPP market. This analysis was based on results from the

evaluation as well as the acquired understanding of industry logic and the roles of the stakeholders in the ecosystem.

2.5 Quality of the Study

In this section, the quality of this thesis is discussed in terms of validity, reliability, generalizability, and objectivity.

2.5.1 Validity

Validity concerns whether this study has been able to answer the research questions used or not, or if it answers some other questions. Overall the validity is judged to be good, but one can criticise the study on the following points:

- The empirical data is collected locally and thus represents Sweden rather than the whole world. One might then object that this thesis answers questions about the Swedish MPP market rather than the global one. In order to deal with this limitation, other sources have been used, such as trend reports and empirical studies in other countries. The results from our own empirical studies (interviews and focus groups) have been confirmed to be in line with the rest of the world and one could argue that needs, problems, and desires related to MPPs are relatively uniform in most developed countries.
- The complexity of the research question makes it hard to cover all relevant factors that influence the success of MPP solutions. One might argue that there is a disproportionate focus on the two main stakeholder groups: consumers and merchants. However, the authors believe that factors derived from them truly are the main determinants of the success of MPPs. In order to achieve a well-rounded analysis, stakeholder mapping and analysis has been used to ensure that no factors were overlooked. Naturally it is however impossible to guarantee that nothing at all has been missed.

2.5.2 Reliability

Reliability is the extent to which our results can be replicated, *i.e.* that the same results would be achieved if repeated under the same conditions. Since the MPP market is constantly changing, it would be hard to replicate the same conditions. However, the authors believe that a study conducted at the same time and in the same way as this one would indeed produce similar results. The main objection would be that our empirical data was collected from a relatively small sample and that individual opinions could influence the result too much. In order to deal with this, an iterative process has been used, going back and forth between our own empirical

results, other empirical studies, trend reports, and theoretical literature. During focus group interviews and merchant interviews, the authors were also rigorous in questioning the opinions of the participants, to understand their underlying motives and backgrounds.

2.5.3 Generalizability

Generalizability is to what extent the results of this study can be generalized to the whole population. Since our empirical studies used a small number of participants, one might question the generalizability of our conclusions. However, since other sources (*e.g.* global trend reports, other empirical investigations, and theoretical articles) have been consulted, our conclusions are not exclusively based on focus groups and interviews, but rather on our holistic judgement of all sources. This has significantly increased the generalizability of this study, allowing us to draw conclusions not only about the participants but about the population as a whole, including other countries.

2.5.4 Objectivity

Objectivity concerns the extent to which our results represent the “objective truth” and are not influenced by subjective beliefs such as prejudice, bias, hidden assumptions, and preconceived notions. Naturally, the authors believe themselves to be free of these, but this is a poor justification of objectivity. To convince the readers of the objectivity of this master thesis, one might mention that our initial ideas many times were proven wrong. For instance, the authors assumed that security would be a much more important factor than what our investigations have shown.

Furthermore, all sources have been used in concert, iterating between empirical and theoretical findings to make sure that they point in the same direction. The authors believe that this method of working has ensured that the results are close to the objective truth.

2.6 Criticism of the Sources

The sources for this master thesis mostly come from well-known academics and companies, and can be considered reliable. However, the MPP market is changing at a fast pace, and although information from our sources may be correct, it could quickly become outdated. The reader should therefore be aware of this and verify that no major changes have occurred before using this thesis to guide decision making.

Another drawback is that while the study has a global focus, the empirical evidence (focus groups and merchant interviews) was collected from Swedish citizens. This could skew the results towards a Nordic understanding of the MPP market. However, secondary sources were

used to complement the primary evidence. For example, the results from consumer focus groups were corroborated with data from other countries. In conclusion, the major trends in Sweden seem to be in accordance with trends in other countries and the results are likely applicable for the global market.

3 Theoretical Framework

This section describes the theoretical frameworks that have been used for the purpose of this study. The figure below provides an overview of the used frameworks.

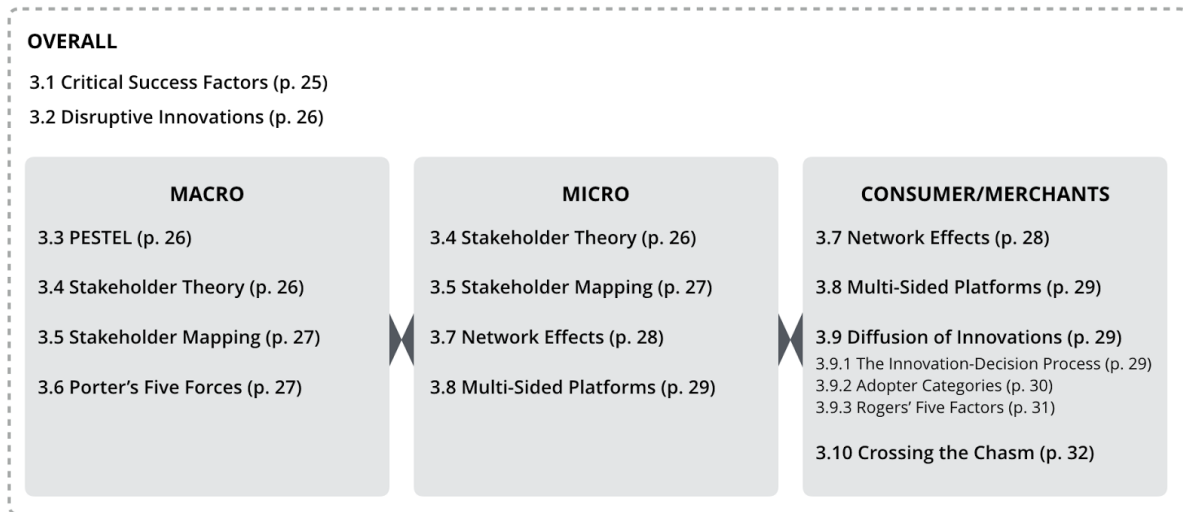


Figure 3. Overview of the used frameworks.

3.1 Critical Success Factors

Critical Success Factors, commonly abbreviated CSFs, is a concept that originates from Ronald D. Daniel at McKinsey & Company, and was further developed by John F. Rockart and Christine V. Bullen. It is defined as an area “in which satisfactory results will ensure successful competitive performance” (Rockart and Bullen, 1981, p. 7). It is used to identify the most important areas of success and thus, to guide the allocation of resources to those areas. CSFs arise from five major sources (Ibid, p. 16):

- The industry;
- Competitive strategy/industry position;
- Environmental factors (factors that are outside the control of the company);
- Temporal factors (temporary issues that need to be resolved); and
- Managerial position (different CSFs for different levels of the company).

This is a basic concept needed to understand the issue of mobile proximity payments (MPP).

3.2 Disruptive Innovations

A disruptive innovation is an innovation that disrupts an existing market by displacing current products and companies and thus, creates a new market which is significantly different from the previous. One example is the portable MP3-player, which disrupted the market for portable CD-players. The term was coined by Clayton M. Christensen (1995, p. 506). This is a basic concept needed to understand the issue of MPPs.

3.3 PESTEL

PESTEL is a framework used to understand the macro-environment of a market. It consists of six factors (Johnson *et al.*, 2012, p. 21):

- **Political** factors include the political stability of the region, tax policy, trade rules, *etc.*
- **Economic** factors include growth, interest rates, exchange rates, inflation, *etc.*
- **Social** factors include culture, demography, trends, population growth, *etc.*
- **Technological** factors include different technological solutions, R&D, automation, *etc.*
- **Environmental** factors include weather, climate, ecosystems, *etc.*
- **Legal** factors include laws and regulations that are relevant for the industry

This theory is needed for analysis and understanding of the macro environment regarding the MPP landscape.

3.4 Stakeholder Theory

Stakeholder theory suggests that companies should regard the interests of more than just the shareholders and owners of the company. In order to understand the market and maintain good relationships with all people/organisations that can influence the success of the company, one needs to understand all stakeholders (Johnson *et al.*, 2012, p. 89). Examples of stakeholders are:

- Shareholders
- Owners
- Managers
- Employees
- Customers
- Suppliers
- Creditors
- Government
- Society
- Labour unions
- Activist groups

This theory is needed to understand all relevant actors that influence a company in the MPP market.

3.5 Stakeholder Mapping

In order to understand the stakeholders' different roles in the ecosystem, stakeholder mapping can be used, typically through a matrix with two dimensions. One of the most popular stakeholder mapping methods is the power-interest matrix, in which all stakeholders are analysed according to how much power they have over the other stakeholders and how much interest they have (Mitchell, Agle, *et al.*, 1997). For instance, a big company with a lot of resources might have high power and a company which could potentially increase their revenue significantly might have high interest. For an illustration of the power-interest matrix, see figure below. This theory is needed to understand the different stakeholders and how they interact in the MPP ecosystem.

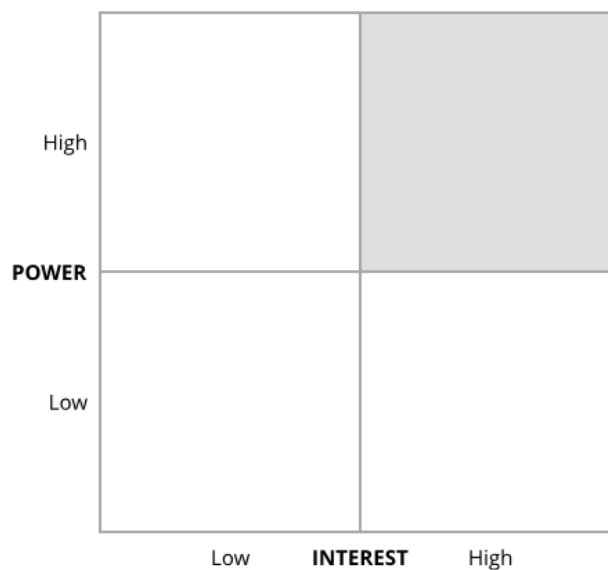


Figure 4. Power-interest matrix (Stakeholder mapping).

3.6 Porter's Five Forces

Porter's Five Forces is a framework used to assess the level of competition on a market. A high level of competition makes it harder to achieve a high profitability. The five forces are (Johnson *et al.*, 2012, p. 25):

- **Threat of new entrants** is influenced by barriers to entry, high capital requirements, economies of scale, brand loyalty, *etc.*
- **Threat of substitutes** is influenced by number of substitutes available, switching costs for customers, customer loyalty, *etc.*
- **Bargaining power of customers** is influenced by the size of customers, number of customers, switching costs, customer price sensitivity, *etc.*
- **Bargaining power of suppliers** is influenced by size of suppliers, number of suppliers, switching costs, degree of differentiation in inputs, *etc.*
- **Industry rivalry** is influenced by number of competitors, size of competitors, the competitors' competitive advantages, *etc.*

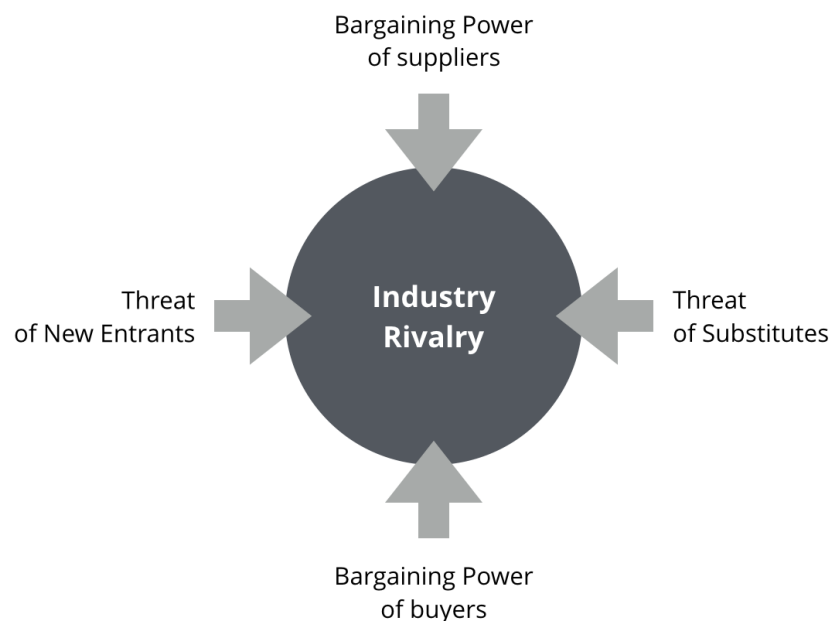


Figure 5. Figure describing Porter's Five Forces.

This theory is needed to understand industry logic and market conditions.

3.7 Network Effects

Network effects are ways that the users of a service influence the value of the service (Shapiro & Varian, 2013). The best example is with telephones: if you are the only user the telephone has no value at all, but when other people start using telephones, its value increases significantly. There is also a distinction between direct and indirect network effects. Direct network effects are the effects that come from the same group of users, while indirect network effects are effects that

come from the interplay between two or more different user groups. For instance, the popularity of a smartphone increases the value for both consumers and for application developers. The consumers get more applications to choose from as more developers start developing applications for the smartphone and the developers get an increased market when more consumers buy the smartphone. Therefore, smartphones can be used as an example of both direct (you can contact your friends) and indirect (you get more applications/application developers get more users) network effects. This theory is needed to understand how different stakeholder groups interact and bring about forces that can change the market.

3.8 Multi-Sided Platforms

A multi-sided platform is a platform where two or more distinct user groups interact and bring benefits to each other, for example a gaming platform where developers can sell games to players. It is characterized by direct and indirect network effects: the more developers that sell games, the better the assortment of games and the more players that use the gaming platform, the more potential customers for the developers. For a company that uses a multi-sided platform as a business model, it can be challenging to attract significant amount of users from either group before the other group has joined the platform (Andrei & Wright, 2011). This theory is needed to understand how different user groups influence each other in terms of adoption.

3.9 Diffusion of Innovations

In 1962, Everett Rogers wrote a book called Diffusion of Innovations, presenting his theory on how and why new ideas and technologies are adapted by society. According to his theory, the rate at which new ideas spread to adopters is influenced by the innovation itself, communication channels, time, and the social system (Rogers, 2010, p. 34). Diffusion of Innovations tries to explain how these aspects interact and how they can be used to become successful when launching a new innovation. This theory is needed to gain an in-depth understanding of how new innovations spread through society

3.9.1 The Innovation-Decision Process

When an individual decides whether to adopt a new innovation or not, they go through a process which Rogers calls the Innovation-Decision Process (Ibid, p. 164):

- **Knowledge** is the first stage, where the individual is exposed to the existence and functionality of the innovation

- **Persuasion** is the second stage and occurs when the individual forms a favourable or unfavourable opinion of the innovation
- **Decision** is when the individual decides whether to adopt or reject the innovation
- **Implementation** is when the individual starts using the innovation
- **Confirmation** is the last stage, when the individual has made a decision and tries to confirm that the correct decision was made

This theory is needed to understand consumers decisions when choosing whether to use MPPs or not, and which one they choose.

3.9.2 Adopter Categories

Adopters are the people that adopt a new idea, innovation, or technology. They can be divided into five broad adopter categories, often presented in a bell-shaped curve (see Figure 6). It is key to the understanding that although there are five distinct categories, people exist in a continuum and the descriptions below are not meant to be representative for all people (Ibid, p. 248).

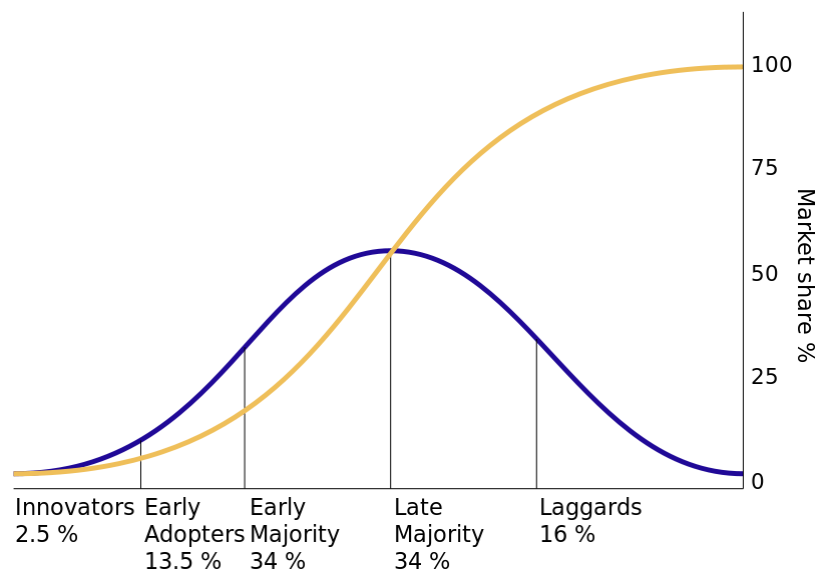


Figure 6. Adopter categories.

- **Innovators** are the first to try a new idea. They can accept the risk of adopting a new technology that might not be successful. They can understand complex technical knowledge and have a high desire to be the first to try something new.
- **Early adopters** come next in the adoption process. They have a higher degree of opinion forming leadership in the social system than the innovators and other people rely on them to make the 'correct' decision. While they take lesser risk than innovators, they want to be among the first to have a new technology that will spread through their social

circles. Because of their ability to spread new ideas, they are often very important for the success of a new product or service.

- **Early majority** adopt new ideas before the average member of the social system. They do not want to be the last to something new, but they are more careful and require more time than the early adopters before they adopt an innovation. Although they have less opinion forming leadership and thus less power to influence other people, they form a link between the early and the late adopters. Only when the early majority has accepted a new idea will the rest be open to it.
- **Late majority** are more skeptical and need even more certainty before they make their move. Reasons for adopting could be an economic necessity or increased network pressure.
- **Laggards** are the absolute last people to accept a new innovation. When they adopt a technology, its replacement might already be on the market. They are skeptical and suspicious of change, have a traditional attitude, and almost no opinion forming leadership at all.

In general, higher level of education, socioeconomic, and social status are associated with being earlier in the adoption process. This theory is needed to understand how different people adopt technologies for different reasons.

3.9.3 Rogers' Five Factors

For the innovations itself, Rogers' has identified five characteristics, called Rogers' Five Factors, that facilitate the rate of adoption (Ibid, p. 213–232):

- **Relative advantage** is the perceived advantages of the innovation over other alternatives, *e.g.* lower cost, better performance, or superior design.
- **Compatibility** is how well the innovation aligns with existing values, past experiences, and needs of adopters. For example, adopters expect new products to work in a similar way as previous ones.
- **Simplicity** is how easy it is to understand and use the innovation.
- **Trialability** is the ability to try and experiment with an innovation without having to buy it first. This is especially important for later adopters who require less uncertainty before they make a buy decision.
- **Observability** is the possibility to see the results of the innovation. If it is easy to see other people use and get advantages from a product, or if it is easy to demonstrate the product to customers, it will increase the rate of adoption.

This theory is needed to understand factors that influence the adoption rate of a technology, used to generate initial success factors to be evaluated by empirical studies.

3.10 Crossing the Chasm

According to Geoffrey A. Moore, there exists a chasm between the early adopters and the early majority which makes it hard for new innovations to spread to the public. In his two books, “Crossing the Chasm” from 1991, and “Inside the Tornado” from 1995, he presents his theory on how to bridge this gap and spread an innovation.

The chasm exists because of the big differences in expectations between early adopters and the early majority. Early adopters are willing to accept incomplete features (*e.g.* beta versions of software) and uncertainty, but the early majority wants a complete solution that solves their particular problem. This is further worsened by the lack of reference customers from the same adopter category (Moore, 1991, p. 41).

The solution to the problem of how to cross the chasm is to provide complete product solutions to niches in the early majority, moving from one niche to the next until you have captured a significant part of the market. Moore calls this “the Bowling Alley” in which every niche segment is represented by a bowling pin. The first segment is the “beachhead,” where the company launches its attempt. By creating a complete product for an initial target segment, the company gains reference customers and adds features that can be expanded upon for successive similar niche segments. After repeating this for several segments, a product that is mature for the majority emerges (Moore, 1995, p. 26). The next phase is “the Tornado” in which demand is very high and the main focus should be on supplying the products: expand distribution channels and ensure you can handle scaling up (*Ibid*, p. 55). The last phase is “the Main Street” when the new innovation has been largely accepted and growth opportunities are limited. Moore recommends focusing on aftermarket sales that improve functionality and differentiate with secondary features rather than with the primary ones (*Ibid*, p. 88). This theory is needed to understand strategies for facilitating diffusion between adopter categories.

4 Background: Market Analysis

This section aims to provide the reader with a deep understanding of the landscape of mobile proximity payments (MPP). Firstly, a brief introduction to the evolution of payments and MPPs are presented; this is followed by a macro description of the landscape; introduction to some main actors; a presentation of different technologies for enabling MPPs; social aspects regarding MPPs and lastly; laws and politics regarding MPPs are presented.

4.1 Evolution of Payment Solutions

The first trades are described through the *Barter system* where goods are exchanged for other goods directly from one to another without using a medium of exchange (O'Sullivan and Sheffrin, 2003, p. 243), *e.g.* meat in exchange for rice. The first medium of exchange were found in Asia where they used tools and weapons, they later on, around 1,100 B.C., moved on from using tools and weapons to using miniature replicas of these in bronze (Investopedia, 2015). These replicas were also inconvenient to carry around, hence they made small circle-like shapes with carved in tools and weapons instead (Ibid).

The first currency was founded by King Alyattes in Lydia 500 years later, 600 B.C (Investopedia, 2015). During the same time, the Chinese took another step in the evolution of payments through introducing paper money instead of heavy coins (Ibid). It took Europe more than 2000 years, from 600 B.C., to start using paper money (Ibid). The use of credits begun in the late 1800s and the plastic card entered the arena during the 1940s (Woolsey & Starbuck Gerson, 2016). However, a sophisticated system of checks and money orders were established in the US already during the late 1800 by both American Express and U.S. Postal Service (Ibid).

The collective driving force for the evolution of payments, as seen above and in present new solutions, is convenience — from tools and weapons to replicas of tools and weapons, from coins to credits cards (Legters, 2013). The subject of this paper, MPPs, could be seen as the next step in the evolution of payments — moving the wallet and payment process online and to the smartphone, making it even more convenient. Initial initiatives regarding MPPs comes from the introduction of Google Wallet in 2011, Apple Pay in 2014 and the launch of Android Pay and Samsung Pay in 2015 (Smart Card Alliance, 2015) — three different platforms and two different enabling technologies (MST for Samsung Pay; and NFC for Google Wallet and Apple Pay).

In summary, there are many options for a consumer to make a payment at a physical store today, see figure below. Starbuck's application is an example of in-app ordering.



Figure 7. Overview of ways to make an in-store purchase today.

4.2 Mobile Proximity Payments

When discussing MPP it is of great importance to distinguish between different kinds of situations where the mobile is used for making an in-store transaction. For many years it has been possible to pay bills, transfer money to peers, order goods from e-commerce (sometimes called m-commerce when using a mobile) *etc.* with your smartphone. However, this thesis is not addressing these situations. This paper discuss situations where consumers use their smartphone to pay at a physical point of sales, *e.g.* at the counter at a café.

Kerviler *et al.* (2015) defines MPP as a payment method representing a direct substitute for traditional payments methods such as cash and/or cards at a physical point of sales. These transactions have not yet been gathered under a common name, *e.g.* being called physical mobile payments, mobile proximity payments, mobile in-person payments. However, they all describe the same situation, when a consumer uses their smartphone to make a transaction at a physical point of sales.

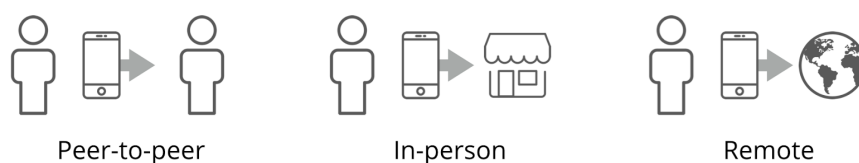


Figure 8. Three different situations and definitions of usage of mobile payments (PwC, 2016). The focus of the paper is the middle one, “In-person” payment – mobile proximity payments (MPP).

4.3 A Dynamic Arena

The MPP arena is under rapid change and development — or as Capgemini (2016) describes, “[in] a state of flux”. The financial sector regarding traditional credit cards and so forth could be described as mature — however, the fast growth of people using smartphones, from 1.5 billion in 2014 to 2.1 billion in 2016 (Statista, 2017a), and at the same time being connected to the

internet, from less than one percent in 1995 to around 40 percent in 2016 (internet live stats, n.d.), has made it possible for new solutions regarding, for instance, how we transfer money.

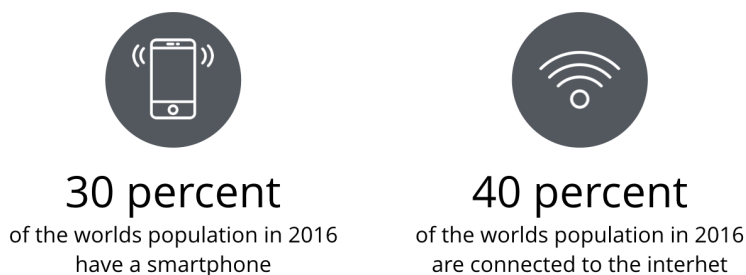


Figure 9. People using smartphone (left) and being connected to the internet (right) (Statista, 2017a; internet live stats, n.d.).

4.3.1 What is Affecting the Market?

BCG's (2016) report, *Digital Payments 2020*, identifies four macro trends that is contributing, and will continue to contribute, to the rapid growth of the MPP market: The ongoing digital and technology revolution; Entry of non-traditional players; More demanding customer expectations; and Enabling regulations.



Figure 10. Macro trends affecting the mobile landscape (BCG, 2016).

The **first** arrives from the fact that access to internet around the world has grown rapidly recent years and access to internet on mobile devices is expected to reach 3 billion by 2020, compared to around 1.9 billion 2015 (BCG, 2016).

The **second** describes the fact that players from different industries are entering the MPP market, *e.g.* manufactures (Apple, Samsung), retailers (Starbucks, Walmart), telecom companies (Vodafone, Orange) and startups. Also, the number of FinTech startups, that has doubled the last five growing to approximately 1 000, is expected to disrupt and increase the growth of the market. In total, the number on FinTech companies have tripled the last ten years, and funding to FinTech companies grew seven times the same period. (BCG, 2016) In another report, BCG estimated that roughly USD 76 billion in venture capital has been invested in payment-related business since 2010 (BCG, 2015a).

Third, since the market is opening and many players are competing, customers both demand and expect a smooth, intuitive and frictionless experience that is just as simple as using Facebook on your mobile device. **Last**, regulations have enabled providers to make use of infrastructure that before was owned by the banks, *e.g.* real-time systems. (BCG, 2016)

4.3.2 Market Size and Growth

The market size and growth of MPPs in the world is a constantly changing subject, but common for all projections is that it is an enormous market – just imagine the volume of all transactions in the world. BCG (2016) estimated that the total value of global retail transactions in 2015 was USD 16 trillion and grow to USD 21 trillion by 2020. Digital payments contributed with around 8 percent and is expected to grow to 18-24 percent by 2020 (Ibid.). Oliveira *et al.* (2015) refers to a survey conducted by Statista Corporation in 2015, that the global revenue for MPPs will reach USD 721 billion by 2017. However, projections from PwC (2016) estimates the market for MPPs by 2017 to USD 114,5 billion. In conclusion, the market is huge but hard to estimate.

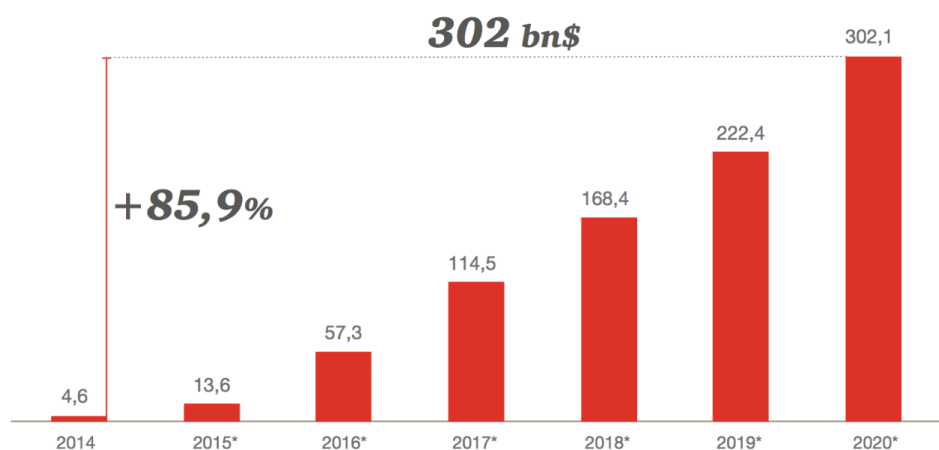


Figure 11. Mobile proximity payments worldwide 2014-2020 (USD bn), *projected values (PwC, 2016).

PwC (2016) concluded that MPPs increased in the US with more than 50 percent from 2015 to 2016. The same report estimates an yearly growth of around 50 percent during the next three years, which would set the market for MPPs in the U.S. to around USD 35 billion by 2019 (Ibid). BCG (2016) places the market for MPPs in India in the range of USD 500 billion by 2020, which would imply a 10X growth of current value. BCG (2015a) makes projections of potential industry revenue growth of USD 900 billion that is up for grabs through 2024. China is in the front when it comes to MPPs, being nearly 50 times greater than US during 2016 (Wildau and Hook, 2017). However, this includes all mobile payments.

The potential market for MPP could also be described at by looking at the total global non-cash transactions. During 2014 the global non-cash transaction volumes grew by around nine percent

to 387.3 billion, and is estimated to keep growing at an even faster pace (Capgemini and BNP Paribas, 2016). BCG (2016) concludes that the cash to non-cash ratio will invert over the next ten years, suggesting that it will become more common for merchants to *not* accept cash than to accept cash. For example in Sweden, the number of merchants not accepting cash has grown in the past years. One example of this is the coffee chain Barista (Sweden) which does not accept cash.



Figure 12. Market describing statistics from PwC (2016) and BCG (2016), MPP - mobile proximity payments.

4.4 Stakeholders

The main stakeholders providing the possibility of MPPs are (BCG, 2016):

- **Banks:** providing the possibility to transfer money from one account to another (*e.g.* Bank of America and Swedbank);
- **Telecom companies:** providing carrier billing and/or direct carrier billing;
- **Credit card providers:** providing consumers the possibility to make payments with their credit card (*e.g.* VISA and MasterCard);
- **Terminal providers:** providing merchants the possibility to offer debit and/or credit card payments (*e.g.* Babs Paylink);
- **Smartphone producers:** providing consumers with the possibility to pay with their smartphone (*e.g.* Apple, Samsung and Google);
- **Software (application) producers:** providing consumers/merchants to make/offer MPPs with their smartphone (*e.g.* Square, Swish and pej); and
- **Governmental institutions:** institutions with legal and political power (*e.g.* government, political parties and legal system).

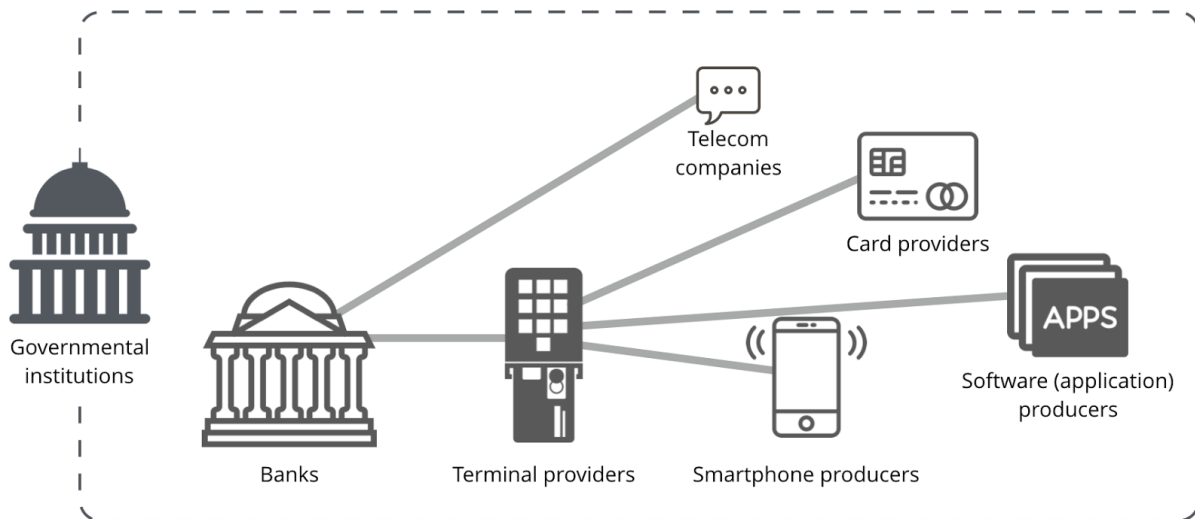


Figure 13. Main stakeholders providing the possibility to make mobile proximity payments (MPP).

One interesting aspect to consider is the fact, as described under “*What is affecting the market?*”, that players from different industries are entering the MPP market, *e.g.* manufactures (Apple, Samsung), retailers (Starbucks, Walmart), telecom companies (Vodafone, Orange) and startups. This could be described as a result from more people having smartphones and being connected to the internet, combined with the fact that new regulations have enabled providers to make use of infrastructure that was previously owned by the banks, *e.g.* real-time systems. (BCG, 2016)

Other than the presented stakeholders above, of course both merchants and consumers are considered to be stakeholders. Their needs, pains and wants are described in the result section.

4.4.1 Providers

Below, in Table 3, are some of the main providers of MPP solutions and their service described through their technology; supported devices; issuers; availability; and users.

Table 3. Some of the main providers and their services (NFC - Near Field Communication; MST - Magnetic Secure Transmission). (ABA, 2016)

Service	Apple Pay	Android Pay	Samsung Pay	AliPay
<i>Company</i>	Apple	Google	Samsung	Alibaba
<i>Technology</i>	NFC	NFC	NFC, MST	Barcode
<i>Supported consumer devices</i>	iPhone, Apple Watch	Android with NFC chip	Galaxy S6 or above, Galaxy Note5, Gear S2 smartwatches	All smartphones
<i>Issuers</i>	900+ U.S. banks	32 bank and credit	30 banks and	-

	and credit unions	unions	credit unions	
<i>Availability</i>	20 million+ stores* NFC ready terminals	1 million+ stores and NFC ready terminals	90 percent of MST-compatible terminals	China
<i>Users (2016/2017)**</i>	45/86 million	12/24 million	18/34 million	270 million users***

* (Rao, 2017); ** (JUNIPER Research, 2017) – projection for 2017; *** (BCG, 2016) 2015, including online transactions.

Other large providers are for example WeChat Pay in China and M-PESA in Kenya (BCG, 2016). And, when discussing MPPs, Starbucks is often mentioned as a leading example. They are considered to offer one of the most successful in-app payment wallet with a great integration of loyalty programs through letting customers earn rewards depending on their consumption through in-app purchases (BCG, 2016). At Starbucks, MPPs counted for around 15-20 percent (8 million weekly) of all transactions at Starbucks in 2015 (Statista, 2017b; BCG, 2016).

4.5 Technologies

This section provides an overview of the main technologies that are used today for enabling MPPs. The technologies are used for making a connection between the merchant's terminal and the consumer's smartphone. After the connection, the payment process could be similar to each other, *e.g.* regarding security features such as using fingerprint as authentication.

An overview of the main technologies is provided at the end of this section. The main technologies are as follows:

- Bluetooth Low-energy (BLE; Beacons and iBeacon);
- Magnetic Secure Transmission (MST);
- Near Field Communication (NFC);
- Quick Response Code (QR-code); and
- Telecom solutions.

4.5.1 Bluetooth Low-Energy

How does it work? Beacons and iBeacons uses Bluetooth Low-Energy (BLE) to communicate between devices. BLE could be described as a wireless spheric area surrounding the device and enabling data transmission over short distance (0-100 m). It is designed to have both low energy consumption and cost. BLE differs from regular bluetooth by having much lower energy consumption; being 60-80% cheaper; and through being more optimal for small periodic transfers of data. (ibeaconinsider, n.d.)

Beacons and iBeacon uses the same technology, BLE. The differences is that iBeacon is the name for Apple's technology within iOS7 or later (operating system). iBeacon is in some articles described as Apple's own version of Near Field Communication (NFC, described below). A beacon is a small hardware product that emits BLE signals and could be placed at preferred places, *e.g.* at the entrance to a supermarket sending out deals to customers that have a BLE-enabled smartphone that is listening for BLE signals. (ibid.)

Availability. Lately the technology from beacons have been integrated in not only Apple's smartphones through iBeacon but also in Android and Blackberry devices, and support from Windows Phones are likely to arrive soon (Newman, 2014). By making smartphones transmitters, the hardware beacon becomes less important, still with good user cases. For example, with Apple's iBeacon in all iOS7 or above (operating system), they have more than 700 million possible transmitters around the world. BLE overcomes some of the issues that have been noticed with NFC, *e.g.* the short distance that NFC requires. (Henning, 2014)

Distance. BLE transmitters (including smartphones or tablets acting as transmitters) can transmit in a radius of up to 100 meter and also measure how far away the transmitter is from the listening device is, *e.g.* within 5, 25 or 100 meters from the transmitter. This gives the chance to trigger different events depending on how far away the listening device is from the transmitter. (Newman, 2014)

User case. The figure below describes a user case where the terminal sends out three different BLE signals depending on how far away the user is from the terminal. The basic case is that if a user is within the range of the signal from the terminal, then the user can for instance be notified or make a transaction with their smartphone.

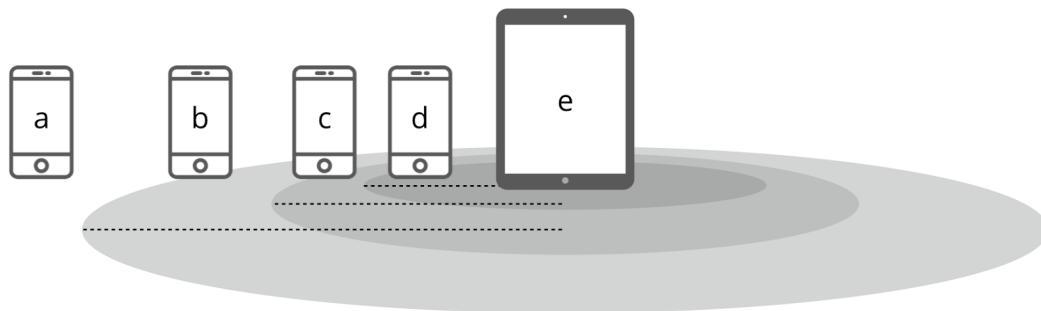


Figure 14. Figure describing a situation where the terminal (e) is sending out three different BLE signals, creating three different situations for the user (a-d). User smartphone (a) is out of range, hence not receiving any information. User smartphone (b-d) is in range but in different range from the terminal, hence getting different information exchange.

There are many live cases where BLE are used in the way described above. For example many Major League Baseball (MLB) arenas in the U.S. have installed beacons around the arena giving visitors the possibility to for example order a beer from their seat and get it delivered to their seat – not having to stand in line or even leave their seat. The only thing required is that the visitor have their MLB-application installed and bluetooth turned on. (Borehed and Westerholm, 2014)

Another user example could be to install beacons at a store and trigger different information depending on where the user is located. For example: (a) If the user is just outside of the store a special, real-time and personalized offer could be triggered; (b) when inside the store, the user can find information about the products just being near them; and (c) when checking out at the counter they can pay without having to pick up their smartphone from their pocket. As with the example from MLB above, this case requires that the user have the specific application installed and bluetooth turned on. (Borehed and Westerholm, 2014)

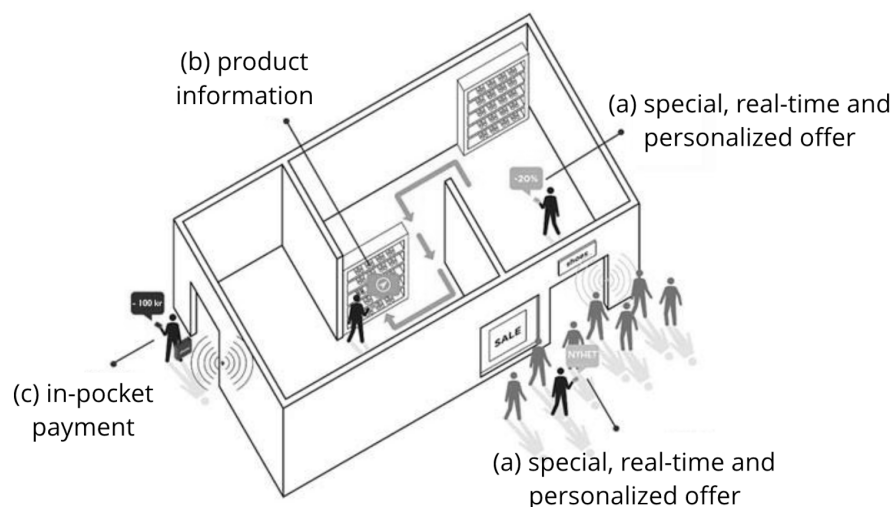


Figure 15. Figure describing a situation where beacons are installed in a store.

Advantages. Some of the main advantages with BLE are

- Long range (up to 100 meter);
- Better indoor-location precision than GPS;
- Not as battery draining as regular bluetooth or GPS;
- Wide-reaching distribution (through the use of smartphones as transmitters); and
- Background mode (read below). (Newman, 2014)

The fact that BLE can be used in background mode makes it possible for users to make an MPP without having to take out their phone from their pocket/bag *etc.* However, this requires that the user allows an app to always use their bluetooth, even if the app is not in active mode (open).

This could be hard since bluetooth still is largely associated with battery-draining. More challenges with paying without picking up the smartphone is the behavioural change this requires of users and that the user may feel uncomfortable not having to confirm the transaction with for example a pin-code or touchID. (Newman, 2014)

4.5.2 Magnetic Secure Transmission

How does it work? Magnetic Secure Transmission (MST) is a technology that emits a magnetic signal that mimics the magnetic strip on a traditional payment card (ABA, 2016). The signal is emitted from the terminal's card reader, hence the user is required to touch at or hold the the smartphone within an inch of the card terminal's reader. (Villas-Boas, 2015; and Samsung, n.d.)

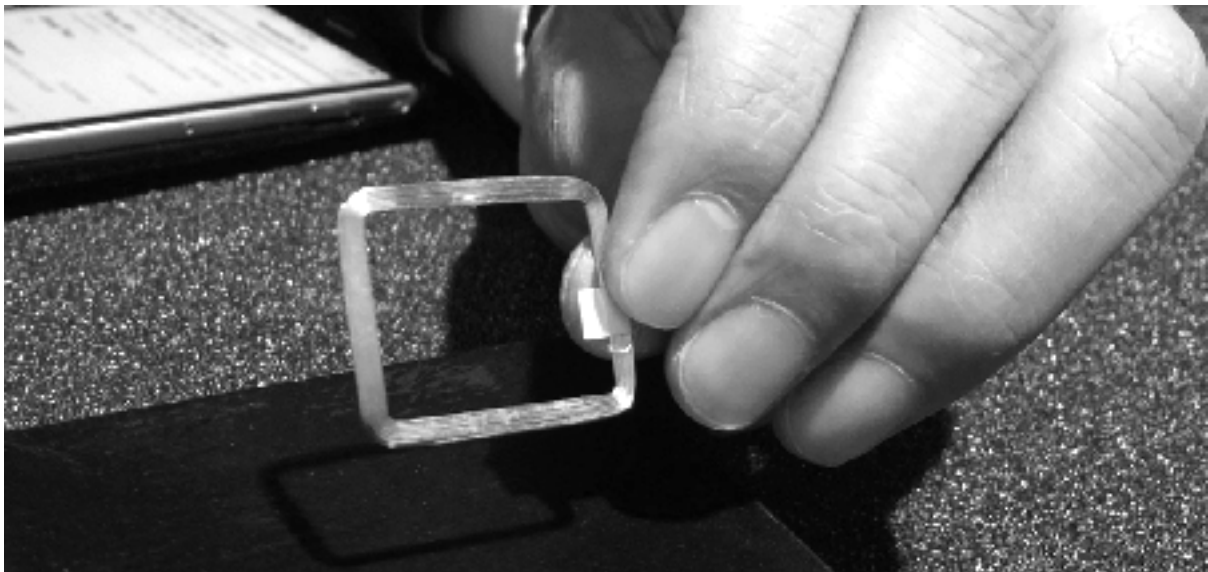


Image 1. An example of the technology in a Samsung phone enabling MST (Villas-Boas, 2015).

Availability and advantages. The fact that this technology uses the same technology that cards use when a user swipes their card at a payment terminal – makes it useable at almost all traditional payment terminals (some payment terminals may require a software update). This is a huge advantages compared to BLE or Near Field Communication (NFC) which do not have the same reach today. The main provider of this technology is Samsung with their service Samsung Pay, and so far Samsung phones are the only one with the MST feature — due to an acquisition of LoopPay, the company with the enabling technology. Samsung claims that Samsung Pay is accepted at over 90 percent of all retailers. (Villas-Boas, 2015)

User case. When using Samsung Pay, the user just has to open the application and place the smartphone near at the card terminal's reader (granted that the user credit card is from a bank that Samsung has partnered with). As many other solutions, Samsung Pay then lets the

consumer confirm the payment with either a fingerprint or pin-code (on their own smartphone). (Villas-Boas, 2015)

4.5.3 Near Field Communication

Distance and how it works. ABA (2016) describes NFC as “[...] a technology that transfers information from phone to receiver via proximity”. Near Field Communication (NFC) was developed through a collaboration between Philips and Sony during 2002. NFC is a combination of contactless identification and interconnection between two devices making it possible to create contact between devices without having to pair, being in the same network or even using location services or bluetooth. NFC is a short-range communication, the devices have to be within 10 centimeters and they communicate with 13.56 MHz operating frequency. (Coskun, *et al.*, 2012)

The interaction is often between a NFC-tag, -reader or -mobile (Coskun, *et al.*, 2012). The connection can then be refined into desired application, *e.g.* a payment, open a web page or providing a loyalty program. In short, NFC enables users to exchange data simply by bringing their phones close to each other.

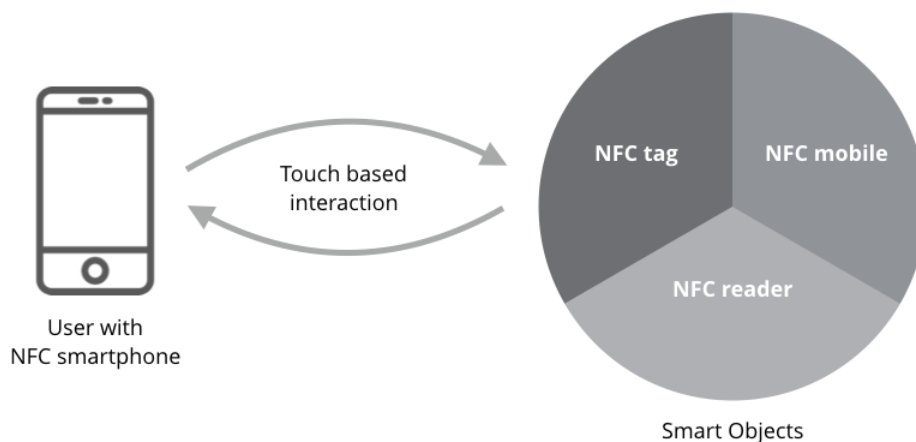


Figure 16. Description of the smart objects that provide interaction with a smartphone.

User case. When using NFC for an MPP the user must open a payment application with their smartphone and then hold it near, or even touch, the NFC tag – *e.g.* a NFC updated card terminal.

The usage for NFC is wide, ranging from MPP and loyalty programs to access keys for offices and houses – and many people use NFC on a daily basis through *e.g.* their bus card. The main usage being explored today for NFC is making MPPs. Hence the short distance or even the requirement

of touching, NFC is considered to be safer than other solution providing a similar connection between devices. (Coskun, *et al.*, 2012)

Availability. You find NFC in almost every new smartphone *e.g.*, Android, Windows and Apple (iPhone 6, iPhone 6 Plus and Apple Watch). One of the main benefits when comparing NFC to connections made with the use of BLE is the fact that it uses less power/battery. This is considered to be important for example when using the mobile as a payments solution. Another big benefit with using NFC is the fact that many retailers today already have the possibility to let consumers pay with the use of NFC that is integrated in their existing terminals. (Profis, 2014)

Challenge. A challenge with NFC is the fact that merchants need to have EMV-compliant (EMV: Europay, MasterCard, and Visa) terminals. EMV-compliant terminals are those that let the user pay with their credit card by just “blipping” the card at the payment terminal, sometimes called contactless payment cards. This means that as merchants upgrade to enable their terminals to accept EMV contact chip cards, they also enable MPPs using NFC. (Smart Card Alliance, 2015)

Opportunity. The Payments Security Task Force (PST) reported that 60 percent of their U.S. consumer credit and debit cards will contain EMV chips by the end of 2015, reaching 98 percent by the end of 2017 (PST, September 2015). Smart Card Alliance (2015) reported that more than 50 percent of consumers have at least one card with EMV chip in their wallet. MasterCard (2015) reported that more than 350,000 merchants accept chip cards, growing with more than 26 percent during 2015. The growing amount of consumers having credit and debit cards with EMV chips and merchants upgrading their terminals could be seen as a driving force for the use of MPPs through NFC (Krueger, 2016).



Figure 17. Projections regarding users using NFC (ABA, 2016).

4.5.4 Quick Response Code

How does it work. The underlying technology behind Quick Response Code (QR Code) is using a machine-readable label that stores payment data (ABA, 2016). The label is a matrix barcode, also called two-dimensional barcode, Figure 18 below (Cline, 2015). The QR code was first created for the automotive industry in 1994, tracking throughout the manufacturing process,

but is today used for many other applications such as product-tracking, item identification and receiving information through scanning a QR code with a smartphone *e.g.* contact information, open website links (Ibid. and Money Today, 2017).



Figure 18. Example of a QR-code.

Advantages. The main advantages between QR codes and regular barcodes is that they take less space than barcodes; contain more information and can be scanned from any directions (Cline, 2015).

User cases. There are two main user cases for enabling MPPs with QR code, either:

- the consumer scans the unique QR code for the store with their smartphone and then make the payment; or
- the store scans the consumer's smartphone-screen, containing the consumer specific QR code and then the transaction is made. (PwC, 2016; Cline, 2015 and Money Today, 2017)

Distance. The distance for using QR code for enabling an MPP is very short since the consumer must scan the store QR code with their smartphone or let the shop scan the consumer specific consumer QR code.

Providers. There are many software developers that provides applications for smartphones which uses QR code scanning for enabling MPPs. LevelUp was one of the pioneers using QR code for MPPs having more than 500,000 users during 2012 (Money Today, 2017). In Europe, an application called SEQR is gaining traction with their QR code solution for making MPPs (S-W, 2014).

Challenges. One of the main challenges with QR codes, expect the short distance, is when it comes to the user case where the consumer scans the store QR code for making a payment. The scanned QR code could easily be replaced with a fake one making the consumer transfer money to the wrong account (Lu et al., 2016).

4.5.5 Telecom Solutions

How does it work. The main telecom solution for making MPPs is when it is used as direct carrier billing (DCB), also known as direct operator billing. The most common way of using DCB is to send a Short Message Service (SMS) containing a specific code to a specific number. The service allows users to add their purchases through carrier billing to their smartphone bill or a prepaid credit. (SLA Digital, 2015)

Challenges. DCB gained traction when first released and is still growing. However, competitive pressure from new payment technologies is challenging DCB with *e.g.* features that does not require the consumer to for example input a number and send a SMS. (Abraham and van der Lande, 2013)

Advantages. Since a telecom solution does not require that the consumer nor the merchant is connected to internet – the solution could be used at areas with bad or even no internet availability.

4.5.6 Other Innovative Solutions

There are many other innovative solutions that are worth mentioning, such as Swish; Self checkout; and AmazonGo.

Swish	Swish, a Swedish solution for transferring money peer-to-peer and peer to in-store, use a consumer mobile phone number to create an account for sending money. It could be seen as a <i>Telecom solution</i> since the user creates an account by linking their bank account to their mobile phone number, however the transaction is not added to the user phone bill (as in direct carrier billing).
Self checkout	Self checkout at <i>e.g.</i> grocery stores, are gaining traction around the globe. The solution let consumers scan, package and pay for their groceries them self at a special checkout disk. One large provider is IBM with their retail solution. However, there is still a payment process where the consumer can choose to pay with cash, credit card or perhaps their smartphone.
AmazonGo	One of the latest and most innovative solutions within retail is AmazonGo. Easy described, AmazonGo lets a consumer walk into a store; pick what they want and then just walk out. With extensive technology, AmazonGo tracks what the user picked and makes an

automatic transaction from the users linked account when leaving the store. (Franson, 2017)

4.6 Social

Social aspects that are affecting the MPP market are:

- more smartphone users;
- more people being connected to the internet;
- smartphone usage is increasing, more “things” are being integrated in the smartphone, the latest example is the wallet (with credit cards, identity cards, tickets *etc.*) (PwC, 2015); and
- security, threats and privacy regarding MPPs (Statista, 2017a; internet live stats, n.d.; and Wang *et al.*, 2016).

4.6.1 Shopping Journey

Social aspects of the payment process can be found through looking at the shopping journey, customer journey, that describes five steps that a consumer goes through when shopping: (1) Discovery; (2) Trial; (3) Purchase; (4) Pickup; and (5) Return (Figure 19) (AtKearney, 2014). As stated above, the use of smartphones are increasing, meaning that the steps are becoming more digital, hence also the payment process (Ibid.). PwC (2016) concludes after a large survey that: “Retailers need to keep in mind that payment is only one moment of a much bigger picture: the customer journey”. This means that adding value to the payment process could be seen, and discussed, as giving value to the whole shopping journey and therefore providers must look at the whole picture and how they can enhance the shopping journey through innovating the “Purchase”-step and maybe include the other steps (Ibid.).

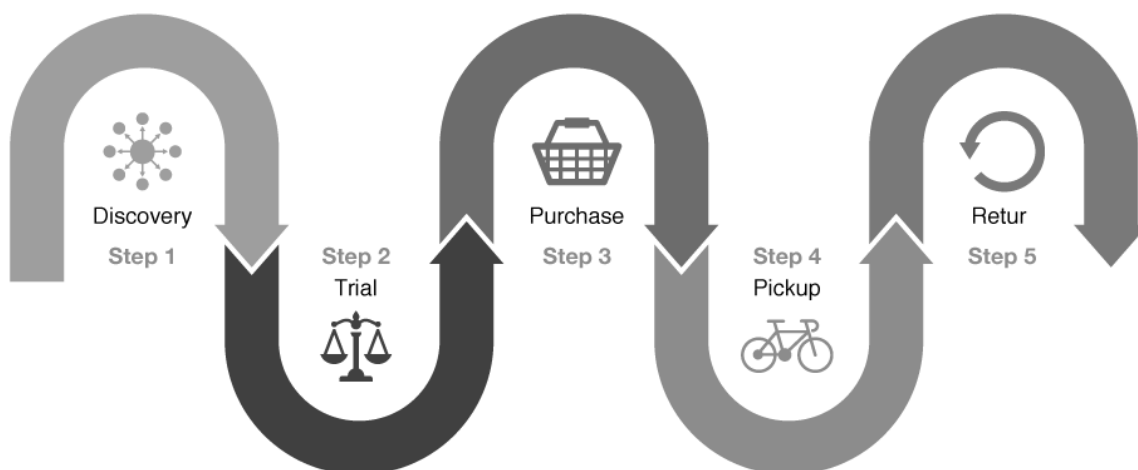


Figure 19. The Shopping journey (ATKearney, 2014).

PwC (2016) also refers to the shopping journey and how the new payment process can enhance the whole shopping journey through *e.g.* better loyalty programs, targeted promotions *etc.* PwC (2016); and Hayashi and Bradford (2014) conclude that retailers must keep in mind that the payment process is only one step in the shopping journey, but could change the whole experience for the consumers. (PwC, 2016)

Both Taylor and Levin (2014) and Kerviler *et al.* (2015) describes two main in-store mobile behaviors: information search, and purchase transaction; and how this could be integrated for a better social and user experience.

4.6.2 Security and Privacy

In BCG's (2015a) survey ("BCG survey of nearly 5,500 consumers in four countries—France, Germany, the U.K., and the U.S. – with the goal of discovering why the adoption of digital payments has been relatively slow to date; identifying current consumer needs, preferences, and pain points in payments.") they found that "Data privacy and Security" as the most significant barriers to Digital Adoption. PwC (2012) also had the same result from their survey saying that security is the greatest concern for consumers.

Newman (2014) discuss that with the increase of MPPs, the amount of data analysis will also increase. This could intrude with consumer privacy, hence it is important that the data is encrypted but also that the consumer both knows which data is used, and feel the value of the analysis – the value exchange of letting a organization collect consumer data must provide greater value back to the consumer.

In Wang *et al.*'s (2016) report *Mobile payment Security, Threats, and Challenges*, they present that the desired security measures are:

- authentication (*e.g.* pin code or fingerprint authentication);
- confidentiality;
- control (*e.g.* being able to track transactions); and
- integrity (*e.g.*, knowing which data and how it is used).

As with all digital services, there is a risk of viruses, *e.g.* malware (one of the main threats to an MPP solution). There are many safety precautions to have in hand to protect against viruses and as well to detect and prevent fraud. The MPP provider must also take great security precautions to protect against data breaches. (Wang *et al.*, 2016)

Some consumers express a fear of the security risk of losing or being robbed of the smartphone. However, the extensive security measures that are used, *e.g.* pin code and/or fingerprint, makes it almost impossible to use the robbed smartphone for payments. And, when using a

smartphone for an MPP, the merchant does not get access to the users credit card number. (Englund, 2015)

4.6.3 Spam

Another social aspect for providers of MPPs to consider is the balance between customer value and customer spam – a balance towards integrity. The connection used for enabling MPPs could for instance be used to send notifications to users, which could be of great value to the user, or irritate the user. (Henning, 2014)

4.6.4 Behaviour

One social challenge for MPPs is the fact that it challenges a social behaviour, both in the direct way of making a payment (*e.g.* with cash or card) but also in the way the both consumers and merchants relate to money (*e.g.* the visibility with cash) (BCG, 2016). PwC (2016) also found that consumers are especially reluctant to change their habits when it comes to payments.

4.7 Laws and Politics

There are many laws that affect the MPP market, and especially the purchasing process, *e.g.* Swedish Commercial Legislation (Swe.: *Konsumentköplagen*) in Sweden. Most recent, a pro-mobile-payment regulation in Europe have been approved (BCG, 2015a). An article analysing the legal framework for MPPs in the U.S., from The Pew Charitable Trust (2016), found 15 laws that MPP solutions must follow (Mobile Payments, 2016).

A new regulation in Europe, starting November 2017, is described as making it easier, and still safe, for new solutions and innovations to make use of banking transaction, not having to use *e.g.* MasterCard or VISA for making a transaction (Mobile Payments Today, 2016).

Regarding political aspects, references could be made to what happened to Über in France during 2016. Über, a platform for cab drivers and consumers disrupting the cab industry, was banned in France and Germany due to for example letting drivers that have not been licensed by the state drive customers (Davies, 2016).

5 Results

Presented below are the results from the focus groups with consumers; the literature study regarding consumers and mobile proximity payments (MPP); the interviews with merchants; and the literature study regarding merchants view on MPP. A summary of the findings regarding both consumers and merchants is found for consumers after the results from the focus groups and literature study is presented; and for the merchant after the results from the interviews and literature study, see the figure below for an overview.

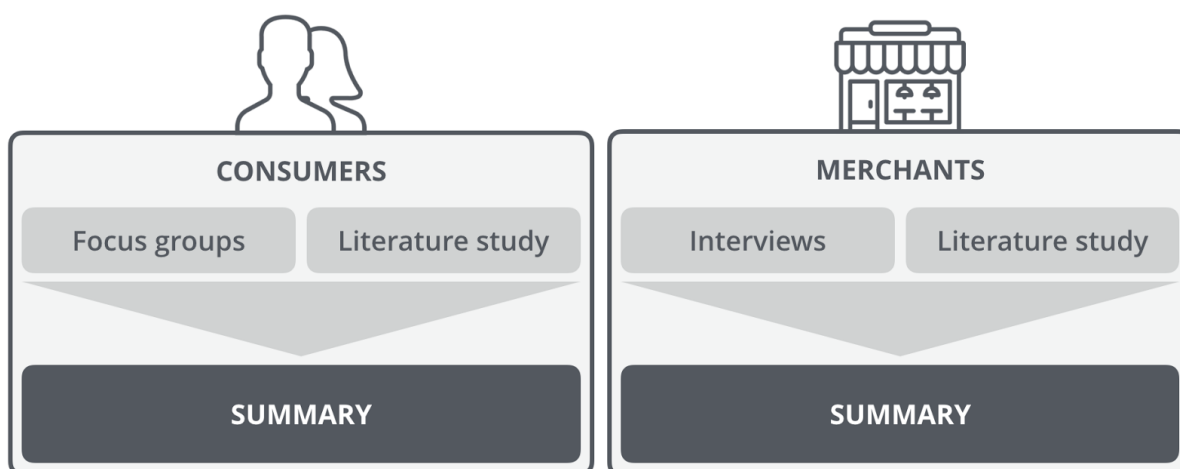


Figure 20. Overview of how the results are presented, first the results from focus groups with consumers and the literature study regarding consumer needs followed by a summary; and then results from interviews with merchants and the literature study regarding merchant needs followed by a summary.

5.1 Focus Group: Consumers

The results from the focus group interview is presented below. The interview covered three different areas: knowledge of MPP solutions, reasons of using MPP solutions, and reasons for scepticism about MPP solutions. Different situations for using MPPs were also covered: at a market, a clothing store, a bar/night club, and a restaurant. Finally, the most *Critical Success Factors* (CSF) for adopting MPPs were discussed and identified as:

- Trust;
- Convenience; and
- Availability/Merchant adoption.

5.1.1 Knowledge of Mobile Proximity Payment Solutions

Although all participants reported using card payments as their main payment method, they had all used their smartphones to pay on at least one previous occasion. The most common way of

paying with their phones was through the application Swish, a widespread Swedish payment solution, which can be used for both peer-to-peer payments and for commercial payments. No other MPP solution had been tried by any participant. Payment with Swish had occurred in various different situations, including at a market, at a gym, and at a lunch restaurant. All participants were generally satisfied with their, however brief, MPP experience.

Concerning other MPP solutions and technologies, knowledge was in general poor. Participants had heard of Apple Pay, Android Pay, and QR codes but only one knew about iBeacon (BLE technology), and no one knew about the other solutions. Most participants knew very little about the underlying technologies behind the solutions. Therefore, there was some scepticism about whether MPP solutions can deliver benefits without technical issues.

5.1.2 Reasons for Using Mobile Proximity Payment Solutions

The participants were generally positive towards using MPPs, with some scepticism regarding security and whether the potential benefits can be realised. Two main categories of reasons were expressed: solving problems with current payment solutions, and adding features that enhance the payment experience. The main problems with current payment solutions (mainly cash and card) were the following:

- Always carrying a wallet
- Time consuming
- Queuing
- Handling physical receipts

The participants agreed that all of the problems above could be reduced by using MPPs, however there was some scepticism about its ability to reduce queues and speed up the payment procedure. Additional features that could enhance the payment experience that were mentioned are presented below:

- Ability to see menu items on your smartphone
- Ability to order at the table and not by the counter (for restaurants and bars)
- Electronic receipts that could be automatically processed for better overview of personal finances
- Freeing up time for store workers, improving service
- "Smart" recommendations, offers and discounts
- Collecting all membership cards in the same application

It is clear that the benefits of MPPs vary depending on situation. For bars/nightclubs, the main benefit is to reduce queuing and speed up the time spent waiting on drinks. For restaurants, where payment is a small portion of the experience, the ability to see the menu on your smartphone might provide a larger benefit. Therefore, different MPP solutions might suit different situations.

5.1.3 Reasons for Being Sceptical About Mobile Proximity Payment Solutions

Although the focus group participants were generally positive towards MPPs, scepticism made most of them want to wait before switching from their current payment methods. The scepticism can be divided into two areas: regarding MPPs ability to solve problems with the current methods, and regarding problems that are specific to using MPPs. Of the previously mentioned problems with current methods, the scepticism was mostly targeted at MPPs ability to shorten queues and reduce time, but also regarding the need of a wallet:

- For solutions that include a counter as point-of-sale, the queue will remain and paying with your phone will take approximately the same amount of time; and
- You will still have to carry your wallet with you until most places accept MPPs.

Scepticism that is specific for MPP solutions:

- Technical problems
 - Connectivity
 - Fear of double paying
 - Battery consumption (smartphone “dies”)
- Security
 - Feels less secure unless backed by banks/big companies/government
 - Fear of someone else paying with their phones in the case of theft
 - Solutions are not proven to be secure: participants wanted to see other people use it successfully before adopting
 - Verification: participants want a verification that the payment is sent to the correct recipient, with the correct amount, and that the payment was successful
- Inconvenience
 - Having multiple applications for different stores
 - Feels like a “lock-in” if solution is store-specific
 - Having multiple applications for different payment situations
 - Solutions that involve pre-charging an account with money was very disliked
- Fear that one might consume more than planned if it is too easy to pay with mobile
- Less personal service if you order with your phone and thus less suitable for expensive restaurants

Again, the benefits of MPPs are very context-dependent. For some situations, MPPs provide many benefits, while in other situations they are fewer.

5.1.4 Advantages and Disadvantages of Specific Mobile Proximity Payment Solutions

For the specific solutions that were discussed, advantages and disadvantages are presented below, along with a short description of the solution. Advantages and disadvantages mentioned above are still applicable to the specific solutions but are omitted for sake of clarity and brevity.

Table 4. Overview of different technologies/services for mobile proximity payments.

Solution	Explanation	Advantages	Disadvantages
Swish	<i>Sending payments to cell phone number that is linked to bank account</i>	Reduces queues	Verification that payment is received to the correct recipient Inconvenient to manually enter phone number
NFC	<i>Touching cell phone against terminal</i>	Fast and easy	No queue reduction
MST	<i>Touching cell phone against terminal</i>	Fast and easy	No queue reduction
QR	<i>Pre-charging an app with money, scanning the app at counter</i>	Faster payment	Tying up money Inconvenient Feels like a “lock-in”
BLE	<i>Medium-distance wireless connection between phone and terminal</i>	Order from distance Reduces queues	Benefits are limited to certain situations

5.1.5 Factors that are Required for the Adoption of Mobile Proximity Payments

In the last part of the focus group, participants were asked to think through the previous discussions and choose the factors that matters most for their own adoption of MPPs. These factors were then discussed in depth to gain understanding of what they specifically mean:

5.1.5.1 Trust

- Being backed/guaranteed by a trusted institution (*e.g.* banks, big trusted companies, the government)
- Personal locks to prevent others from paying with your cell phone (*e.g.* passcode, fingerprint lock, etc)
- Verifications of recipient, amount, and confirmation of successful payment
- Observability through seeing friends using the solution provides a feeling of security

5.1.5.2 Convenience

- Easy to use, intuitive design
- Few steps involved

- Automatic context adoption for different situations: it should be as easy to order and pay as it is to just pay

5.1.5.3 Availability/merchant adoption

- Available in a wide range of different stores
- Available in all stores of the same kind

5.1.6 Incentives for Using Mobile Proximity Payments

Apart from these factors which are critical for the adoption of MPPs, incentives were also discussed. All participants were positive towards general discounts and membership benefits and reported it would strongly influence them to use MPPs. Some reported that they were more interested in extra features, such as having all your membership cards in the same application, or getting a better overview of their personal finances, rather than solving problems with current payment methods. This gives us another CSF:

5.1.6.1 Added value

- Discounts, digital memberships, loyalty programmes
- Personalized recommendations
- Overview of personal finances
- Queue reduction

5.2 Literature Study: Consumers

Presented below is a summary of a literature study regarding consumer and MPPs. The first section provides findings of important consumer needs and the second part consumer challenges regarding MPPs.

5.2.1 Consumer Needs

Identified consumer needs from literature are presented in the following chapters. The most significant, found in literature, are in independent order:

- (i) Compelling value proposition;
- (ii) Large merchant acceptance;
- (iii) Convenience –"As easy as cash"; and
- (iv) Data Privacy and Security.

5.2.1.1 Compelling Value Proposition

When enabling consumers to use their smartphone for in-store purchases, a great opportunity of enhanced and augmented value could be added, and have to be added for driving the growth

of MPPs. MPPs allows for the creation of distinctive value to both consumers and merchants (Oliveira *et al.*, 2015). As BCG (2016) concludes from a large survey regarding MPPs – “*It must be at least as easy as cash*”. This meaning that some of the present solutions for MPPs are not adding any value to the consumers, *e.g.* picking up your phone instead of a plastic card for making an in-store payment. Hence, an important factor – maybe the winning factor – is to understand consumer “pain”, needs, regarding the payment process and bring a compelling value proposition as a solution. (BCG, 2016; McKinsey, 2015; PwC, 2016; and PwC, 2012)

“Paying with a smartphone still needs to offer clear added value to be able to invoke adoption.”

Quote from Kerviler *et al.*'s (2015) study of adoption of mobile proximity payments.

Oliveira *et al.* (2015) found that consumers today do not see the value, or advantages, of MPPs to even being willing to try one.

Example of a compelling value proposition: *An in-store payment solution that reduces, or eliminates, queueing time for consumers.*

5.2.1.2 Large Merchant Acceptance

Another important success factor is that a solution has to be integrated at as many merchants as possible – preferably all. A solution that is isolated to a specific store will have a hard time to gain traction (grow), as the case with a credit card that could only be used at one store. To gain a large merchant acceptance, partnership is essential, *e.g.* with a payment terminal provider. In a survey presented from BCG (2016) the second most important factor for using digital payments was to be able to make payments anywhere. (BCG, 2016; McKinsey, 2015)

Example of a large merchant acceptance: *With the use of MST, a consumer with an MST ready smartphone could make mobile proximity payments at all payment terminals with a magnetic stripe function.*

5.2.1.3 Convenience – “As easy as cash”

In a survey presented from BCG (2016) the most important factor for using digital payments was to make the payment process as simple and fast as possible – “One-click payments”. McKinsey (2015) and PwC (2015) also concludes that present mobile proximity solutions demands more effort from the consumer than currently favored payments methods. McKinsey (2016) found convenience to be the leading factor when it comes to increasing consumer adoption.

Schiertz *et al.* (2009) found, in their empirical study of trying to understand consumer acceptance of MPP services, that not only must the solution be easy to use, a new MPP must also reconcile with existing behavioural patterns – making it easier for users to understand and start using them. (Schiertz *et al.*, 2009)

5.2.1.4 Data Privacy and Security Concerns

As stated in the background, both BCG (2015a) and PwC (2012, 2015) from their survey found “Data privacy and Security” as the most significant barriers to Digital Adoption. Oliveira *et al.* (2015) in their study discuss the different technologies security issues. One could argue that depending on the length from the terminal that the user could make an MPP, the riskier the payment. However, the real security is not in the connection, since the actual payment is transferred through many security layers online.

PwC (2015) found that there is an important balance between providing personalized and targeted *e.g.* offers to consumers and the privacy rights of consumers. And in their latest report regarding MPP, PwC (2016) once again found that security regarding consumer information is very important.

5.2.1.5 Onboarding: Reduce Entry Barriers for Consumers

There are high demands on new software applications, *e.g.* when it comes to reducing entry barriers for consumers. It must be easy to try/test an MPP solution, hence not having large entry barriers. (BCG, 2016)

5.2.1.6 Personal and Real-time Offers

One driver for MPPs, *e.g.* for the Starbucks Application, is through providing consumers with personal and real-time offers. BCG (2016) found that providers must mine consumer data to both build additional revenue streams but also to let consumers make use of personal and real-time offers. BCG (2016) concludes that the payment process could be driving consumption, and not the other way around, through providing consumers with offers in the payment process making the consumer consume more. (BCG, 2016)

Example: *When using a mobile proximity payment solution to pay for a coffee, this could be registered and the next time the same user is paying for a coffee they could get a discount.*

5.2.1.7 Speed

The payment process today is in some cases seen as a time demanding activity. MPPs must address this issue and be faster, not slower, than present solutions. (BCG, 2015b; BCG, 2016)

5.2.1.8 Extended Functionality

Some examples of wanted extended functionality:

- Extend the basic payment capabilities to being able to include *e.g.* ID cards, loyalty cards and electronic fare collection on public transit.“ (McKinsey, 2015);
- Ability to monitor user spending (BCG, 2015b); and
- Ability to use MPP solutions at ATMs (BCG, 2015b).

5.2.2 Consumer Challenges

BCG (2016) researched what key barriers there are for consumers to adopt MPPs and the reasons for consumers to stop using MPPs. Their results are shown below.

5.2.2.1 Key Barriers for Adoption

From BCG (2016), a large survey, they found the following barriers to be most important when it comes to consumers adoption of MPP solutions:

- Habit to use cash (68%);
- Complexity of using (55%);
- Lack of compelling value proposition (48%);
- Inertia of Non-cash methods (33%);
- Offers from other methods (29%);
- Fraud (27%); and
- Reach (16%).

5.2.2.2 Reason to Stop Using Mobile Proximity Payments

In the same report, BCG (2016), they found the following most important reasons for consumers to stop using MPPs:

- Need to remember multiple passwords & usernames (47%);
- Not everyone accepts this payment (44%);
- Possibility for technical/human mistake (43%);
- Not enough balance (42%);
- Likelihood of fraud (29%); and
- Hidden charges (10%).

5.2.2.3 Multi-sided Platform

Another challenge for MPPs solutions is the challenge for all multi-sided platforms: Chicken or egg? What comes first, consumers or merchants? The merchants want to implement the solutions with the largest consumer base and vice versa. (PwC, 2016)

5.3 Summary: Literature Study and Focus Groups with Consumers

From the focus groups, the most discussed and important factors for MPPs were: trust; convenience and availability/merchant adoption. From the literature, the same were found to be most important. However, from both the focus groups and the literature – it was clear that MPPs today lack a clear and compelling value proposition (added value). In summary, the found *Critical Success Factors* (CSF) regarding consumers and MPPs are in independent order:

- Trust;
- Convenience;
- Added Value; and
- Merchant adoption.

5.4 Interviews with Merchants

The results from interviews with three merchants (one large coffee chain store; one small-medium sized grocery store; and one small retail store) is presented below. Three interviews were held and covered six different areas:

- knowledge of in-store mobile proximity payment solutions;
- reasons for letting consumers make mobile proximity payments;
- reasons for being sceptical about mobile proximity payment solutions;
- advantages and disadvantages of specific known solutions;
- factors that are required for the adoption of mobile proximity payments; and
- incentives for using mobile proximity payments.

5.4.1 Knowledge of Mobile Proximity Payment Solutions

The overall knowledge of MPP solutions from the interviews with merchants were very dependent on technology or service. Two out of three had one or more solutions for the consumer to make MPPs (Swish and SEQR, an QR code based payment solution). When it came to new solutions, using NFC, MST or BLE (*e.g.* Beacons) – they all had heard about Apple Pay (NFC), but not the other services. The common thought was that MPPs will become more popular soon but there is no customer pull at the moment, no one is asking about it (excluding Swish).

None of the merchants had tried or seen someone use some of the main technologies discussed in this paper (NFC, MST and BLE). However, the interviews are still important since these are the technologies that surely will be provided to them and therefore will affect their daily business.

5.4.2 Reasons for Letting Consumers Make Mobile Proximity Payments

The main reason for merchants to let consumers make MPPs was if there first and most firmly would be a customer pull, that someone (more than one) would ask about it. However, reaching beyond customer pull the most urgent reasons could be summarized to:

- Making the payment process, hence the business, more efficient; and
- Adding value to their customers by reducing queue time.



“People really dislike standing in line and I have people everyday not choosing my lunch because of the long queue – a missed income opportunity”

Quote from an interview (Merchant 1).

Another reason would be if it was possible to include some kind of loyalty program into the payment process in a smooth way. Two of the merchants had tried their own loyalty program but had a hard time making it efficient for both their business and consumer. Entangled with this, they also wished that a possible MPP solution could provide data on their consumers giving them the possibility to take better business actions.

5.4.3 Reasons for Being Sceptical About Mobile Proximity Payment Solutions

One common and important aspect that all interview merchants were keen about was the fact that new solutions and routines are hard to implement and teach their staff. It takes time, and time is expensive. Therefore, there has to be a clear value proposition that is in line with daily needs and pains. One of them lets their customers pay with SEQR, but neither the staff nor the customers now how it works, or asks about it. Hence, SEQR has been an example of a new MPP solution that took both time and money to implement but did not carry any fruit (so far). This has off course made this merchant quite pessimistic about new solutions.

Another reason for being sceptical is the fact that they, so far, have not seen or been presented with a solution that has a clear value proposition. Together with the fact that it is costly and time demanding, this makes the merchants quite sceptical about MPPs. They also presented a fear of

implementing a solution that does not work for all customers, *e.g.* a phone without internet connection.

In summary, reasons for being sceptical about MPP solutions:

- New routines takes time to learn and teach to the staff;
- No clear value proposition;
- Costly and time demanding to implement; and
- Fear of implementing a solution that does not attract all consumers.



“The most important factor is that the payment process becomes a lot faster. A new solution can not be slower or more complex — neither for us nor our guests!”

Quote from an interview (Merchant 1).

5.4.4 Advantages and Disadvantages of Specific Known Solutions

Except cash and credit card, the known solutions were Swish (a Swedish payment solution where a user links their phone number to their bank account) and SEQR (a QR-code based MPP solution).

5.4.4.1 Cash

The viewpoint on giving guests the possibility to pay with cash differed between the interviewed merchants, from being viewed as an augmented service, to disallowing the use of cash and receiving almost no complaints. The common the view was however that it is becoming less and less common for guest to pay with cash. Cash was also seen as a risk regarding the possibility of being robbed. One interesting aspect was that one merchant expressed that internal stealing was a big issue. The same merchant, also concluded that working with food and at the same time handling cash is a large issue since the handling of cash requires the merchant to wash their hands more often, which is time consuming. In summary, their view on use of cash as a payment solution:

- Uncommon for guest to use cash;
- Higher risk (*e.g.* due to external robbery and internal ullage);
- Expensive, since time consuming when it *e.g.* comes to calculate daily statements; and
- Inconvenient when working with food.

5.4.4.2 Credit Card

The use of credit card as a payment solution is the most common payment solution for the merchants. They describe it as something every guest, as well as all personnel, are familiar with. The only disadvantages with credit card payments is the fact that it could feel quite time demanding during stressful hours, where the credit card terminal becomes a bottleneck in the process.



“Everyone knows how to pay with a credit card!”

Quote from an interview (Merchant 3).

5.4.4.3 Swish

Two out of three interview merchants let their guest pay with Swish. However, neither of them advertise the possibility to their guest. They describe Swish as:

- Time consuming, since the consumer must input their long merchant-specific number;
- Too expensive compared to a credit card transaction; and
- Hard to follow if the transaction have been confirmed (the only way is to look at the guest’s smartphone).



“We have it [Swish], but it is not good enough to be marketed to our guests!”

Quote from an interview (Merchant 2).

5.4.4.4 SEQR (QR code)

One of the three interview merchants let their guests pay with SEQR (QR code based MPP solution). However, this merchant expressed that neither them nor their guest see any value since it is not easier than paying with a credit card. The merchant also expressed the fact that SEQR had been tough to teach to the staff.

5.4.5 Factors that are Required for the Adoption of Mobile Proximity Payments

If choosing to implement an MPP solution, the following factors would be in direct consideration:

- Costs (start-up cost; transaction cost; costs of service *etc.*); and
- Education for the staff.

Other than these, required factors for the solution are to:

- be simple and fast; and
- have a large consumer base (*e.g.* not excluding Samsung users).

However, as stated above – there is no demand from their customers at the moment and there is no good enough value proposition for the merchants at this point to start asking customers if they want to make MPPs.

5.4.6 Incentives for Providing Mobile Proximity Payments

When asked about overall challenges, the following were commonly mentioned:

- (i) Improve efficiency
- (ii) Plan the amount of staff needed
- (iii) Stochastic long queue, often during lunch for the cafées
- (iv) Educate and improve daily routines

None of the mentioned above are directly affected by the payment process but (i) and (iii) could be included in a potential value proposition for an MPP solution. The overall view, regarding incentives for providing MPPs, was that a consumer demand would make MPP a priority.



“It would be great if our staff, during times with long queue, could focus on service and reducing the queue instead of handling payments.”

Quote from an interview (Merchant 1).

5.4.7 Overview of Results from Interview with Merchant

The overall results from the interviews with merchants could be summarized to:

- (i) The cost of the solution is essential;
- (ii) The solution must be easier (or at least as easy), faster and less complex than cash or card;
- (iii) There is no customer pull, hence no rigorous preparation for mobile proximity payments has started; and
- (iv) The solution must add new value (to both the merchant and the consumer) solving existing problems with *e.g.* long time for making a payment.

5.5 Literature Study: Merchants

Presented below is a summary of a literature study regarding merchants enabling MPPs.

5.5.1 Merchant Needs

From literature, the following merchant needs were found to be most significant (independent order):

- Low-cost;
- Convenience;
- Added value; and
- Consumer adoption.

5.5.1.1 Added Value

Both BCG (2016) and PwC (2015) found that one main need when it comes to merchants providing MPP solutions is the fact that there is no clear benefit over other payment methods – no clear value proposition. In Hayashi and Bradford (2014) report, interviewing 20 large and medium sized merchants, found that the added value for a merchant could indirectly be the added value to the consumer.

5.5.1.2 Low-cost

A clear and very important aspect for merchants is the cost. PwC (2012 and 2015) find that the cost aspect is very important for all merchants, both the setup cost and transaction cost. An MPP solution that could reduce the cost for the merchant would be a key motivation for merchants (Hayashi and Bradford, 2014).

5.5.1.3 Convenience

When it comes to new solutions, one key need is that they are convenient. For merchants, BCG (2016) found that speed is very important, *e.g.* transactional speed, and for both the merchant and the user the convenience of MPPs will be compared against both cash and credit card transactions. Possible technical issues is one main barrier for merchants to start enabling MPPs (Ibid.). PwC (2016) also concludes the importance of convenience, both when used and when implemented – the solution must be both easy to use and implement. PwC (2015) found that convenience is as important for users as for merchants.

5.5.1.4 Consumer Adoption

BCG (2016) found in their survey that one of the most important reasons for merchants to enable MPPs is if users started asking for it. Today, there is no real customer pull – hence, the merchants are not interested in offering MPPs (Ibid.). When choosing an MPP solution, the merchant will have to evaluate which solution has the most users – or provide them all (Hayashi and Bradford, 2014). This is a new challenge, since present card terminals are more general (i.e. accept many different credit cards) than the MPPs solutions offered today.

5.5.2 Merchant Challenges

BCG (2016) survey with merchants identified triggers for merchants to provide MPPs. They found the following triggers to be most important:

- **Convenience over cash (84%):** Cash is expensive and creates a larger risk than *e.g.* credit card payments;
- **24X7 access (77%):** 24-hour access to the financial transactions;
- **Increase sales (75%):** MPPs as a driving force for consumption, *e.g.* through personalized offers to consumers calculated from the MPPs;
- **Competitive advantages (37%):** Adding value through MPPs could create a competitive advantage;
- **Marketing (23%):** More and better data could provide better marketing possibilities as well as the providing of MPPs could by itself be used as marketing; and
- **Customers use it (34%):** A consumer pull for MPPs. (BCG, 2016)

5.6 Summary: Literature Study and Interview with Merchants

The results from both the interviews and the literature study showed the same result, summarized to four major CSFs for merchants to enable MPPs:

- Low-costs;
- Convenience;
- Added Value; and
- Consumer adoption.

6 Discussion

The following discussion is structured according to the research questions stated in the “Purpose”:

1. **What are the *Critical Success Factors* for a *Mobile Proximity Payment Solution*?**
 - a. Who are the key stakeholders on the mobile proximity payment market?
 - b. What are the *Critical Success Factors* for acceptance among these stakeholders?
 - c. What other driving forces from the macro environment affect the acceptance of mobile proximity payments?

2. **Which enabling technology is most likely to become a part of the dominant solution?**
 - a. What are the distinctive technologies that enable mobile proximity payment solutions?
 - b. How well suited are these technologies to fulfil the *Critical Success Factors* established in question 1?

3. **What will be the future of the mobile proximity payments market?**

Critical Success Factors. Firstly, question 1a-1c is analysed and discussed under chapter “6.1 Stakeholders and Critical Success Factors”. In the first part, stakeholders are discussed, both individually and their relationships in the ecosystem, and presented through a *Stakeholder map* (with regard to their Interest and Power). Then, *Critical Success Factors* (CSF) for consumers, merchants and the overall market are discussed. The goal of this chapter is to analyse, discuss and identify CSFs and create a framework representing the relationships between key stakeholders and the most important direct and indirect CSFs for mobile proximity payments (MPP).

Technologies and Critical Success Factors. Secondly, question 2a is analysed and discussed under chapter “6.2 Mobile Payments Technologies and Critical Success Factors”. The first section of this chapter analyses and discuss technical aspects of the main technologies that enables MPPs. Later, relevant CSFs, from the previous chapter, for the technologies are compared against technology specific capabilities. The relationship between technology specific capabilities and CSFs are analysed, discussed and displayed through *Radar charts* (also called *Spider chart/diagram*). Finally, a summary is presented showing how well the technologies fulfil the identified CSFs.

Future (Road map). Thirdly, the analysis is concluded with a speculative discussion containing predictions, based on previous analysis, about the future of the market for MPPs (“6.3 Future (Road map) for mobile proximity payments”). *What is the future of mobile proximity payments?*

Which will be the dominant technology? Who will provide it? How will it change the way we make payments and consume goods and services? What changes will we see on the market?

6.1 Stakeholders and Critical Success Factors

To provide an overview of the MPP landscape, stakeholders, and stakeholder specific and non-specific CSFs are discussed in the following chapter.

6.1.1 Stakeholders

As mentioned in the Background, there are many stakeholders for the MPP market. To provide an overview for further discussion, the main stakeholders for the MPP market are presented below in Table 5.

Table 5. Stakeholders on the mobile proximity payment market.

Stakeholder	Description	Examples
Consumers	<i>Smartphone users who want to pay for goods in stores</i>	<ul style="list-style-type: none"> • All citizens
Merchants	<i>Stores that sell goods</i>	<ul style="list-style-type: none"> • Grocery stores • Clothing stores • Bars/Nightclubs • Restaurants • Market vendors
Smartphone producers	<i>Companies that produce smartphones</i>	<ul style="list-style-type: none"> • Apple • Samsung • Google
Banks/financial institutions	<i>Companies that provide financial services</i>	<ul style="list-style-type: none"> • Banks • Debt collection companies
Telecom companies	<i>Companies that provide network coverage and/or billing options as e.g. carrier billing</i>	<ul style="list-style-type: none"> • Verizon • AT&T • Telenor • Vodafone
Credit card providers	<i>Companies that provide debit and/or credit cards</i>	<ul style="list-style-type: none"> • VISA • Mastercard • American Express
Terminal providers	<i>Companies that provide (payment) terminals</i>	<ul style="list-style-type: none"> • Babs Paylink
Software (application) producers	<i>Companies that develop applications for smartphones</i>	<ul style="list-style-type: none"> • Google • Apple • Tech startups
Governmental institutions	<i>Institutions with legal and political power</i>	<ul style="list-style-type: none"> • Government • Political parties • Legal system

- **Consumers.** One of the two main stakeholder groups (together with merchants) that are *users* of MPP solutions. Since they are users and will benefit most from new innovations, consumers have a high interest in MPPs. Individually their power is very weak, but as a group they determine the winning solutions.
- **Merchants.** The second stakeholder group that are *users* of MPP solutions. They also have a high interest in MPPs, benefitting through lower costs, faster service and other benefits. The different sizes of merchants entail that some have a lot of power, while others have no power at all. Bigger chain stores could play a large role through partnerships with other stakeholders.
- **Smartphone producers.** Smartphone producers are the primary *providers* of MPP solutions. They control the underlying technologies that can be used for mobile transactions, as well as software solutions. MPPs represents an extremely big opportunity, opening up a very large new potential revenue stream. Both their interest and power is therefore very high. It is likely that the smartphone producers will be the leaders of the MPP development, entering partnerships with other stakeholders and designing new solutions.
- **Banks.** A vital part of MPPs is the underlying transaction system, which is provided by banks. Since the number of transactions that will be performed with MPPs in the future is likely very large, banks and other financial institutions have a strong interest in MPPs. Since they are such a vital part of the ecosystem, and their sizes are usually large, they have much power. Therefore, MPP solutions providers need to have good relationships with banks in order to succeed.
- **Telecom companies.** Telecom companies provide another vital part of the MPP ecosystem: the network infrastructure. They also have their own payment solutions through, *e.g.* carrier billing. This means that they have a strong interest, although the potential earnings for telecom companies are probably smaller than for the previously mentioned actors. Their power is also smaller, since their role in the ecosystem is more limited.
- **Credit card providers.** MPPs represent a significant threat to traditional payment methods. Therefore, credit card providers are one of the stakeholders that might have a negative interest in MPPs. If they cannot adapt to the changing environment, they risk losing a large portion of their revenue. Therefore, it is likely that we see either competitive responses (*e.g.* transaction fee reductions) or an attempt to enter the MPPs

market (*e.g.* through partnerships). Their power is high now, but will likely shrink as MPPs become more common.

- **Terminal providers.** Terminal providers are also threatened by MPPs, as some technologies only require another smartphone to receive payments. However, most technologies still make use of some sort of terminal. As with credit card providers, terminal providers need to adapt to the changing landscape. It is however unlikely that they could influence MPPs in a significant way, why their power is considered to be low.
- **Software (application) producers.** Apart from the technologies that are needed for MPPs, software in the form of mobile apps are another part of the MPP solutions. Most smartphone producers develop their own applications, but an increasing amount of tech companies nowadays develop mobile applications. Since they are generally smaller, they have less power to influence the development of MPPs. However, innovations often start with these smaller companies, and are subsequently incorporated into the bigger smartphone companies through acquisitions. Therefore, one possibility is that the best software solution for MPPs will be found by one of these companies.
- **Governmental institutions.** Governmental institutions can significantly influence the development of MPP solutions. Since it is concerned with financial transactions, regulations can play a big role in the success of different solutions. There are also many benefits for governments, including a digitalization of transactions, making it easier to gather information. The societal costs of cash handling and thefts of cash is also a problem that could be reduced with an increase in MPPs.

The stakeholders are presented below in a stakeholder mapping influence-power diagram, which illustrates their relation with regards to power and interest.

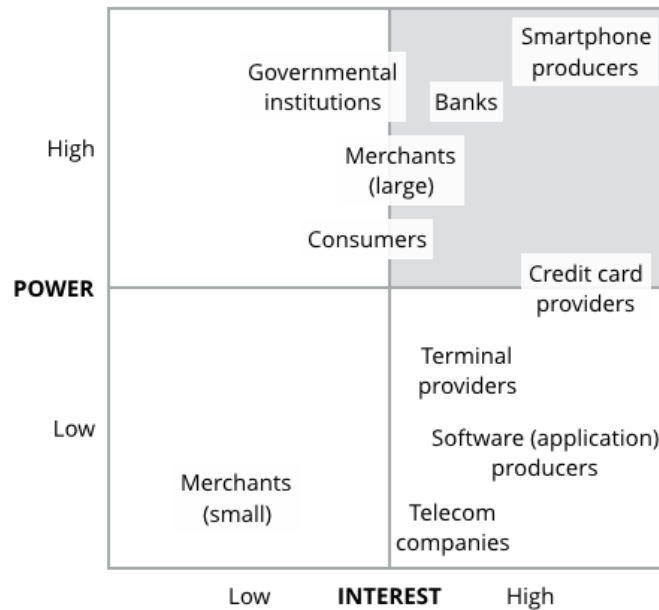


Figure 21. Stakeholder mapping of the relevant stakeholders for the mobile proximity payment market.

As shown above, smartphone producers have the most interest and power of all stakeholders. Banks and larger merchants are close seconds on the power dimension, due to their vital roles in the success of MPPs. The government has a lot of legal power, and relatively high interest. Credit card companies, who control the main competing payment method also have a high interest, but less power as there are ways to make transactions without their involvement. While consumers individually have little to no power, their needs and preferences determine how a successful solution should be designed. Other stakeholders that are part of the infrastructure (terminal providers, software producers and telecom companies) have a high interest but are not large or influential enough to affect the market significantly. Last, the small merchants are relatively uninterested in new technologies, focusing mostly on costs and additional training required rather than the potential benefits. They are also small, giving them virtually no power at all.

6.1.2 Critical Success Factors

This section is focused on the CSFs for the acceptance of MPP solutions. It starts with the success factors that are specific to the solution, i.e. for the adoption among the two key stakeholders *consumers* and *merchants*. What is required of a solution in order to satisfy the needs of the main *users* of MPPs? The analysis will then move on to what success factors are needed for the successful delivery of the solution, i.e. in terms of infrastructure and aspects that are related to the other stakeholders and the macroenvironment at large.

6.1.2.1 Consumers

The main findings for consumers are summarized below in Table 6, in independent order.

Table 6. Critical Success Factors (CSF) for Consumer Adoption (see “Results”).

CSF	Description	Examples
Trust	<i>Trusting that transactions are correct and that the money is safe against theft, bankruptcies, etc.</i>	<ul style="list-style-type: none"> • Security features such as passwords • Verification of transactions • Trusted institutions guarantee money • Other people use it • Privacy
Convenience	<i>Transactions are fast and easy</i>	<ul style="list-style-type: none"> • Easy to use • Intuitive design • Few clicks • Fast transactions
Added value	<i>Extra features or benefits</i>	<ul style="list-style-type: none"> • Queue reduction • Personalized recommendations • Simplified overview of private finances • Discounts and loyalty programmes
Merchant adoption	<i>Availability in stores</i>	<ul style="list-style-type: none"> • Available in many different kinds of stores • Available in many stores of the same kind • Geographically widespread

Trust

Since MPPs is a new phenomenon, consumers are reluctant to be the first to try it. It is therefore important to reduce the perceived risks. There are a number of ways of doing this, including security features on the user’s smartphone (*e.g.* password protection, fingerprint verification, *etc.*); verifications of the recipient, amount of money and confirmation of successful transactions; and guaranteeing the user’s money through trusted institutions. A successful solution needs to be protected against fraud and theft, as reports about this would seriously dampen interest of MPPs. It is also important that the user feels trust toward the solution provider, which could be achieved through a long term customer relationship, or through observing other people that use the service. The last point can be related to *Rogers’ Five Factors* theory (see Theory, page 31) in which *observability* is a factor for successful adoption of new innovations. Another factor from the same theory is *trialability*, meaning the ability to try a new innovation in a convenient, low-risk setting. Allowing people to try the solution in a low-commitment way (*e.g.* without providing bank information) could be used to make consumers more comfortable with using MPPs. Lastly, privacy concerns are still important for many people, and the amount of personal information that could be collected through MPP

technology is frighteningly large to some. It is essential that this is resolved in a satisfactory way for all consumers. A leak of private data would be a public relations (PR) disaster that could set back adoption significantly.

Convenience

Traditional payment methods (*e.g.* cash and credit cards) are fast and easy to use, and work relatively well. In order to make consumers want to change their current behaviour, it is vital that MPPs do not represent a drawback in terms of convenience. It should be easy to use, easy to learn how to use, and ideally take less time than the current payment methods. Intuitive and user-friendly design is therefore very important. This is especially true for certain situations, such as paying for lunch at a fast food place, or ordering drinks in the bar. However, a successful solution must balance *convenience* and *security*: passwords for example increase the time of the transaction but might be required for consumers to feel safe. The convenience factor is related to *simplicity* and *compatibility* in Rogers' Five Factors. A convenient solution should be easy to use but also conform to the user's expectations of how a payment is made.

Added value

Since traditional forms of payment work relatively well today, there is a big question of why consumers would even bother with MPPs. If MPPs cannot offer any relative advantage to other alternatives, adoption will be very slow. There are however many potential benefits, including queue reduction (mostly for solutions that allow consumers to order and pay from larger distances); personalized recommendations, discounts and loyalty programmes; and other services such as simplified personal finance. One way of increasing consumer adoption could be to give consumers a small amount to spend the first time they use the solution, without requiring them to connect their bank account. This would represent both an added value and a way of decreasing skepticism (see the first point, Trust). Added value is connected to *relative advantage* in Rogers' Five Factors theory, and as such is one of the most important factors for consumer adoption.

Merchant adoption

A fundamental challenge with MPPs is the multi-platform nature of the business model: both consumers and merchants are needed for

transactions to occur. The availability of stores that accept MPPs determines the possibilities of using MPPs, and a successful solution must therefore attract merchants and consumers alike. In other words, there are strong indirect network effects. One way to combat this problem could be to form partnerships/deals with chain stores, allowing for a fast spread to many stores at once. Another way is to make MPPs attractive in terms of the added benefits a merchant experiences, *e.g.* if a restaurant that allows MPPs can provide better service, this might put pressure on other restaurants to conform. Again, this is connected to *observability* in Rogers' Five Factors theory.

6.1.2.2 Merchants

As stated above, merchant adoption is very important for the success of MPPs. The CSFs for merchant adoption are presented below in Table 7, in independent order. They are on the whole similar to the factors for consumers, differing only in Trust, which is replaced with Costs for merchants.

Table 7. Critical Success Factors (CSF) for Merchant Adoption.

CSF	Description	Examples
Low-costs	<i>Cost of using mobile proximity payments</i>	<ul style="list-style-type: none"> ● Start-up costs (investment) ● Transaction fees ● Training of staff ● Service costs
Convenience	<i>Transactions are fast and easy</i>	<ul style="list-style-type: none"> ● Easy to use ● Easy to train staff ● Faster than current alternatives ● Fast transactions
Added value	<i>Extra features or benefits</i>	<ul style="list-style-type: none"> ● Efficiency (<i>e.g.</i>, queue reduction) ● Customer analysis ● Closer customer relationships
Consumer adoption	<i>Many customers use the solution</i>	<ul style="list-style-type: none"> ● Large number of customers who use the solution ● Most customers use the same solution

Low-cost

Merchants carry the transaction costs and are thus more sensitive to this factor than consumers. Since they mostly receive payments rather than make payments, they are less concerned with trust. Costs include the cost of installing/switching to MPPs, training of staff, transaction fees and service costs. It is important that the costs are similar or lower than the costs associated with credit cards and cash. In comparison to cash, MPPs fair well. Cash handling can be very

expensive, primarily for security reasons. One must also remember that MPPs will in the near future be an addition to rather than a replacement of the current payment methods.

Convenience

Many of the main benefits merchants get from MPPs are related to efficiency. A faster check-out, less queues, and digital receipts can free up time for better service, or serving more customers. A successful MPPs solution therefore needs to realize these time saving benefits. It needs to be fast and easy to use. In connection to costs, it also needs to be easy to learn how to use, in order to minimize time spent training staff.

Added value

Apart from potentially saving time and being more efficient, MPPs have the potential of delivering many other valuable features, mostly related to customer relationships. By connecting with the customer's smartphone, a business can develop a mutually beneficial relationship, for instance personalize communication; tailor offers and discounts; and receive requests or other up-to-date information about the customer's needs and preferences. This could give the customer a better customer experience, and potentially increase additional sales. Large amounts of customer data could be used to better plan staffing requirements, inventory and promotional campaigns. Loyalty programmes could be more efficiently implemented in comparison to today's membership cards that customers need to carry with them. The use of customer (big) data is likely one of the driving forces behind merchant adoption. The downside of this is privacy – many people feel uncomfortable with sharing personal information with companies. It is therefore important that MPPs solution providers handle this issue in a way that satisfies people with different privacy preferences.

Consumer adoption

As stated previously, the multi platform nature of the business requires both merchant and consumer adoption to grow in parallel. There are no incentives to implement MPP technology in a store unless the consumers who buy there are interested in using the technology. For this aspect, smartphone producers have a significant advantage over separate software developers, since they can “push” the technology with updates to the consumers. Consumers do not

buy smartphones primarily for the MPP technologies included, but instead for other features. A smartphone that includes payment technology lowers the barrier of testing, since consumers already have the technology in their pockets. However, different smartphones use different technologies, and merchants are unlikely to implement different payment methods unless the infrastructure is already in place. Therefore, the dominant solution (on the consumer side) is more likely to be implemented for merchants as well, i.e. there are strong indirect network effects.

6.1.2.3 Other Important Aspects

Except for the CSFs mentioned above regarding consumers and merchants, there are driving forces that affect the acceptance of MPPs. The discussed forces below are forces on a macro environment but some could also be seen as having implications on a micro environment:

- Digitalisation;
- Knowledge;
- Scale;
- Partnership; and
- Regulations.

Digitalisation

One significant driving force, as mentioned by *e.g.* BCG (2016), is the fact that the amount of smartphones connected to the internet around the world is increasing. Users are also using their smartphone more and more and several applications are being integrated, solving needs that previously were not conducted with a smartphone. Users are expecting more, consumer demands are increasing, and to be able to use their smartphone for almost everything is becoming a reality. Other than smartphones, more areas contributing to the MPP market are becoming “more” digital, *e.g.* the whole so called Shopping Journey. Also, the increasing amount of terminals accepting NFC-technology will also have a positive effect on the MPP market since two major solutions (Apple Pay and Android Pay) are based on this technology.

Knowledge

New innovations, as presented in the first step from the theory about “*The Innovation-Decision Process*” (Rogers, 2010), must provide knowledge to the users. The knowledge about MPPs in the overall payment market is very limited. The innovation around making in-store payments with a smartphone could be seen as a technology

push and not a customer pull — hence, the knowledge, especially the benefits, of MPPs must be communicated to the users to gain traction.

Scale

Another force that affect the mobile proximity market is the capabilities of the providers to scale, *e.g.* through their consumer base, brand and capital. Providers with a large consumer base will have it easier than those with not to launch their innovation and get immediate traction. For example, when launching Apple Pay in the U.S. Apple instantly (after user updates) made it possible for all iPhone users to use their new innovation. Since *Trust* is one of the biggest concerns for consumers regarding MPPs, a well-known brand will also determine the capabilities for a solution to scale.

Partnership

When launching entire software products, one the most important factors to have is a large online platform where consumers can access the innovation — *e.g.* launching a game application on App Store directly reaches a broad mass. However, the MPP solution is not entirely software based. It requires effort from many stakeholder, *e.g.* terminal providers through either new hardware or updates on present hardware. Therefore, a driving force will be how well partnerships will be accomplished to the best infrastructure. To reach a significant amount of merchants, partnerships with the larger ones could be necessary.

Regulations

As with all innovations, mainly disruptive innovations, regulations such as law and politics often have a way of being one step, or several steps, behind. However, recent years some regulations regarding MPPs have been beneficial for the market, *e.g.* with the enabling regulations in Europe opening up the possibility for producers to engage with the transaction API. However, the overall regulations are still a challenge for the market and some stakeholders, *e.g.* providers, should consider actions that could both speed up and provide more open regulations. When it comes to *e.g. Data Privacy*, regulations are rigorous, and when MPPs increase and more user data will be collected these regulations are expected to evolve. As regulations change, the MPP market will change — a positive regulation development will have positive effects on the market and vice versa.

Therefore, some stakeholders, such as providers, must be aware of how the development of regulations proceed.

Other factors/forces Some of the presented MPP solutions presented in this thesis are not as disruptive as other, compare “blipping your smartphone” with “in-pocket payments”. However, both solutions require a new behavioural pattern. Changing consumer behaviour is a challenge and there is no clear way of doing it. How will consumers respond and how fast will their behaviour of making in-store payments change? This leads us to the most common aspects regarding timing. Are consumers ready for this change or are MPPs ahead of its time? Whether the market is ready or not, this factor must be considered.

6.1.3 The Critical Success Factors Framework

The identified CSFs discussed above are presented below in the final framework that has been constructed for an overview of what determines the future of MPPs. It consists of three parts: CSFs for consumers, CSFs for merchants, and other driving forces that influence the adoption of MPPs. For the consumers and merchants, there are three main factors: added value, convenience, and trust or costs respectively. Since there are strong indirect network effects, merchant adoption influences consumer adoption and vice versa. The five main other driving forces are Regulations, Knowledge, Digitalisation, Partnerships, and Scale.

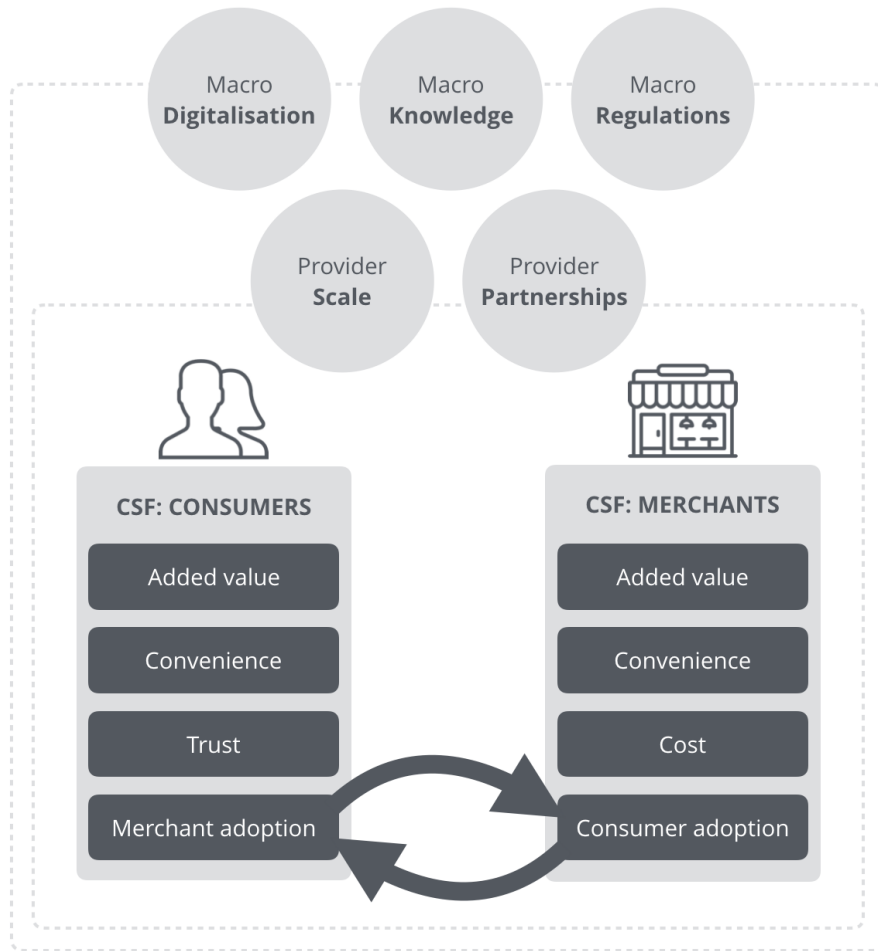


Figure 22. The *Critical Success Factors* (CSF) presented in the final framework that has been constructed for an overview of what determines the future of mobile proximity payments.

The presented CSF Framework can be used to evaluate different solutions as well as the solution providers' abilities to deliver the solutions. It can also be used to predict the future developments in the MPPs market, which will be covered in the last part of this discussion. Next, the CSF Framework is used to critically evaluate the different technologies with the goal of assessing the suitability of the respective technologies for different long and short term situations. This is then used to predict what technologies that will emerge as dominant solutions in the future.

6.2 Mobile Proximity Payment Technologies and Critical Success Factors

In this section the enabling technologies are first discussed and later evaluated and compared to the identified CSFs.

6.2.1 Enabling Technologies

As shown in the Background-section, the main enabling technologies for MPPs are:

- Bluetooth Low-energy (BLE; Beacons and iBeacon);
- Magnetic Secure Transmission (MST);
- Near Field Communication (NFC);
- Quick Response Code (QR-code); and
- Telecom solutions.

When evaluating the technologies there are many aspects to consider. In this section the technologies are evaluated from a technical point of view. Identified technical aspects (Security; Distance; Battery consumption; Availability; Speed; and Setup cost) are discussed below and an overview could be found in Table 8 at the end of this section.

Security

The security aspect for the technologies could be seen as equal for all of them since the real security features, such as confirming the payment with passcodes, TouchID or key chains could be used for all solutions. The technical solution enables connection between two devices, but in order to verify that it is the correct devices, online protocols are used, see Figure 23.

One could argue that a longer signal (discussed as “Distance” below) could implicate a less secure solution since a long signal easier could be caught/interrupted than a short signal. However, either way – the security features are managed through the cloud (online) for all technologies. One might also argue that QR codes and Telecom solutions are less secure since one could change the sign with the barcode or phone number that should be used, however – once again, security features online and confirmation functionality on the terminal overcome this challenge.

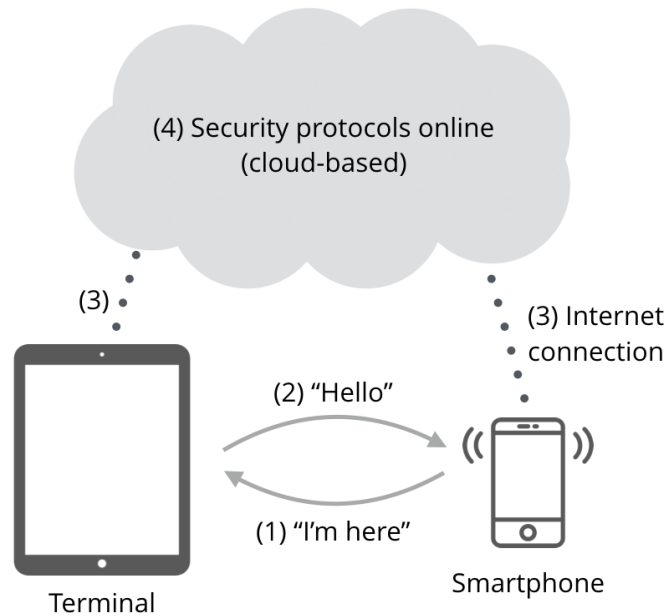


Figure 23. Overview of how the technology enables connection between the smartphone and the terminal but the security is mainly handled online (cloud-based).

Distance

With regard to the distance that the technologies enables MPPs there are huge differences. MST and NFC are short distance technologies, ranging from 0-10 centimeters. This meaning that the payment process with MST and NFC is in a distance aspect similar to the use of credit cards.

Solutions based on BLE could be used up to 100 meters from the terminal. QR code and Telecom solutions are in some sense not limited to a specific distance, however the user must be provided with either a phone number or a QR code for making the payment. At for example a café, this could be solved with QR codes marked at all tables that the user could use for making an MPP.

Battery consumption

With regard to battery consumptions the main difference between the technologies is the fact that solutions based on BLE uses more battery than the other. Still, the difference in battery consumption is not significant if the BLE based solution only uses BLE when the connection is needed, and not in background mode.

Battery consumption is a common challenge for all solutions since a smartphone without battery would mean that the user would not be able to make a payment.

Availability

Consumer. Availability for the different technical solutions is very diverse. As mentioned in the Background, MST could be used at all credit card terminals where the user swipes a credit card; and NFC could be used at all credit card terminals where the user “blipps” a credit card. BLE requires a terminal which transmits a BLE signal (*e.g.* an iPad); QR code requires the terminal to provide a QR code; and a Telecom solution requires a terminal that provides the user with a carrier billing option. This sets MST and NFC as the solutions with the best availability today. For example, if Samsung Pay would launch in Sweden, it could be used at almost all present terminals; however if a BLE based solution launched in Sweden, it could only be used at a point of sales system with a BLE terminal (very few at the present time).

Merchant. With regard to how many users the different technologies are provided to there are some difference between the technical solutions. First, BLE; QR code; and Telecom solutions could be used on almost all devices. However, this requires a provider to create a large consumer base. MST is at the moment provided by Samsung (through Samsung Pay), and NFC is provided by Apple (Apple Pay), Google (Android Pay) and Samsung (Samsung Pay). This meaning that the mentioned solutions above already have a large user base that easily could start to use their solution.

Consumer and Merchants. If looking at both consumers and merchants the technical solutions with overall best availability is MST and NFC since most terminals today are MST and NFC ready and many users already have the technology integrated in their smartphone.

Speed

When it comes to speed, for making an MPP, between the different technologies the main difference is between BLE, MST and NFC compared to QR code and Telecom solutions. This since QR code and Telecom solutions requires the user to either scan (take a picture) of the QR code or input a phone number while BLE, MST and NFC

automatically makes a connection between the smartphone and the terminal.

Setup cost

The setup cost between the different technologies are very different. Both NFC and MST are easy and low-cost technologies since they are based on the present credit card terminal solution (some credit card terminals could need a minor update). A Telecom solution needs the merchant to install a new payment option, however no new hardware is needed. A solution based on BLE or QR code would demand new hardware to be installed which would implicate a higher cost.

Another advantage of MST and NFC is the fact that the transaction works just like credit cards, making the accounting easy, or the same. However, BLE, QR code and a Telecom solution would require a new accounting process which could implicate a higher initial cost.

A summary of the technology aspects are found below in Table 8. Security is not included since it is discussed to be equal between the compared solutions.

Table 8. Summary of applied technologies regarding: distance; battery consumption; availability; speed and setup cost.

Technology	Distance	Battery consumption	Availability	Speed	Setup cost
BLE	Long (0-100 m)	Low (to medium)	Bad	Very fast*	High
MST	Touch (very short)	Low (when used)	Great	Fast	Low
NFC	Short (0-10 cm)	Low (when used)	Great	Fast	Low
QR code	Photo (long)	Low (when used)	Bad	Slow	Medium to high
Telecom	Long	Low (when used)	Bad	Very slow	Medium

*Does not require that the consumer stand in line in some situations.

6.2.2 Evaluating the Technologies with Regards to Critical Success Factors

In this section, the identified CSFs related to consumer and merchant adoption is used to evaluate the five different technologies. Scores of “low”, “mid” and “high” suitability are used. The evaluation starts with comparing how well the technologies fulfill a particular factor, and later, each technology as a whole is evaluated.

6.2.2.1 Consumer CSF: Trust

- **BLE: Low** — As of now, very few people know about BLE technology, and it is almost never used. The technology also requires a significant behaviour change in how financial transactions are made. Therefore, there is a significant trust barrier for BLE technology. As it can be used over long distances, this might be perceived as a higher risk of someone intercepting or manipulating the signal. The data collection potential is also high, making privacy a concern. However, BLE technology has a high social recommendation potential and the trust barrier could therefore be overcome relatively fast.
- **MST/NFC: High** — Since these technologies are very similar to credit card payments, almost no behaviour change is required. It feels familiar, and since the distance is low, transactions are made while talking to the merchant, making it feel less risky. Knowledge of these technologies is also significantly better, providing a smaller step towards adoption.
- **QR: Mid** — This technology has existed for a while, and people have some knowledge about it. However, it requires a behaviour change and it has empirically not been a success. Depending on implementation, QR codes could be used at the cash register or at a distance, which could influence the amount of trust consumers have.
- **Telecom: Mid** — This is a common technology on some geographic markets and less common on others. It requires a behaviour change and can be used at a distance. Since telecom companies can access data, there are some privacy issues. Therefore, trust is somewhat of a challenge.

6.2.2.2 Consumer CSF: Convenience

- **BLE: Mid** — Since this is a new technology and a completely new way of paying, it requires learning and behaviour change. This causes a lower grade for convenience. However, the potential is very high. With BLE technology, the whole shopping journey can be enhanced, providing a more convenient experience from finding what you want,

to paying. For example, the long distance makes it possible to order food at the table without standing in line.

- **MST/NFC: Mid** — These technologies are very compatible with current user expectations. It is as easy as paying with a credit card, and thus requires almost no learning or behaviour change. This gives it a high score, but it is lowered due to less potential in comparison to BLE technology. For example, it requires customers to be physically near the payment terminal.
- **QR: Low** — Since this technology is both very different from traditional payment methods and adds little benefits in terms of convenience, the score is low. It could actually be less convenient and more time consuming than cash and credit cards, and has empirically been unpopular. From interviews with merchants, it was considered a worse alternative to current forms of payment, with one merchant expressing significant irritation with the technology.
- **Telecom: Low** — As this technology requires phone numbers to be either entered manually or synced, it could take longer time and be less convenient than current payment methods. It also requires behaviour change and learning while adding few benefits in terms of simplicity, which further makes it less convenient.

6.2.2.3 Consumer CSF: Merchant Adoption

- **BLE: Low** — BLE technology is new, requires investments, staff training and is not well known. There are almost no merchants who accept BLE transactions, and it will likely take a long time before it is widely available.
- **MST: High** — Since MST uses existing payment terminals, almost all merchants already have the necessary infrastructure. It works almost the same way as swiping a card and thus requires no staff training. Since merchant adoption is already almost complete, the score is high.
- **NFC: Mid** — NFC is starting to become as frequent as MST, propagated by NFC technology in credit cards. It works almost the same way as credit cards, why no staff training is needed. However, there are many places who still use older terminals without NFC technology enabled, why the score is lower than for MST.
- **QR: Low** — Some places use QR codes but it has empirically been unsuccessful. It also requires investment and staff training. According to interviews with merchants, it is disliked and will probably not be adopted widely.

- **Telecom: Low** — Similarly to QR, some places use this technology, but it is not widely accepted. It requires staff training but almost no investment. However, since benefits are scarce, it is not likely to be adopted.

6.2.2.4 Consumer CSF: Added Value

- **BLE: High** — BLE technology offers most potential in terms of added value. Since it covers the whole shopping journey, it can radically change consumers expectations of the buying experience. You can not only pay, but also order, use the technology from a distance and get a richer, more personalized experience.
- **NFC/MST: Mid** — These technologies offer less potential. Although it might be more convenient, and digital memberships with stores provide extra benefits, it only covers the payment part of the shopping experience. If it proves to be faster than credit cards and cash, queue reduction could also enhance the value.
- **QR/Telecom: Low** — With very few added benefits, QR codes and telecom solutions receive a low score for added value. It has low potential for queue reduction but could offer digital membership cards.

6.2.2.5 Merchant CSF: Low-cost

- **BLE: Mid** — Because BLE technology is very different, investment and staff training is required. However, the investment costs could be lowered if merchants use their (potentially) already existing smartphones. Furthermore, due to the potential of automating ordering and payment, this could lead to labour cost reductions, and the potential for additional sales could offset eventual costs. Therefore, BLE technology does not have to be a costly investment.
- **MST: High** — Since no new equipment nor staff training is needed, the costs for MST are very low.
- **NFC: Mid** — Since many stores already have NFC technology, no additional costs are needed. For those who lack the technology, a small investment could be required, *e.g.* for an update of the present terminal.
- **QR: Low** — Requires both new technology and staff training, and combined with low interest among consumers, the cost per transaction could become high.
- **Telecom: Mid** — Requires staff training and a small investment.

6.2.2.6 Merchant CSF: Convenience

- **BLE: Mid** — The potential for enhanced convenience is high for BLE technology, *e.g.* through automatization of ordering and payment. However, since it is a new way of working, it might be inconvenient to make changes and train staff.
- **NFC/MST: High** — Almost no staff training is required, and merchants can keep working the way they currently do. NFC/MST also provides fast transactions, making them convenient payment technologies.
- **QR/Telecom: Low** — The convenience for QR codes and Telecom solutions is low since it requires both staff training and could be more time consuming than current payment methods.

6.2.2.7 Merchant CSF: Consumer Adoption

- **BLE: Mid** — BLE technology is already available in iPhones and many Android phones, but the technology is new and relatively unknown. It requires behaviour change and is mostly for early adopters. However, the richer shopping experience and other benefits offer clear incentives for consumers to start using this technology.
- **MST: Mid** — MST is only included in Samsung phones, why the technology is limited to a segment of consumers. It is however easy to use, why it is likely that many Samsung owners will use the technology.
- **NFC: High** — Most smartphones are NFC-capable. It is also easy to use and requires little to no learning, which makes the probability of consumer adoption very high.
- **QR: Low** — This technology is possible with all smartphones that have cameras, but it requires learning and behaviour change, and it has empirically been unsuccessful in getting consumers to use it.
- **Telecom: Low** — As with QR codes, telecom solutions are available for all smartphones, but requires learning and behaviour change.

6.2.2.8 Merchant CSF: Added Value

- **BLE: High** — The potential for BLE technology is very high. It could offer automatization of ordering and payment; better customer relationships through personalized offers and

discounts; additional sales; and better customer data which improves planning and decision making.

- **NFC/MST: Mid** — While the potential is lower compared to BLE technology, NFC and MST could result in queue reduction and better customer relationships through data collection.
- **QR/Telecom: Low** — These technologies offer very few extra benefits, and could result in more queues and a more time consuming process. It might however add better customer data collection.

The scores of the above evaluation are presented below in Table 9 (consumer) and Table 10 (merchants).

Table 9. Consumer *Critical Success Factors* (CSF) and technology fit.

Technology	BLE	MST	NFC	QR code	Telecom
<i>Trust</i>	<i>Low</i>	High	High	<i>Mid</i>	<i>Mid</i>
<i>Convenience</i>	<i>Mid</i>	<i>Mid</i>	High	<i>Low</i>	<i>Low</i>
<i>Merchant adoption</i>	<i>Low</i>	High	High	<i>Low</i>	<i>Low</i>
<i>Added value</i>	High	<i>Mid</i>	<i>Mid</i>	<i>Low</i>	<i>Low</i>

Table 10. Merchant *Critical Success Factors* (CSF) and technology fit.

Technology	BLE	MST	NFC	QR code	Telecom
<i>Low costs</i>	<i>Mid</i>	High	High	<i>Low</i>	<i>Mid</i>
<i>Convenience</i>	<i>Mid</i>	High	High	<i>Low</i>	<i>Low</i>
<i>Consumer adoption</i>	<i>Mid</i>	<i>Mid</i>	High	<i>Low</i>	<i>Low</i>
<i>Added value</i>	High	<i>Mid</i>	<i>Mid</i>	<i>Low</i>	<i>Low</i>

In the following section, the overall suitability of the respective technologies are discussed. For a better overview, radar charts are used to show the scores on all dimensions for each technology.

6.2.2.9 Bluetooth Low-Energy

BLE technology has high scores for added value, both for consumers and merchants, and for consumer convenience. It has low scores for consumer trust and merchant adoption, and mid

scores for the other factors. Overall, the score indicates that it will take a significant effort to make consumers and merchants use this technology, but that the potential is great for added value. The main reasons for the lower scores have to do with the fact that it is a new and relatively unknown technology which requires behaviour changes, investments and a new way of thinking about payments. It is therefore unlikely that we will see BLE technology succeed in the short term, but the prospects for the future look very good, provided that providers are able to push this technology to consumers and merchants.

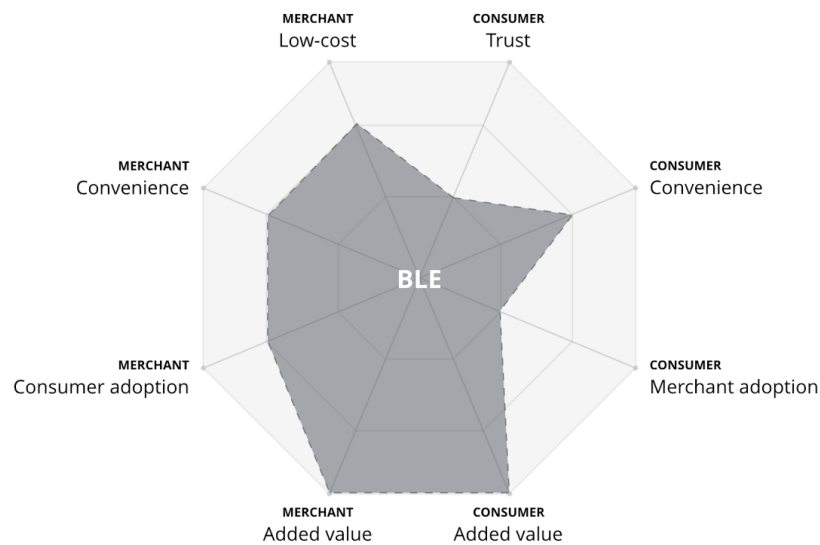


Figure 24. Radar chart for Bluetooth Low-Energy (BLE).

6.2.2.10 Near Field Communication

NFC has overall high scores, but is somewhat inferior when it comes to added value, for both consumers and merchants. While an excellent technology now, it lacks the potential to change the way we consume and buy goods and services. While some of these issues could be solved with software, the short distance requirements limits its potential usage. For example, it would not be able to completely eliminate queues or automate the payment process. This technology is therefore the best one for the short term, but might be replaced by BLE or another more powerful technology in the long term.

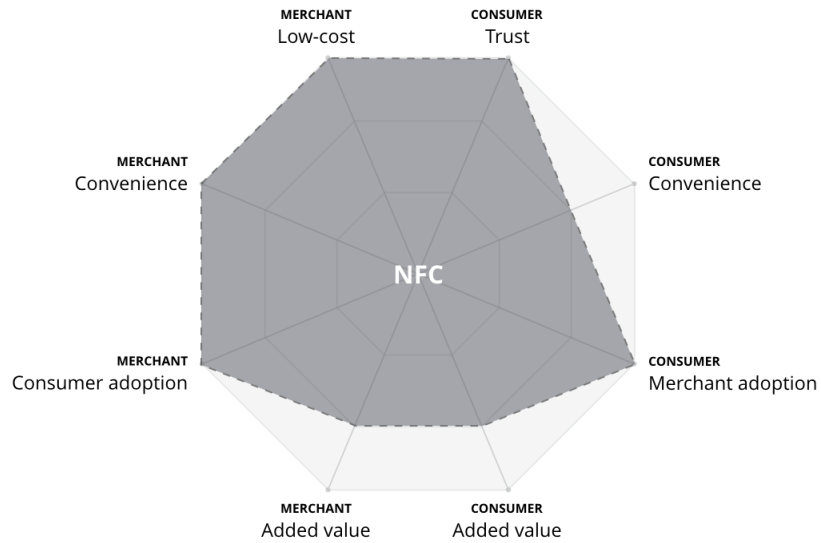


Figure 25. Radar chart for Near Field Communication (NFC).

6.2.2.11 Magnetic Secure Transmission

The scores for MST are all high or mid. It excels with consumer trust, and most merchant aspects such as low costs, merchant convenience and adoption, but is somewhat impaired by only being available for Samsung smartphones. The added value is, similar to NFC, also limited. While it is possible that other smartphone producers also implement MST to access a wider range of merchants, there is little need for this since NFC is almost as widely available. However, since MST requires no extra costs or staff training, and the infrastructure is already in place, merchants can offer MST in addition to other payment methods. It will therefore likely be successful in the near future, but will probably be replaced by a more powerful technology like BLE in the long term.

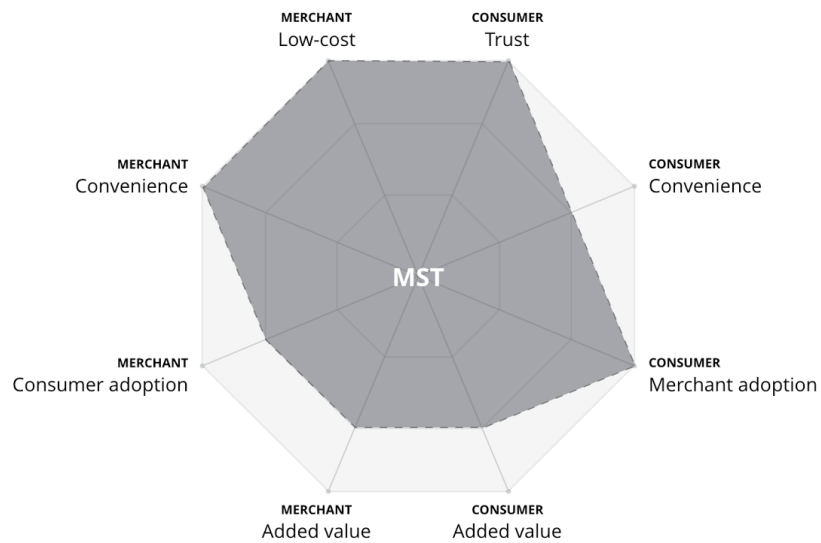


Figure 26. Radar chart for Magnetic Secure Transmission (MST).

6.2.2.12 Quick Response Codes

QR codes have almost universally low scores for all aspects, except for consumer trust, as it has existed for some time and consumers have some knowledge about it. The low scores are due to the incompatibility with current payment methods, requiring both infrastructure and behaviour change, and to the relatively few benefits it offers. Empirically it has also been unpopular, and will likely continue to be so.

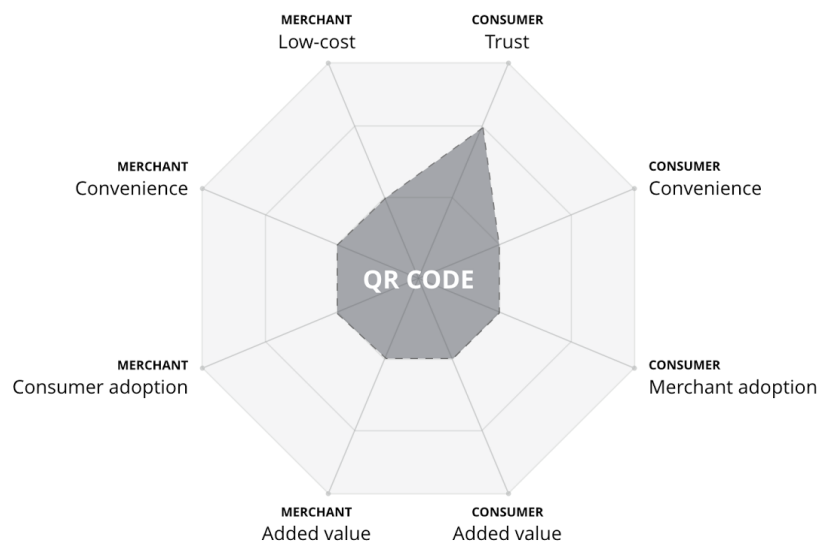


Figure 27. Radar chart for QR code.

6.2.2.13 Telecom Solutions

Similar to QR codes, telecom solution have overall low scores, with the only difference being a lower cost for merchants. The reasons are the same as for QR codes, being an incompatible technology that offers few benefits. It is somewhat more popular in some countries, with a success in peer-to-peer transaction in Sweden. However, as a proximity payment, there are few reasons to choose telecom solutions over the other alternatives, and it will likely not survive in the long run.

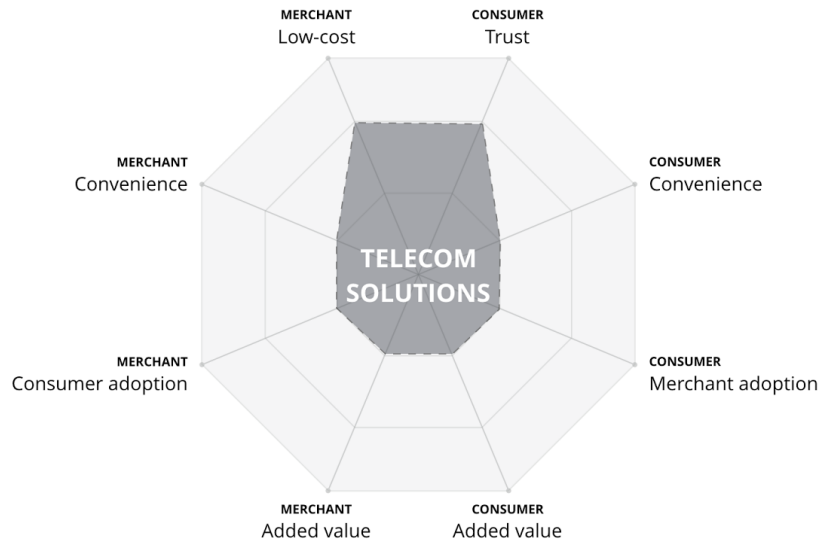


Figure 28. Radar chart for Telecom solutions.

6.2.2.14 Final Results of Technology Evaluation

There is no technology that is superior than the others for all aspects. However, there are two clearly inferior technologies: QR codes and telecom solutions. They will therefore likely not be challengers for the dominant position on the MPPs market. NFC and MST offer a good fit for the short term, but have fewer benefits in the long term. BLE technology is a powerful alternative, but is hampered by the complexity and behaviour change needed for a success. In conclusion, NFC and MST will be the dominant solutions in the short term, and BLE or a similarly powerful technology will eventually take over, provided that the solution providers can push the technology to the market.



Figure 29. Overview of the radar charts.

6.3 Future (Road map) for Mobile Proximity Payments

What is the future of mobile proximity payments? Which will be the dominant technology? Who will provide it? How will it change the way we make payments and consume goods and services? What changes will we see on the market? In this section, we discuss and try to predict what will happen in the near future, and also give some recommendations on how the different stakeholders should act.

6.3.1 Technology

From our analysis of the enabling technologies, no clear winner has emerged. However, there is a clear distinction between what is best in the long term versus the short term. For MST and NFC, infrastructure is already in place, making the technology already widely available. This will likely result in an initially broad adoption of these two technologies. However, they offer limited added value. BLE technology is the best option for queue reduction, customer relationships, and a richer shopping experience, but it requires significant investments and behavioural change. Therefore, we predict that NFC and MST will be the dominant technologies in the short term, paving the way for more complex technology such as BLE, which is likely to be successful in the long term.

6.3.2 Solution providers

Regarding solution providers, smartphone producers have many advantages. They are big, have large consumer bases and widely trusted brands. They also have the funds and experience necessary for pushing a change to the market, and have already launched MPP solutions. The other alternative is smaller, application development companies. They might provide software solutions that are more innovative or user friendly, but since their power is very small, they are more likely to be acquired by the smartphone producers than to be leaders of changes on the market. Therefore, we predict that Apple, Samsung, Google and other similar companies are most likely to be successful providers of MPP solutions.

6.3.3 Consequences for the market

If smartphone producers are the most likely providers of MPP solutions, what does this mean for the rest of the stakeholders and the market at large? In the analysis, partnerships have been mentioned many times. Although the smartphone producers have the most power and interest, they cannot succeed without the cooperation of other stakeholders. It is likely that we see partnerships between with banks and the bigger merchants (i.e. chain stores). Strong relationships with these stakeholders ensure a well functioning system and speedy merchant

adoption. It is also possible that partnerships form with terminal providers and telecom companies, but we believe this to be less likely as they have less influence.

6.3.4 Competing alternatives

Since MPPs compete with the current payment methods, credit card companies risk losing revenue with the success of MPPs. Although very big and powerful, they will not be able to stop the development of this new payment method. How will they protect their market share? They could try to compete on the MPPs market with their own product, but since they lack core capabilities, this is not feasible. They could try to compete by making their current product/service better, but since the technology is relatively simple (in comparison to a smartphone) there is only so much improvement to be made. They could lower their transaction fees, i.e. compete with lower costs, but the smartphone producers could likely survive losses from MPPs for a sufficient amount of time to gain a significant market share. Therefore, the best course of action would be to adapt and pursue a partnership relationship with the smartphone producers. If not, they risk giving their position away to the smartphone companies. Could Apple and Samsung become the new VISA and Mastercard?

We believe this to be more realistic than one might think. First, successful MPPs will change the way in which people make transactions, and their expectations of what the buying experience should look like. It will be richer, more personalized, and you can leave your wallet at home. Second, through various “app stores” and other online payments, most consumers already have a payment history with these companies, making the step towards using them as their primary transaction intermediary smaller. Third, there are ways of making transactions without the involvement of credit card companies, especially through partnership with banks. The recent EU regulation to open up the banks’ transaction API’s is further evidence of this. Therefore, it is very likely that the smartphone producers will replace the credit card companies in the long run.

6.3.5 Roadmap

Now we know what might happen in terms of technology, providers and other stakeholders, but what will the road towards this future look like? What will be the major developments and challenges until then? One answer might come from the theory “Crossing the Chasm” (see *Theory*). The theory says that a way of ensuring adoption of a new innovation is to target niche segments, gradually moving from one segment to another related one, just like knocking down bowling pins. What then would be suitable segments to start with? The goal is a segment which can gain many benefits of the innovation, and from which there are many similar, related segments. One suggestion is fast food restaurants, especially chains. In fast food, the queue reduction and potential speediness is a major benefit, and chain restaurants provide a sufficiently large segment to accelerate the initial adoption. From there, smaller restaurants, cafés, bars and nightclubs could be the next targets. These segments also allow the consumers to

experience the new way of buying in a fun and social way, which would facilitate consumer adoption as well. Eventually a significantly large amount of consumers and merchants have either tried the technology, or at least observed other people do it, that further adoption could move fast.

6.3.6 Challenges

However, some major challenges need to be resolved along the way. First, regulation is still a question. Lawmakers and politicians are usually slower than the innovations that need to be regulated. Making sure that regulations happen swiftly should therefore be a priority for all stakeholders involved. Second, as mentioned many times before, partnerships are vital for this business model. Making sure that these partnerships work smoothly could take a long time and a lot of resources. Last but not least, the knowledge of MPPs is still lacking. Although solutions exist, many smartphone users have never tried them or know how they work. This represents a large barrier for adoption, and needs to be addressed.

Although many challenges lie ahead of us, it is clear to us that the future of MPPs is a bright one, guaranteed to change the way we shop, consume and think about our money.

7 Conclusion

In this section, a summarized version of the thesis is provided, along with the most important conclusions. An evaluation of the methodology and suggestions for future research is also included.

7.1 Summary

The mobile proximity payment (MPP) market is expected to grow quickly, and many different payment solutions have been developed, but there is not yet a dominant solution on the market. In this master thesis, the driving forces, stakeholders, enabling technologies and conditions for adoption was studied with the goal of creating a *Critical Success Factor (CSF) Framework* to be used for evaluation of solutions and predictions for the market.

Through a wide array of different sources, including academic theories, business reports, focus group interviews, interviews with merchants, and other empirical research, CSFs were identified and evaluated, and finally put together in the CSF Framework presented in the figure below.

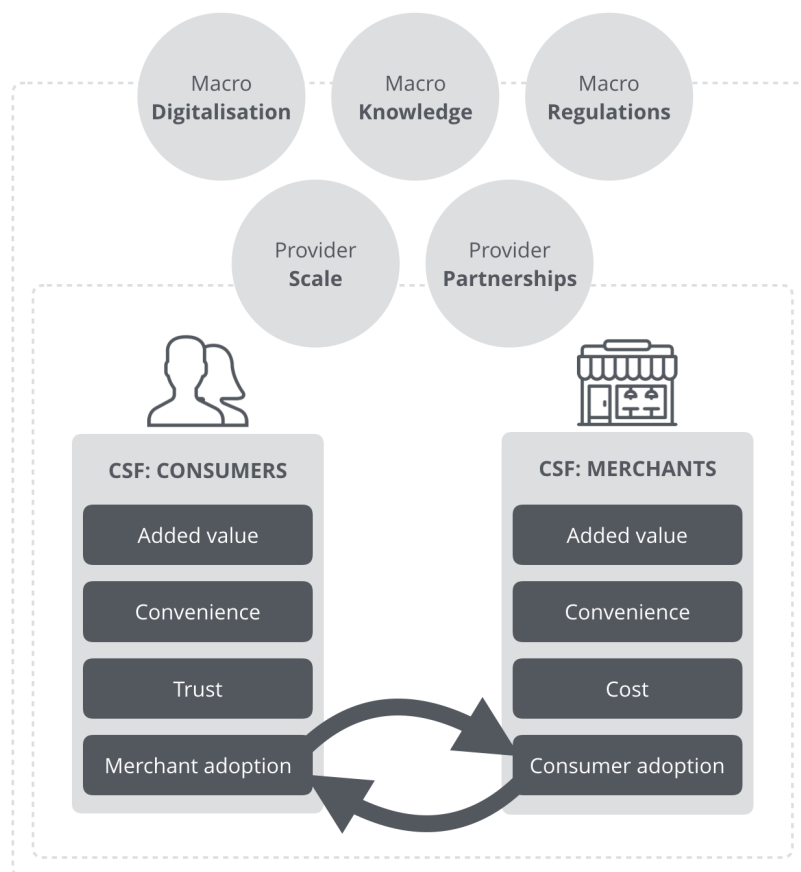


Figure 30. Critical Success Factor (CSF) Framework.

The framework relates the adoption of the two user groups *Consumers* and *Merchants* with each other and with other driving forces. It can be used to evaluate different solutions, solution providers, and to make predictions about the future of MPPs. In this thesis, it was used to evaluate the enabling technologies BLE, NFC, MST, QR codes, and Telecom solutions. This evaluation, together with stakeholder analysis, was then used to make predictions about the future of the market.

Based on the analysis, the authors made the following predictions:

- NFC and MST will be the dominant technologies in the short term;
- BLE or a similarly complex technology will be dominant in the long term;
- Smartphone producers are the most likely solution providers; and
- Partnerships will be vital for the success, especially with banks and the larger merchants.

7.2 Purpose

The purpose of this thesis was to explore and identify the most important key factors (called *Critical Success Factors*) for mobile proximity payment solutions, from several perspectives, including all relevant stakeholders (*e.g.* consumers, merchants, banks and other industry relevant actors) as well as the macro environment (*e.g.* economics, regulations, and social factors). These factors were then used to critically evaluate the different enabling technologies used to provide mobile proximity payments. Also, preliminary predictions about the future of mobile proximity payments were identified and discussed.

7.3 Research Questions and Answers

The research questions for this thesis are presented below, along with short answers.

1. **What are the *Critical Success Factors* for a Mobile Proximity Payment Solution?**
 - a. **Who are the key stakeholders on the mobile proximity payment market?**
Consumers, Merchants, Smartphone producers, Banks, Terminal providers, Telecom companies, Credit card companies, Software developers, and Governmental institutions, presented below in a power-interest diagram.

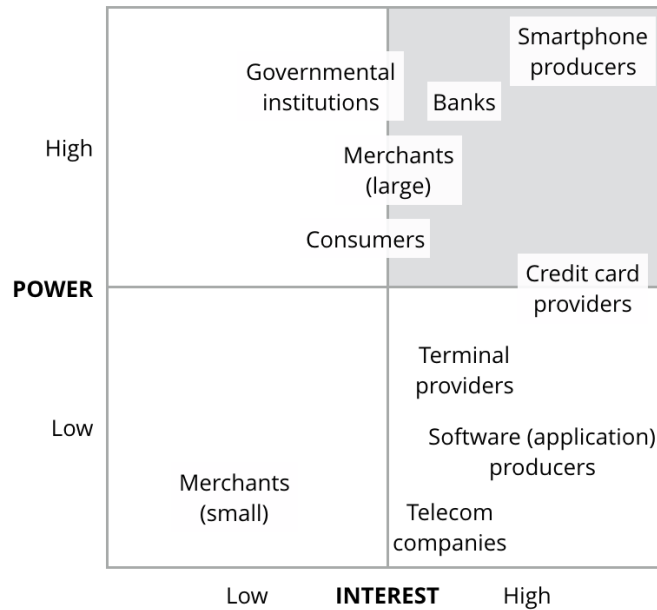


Figure 31. Stakeholder mapping of the relevant stakeholders for the mobile proximity payment market.

b. What are the *Critical Success Factors* for acceptance among these key stakeholders?

For consumers: *Trust, Convenience, Added value, and Merchant adoption*

For merchants: *Costs, Convenience, Added value, and Consumer adoption*

(see CSF Framework, Figure 30).

c. What other driving forces from the macro environment affect the acceptance of mobile proximity payments?

The main driving forces are Digitalisation, Knowledge, Regulations, Partnerships and Scale (see CSF Framework, Figure 30).

2. Which enabling technology is most likely to become a part of the dominant solution?

a. What are the distinctive technologies that enable mobile proximity payment solutions?

BLE, NFC, MST, QR codes and Telecom solutions.

b. How well suited are these technologies to fulfilling the *Critical Success Factors* established in question 1?

NFC and MST are best suited for the short term, BLE is best suited for the long term, and QR Codes/Telecom solutions are not very well suited at all.

3. What will be the future of the mobile proximity payments market?

Dominant solutions based on NFC/MST, provided by smartphone producers will emerge in the short term, and will eventually be replaced by BLE-based solutions. Partnerships will be vital to the success of solutions.

7.4 Methodology Reflection

This study used an inductive and iterative approach, which has proven to be very useful for answering the research questions. Many different perspectives and theories were used to get a complete and broad appreciation of different entities and their interactions on the MPP market. While complex and demanding of the authors, this approach allowed for a holistic understanding which would have been hard to achieve with other approaches.

The choice to gather our own empirical data from consumers and merchants was a good choice as it allowed a deeper understanding of the qualitative aspects of what the two stakeholder groups desire. By allowing follow-up questions and discussions, we gained access to information that was unattainable from other sources, for instance, specific examples of what the factor *Trust* means for consumers.

Another vital part of the methodology was the corroboration of empirical data with other sources. If the insights gained from interviews had not been verified, important aspects would have been missed, and the reliability and generalizability would have been significantly impaired.

7.5 Contributions

The main contribution of this study was the development of the MPP CSF Framework, which can be used to evaluate and predict what will happen on the MPP market. As such, it can be useful to everybody who has an interest in MPPs, from the amateur enthusiast, to the upper management of smartphone companies. As a business framework, it is also useful to students of business and technology, and other researchers in related fields.

Another contribution is the evaluation of the enabling technologies, which can be used for strategic decision making of all stakeholders involved in MPPs. It might also be helpful for the future evaluation of new technologies that may challenge the technologies that are covered in this study.

Additionally, the predictions made about the future of MPPs contribute by making it easier for all stakeholders to plan and make decisions about the future. For governments, it can make it easier to prioritise among regulations; for most stakeholders, it can make it easier to identify strategic partnerships; and for credit card companies, it offers a starting point for a development of a competitive strategy.

Finally, this study has made contributions to the application of several theoretical frameworks. It can therefore be used as a practical example of how to use the theories, and as a starting point for the continuous development of these theoretical models.

7.6 Suggestions for Further Studies

Having developed the CSF Framework, applied it to the current competing technologies and made predictions about the future of MPPs, there are still questions that remain. Here are some suggestion for future research questions:

7.6.1 Regarding adoption

- How can a strategy for consumer and merchant adoption ensure the success of MPP solutions?
- What is the best way to promote (consumer/merchant) behaviour change with regard to MPP?

7.6.2 Regarding the solution

- How can personal recommendations, discounts and loyalty programmes in MPP solutions be used to increase additional sales for merchants?
- How should the value proposition look like to maximize interest?
- What features are most important for a MPP solution?
- What features can be added to an MPP solution in order to enrich the consumer shopping experience?

7.6.3 Regarding business models

- How should strategic partnerships be designed to ensure the success of MPP solutions?
- How can MPP solution providers optimally capture revenues from transactions?

7.6.4 Other

- What is the best competitive response strategy against MPP for credit card companies?
- How can big data from MPP solutions be used to improve sales and customer relationships for merchants?

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Appendices

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Appendix I. Framework for the Focus Groups

Date: February 28th, 2017

Time: 13.00-15.00

Location: LTH

Participants: 7 people

- **Survey before the focus groups:**
 - <https://goo.gl/forms/aB0vsY6DSLqTwFZu2>

- **Agenda:**
 1. Introduction and fika
 2. Presentation of goals with the focus group
 3. Setup:
 - Short intro about the discussion format
 - Different surroundings where physical payments are made
 - Short introductions to the different solutions
 - Discussion through e.g. pros and cons
 - Further discussion about most important factors
 - Discussion rules
 - Ask if it is alright to record the discussion
 4. Short introductions to the different solutions
 5. Discussion-1
 6. Short break
 7. Discussion-2
 8. Summary and Thanks

Appendix II. Interview Guide and Questions for the Focus Groups

- **Different solutions**
 - Which mobile solutions do you know?
 - *E.g.* Swish, QR-kod, "blipp", Beacon
 - Have you used anyone of them?
 - ...have you seen them being used?
 - Pros and cons
 - What do you think?
 - Do you agree?
 - Depending on surrounding?
 - Have you used any other way to make physical payments?
 - The above mentioned, do you think there is a winner?

- **Deeper discussion regarding important factors**
 - What does ___ mean to you? (e.g. trust)
 - Pros and cons
 - Important factors
 - What does ___ mean to you? (e.g. trust)
 - Discussion about each mentioned factor

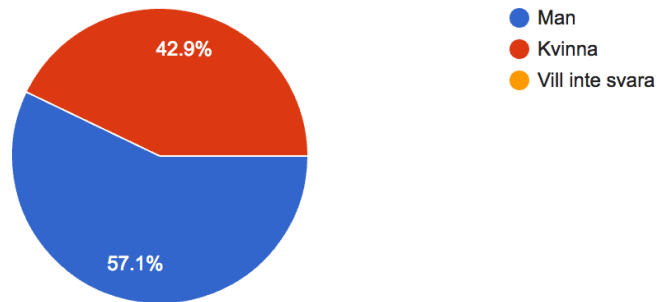
- **Critical Success Factors**
 - Go through a purchase (café, restaurant, bar, grocery store)
 - Are there any steps in this process which could be improved? MPP?
 - Could MPP be helpful?
 - What needs would be solved with MPP?
 - What would make you pay with your smartphone?
 - Most important factor?
 - In which situations would you want to pay with your smartphone?
 - What extra features would convince you?
 - Why do you not use your smartphone as a payment method today?
 - If [that reason] was not a problem, what would hinder you from paying with your smartphone today? (iterate the stated problems)
 - *Finishing*: What is the most important factors for a mobile proximity payment solution?

- **Finish**
 - Is there anything else you would like to add, discuss?

Appendix III. Results from the Survey Before the Focus Group Session

Kön?

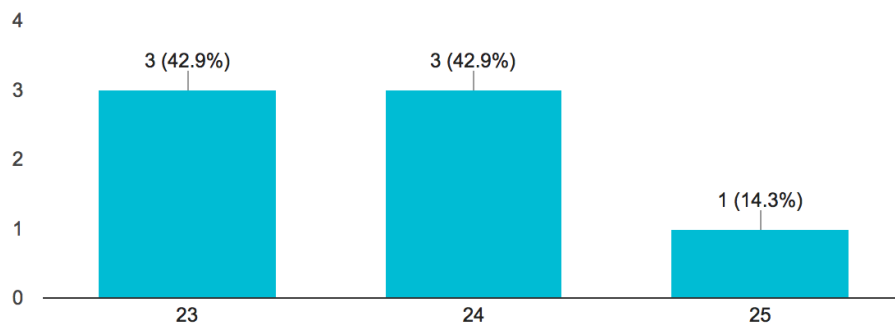
7 responses



[Eng. Male; female or no answer]

Ålder

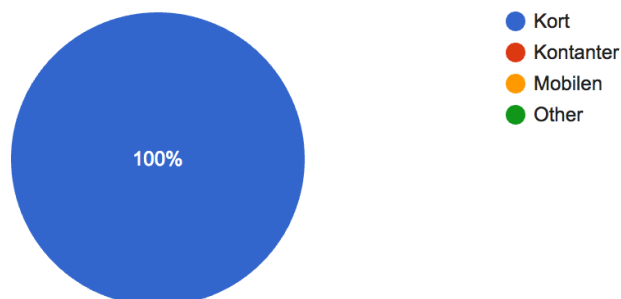
7 responses



[Eng. Age]

Vilket betalningsmedel använder du oftast idag när du handlar i en fysisk butik?

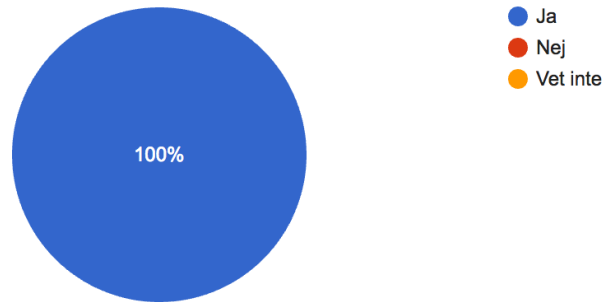
7 responses



[Eng. Which payment method do you use the most? Card; cash; smartphone or other]

Har du en smartphone?

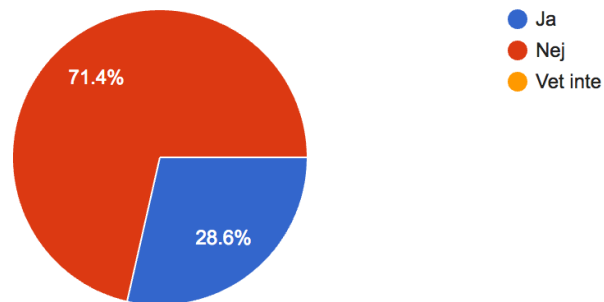
7 responses



[Eng. Do you have a smartphone?]

Har du provat att betala med mobilen i en fysisk butik?

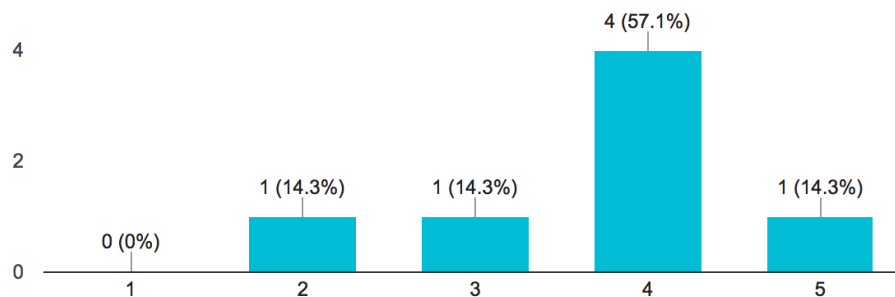
7 responses



[Eng. Have you tried paying with your smartphone in a physical store?]

Jag är teknikintresserad

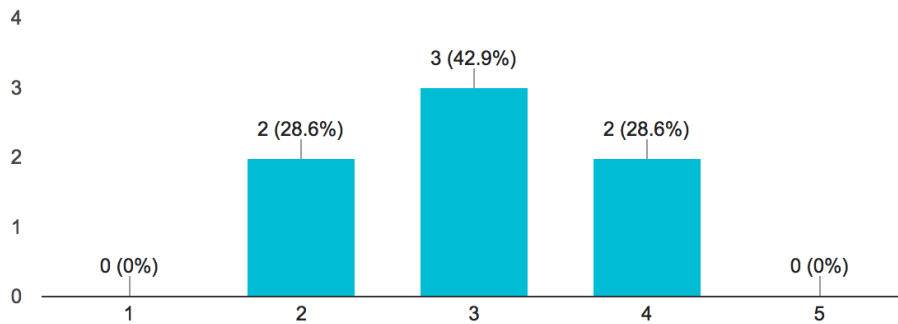
7 responses



[Eng. I am interested in technology (1- not true at all; 5 - very true)]

Jag testar ofta nya applikationer

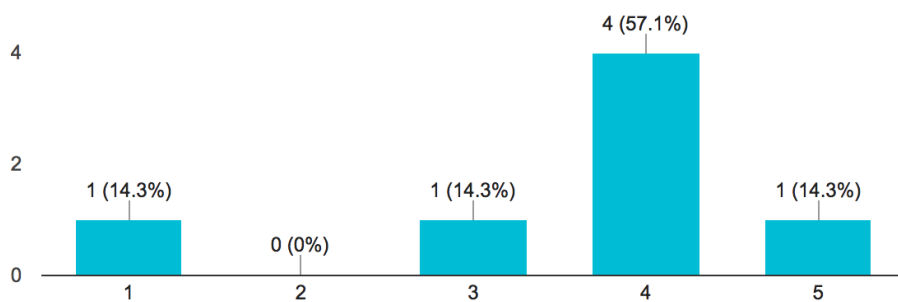
7 responses



[Eng. I try new applications often (1- not true at all; 5 - very true)]

Jag förklarar ofta för andra när de har problem med datorn eller mobilen

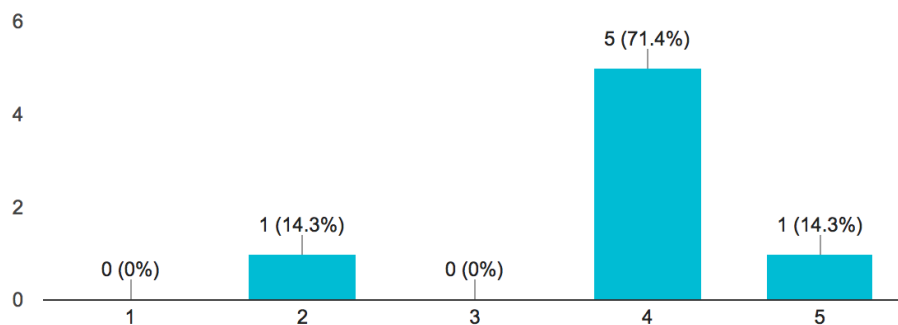
7 responses



[Eng. I usually explain and help others when they have trouble with their computer or smartphone(1- not true at all; 5 - very true)]

Jag har enkelt att förstå ny teknologi

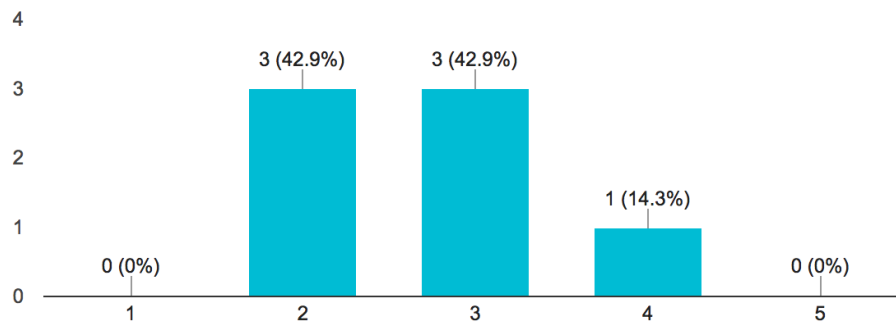
7 responses



[Eng. I think it is easy to understand new technology (1- not true at all; 5 - very true)]

Jag gillar att vara först med nya tekniker

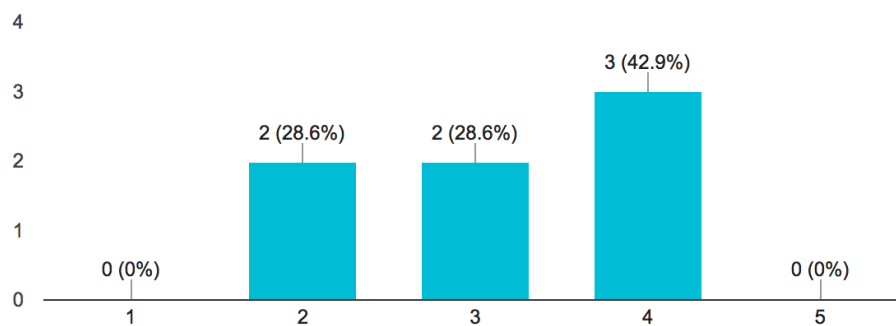
7 responses



[Eng. I like being first with new technology (1 - not true at all; 5 - very true)]

Jag rekommenderar ofta applikationer och/eller teknologier till andra i min omgivning

7 responses



[Eng. I often recommend new technology to my surrounding (1 - not true at all; 5 - very true)]

Appendix IV. Preparation and Guide for Interviews with Merchants

Overall Structure

The interviews are performed with the following overall structure (extended description for I-IV are found below):

- I. Overall preparation
- II. Identification of possible interview candidates (merchants in Lund)
- III. Overall communication
 - In-person contact in the store with the goal of booking an interview
 - E-mail communication with overall information before and after the interview
- IV. Interview session
 - Introduction
 - Introduction with *e.g.* presentation of us, the project, purpose and how the information is handled
 - Interview
 - Interview with four main components: About the person, About the company, Mobile Proximity Payments and Other
 - Summary
 - Short summary of the answers with possibility for the merchant to add or withdraw comments
 - Thanks
 - Closing statement with thanks and short description of our next step and how they can take part of the result

Overall Preparation

The main aspects to consider for the interviews are to be well prepared; use what is referred to as open questions; and to be both respectful and not pushy towards the respondent. Below are listed more aspects to consider before and during the interviews:

- Script
 - Make a clear script for the interview
 - Be aware that the script is mainly for making sure that the main questions are answered, the interviews will take different form depending on the answers from the respondent hence the actual interview script could look a bit different from the prepared
 - Practise the script and look for feedback before the interview
 - Print the script on paper (the use of computer or smartphone could be distracting for both the respondent and the interviewer)

- Notes from the interview
 - Both of the two authors will attend the interview, one will be responsible for the interview and one will take notes and also help the interviewer to *e.g.* not forget any important questions/aspects
 - If the respondent approves, the interview will be sound recorded

- Questions
 - Use what is referred to as Open questions and minimise the use of “Yes or No”-questions
 - Be neutral and do not judge or criticise answers
 - Make sure that you understand what the respondent are communicating and ask for in depth answers – *e.g.* through asking “Why?” many times
 - Respect the person you are interviewing and do not push for answers, *e.g.* if it is clear that they do not want to answer

- Other
 - Print and leave your contact information so that they can contact you
 - Get their contact information if you have any uncertainty — ask if you can contact them if you have any
 - Try to create a calm and safe surrounding

Identification of Possible Interview Candidates

The merchants are anonymous however the three interviewed merchants could be described as:

- one large coffee chain store;
- one small-medium sized grocery store; and
- one small retail store.

The three different merchants, regarding size and organisation structure (*e.g.* chain store), are chosen with the goal of finding and understanding aspects from merchants with different needs, solutions and problems.

Overall Communication

Below is a short summary of the communication between the authors and the respondents.

- In-person contact with suitable merchants
 - Introduction of us and the project

- Set date and time for the interview
- E-mail sent before the interview
 - Hi {{name}}, and thank you for taking your time to let us interview you on the {{date for interview}}, we'll come to your store! As we told you before, the interview will take around one hour and your answers will be kept confidential and only handled by us.

As we described, we're making a thesis at Lund University about mobile proximity payments and the results from your interview, combined with interview with other merchants, will be published in our thesis and compared with results from interview with consumers and secondary information from consulting reports. We're happy to share the results with you if you are interested and maybe the report could help you with future decisions regarding implementing a physical mobile proximity payments solution in your store.

Please feel free to contact us at any time if you have any questions. Our supervisor at Lund University is Carl-Johan Asplund and can be reach through mobile +46 (0)76-108 49 00 or e-mail Carl-Johan.Asplund@iml.lth.se.

Sincerely,

Joel and Johannes

Joel Oredsson: +46 (0)73-786 31 32 (joeloredsson@gmail.com)

Johannes Larsson: +46 (0)70-994 45 62 (johannes.larsson@me.com)

- E-mail sent after the interview
 - Hi {{name}}, and thank you again for taking your time for the interview last week! It was both interesting and fun to take part of your thoughts. As mentioned, please feel free to contact us if you have any questions or if you maybe want to add something to your answers.

As requested, we'll send you the report when finished in mid June. Please feel free to contact us at any time if you have any questions. Our supervisor at Lund University is Carl-Johan Asplund and can be reach through mobile +46 (0)76-108 49 00 or e-mail Carl-Johan.Asplund@iml.lth.se.

Sincerely,

Joel and Johannes

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Johannes Larsson: +46 (0)70-994 45 62 (johannes.larsson@me.com)

Interview Session

As one of the preparations the authors read the book “The Mom Test” by Rob Fitzpatrick. Key takeaways from the book is to:

- talk about their life and processes;
- talk about how they are solving the potential problem today;
- never affect their answers with your own thoughts and wishes;
- discuss specifics in the past, not guesses about the future; and
- always when interviewing someone, you should be asking at least one question which has the potential to destroy the imagined business (in this case mobile proximity payment solutions).

Interview guide. Below is an overall structure with questions and descriptions that will be used during the interviews. The interviews are held in Swedish but the questions below are translated to English.

- Introduction
 - Thank the respondent for their time
 - Describe yourself, the project, the purpose of the interview, how we handle their information and how they can make use of the result.
- Interview
 - About the person
 - Tell us a little about yourself: age, education, responsibility and role, experience *etc.*
 - About the company
 - What is the goal and purpose of the company?
 - What are your main challenges? How are you addressing them today?
 - What are your main possibilities? How are you addressing them today?
 - Are you working with loyalty programs? If yes, how and why?
 - What trends are you seeing for your business?
 - What trends are you seeing for your market?
 - How and who is the competition in your market?
 - Mobile Proximity Payments
 - How does a payment look like in your store? Could you try to describe and/or show the process?

- What challenges do you see? What possibilities do you see? Are consumers asking for something in the payment process that you're not providing today? Any missing features?
 - How can consumers pay, which kind of solutions can they use at your store today? (Swish, QR, Mobile proximity payments *etc.*)
 - What pros and cons do you see with these? *E.g.* cost, time or loyalty possibilities?
 - Do you offer your consumers to pay with their mobile? Why? Why not?
 - Have you tried to pay with your mobile? What do you think?
 - Which payments solutions have you tried? Pros and cons?
 - What would be the most important aspect to take in consideration for starting to let consumers pay with their mobile in your store? What challenges and possibilities do you see?
 - Other
 - Is there something else we should ask or that you would like to add?
- Summary
 - Make a short summary of the interview and present to the respondent and ask if they have anything to add or something that they want to change or withdraw
- Thanks
 - Thank them properly and tell them about the next step in our process