

Towards a Universal Mobile Payments System

Themistoklis Karavellas – t.karavellas@uu.nl



Utrecht University



Delft University of Technology

	Themistoklis Karavellas
Student number	3494551
MSc programme	Business Informatics
TU Delft Supervisor	Prof. Dr. W.A.G.A. Bouwman
Utrecht University 1st Supervisor	Dr. Slinger Jansen
Utrecht University 2nd Supervisor	Dr. M.R. Spruit
UL Transaction Security Supervisor	M.Sc. Amos Kater

Abstract

The shift of payments' market from cash and paper-based payment means to electronic solutions has led to many changes in the last decades. In today's market we see mobile devices being able to fulfill the role of a digital wallet and consequently organizations offering solutions to the market. Despite the steep growth of mobile device usage rates, mobile payments still show low diffusion rates. Numerous different solutions are introduced but incompatibility among them does not help in reaching high levels of users' adoption. In our research we address the payments market through a literature and market review in order to understand the way Mobile Payments fit in. We create an ecosystem view and depict the associated stakeholders. We address the matter of diffusion suggesting the introduction of a Universal Mobile Payments System. In order to understand how today market could be driven towards such a platform we examine two existing solutions by addressing each case's business model design issues.

Acknowledgements

This master thesis was written as a final assignment for the master program Business Informatics at the Utrecht University.

First I wish to thank my supervisor from TU Delft Professor Dr. W.A.G.A. Bouwman, for his guidance and comments during this research. The help coming from his deep knowledge in the topic of mobile payments was more than essential for me to undertake and deliver this document. I also want to thank Slinger Jansen and Marco Spruit for their insightful comments, continuous help and support in pursuing and conducting a research on the topic of mobile payments.

I am grateful to Amos Kater, Sanne Ketelaar and Hugo Reijkens for their help and guidance in the market dimension of mobile payments. I want to thank all the interviewees for agreeing to participate in my research process and sharing their thoughts and knowledge on the subject.

I also want to thank all those who are not mentioned in this text but without them this thesis would have not been realized.

Thank you all so much!

Themistoklis Karavellas

Utrecht, February 1st 2013

Contents

Abstract	1
Acknowledgements	1
Chapter 1 - Introduction.....	5
1.1 - Background.....	5
1.2 - Problem Formulation	8
1.3 - Research Objective.....	9
1.4 - Research Questions.....	10
1.5 - Limitations.....	10
1.6 - Outline.....	11
Chapter 2 - Domain Description.....	11
2.1 - Payments Market	11
2.1.1 - Cash Payment.....	12
2.1.2 - Card payment	12
2.1.3 - Direct Debit payment	13
2.1.4 - Credit Transfer payment	13
2.1.5 - Cheque payment	13
2.1.6 - Payment Instruments Statistics.....	14
2.2 - Mobile Payments.....	16
2.3 - Mobile Payments Ecosystem	20
2.4 - Stakeholder Analysis	21
2.4.1 - Payment Service Providers (PSPs).....	21
2.4.2 - Merchants	25
2.4.3 - Consumers.....	26
2.4.4 - Technology Providers	26
2.4.5 - Government and Regulatory Agencies.....	27
2.5 - Mobile Payments Business Models.....	27
2.6 - Chapter Conclusions.....	29
Chapter 3 - Research Method	30
3.1 - Research Approach	30
3.2 - Data Collection	32
3.3 - Theoretical Framework	34
3.3.1 - Case Selection	34
3.3.2 - STOF Framework	36

3.3.3 - Network externalities on multi-sided markets	38
Chapter 4 - Case study results	39
4.1 - MasterCard PayPass (Online)	39
4.1.1 - Service design	39
4.1.2 - Technology design	43
4.1.3 - Organization design	46
4.1.4 - Financial design	48
4.2 - Google Wallet (Online)	50
4.2.1 - Service design	50
4.2.2 - Technology design	53
4.2.3 - Organizational design	55
4.2.4 - Financial design	57
4.3 - Cross-Case analysis	58
4.3.1 - Service Design	58
4.3.1 - Technology Design	59
4.3.2 - Organization Design	60
4.3.3 - Financial Design	61
4.4 - Chapter Summary	62
Chapter 5 - Uncertainties Mapping	63
5.1 - MasterCard PayPass (Online)	63
5.1.1 - Service design	63
5.1.2 - Technology design	66
5.1.3 - Organization design	68
5.1.4 - Financial design	70
5.2 - Google Wallet (Online)	72
5.2.1 - Service design	72
5.2.2 - Technology design	74
5.2.3 - Organizational design	76
5.2.4 - Financial design	78
5.3 - Chapter Summary	80
Chapter 6 - Discussion	80
Chapter 7 - Conclusion	82
7.1 - Research objective	82
7.2 - Limitations	84

7.3 - Reflection	85
7.4 - Future Research	85
References.....	86
Appendix A- Interview sheet	90

Chapter 1 - Introduction

1.1 - Background

In the last years there has been a significant growth of mobile commerce which can be seen in the significant growth of the volume of payments through mobile devices (World Payment Report [WPR], 2011). This follows the increasingly popular ownership and use of mobile personal, programmable communication devices (Herzberg, 2003) whose beginning is dated almost a decade ago. In today's world we can see that mobile devices tend to evolve into platforms for the integrated execution of multiple tasks such as internet browsing, scheduling and even performing payment transactions. This research focuses on the business models related to payments executed through a mobile device. Such a payment is called *Mobile Payment* (hereafter "MP"). The vision of this research is represented by the following combination of definitions.

"Any payment where a mobile device is used in order to initiate, activate and/or confirm this payment can be considered a Mobile Payment (Karnouskos, 2004). Mobile Payments are payments for goods, services and bills with a mobile device by taking advantage of wireless and other communication technologies (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008)."

The payments' market structure has changed substantially in the last decades, when technology advancements offered a number of cost-effective solutions for completing payments which gradually supplanted traditional payment methods. *Financial Institutions* (hereafter "FI"), up until the rise of e-Business, had been the widely accepted party offering solutions for payments execution, which were regulated, controlled and cleared exclusively by a network of affiliated FIs. The rise of e-Business gave ground to companies' (mostly Web based), willing to take the responsibility of issuing and executing payment orders, emergence who would substitute or mediate the payers' and payees' connection and value transfer between different FIs (i.e. PayPal (Prasanth, & Gupta, 2004)). In the flourishing e-Business era electronic payment transactions became a norm and today payments through mobile devices can be seen as their successor (Kalakota, Robinson, & Ebrary, 2002).

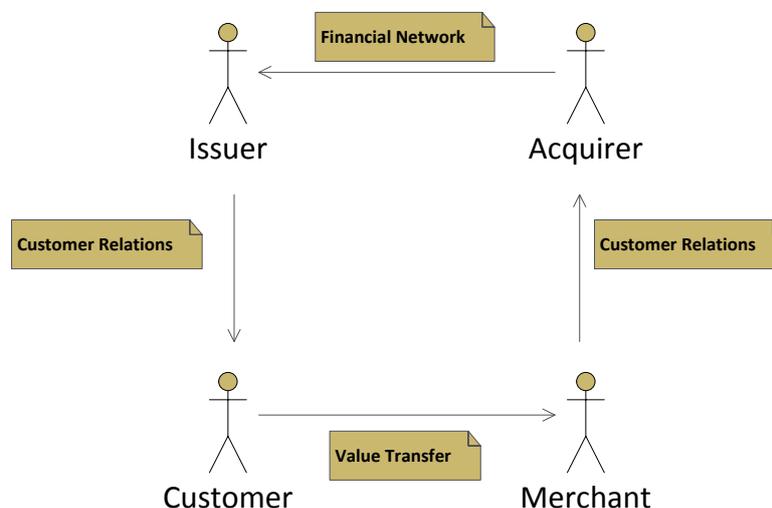


Figure 1-Typical digital payment scenario (Karnouskos, 2004)

Both traditional and emerging services in the digital payments arena realize the model shown in Figure1. In this model a typical digital payment scenario is depicted where a *Customer* (payer) wants to transfer value to a *Merchant* (payee) through a digital payment means (credit card, e-banking, mobile payment etc.). The *Issuer* is a party that has a relationship and interacts with the payer and the *Acquirer* a party having a relationship and interacting with the payee. In a typical procedure followed the customer pays the merchant with a means provided by the issuer. The merchants send the payment details to the acquirer who uses the financial network to communicate with the issuer. The issuer makes the fund reservation and ultimately transfers the funds to the merchant's side. In this model the scheme settles/pays the acquirer, the acquirer settles/pays the merchant, the issuer settles/pays the scheme and the customer pays the issuer (Karnouskos, 2004).

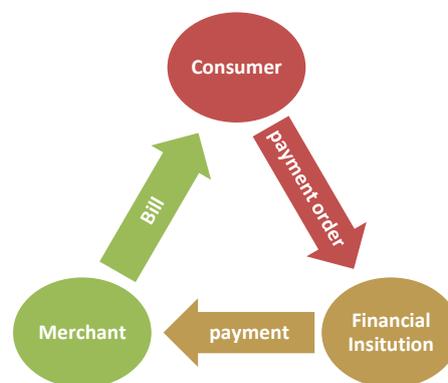


Figure 2- Three-party payment scheme

Following the line of thought in Karnouskos (2004) model, Figure 2 presents a simplified situation where the acquirer and issuer belong to the same body. Such a case would be the network of affiliated FIs having internal agreements for the payments among them. Figure 2 shows a three-party payment scheme, describing the interaction between the participating actors, in the time before and during the rise of e-Business. In this scheme, the consumer wants to pay the merchant (for a product or service) and the merchant sends/presents the bill to the consumer. The consumer sends a payment order to the FI that hosts his funds and thereafter the FI is responsible for clearing the payment. FI clears the payment by assuring the merchant that will transfer the bill amount to the merchant's account. The point on which the transfer is made is irrelevant for this research but it is important to know that the actual fund transfer is called settlement.

What changed through the years has been the way in which the payment order is transferred to the FI. This way we got from cash and checks to credit cards, phone payment orders, electronic payments etc. In a typical case of payment with e.g. a credit card the consumer sends the payment order to the issuer FI through the merchant's card reader device. The merchant gets a confirmation on his reader

that a payment has been ordered from the consumer's account to his account and thus completes the transaction with the consumer.

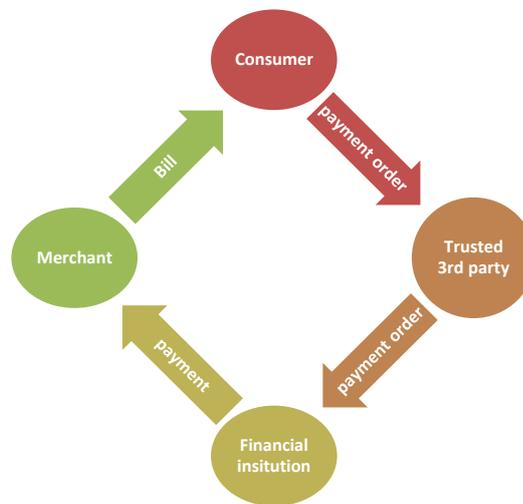


Figure 3- Four-party payment scheme

E-Business advancement helped in bypassing the direct connection of the consumer with the FI and a new actor was introduced (which can be considered as trusted 3rd party). The trusted 3rd party is an organization responsible for issuing the payment order on the consumer's behalf and making sure that the payment is cleared by the financial institution.

The introduction of a new actor in the value chain did not come unbidden. FIs' inability to introduce simple, interoperable electronic payment solutions that would benefit consumers and merchants uncovered a need that could create profit for any organization willing to develop the appropriate "tools". An indicative example of such an organization, which met wide acceptance in the e-Business era, is PayPal. PayPal has been the fastest growing financial service in history, attracting 6.5 million customers within 14 months from its launch (Dhar, 2006) by offering a solution for money transfers that could be completed without sharing credit card or account information between the parties involved in a financial transaction. For MPs such a case is Google Wallet (GW, 2012) offering MP services regardless of the FI of the user, but only through Google's own branded devices. MP is a field in which WebCOs try to capture market segments and form new standards but no prevailing business case yet exists.

In one of the different MP scenarios, *Mobile Network Operators* (hereafter "MNO") try to take up the role of the trusted 3rd party who will be responsible for communicating the payment order to the financial institution or just take part in the MP scheme due to their binding with technology used to execute payments. This is because the MNOs' network infrastructure is essential for the completion of MPs and there are value-added services to be offered, creating new revenue streams. Extending this case MNOs also try to offer the option of directly executing payments and avoid the involvement of FIs in the payment process (MNO Billing). Although this scenario is currently more possible for low value payments, it is a threat for FIs since the option of completing payments through MNOs could

eliminate the need for credit cards (and thus minimize FIs involvement) or help MNOs “evolve” into a hybrid of communications and financial services providers. Such a case would take away the billing processes and customer ownership from FIs and this is naturally meeting great opposition from FIs.

Last “candidate” for taking up the role of the trusted 3rd party in the scheme of Figure 2 is a Trusted Service Manager (hereafter “TSM”). A TSM is an intermediary assuring security for the service provider (FI) through MNOs network infrastructure. This means that a TSM is handling payments from the level of device to service security provision and customer care. TSM is therefore an organization that has direct contact with payment participants while still using the infrastructure of FIs and MNOs, who need to have reached an agreement through the TSM about each one’s responsibilities in a transaction. In most cases, TSM organizations are funded by FIs and MNOs and compete with WebCOs for market acceptance. An indicative example of this scenario is ISIS (ISIS, 2012) and Google Wallet (GW, 2012).

Despite technology advancements, it is still difficult to change or bypass the existing global financial network and form an (at least) equally reliable financial services’ network. Therefore, last decade’s financial network scheme changes are mostly concerned with the level of FIs’ involvement to transaction handling and emerging actors’ interchange fees rights deriving from the different methods used to execute payments.

In this way we understand how advancements in the payment market led in new payment schemes introduction, where we can also see new actors (such as MNOs) compete for their presence. The model of figure 1, though, is never bypassed regardless of the number of parties participating in the scheme. An explanatory description can be seen in the list below.

- **Customer:** This is the role of the payer both in three and four-party schemes
- **Merchant:** This is the role of the payee both in three and four-party schemes.
- **Issuer:** In three party-schemes FIs take up the role. In four party schemes FIs are the service delivery actors but the role can be taken up by other actors (MNOs, WebCOs) as well.
- **Acquirer:** In three party-schemes FIs take up the role. In four party schemes FIs are the service delivery actors but the role can be taken up by other actors (MNOs, WebCOs) as well.

1.2 - Problem Formulation

Technology advancements have been a stepping stone for secure and reliable techniques to be developed for the case of Mobile Payments, but so far there is no universally accepted solution (Dahlberg et al., 2008). Dahlberg et al. (2008) argument is still valid as MPs’ services market is at a pre-standardization phase where no collective standards have been achieved and various industries and consortia, most notably the financial and telecommunication industries, compete to form the dominant standard. Existing literature, examining the market from the stakeholders’ point of view, expresses the need for a consensus (both technological and organizational) among the parties involved (Dahlberg et al., 2008). In this way, it is evident that there is a lack of coordination and cooperation, among the stakeholders participating in the MP value chain, which poses an obstacle in the adoption and diffusion of Mobile Payments.

Power of the stakeholders participating in the market has a great impact on how technologies and other resources are orchestrated into mobile payments and how these services are offered to and used by the market. Moreover, MP services compete for the attention of customer and other parties against physical and electronic payment services. Mobile payments are a natural choice for mobile services but their success could depend on the added value they can offer in other payment environments as well (Dahlberg et al., 2008).

According to Ondrus et al. (2009) for the successful introduction of MPs in the payments' market there are specific issues to be challenged such as the following:

- The need for an alliance strategy between financial institutions and MNOs
- Involvement of sellers and business intermediaries, providing added value to customers that would act as an incentive to join the service
- Involvement of the manufacturers in order to offer interoperability and scale the system
- Dealing with regulatory issues (restrictions, legislation etc.)

Challenging each one of the issues is a step towards mobile payment diffusion. Ondrus et al. (2009) suggest that managing these issues can lead to a successful diffusion of MPs.

Kreyer, Pousttchi, & Turowski (2002) claim that no universally accepted MP system exists and the existence of such a solution could be an easy choice for the customer if it would not require giving up too much convenience. This argument is evidently still valid as Mobile Payments still wait for a “take-off” while existing solutions present a competitive attitude. Kreyer et al. (2002) envision an integrative *Universal Mobile Payment System* (hereafter “UMPS”). Such a system will have to be user-centered, offer interoperability, be cost-effective and deliver the intended value for the end-user. Our question therefore is; what is preventing the existence of such a system? Existing literature has examined how MP can be realized regarding both technology and business issues (Alliance, 2007; Dahlberg et al., 2008; Ondrus & Pigneur, 2007). On the technology part, security and speed have been challenged and researched while the business research has been concerned with user acceptance and service description (Mallat, 2007; Mallat & Tuunainen, 2008). But, little effort is done in the research of a common solution which will promote MPs as a service rather than a commercial product.

1.3 - Research Objective

This thesis research will examine *“what is preventing the diffusion of Mobile Payments through an analysis of how existing services contribute to a Universal Mobile Payments System solution.”*

The objective of this research is to *“examine the steps needed to move towards universality in Mobile Payments.”*

UMPS would be an answer and therefore we consider the results of this research as a part of a potential description of the transition to UMPS. Of course the description of such a system is a multi-aspect problem but the challenge of finding a perfect solution has been underestimated (Ondrus &

Pigneur, 2006). For this, we examine existing solutions in order to see where they stand and understand what steps are needed for convergence between them.

1.4 - Research Questions

In order to analyze existing business models and question their success and contribution to the development of a UMPS model we formulate the following research questions:

- ❖ **RQ1:** How is the payment systems market structured and where do mobile payments stand regarding stakeholder involvement and acceptance?
- ❖ **RQ2:** How do existing solutions challenge success factors of Ondrus et al. (2009), and which are their business model design characteristics that help in the direction of UMPS?

1.5 - Limitations

Mobile Payments as a topic covers a wide spectrum of services as the scenario of Figure 1 describes almost all electronic payment services since they are based on (debit/credit) card schemes. Associated stakeholders and business models in use depend on the offered service and other relevant factors in each case. A description of these different scenarios in MPs is presented in the domain description of Chapter 2.

In this research we will not answer the research questions regarding all possible solutions and offered services. We focus on the solutions of Remote Mobile Payments (explained in 2.2.) and try to extract our results and conclusions from this part of the MP ecosystem. Technology as a limiting factor will not be taken into consideration although technology factors will be used in the evaluation of the case studies as part of the STOF model framework (explained in 3.3.2.). There exist no location boundaries in this research as RMP by definition are location independent. Of course in the case of the studied services, case studies can have location limitations towards their service offer but these are factors influencing the reach of each service rather than the content and intended value of the service. Location limitations also become explicit when discussing regulatory regimes and nation-based industry structures, as for instance described by economic industry analysis. Both regulatory issues as well as industry analysis per se are outside the scope of this thesis, but we acknowledge that they can have an impact.

Regarding the service offering we take into consideration the case of Customer to Business payments (C2B) as this is the most common case in which RMPs are used and both case study subject companies do not offer other types of MP at the time this research is conducted.

This thesis will examine RMP towards their contribution to a Universal Mobile Payments System. Two existing RMP services are analyzed and evaluated following the STOF framework (Faber, Ballon, Bouwman, Haaker, Rietkerk, & Steen, 2003) stress test. We try to answer what factors related to business model design issues prevent RMP from operating through UMPS.

1.6 - Outline

In chapter 2 we describe the domain of payments and then focus on MP where we show possible MP solutions. We present the related stakeholders and create a view of the MP ecosystem. In chapter 3 we present the research approach of the project and explain its theoretical base. In chapter 4 we present the results of the case study for the test cases chosen in this research. In chapter 5 we extend the use of the results to create uncertainty models, which show the robustness of each business case. In chapter 6 we conclude with the answers to the research questions remarks towards gaps to be examined by future research.

Chapter 2 - Domain Description

2.1 - Payments Market

In the payments market there is a number of different solutions that can be used for completing payment transactions. In this chapter these solutions are presented and described in order to create an overview of the payments' domain and understand where MPs stand, what the added value offered is and what is the relation with the other payment means. A person willing to complete a payment transaction can choose among a number of different options, depending on the situation at hand. Solutions offered in the payments market can be divided in two distinct groups, depending on the means used by the parties executing the transaction, cash and non-cash payments. Payer and payee, prior to starting the transaction, need to agree on the payment method to be used. Selection among the different payment methods depends on the distance between the transaction participators and the time period within which the funds transfer need to be completed.

In close distance transactions cash is the most preferred payment mean. Cash has the benefit of carrying monetary value for the bearer without the need of any identification. A payer can transfer cash to the payee in a close distance transaction. A payer can also mail cash to the payee through any kind of post system but in case of a breach in this process the payer would lose his funds and the payee would lose his transaction income without being able to find the person responsible for the breach. Therefore, cash is an anonymous and instant payment mean, which can be used for immediate fund transfers in close distance payment transactions. In the case of remote distance transactions cash remains an option but since there are non-cash payment means bearing less risk, are preferred over anonymous and instant cash. In person-to-person transactions cash payments have been traditionally the prevailing choice but it is also important to notice that there are new options for the non-cash payments, in which mobile payments try to form a new standard.

Cash transactions surpass non-cash transactions but cash transactions value is lower than that of non-cash transactions. Non-cash transactions in Europe have showed an average growth rate of 5.5% in 2001-2009, and still show positive sign.. In 2009 mobile payments accounted for 4% of non-cash payments while the outlooks predicted a nearly 50% rise in transactions volume per year (WPR,

2011). The mix of non-cash payment transactions has changed substantially in the last years, showing a great shift towards electronic forms of payment completion. We consequently realize the shift of the payments market towards non-cash solutions that are proven to be “cheaper” and more processing efficient, i.e. lower transaction costs.

Mobile payments are one of the many solutions in non-cash payments. Currently mobile payments meet a low use rate but are expected to have a great rise of transaction volumes in the coming years.

In the following part the available payment options (2.1) are presented and described in order to understand the domain in which mobile payments are used. A description of Mobile Payments follows (2.2). In the next part the stakeholders of the mobile payments value chain are presented (2.4) together with their roles and (2.3) the ecosystem of mobile payments is described. Concluding, the business models of MP are described (2.5)

2.1.1 - Cash Payment

A cash payment is a form of liquid funds transfer given by a consumer to a provider of goods or services as a compensation for receiving these products. In most domestic business transactions, a cash payment will typically be made in the currency of the country where the transaction takes place, either in paper currency, in coins or in an appropriate combination (BD, 2012). It is essential that both the payer and payee accept the validity of the currency issuer. Cash payments have traditionally been the preferred choice for person-to-person transactions as well as transactions completion at a point of sale. Cost of cash payments is higher than the cost of non-cash payment instruments and a shift towards non-cash payments can be seen in the payments market (WPR, 2011).

Mobile payments might erode the market share of cash payments since one of the capabilities offered is payments execution *at the point of sale* (hereafter “PoS”). Additionally, in MPs every mobile device can act as a point of sale and thus fully substitute all operations in cash transactions. Such is the case that mobile payments seem to have all the potential for taking the place of cash but the associated technology requirements keep acceptance rates low. Furthermore, issues such as anonymity and inability of transaction history access are for the moment, unrivaled.

2.1.2 - Card payment

Card payments are payment transactions enabled by a data and organizational network where both the payer and payee accept the validity of the card instrument and use it in order to transcribe the details of a transaction via data transfer on the interaction. Depending on the type of the payment card the transaction value can be deducted by the payer’s funds instantly (debit) or paid within a prearranged period (credit). Available card types and payment schemes are not of importance for this research. It should be noted though that card based proximity mobile payments, based on NFC technology, (e.g. Visa PayWave [VPW] (2012)) are trying to take over the typical case of magnetic striped card payment solutions, but this research will be focused on phone-based MP solutions.

For the moment most mobile payment solutions use the existing card payments’ infrastructure for the identification and account “connection” of an actor willing to participate in a payment transaction. Additionally, the solutions’ business models do not include other billing bodies than FIs and thus the connection with a bank account holding the payer’s/payee’s funds is inevitable.

2.1.3 - Direct Debit payment

Direct debit payment transactions are preauthorized payments executed by the payee upon whom the payer has given the right of withdrawing funds from an account. Profoundly, in this case the payer himself has both the right of withdrawing funds from the account in question as well as the right of defining another party who will be able to withdraw funds from the same account. The case of direct debit payments is mostly present for fixed amounts in recurring payments of cases such as rent, utility bills or fees payment.

MPs are not a direct competitor for this case of payments although the initiation of such payment contracts could be done through a mobile device, as an advancement of the existing solution. Such a case is not of importance for this research and therefore will not be further discussed.

2.1.4 - Credit Transfer payment

Credit transfer payments are payments in which the payer transfers funds from an account under his jurisdiction to the payee's account. In this kind of payment the payer orders the FI to withdraw an amount from his account and credit this amount to the account of the payee. The FI is responsible for completing the payment while the payer is only responsible for having the amount available in his account.

MPs can substitute traditional credit transfers although the only actual change is the interface used in order to initiate and complete the transaction since in most cases credit transfers are executed between FIs in which MPs' users own an account. In credit transfers the payer knows the payee's account details and directly orders a FI to execute a funds transfer. In MP the initiation of the credit transfer is done through a mobile device but there is no guarantee that the connection between payer and payee will not have intermediate "nodes". MPs are therefore a generalized alternative means for performing a credit transfer.

2.1.5 - Cheque payment

A cheque payment is a payment order given to a FI defining an account out of which funds should be withdrawn and transferred (the method of transfer relies upon the payee's interest) to the payee presenting the cheque. The payer in this case declares the amount and date of the transaction leaving the payee responsible for its completion. Cheque payment is a payment promise since the payer provides the payee with a "contract" which gives him the right to withdraw funds from a designated account on a designated time period, so the actual fund transfer is not completed by the end of payer's and payee's interaction. Cheque payments are becoming less common in Western Europe, although they are still popular in U.S.A (WPR, 2011).

MPs can't be seen as directly competing cheque payments. It is also valuable to notice that cheque payments tend to meet low popularity among the preferred choices in the last decade (WPR, 2011). Cheque payments can be compared to credit cards. The profound difference in credit cards is the immediate transfer of the transaction amount to the payee's account. The payment promise remains for the payer but in this case the card issuer collects the funds and not the payee.

2.1.6 - Payment Instruments Statistics

Below an overview of the payment means used globally is presented. A descriptive report can be found in (WPR, 2011) out of which here are presented the most interesting views related to this research project.

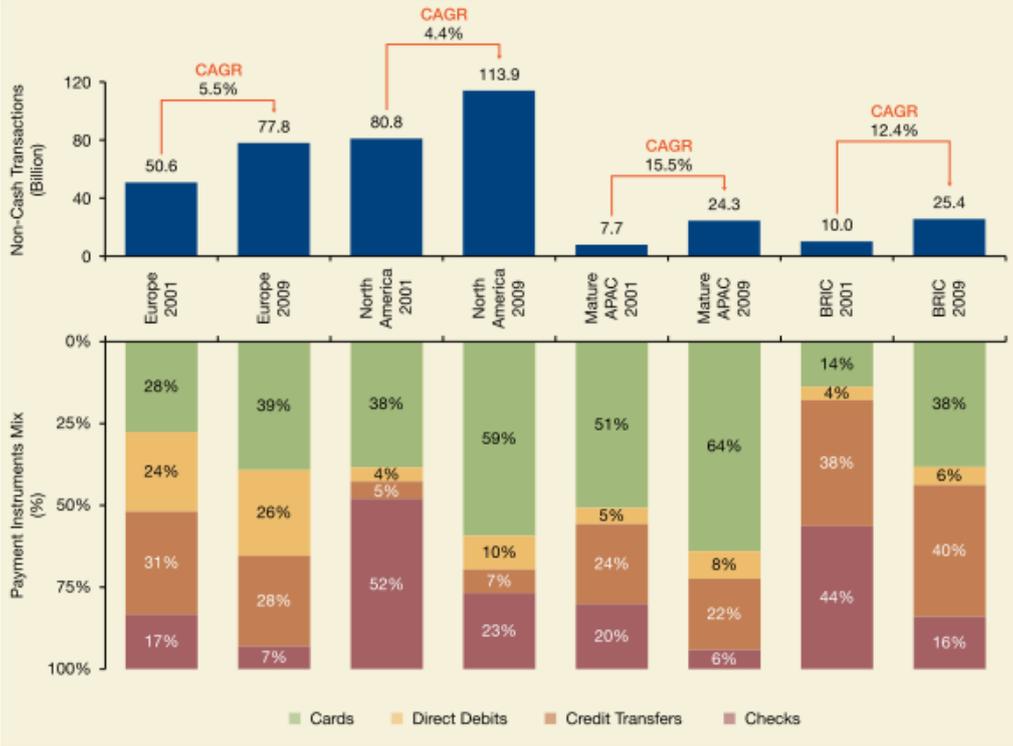


Figure 4 - Comparison of Non-Cash Transactions by Region (Billion) and Change in Payment Instruments Mix (%) 2001 vs. 2009 (WPR, 2011)

In Figure 4 we can see the payment instruments mix changes over a decade’s period. The different economies’ maturity is clearly visible in this figure where APAC 2001 Card transactions account for 51% while at the same time in BRIC they only reach 14%. Situational factors form as well big differences even between advanced economies. In such a case we can see that Check payments in North America account for 52% in 2001 while at the same time in Europe they only hold a 17% market share. What is important to notice in the above graph is the shift towards the electronic based payments card payments and the decline of check payments. Figure 5 shows the global payment instruments mix for 2001 and 2009. Direct debits and Credit transfers show small differentiation through the decade, on the contrary Check payments decline by 60% while Card payments rise by 53%. The shift from paper based payment instruments to electronic payments clearly describes the market’s trend to more technologically advanced, and less manually processed, payment options (Hancock, Humphrey, & Wilcox, 1999).

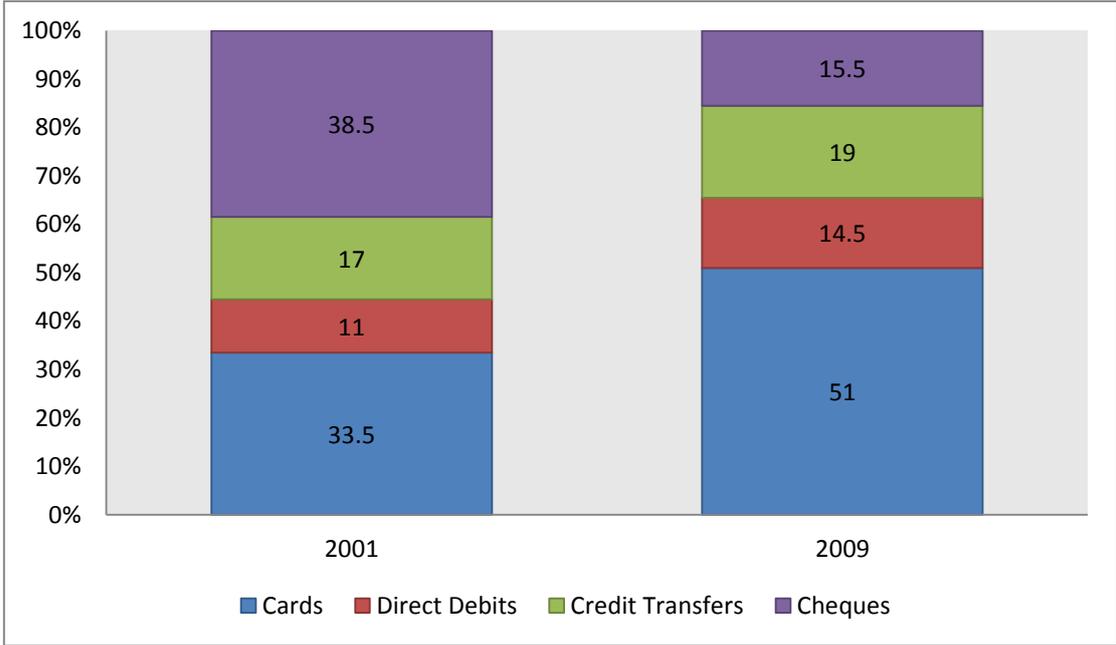


Figure 5 - Change in Payment Instruments Mix (%) 2001 vs. 2009 (WPR, 2011)

Card Transactions took over a large part of the cheque transactions decline. As cash and paper-based non-cash payments rely on manual labor, mechanical processing and land/air transportation, they incur high transaction costs that according to Bauer and Ferrier (1996) lead to a 9.7% production costs increase for every 10% of volume increase. Electronic payments incur higher start-up costs compared to paper-based payments but are by far cheaper as transaction volume rises (Bauer & Ferrier, 1996). Such an argument can explain the move from cheque payments to card payments as infrastructure barriers were overridden by internet diffusion and technology advancements.

Emergence of mobile devices as a technology channel for payments led to the introduction of MPs which have quickly grown their market share in the last decade (WPR, 2011). Market reports predict an outstanding growth rate of 68% for the mobile payments market share in the coming years (Taga & Oswald, 2010) and even surpassing card transaction within the next decade (NFC World, 2011)

Concluding, we can say that global use of cash payments is still endemic, especially for low-value retail transactions (WPR, 2011). Cost of cash is one of the reasons that shift to non-cash payments were pushed by the market and in the same time why MPs advancement is as well fueled. Payment instruments mix changes significantly depending on the time and location measured but a commonality found in all the markets is the relation to technology diffusion and dependence with existing infrastructures. MPs are on the cutting edge of innovation, and thus have the potential to be a powerful tool to develop payments in emerging economies (WPR, 2011).

2.2 - Mobile Payments

MPs are classified as micro-payments and macro-payments depending on the amount of the transaction. The threshold for defining the category in which a payment belongs is the value of 10 €/€ (Mallat, Rossi, & Tuunainen, 2004). Furthermore, depending on the distance of the actors participating in the transaction, MPs are subdivided in Remote Mobile Payments (hereafter “RMP”) and Proximity Mobile Payments (hereafter “PMP”). The matrix presented in Figure 6 shows the way in which mobile payments are classified depending on the transaction amount and the distance between transaction’s participants. The horizontal axis presents the *Payment Type* classification and the vertical axis presents the *Payment Amount* classification. Each quadrant consists also a number of examples cases in which a mobile payment solution is or could be offered. Mallat et al. (2004) claim that payments executed on a close distance, using a PoS are PMPs, while payments executed through an electronic network are RMPs. PMPs need to have a close distance between the participants in order to complete while for RMP distance between the participants does not affect transaction completion. So, the electronic network facilitation does not guarantee that a MP is a RMP since PMP are also handled by and completed through an electronic network (Innopay, 2011). Because of this vague statement we consider one more dimension in Figure 6-Mobile Payment categories (Alliance, 2007) classification matrix for PMP and RMP distinction based on existing technology enablers. In the case of PMPs contactless technologies such as NFC are used while in RMPS the transaction is completed through a mobile network platform.

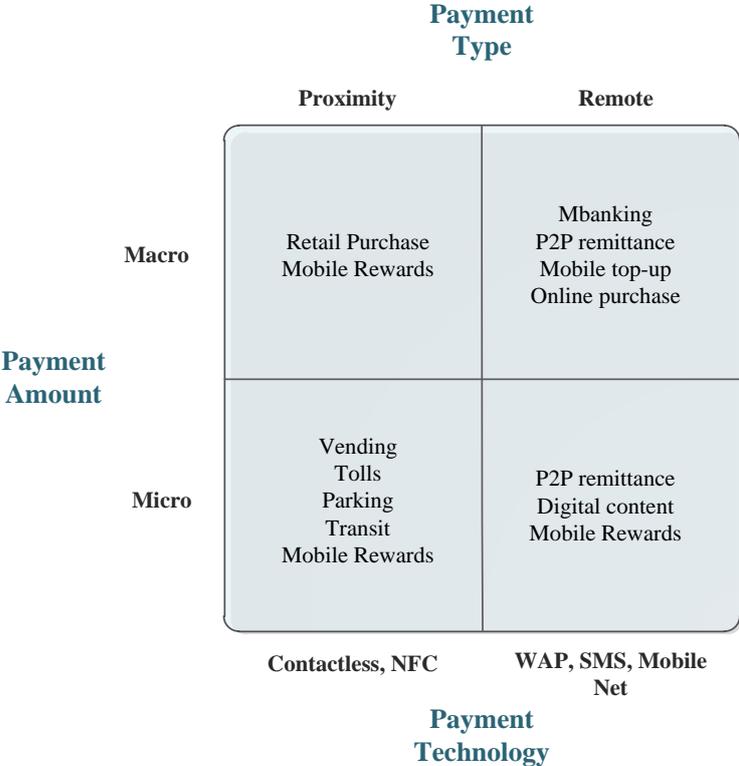


Figure 6-Mobile Payment categories (Alliance, 2007)

Available technology and platforms advancement, have given rise to a number of different solutions which have been introduced to the market. Mobile devices can be used in order to send and receive payments in a customer-to-customer context as well as in a customer to business context. Figure 7- Mobile Payments market solutions presents these solutions while also giving some indicative examples on the companies offering such solutions.

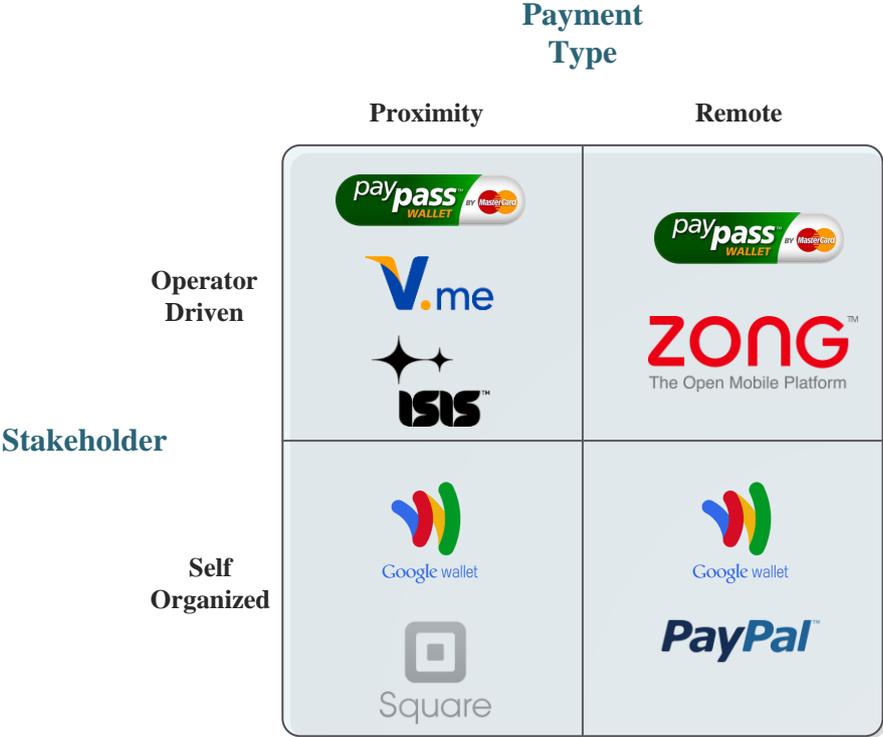


Figure 7-Mobile Payments market solutions

The horizontal axis is used for classifying PMP and RMP solutions and the vertical axis for dividing between operator driven (FI, MNO) and self-organized (WebCo) stakeholders’ solutions, follow Ondrus and Pigneur (2006) line of thought.

Interest of the involved stakeholders has been strong, mostly because of their common belief in the future success of the Mobile Payments market (Herzberg, 2003). On one side MNOs wanted to pay off their investments in 3G networks and create revenue streams from MP services (Ondrus & Pigneur, 2006), on the other we can see that FIs do not want to give-up their role as regulators of financial transactions and/or lose customer ownership so they try to fortify their part in the expected revenue streams. Recent market reports validate these beliefs by showing a significant rate for MP penetration in the payments market (WPR, 2011).

Although the dynamics of business models’ definition in MPs are different for each case, the main factor influencing stakeholders who will take part in the value chain is the proximity-remote classification. This is because of the difference in the facilitating network infrastructure and the way in which technology limitations give additional control to specific actors. In order to understand the differences, below we present an overview of the two MP solutions regarding the offered service, technological framework, deriving organizational network and financial aspects (Faber et al., 2003).

➤ *Proximity Mobile Payments*

Service: Provider offers close distance payments to end users. Close distance (characteristic) comes down as the need for a close distance electronic interaction between the payer and the payee in order to complete the transaction. In the most common scenario such a payment is realized through mobile devices and a PoS.

Technology: Technology aspects of PMP are mostly focused on the part of security and interaction between payer and payee. Transaction security is the limiting factor as a hardware component called Secure Element (hereafter “SE”) needs to be used in order to achieve the required security level. On the interaction part, the most common scenario uses a mobile device and a PoS, which communicate through Near Field Communication (hereafter “NFC”) or another close distance bidirectional technology. Hence, PMP are hardware dependent a service provider and secure element manager to reach an agreement and present an offering for the service to end-users.

Organization: For a PMP to be executed the essential parties are the Financial Service provider, Network Operator and Secure Element issuer for providing access to SE hardware component. The financial service provider is responsible for the funds transfer. The SE manager needs to facilitate the access of the service provider on the SE which exists in the end-user’s device. In most of the cases SE manager is the MNO providing the device to the end-user and therefore financial service providers negotiate with MNOs in order to offer MP services. Negotiations have turned into conflicts in many cases, leaving end-users without MP services (Ondrus & Pigneur, 2009; NFC Times, 2012) .Depending on situational and business factors there are actors’ configurations that create different value networks and, therefore, additional stakeholders might be involved in the organizational network.

Finance: Financial arrangements depend on the actors involved in the value chain at hand. Revenue sharing includes FIs and scheme handlers. In PMP, MNOs try to participate in the value chain by charging scheme handlers for SE access.

➤ *Remote Mobile Payments*

Service: Provider offers payments executed through a mobile device to end users regardless of the distance between payer and payee.

Technology: Technology aspects of RMP deal with security and interaction but are mostly focused on the platform for execution rather than the characteristics of the device participating in the transaction. Same as PMP, a SE is a necessity but is not mandatory for a transaction to be completed. This shows why for RMP we deal more with the platform used in payments execution rather than the enabling devices.

Organization: For a RMP to be executed the essential parties are the Financial Service provider and Payment Service Provider. Financial Service providers ensure the existence of a financial organization holding the funds to be transferred. Payment service providers in this case have no power over the transaction as they do not control any part of it but only provide communication between transaction participants. Although, for RMP as well, depending on situational and business factors there are actors’ configurations that create different value networks and, therefore, additional stakeholders might be involved in the organizational network.

Finance: Financial arrangements depend on the actors involved in the value chain at hand. Revenue sharing includes FIs and scheme handlers. In RMP, MNOs have small control over transactions and therefore small margins for negotiating their participation in the scheme.

Furthermore, depending on the payee in a MP transaction we can have different MP categories. A descriptive quadrant is presented in Figure 8-Mobile Payment categories (Innopay, 2011) (Innopay, 2011).

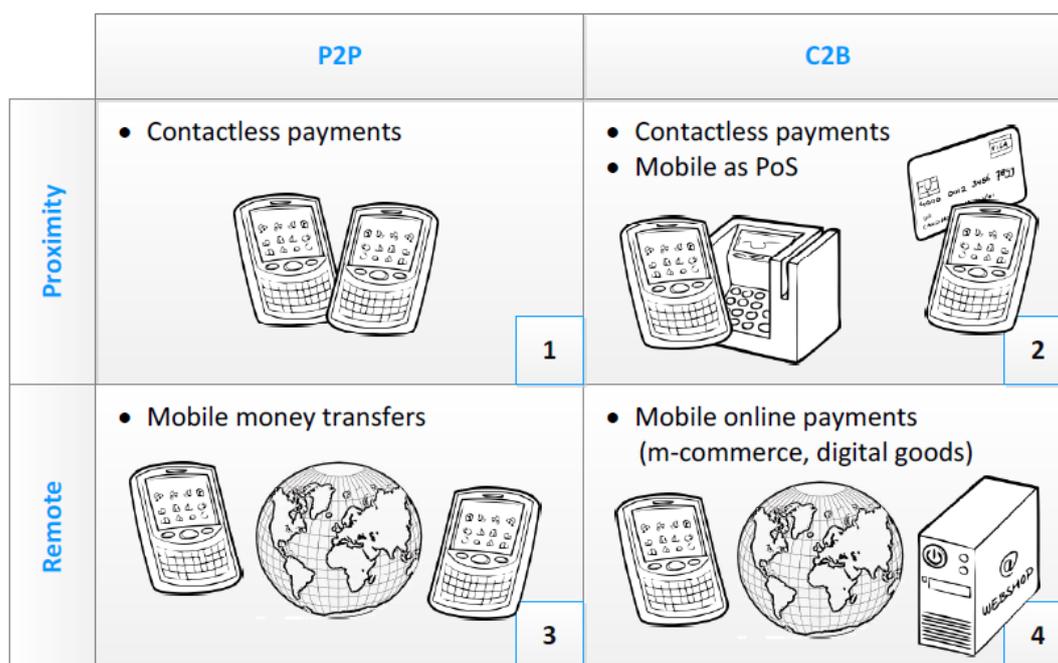


Figure 8-Mobile Payment categories (Innopay, 2011)

Payee can either be a person or a business (merchant) and the associated schemes and business models follow a differentiated approach depending on the case. Figure 8 further distinguishes solutions between proximity and remote payments.

In quadrant 1 lay the category of Person to Person (P2P) PMPs, where payer and payee interact from a close distance and complete a fund transfer between them (payment, remittance). Currently there is not a widely used and accepted business model for this case, although there is a great potential in the market of P2P PMP.

In quadrant 2 the payee is a business and associated business models can have two “profiles”. Consumer profile where mobile is used as a card at a PoS terminal (mobile at PoS) and merchant profile, where mobile is used as a PoS terminal (mobile as PoS).

For quadrants 3 and 4 although the payee changes, in both cases payments are performed over a payment platform. Existing business models give more options to merchants as per which service offering they want to choose and how they want to be charged. MNO Billing or other independent payment platforms are the most common solution in this section of MP.

2.3 - Mobile Payments Ecosystem

Mobile Payments' ecosystem includes all these parties who are interested in creating value from the emergence of MP. Suggesting a concrete and tight ecosystem description, for the case of MP, would comprise a vague representation. The value creator is the consumer but there is a large scope of solutions covered under the MP category giving the option of considering various parts of MP as the core of the ecosystem, depending on the question at hand. Different approaches and business models can be examined under different central ecosystem "regulators'" views. In this part we present a Mobile Payment Transaction-centric view. Mobile Payment Transaction-centric view gives a representation based on the idea that the transaction is the core of the ecosystem and shows how the key stakeholders are classified in different levels depending on their connection to the transaction as an entity. This representation also shows the importance of each stakeholder for the existence of MP.

In the ecosystem model of Figure 9-Transaction centric Mobile Payments ecosystem we create a representation of how available literature and market insights describe MPs from a transaction centric perspective. The stakeholders are categorized and modeled according to their level of relation with the transaction. This approach follows Clarkson's (1995) suggestion where primary stakeholders are the ones who are essential for the survival and well-being of an organization. Although MPs arena is not an organization we consider the MP ecosystem as a valid organizational network in which Clarkson's (1995) arguments are valid. Therefore, customer and merchant are found on level 1 "distance" from the transaction as they are the initiators of a transaction and directly interested in the outcome. On level 2, we can see transaction enablers/participators. FI, TSM and MNO are the parties who handle the transaction details and provide level 1 parties with a result regarding the acceptance or decline of the transaction while following the agreed payment scheme and settling the payment. Clarkson (1995) defines secondary stakeholders as those with whom an organization interacts but interactions are complementary rather than essential. Our model's level 2 stakeholders' roles are essential for the completion of a MP transaction but the actor performing the role does not have to fit into our classification (FI, MNO, TSM). Therefore, the role performed by level 2 stakeholders is that of a primary stakeholder but FI, TSM and MNO are secondary stakeholders as their place can be taken up by other actors (e.g. WebCOs). On level 3, we find the parties who facilitate and provide the framework for MP transaction execution. Technology providers take care of the platform on which MP are executed while also promoting universality and interoperability. Of course directions about which standards are used come from the business enablers of MP (such as FIs and MNOS). Government and regulatory bodies provide the legal framework under which MP are executed and ensure a safe and secure experience. All level 3 stakeholders are secondary stakeholders for the MP ecosystem.

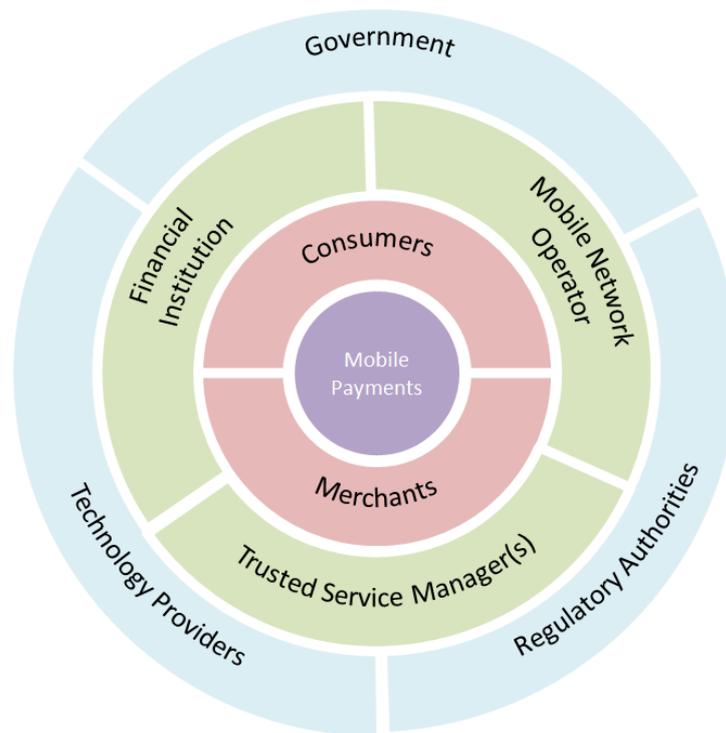


Figure 9-Transaction centric Mobile Payments ecosystem

2.4 - Stakeholder Analysis

Mobile Payments market is an example of a service offered via a multisided platform where different groups of actors emerge and interact (Ondrus & Lyytinen, 2011). On one side we have Payment Service Providers (hereafter “PSP”) and on the other side we see consumers and merchants. These actors are the most evident ones when thinking about MPs and money transactions, but we also need to consider technology manufacturers and government (as a regulatory body) because of their control over specific parts in mobile payments ecosystem which depicts how important their role is or can be (Karnouskos, 2004). Clarkson (1995) defines stakeholders as “persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, or future”. We adopt Clarkson’s definition and try to depict primary and secondary stakeholders of the MP arena. In the following sections the MPs’ stakeholders are presented and their interest in the service offered is depicted. We first show the primary stakeholder roles (2.4.1-2.4.3) and then present the secondary stakeholders (2.4.3, 2.4.4) as classified by Clarkson (1995).

2.4.1 - Payment Service Providers (PSPs)

Payment Service Providers’ category includes the stakeholders delivering the service of mobile payments to the parties in need of completing a payment transaction by using a mobile device. Identified stakeholders in this case are Mobile Network Operators, Financial Institutions and Trusted Service Managers. In the following sections we examine each one of the stakeholders towards the interest and relation to the development of MP platform as well as its operation. Subsequently, we

will be able to understand how each stakeholder formulates a strategy plan to follow, how is connected to the MP arena and what are the control points over MP procedures.

2.4.1.1 - Mobile Network Operators (MNOs)

MNOs have to face the decrease of voice-based services profit and the increase of demand for mobile broadband capacity, leading to higher costs and lower revenues. MNOs see the need to find ways to incorporate this change in their product mix demand and create new revenue streams from added value services such as mobile payments (Markendahl, 2011).

MPs bring higher data usage volumes for MNOs, who have made large infrastructure investments in the last decades and are investing in every technology helping payoff (Ondrus & Pigneur, 2006). Additionally, MNOs control the access keys for hardware parts on mobile devices which are essential for meeting current security requirements. Any PSP willing to offer an MP solution will need to get access on this internal device hardware (as long as no accessory or removable devices are used together with the mobile device) and selling the access rights is the MNOs' strategic choice which will define profit levels coming from MPs. FIs and TSMs are negotiating with MNOs for the abovementioned access rights while also getting in contact with Technology Manufacturers in order to promote their requirements. Therefore, MNOs act as an intermediary between FIs/TSMs and the mobile device customers while also standing between the communicating with Technology Manufacturers.

Across the globe, MNOs currently introduce different types of MP solutions to their customers. We observe that MNOs actively get engaged in MPs' value chains and try to capture parts of the revenue streams. Some examples are:

- Safaricom, in Kenya, has introduced a popular SMS based solution called M-Pesa (2012). M-Pesa allows users to deposit, withdraw and transfer funds.
- In the United States T-Mobile has partnered with AT&T and Verizon and formed a consortium for introducing proximity MPs, called ISIS (2012) . ISIS launched a pilot in October 2012.

We should clarify that MNOs develop and introduce solutions for MP but all of them, so far, require an assisting FI which will provide the network connection to the existing banking network which is used in order to finance the MNOs' MP network. In most of the cases, the service is offered by a different named company which is funded by the participating parties (M-Pesa, ISIS, etc.). MNOs foresee a great value in the upcoming mobile payments market and try to introduce solutions of their own before they are passed by market's advancement.

2.4.1.2 - Financial Institutions (FIs)

Financial Institutions act as depository institutions offering a number of different banking services in order to maximize their financial assets (market definition and analysis antitrust banking, 1997). There also exist non-depository financial institutions which are of no relevance for this research as the type of services offered by them (mutual funds, leasing services, brokerage etc.) are not related to MP systems at the time this research is executed. Our interest lies in the market of financial services typically offered by banks.

As MPs roll out we see banks trying to protect their position in the value chain vis-à-vis to MNOs effort of controlling revenue streams and customer data, substituting in a way the Banks' presence. Banks in this case are trying to achieve multiple goals, specifically by adding an extra channel to their channel-mix, and start offering MP services to their customers. On one hand, motivated by protecting their position and by not being excluded from future payment solutions offered by MNOs (Zheng, 2003) and on the other hand, trying to reach new customers by implementing ICT solutions as well as by remaining attractive to their existing customers by reducing costs of the used channels (Matthäus-Maier & Von Pischke, 2009).

Banks own and control a global payment platform/network which will be the basis for the execution of MP and thus have a great advantage over other actors in the MP Ecosystem. Despite their experience on financial transactions, though, banks mostly have a defensive attitude towards MP, which results in being vulnerable to initiatives of start-up companies who reply to the fast and evolving market environment.

Together with banks credit card institutions (hereafter "CCI"), such as Visa and MasterCard, have interest in MPs since a potential proliferation of MPs which would not be based on the use of card systems (i.e. MNO billing, bank account supported etc.) would minimize their market share and could even put them out of business. From another perspective, CCIs are the owners and network controllers of the banks' issued credit cards. FIs side in the MP arena can be said to be jointly represented by banks and CCI since they are equally dependent on each other's transaction volumes. CCI can create new revenue streams for their business from MP emergence as they can access niche markets like the one of low value payments. According to the WPR (2011) low value payments are an important reason for high cash circulation and both governments, FIs and CCI want to turn this market to cashless payment means.

2.4.1.3 - Trusted Service Managers

Trusted Service Managers (TSM) category includes the parties willing to act as a bridge between the multiple FIs, MNOs, merchants, consumers, technology manufacturers etc. TSMs are the intermediates in the completion of the MP service offered and take actions with the purpose of delivering high quality end-to-end services rather than try to promote the strategic goals of a specific partner in the network. In the past such companies resulted in either total failure or in huge success (e.g. PayPal (Prasanth & Gupta, 2004)), illustrating the winner-takes-all scenario, which is common in markets with network externalities.

According to Kountz (2010), TSM has the role of the infrastructure enabler for MP, while also promoting trust and confidence in the ecosystem.

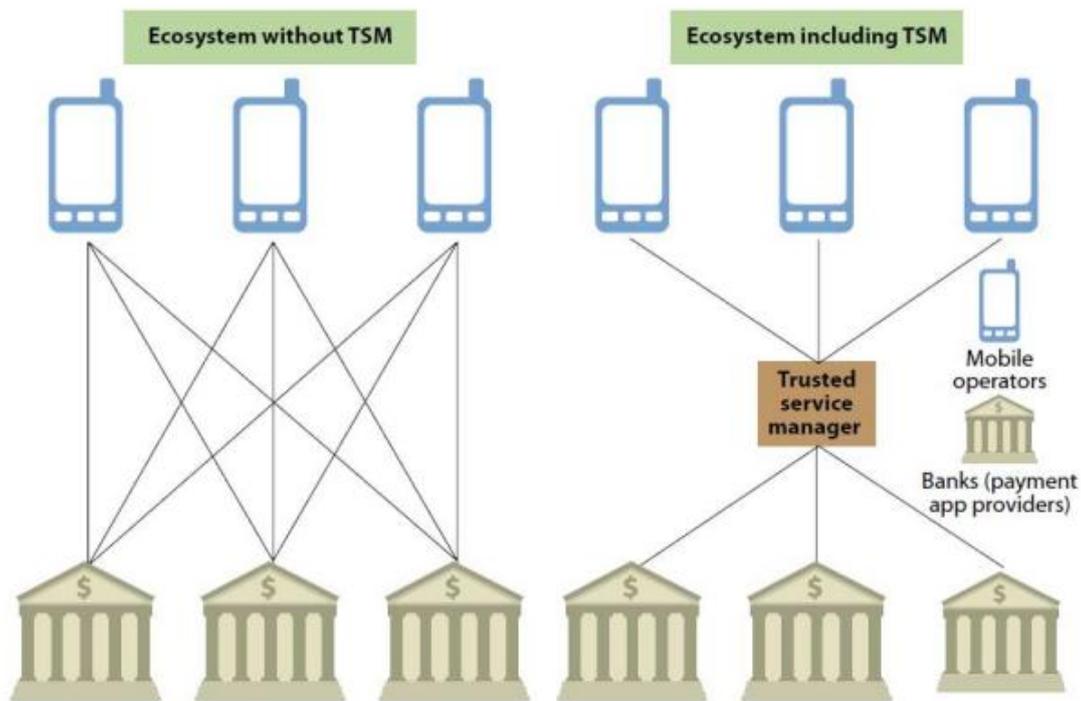


Figure 10 – TSM Role Ecosystem (Kountz, 2010)

A TSM has to deliver a two-fold service. On one side TSM acts as a service provider (hereafter “SP TSM”), being thus responsible for the designated service delivery (in this case payment/money transfer), and on the other side acts as a secure element issuer (hereafter “SEI TSM”), being responsible for providing a hardware device or software solution which will ensure secure service provision. Therefore, SP TSM needs to have FI support for providing payment and transaction services while SEI TSM co-operates with SE managers for ensuring and delivering a secure infrastructure for the execution of payments and fund transfers.

For MP, powerful stakeholders such as FIs and MNOs have established initiatives forming TSM organizations in order to regulate strategic moves of the market according to their interest rather than being driven by the market’s will. Following this model, T-mobile, AT&T and Verizon in the USA have teamed up and formed the ISIS (2012). In this case, MNOs formed the joint venture company enabling the SEI TSM part. For the SP TSM part an agreement was made between the TSM and three FIs, namely American Express, Capital One and JP Morgan Chase.

Other than these efforts, there are numerous start-ups and firms offering MP solutions, acting as service providers, willing to team up with MNOs and/or FIs in order to offer added-value services to consumers. Such is the case of Zong (2012), an eBay financed MP company which is promoting MNO billing. Zong offers MNOs an agreement in which MNOs offer a MP solution operating via Zong’s platform while splitting transaction fees’ revenues. The MNO then has a stand-alone solution for MP, maintains connection with the customer by being the billing party and escapes binding to investment, development and maintenance costs for the used payment platform. The response rate of MNOs to this initiative is indeed promising; in May 2012 Zong had a reach to 43 countries, providing support to more than 95% of MNO subscribers in these countries. Another indicative

example of such an effort is the Google Wallet (2012) initiative. Google Wallet was introduced in May 2011 and launched in September 2011. In this case the user was able to store credit and debit cards, loyalty points etc. in Google's application while it was possible to use it on places accepting the Google Checkout process. Upon the launch of the service Google had already teamed-up with Citibank as a financial institution, MasterCard as the payment network and Sprint as the mobile carrier. In August 2012, Google offered support for its wallet to operate accepting all available credit cards and being NFC compatible with MasterCard PayPass PoS terminals.

2.4.2 - Merchants

In a standard Mobile Payments scenario a payer sends a monetary value to a payee. As this is applied in the existing market structure the payer would be consumer/customer and a payee would be a merchant. Merchants play a crucial role in the mobile payments ecosystem, and their willingness to adopt is crucial for the proliferation of mobile payment options. Merchants comprise one of the two ends in a monetary transaction path and thus are of main interest when analyzing MP.

The use of mobile payment solutions, from the merchants' side of view, offers faster transaction time, increased spending and enhanced customer loyalty (Alliance, 2007). Additionally, it can lead to costs reduction and time and location independence facilitates the sales of products and services (Mallat & Tuunainen, 2008). Such a case might be beneficial for merchants but the way and the incentives for merchants to adopt the proposed technology is what will actually define the diffusion within this group. There is resistance to be expected from merchants due to the fact that they have to manage yet another payment system, leading to additional costs. It is, though, inevitable for merchants to take form an opinion depending on what is offered from TSMs and other MP Service providers. There is currently a great interest in finding ways in which existing payment infrastructure can be used and thus minimize transition costs to MP technology.

Therefore, there are a number of prerequisites for the merchants to consider the adoption of mobile payments, different drivers that will help in realizing this change but also a number of barriers that need to be tackled (Mallat & Tuunainen, 2008).

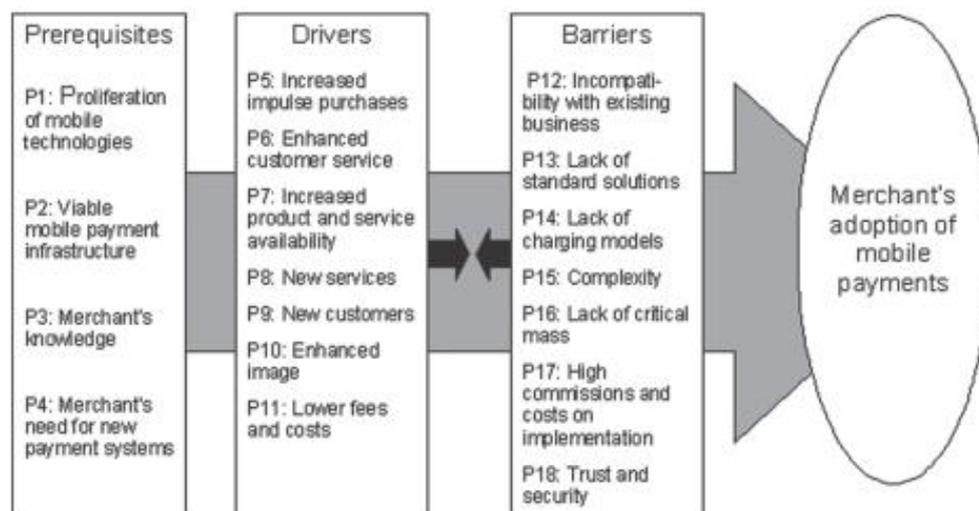


Figure 11 – Research framework for merchants' adoption (Mallat & Tuunainen, 2008)

A scenario which can depict merchants' potential of defining MPs' outcome in the payment market is that of the supermarket sector. Adoption of MP solutions by large supermarket companies can subsequently drive consumers' adoption and help in the diffusion of MP. In this example, the benefit for merchants lies in the combination of loyalty-schemes application with cashless payments, customers can then take advantage of offers and loyalty points gathering while MP Service providers reach the desired situation of MP acceptance.

2.4.3 - Consumers

Consumers pose the other end of the transaction flow described in the case of merchants. It is the consumers that will need to adapt to the change offered by merchants and choose mobile payments over other payment instruments. This makes clear that consumers can be said to have a big influence on the potential success of mobile payments. However, seeing the cross-side network externalities (also labeled as the chicken-and-egg problem) it remains to be seen if a critical mass of merchants or a critical mass of consumers will drive the breakthrough in the mobile payment market (Hoofnagle, Urban, & Li, 2012). It is the consumers who actually generate value for the other stakeholders and thus their choices define the success or failure of the used systems.

Consumers have crucial market power just by taking into account the fact that among the seven billion population, only two billion hold a bank account while there are five billion mobile phone users (S.W.I.F.T., 2012). Consumers will therefore define the strategies which will be followed by the other stakeholders as it is the consumers' needs which will need to be fulfilled by the proliferation of MP.

Therefore, the issue regarding consumers' part in the mobile payments ecosystem relies on consumers to adopt mobile payments as their preferred payment instrument. Existing literature presents numerous case studies and analyses regarding consumer acceptance of MP (Schierz, Schilke, & Wirtz, 2010; Mallat, 2007) mostly in an effort to explain why there have been failures in most of past cases while consumer acceptance has been so high in specific market situations, i.e. developing economies .

2.4.4 - Technology Providers

The group of Technology Providers (hereafter "TP") includes all these parties that provide the hardware and (secure) software solutions upon which a MP system is deployed and implemented. In the MP ecosystem, they are positioned on the same side together with the PSPs (Ondrus et al., 2011). TPs are the ones that introduce and embed technology systems, such as NFC and secure element chips, in the devices offered to the customer base. The degree in which TP choose to include such systems in their devices will determine the diffusion of technology enabling MPs. This can be accelerated by acting jointly with FIs in order to promote interoperability and acceptability of the systems (Ondrus et al., 2011).

Tps play such a significant role in the ecosystem since they are the ones who actually control the capabilities of the devices used in the transactions, thus affecting the deployment of MPs (Karnouskos, 2004). Their ability to define the security and usability of the new services is an adoption driver which cannot be overlooked (Alliance, 2007). The extent in which TPs are willing to

cooperate with each other and with other MP stakeholders to develop a common approach is their key influencing factor (Karnouskos, 2004).

We can therefore consider TP as enablers of MP who are responsible for delivering solutions tailored to the market and other stakeholders' needs. Hardware and software solutions to be used are a crucial part of the business model description but are outside the scope of this research. In our case we deal only with the service related issues in which TP are concerned. For MP this part is security provision and operational standardization.

2.4.5 - Government and Regulatory Agencies

In order to introduce MPs as a payment instrument it is necessary to comply with the legislation set by the government and maybe other regulatory agencies. For these actors in the ecosystem, MPs pose another instance of an infrastructure which will have to be regulated and controlled in order to detect, prevent and discipline fraudulent use while also describing the boundaries of the service operation, as well as safeguard the interest of incumbent parties.

Furthermore, it is also important to see the benefits for the governments' side which can help in understanding the importance and potential of MPs. It is known that payment services are not cheap: 5% or more of the value of an average consumer's purchase is dedicated to transaction costs while the total cost of a country's payment system may account for about 3% of the value of its GDP. Since electronic payments usually cost one-third to one-half that of paper-based transactions, substantial saving in social costs can be realized in shifting from paper to electronic payments and ultimately mobile payments (Hancock et al., 1999), without even taking into account the prevention and minimization of tax-escape. In addition, in many countries government controls organizations of public interest, which could benefit from the introduction and development of mobile payment systems, i.e. public transport.

2.5 - Mobile Payments Business Models

Existing literature gives many different approaches on what a business model is. Revenue models, a firm's position in the value chain, its role in value networks are some of the various definitions given. The fact that these definitions lack in cross-company collaboration perspective (Faber et al., 2003) drives us in using the definition given in (Faber et al., 2003). Therefore we consider that:

"A business model is the way a network of companies intends to create and capture value from the employment of technological opportunities"

In the following part, business models used in MP are presented in order to get an insight on what is the value proposition for each case.

2.5.1.1 - Mobile @ PoS

Mobile @ PoS describes these solutions of proximity Customer to Business (C2B) MP in which a mobile device is used as a wallet at a PoS in order to perform a monetary transaction.

On Mobile at the PoS, a mobile device is used as a wallet which holds funds or the necessary information in order to complete the fund transfer from the payer to the payee. This way, in the transaction executed the payer uses his mobile device at the payee's payment terminal (which could as well be a mobile device) and clears the payment in the agreed way. The payment settlement can be based on pre-loaded credit on the payer's device, which is transferred to the payee's compatible wallet or by issuing a payment order for the payer's financial provider to transfer funds to the payee's compatible account. The actual funds transfer to the payee's side can be completed instantly or in an agreed time depending on the scheme used in the transaction at hand.

Indicative examples of this business model are Google Wallet (2012) and ISIS (2012).

2.5.1.2 - Mobile as PoS

Mobile as PoS model describes proximity C2B MP where participants interact in a close distance and a mobile device is used as the technology infrastructure on the payee side. In this business model stakeholders capture the need of a payee for mobility and benefit from enabling technology.

One of the most popular solutions in this field is the case of Square (2012), in which a hardware accessory is used as an extension to a mobile device and gives the capability of scanning magnetic striped cards and charging the cardholder's account. The user of the service (payee) is charged by a flat rate for each transaction regardless of the cardholder's issuing FI or the MNO operating the mobile's connection. Square's business model has met great acceptance (over 1 million subscribers) since it is one of the few solutions giving the chance of completing a payment transaction without the need of a complex or expensive payment terminal while also offering full mobility. Additionally, the independence and universal acceptance of all FIs' credit cards, by being a self-organized solution and thus having no strategic preferences over specific companies, gives the value of interoperability which is highly appreciated by the market and one of the basic building blocks of successful business models.

Mobile @ PoS and Mobile as Pos are the business models which exist so far as the only left solution for proximity MP is that of contactless MP which is currently only offered through a payment platform.

2.5.1.3 - Payment Platform

RMP in most cases, either C2B or C2C, operate through a platform that depends on the involved stakeholders supporting it. Different business models are introduced from various stakeholders and each solution addresses a smaller or bigger part of RMP. RMP comprise the more interoperable and independent part of MP solutions. Interoperability is offered because of the universality (in most cases) in complying FIs and CCIs. Independence is based on the fact that no service providers (MNO, FI) can affect a platform's service delivery strategy. Service providers still are part of the transaction as they support the fund transfer infrastructure but the transaction is executed over an independent platform and thus can be considered as well independent of the operator.

A typical example for this case is PayPal Mobile Payments (2012) in which users registered on the platform can perform fund transfers to other users of the platform. Funds can be uploaded to the

platform through almost any FI payment structures or connect to the platform as extensions. This way when one needs to perform a fund transfer the transaction amount is instantly debited. In this model, distance between the participating payer and payee is not important and is thus considered a remote payment even in the case of a close distance payment. In this instance a trusted third party is becoming the financial service provider while also offering a platform for direct fund transfers to other platform users.

In another instance of this category, an MNO tries to be the trusted third party offering payments for which the payer is billed by the MNO. In many cases MNOs inability and neglect in creating such solutions has given ground to companies developing them and offering a partnership to MNOs. In a typical example the service is offered by an operator affiliated intermediary who is responsible for completing the fund transfer from the payer to the payee. In this scenario the payer transfers the funds to the payee through the intermediary's platform. The way in which the payer is billed is agreed upon the registration on the platform.

An indicative example is that of Zong (2012). Zong partners with MNOs and offers the service of goods purchasing (mostly digital at the time this research is performed) between different members participating in its platform. The payer is billed about his purchases on his MNO bill. In this specific case the MNO keeps a part of the transaction fees (35 to 50%) the rest of the fees are paid by the merchant and the remaining part is Zong's revenue of the transaction.

2.6 - Chapter Conclusions

The payments' market has seen a lot of changes in the last decades and consequently stakeholders are affected by them. An analysis on the payment means used shows us the benefits of each payment method and the most common related scenarios. We understand that paper based payments have a drawback when it comes to security of a transaction as well as the need for physical reach between participants. Non-paper based payment means raise the security but still (i.e. credit card) require the participants physical interaction for a transaction to be complete. In debit and credit transfers the payer and payee do not need to physically interact but might need to communicate with their FIs for completing transactions. The steps needed to complete this kind of transfers make such payment means inconvenient for day-to-day transactions and therefore they are not selected widely.

A verification of our arguments is given by the payment means statistics of WPR (2011), where a breakdown of the means used for 2001-2009 period is depicted. We can clearly distinguish the shift to non-paper based means and the favor over non location-specific payment means. Card payments show a steep increase in their use. Credit and direct debit transfers show an increase as well in spite of their inconvenience for users selecting them. It is important to keep in mind that e-banking has helped to this as electronically placed credit and direct debit transfer orders have taken away the need of physical communication between the payer and corresponding FI, thus improving convenience of the steps needed for the completion of such a transaction.

Following the line of thought about convenience, MP shows up as a prospective future solution to overtake other payment means. WPR (2011) shows promising adoption rates for MP. In order to understand the expectations we analyze MP solutions and see where they fit in the payments' market and how they can cover existing needs. In the next step an ecosystem view of MP is given where primary and secondary (Clarkson, 1995) stakeholders are depicted and then closely examined. The way each stakeholder is related to MPs is important for understanding what the interest of the stakeholder is.

Ending the chapter we see the business models in which MP solutions fit in. All of the currently used models substitute solutions where PoS are used. They try to either mimic the role of a PoS or communicate with one. Other solutions where a separate payment platform is used consider each mobile device a PoS or a node able to communicate with a PoS of the platform, depending on the intended use case scenario.

Through these steps we get a holistic view on payments, understand how MP emerged and grasp their intended delivered value. We are confident that this approach answers RQ1, *“How is the payment systems market structured and where do mobile payments stand regarding stakeholder involvement and acceptance?”*

Chapter 3 - Research Method

In order to answer the formulated research questions we follow an approach where we directly address two different aspects of the MPs business field.

On one hand an overview of the MP payments market is presented where key stakeholders are identified and their connection to MP value chain is depicted. By analyzing the market we can distinguish the role of each player and understand the purpose of delivering value to the network. Strategic positioning of players and their impact in market can help in understanding the reasoning behind each player's service offering. In this analysis we are able to identify dynamics in the ecosystem and principles in strategic decision-making.

On the other hand, we assess how existing solutions address MP service offering and how business models are structured. Addressing this aspect is done through examination of two popular solutions where their role in the market is depicted while also addressing their individual business models from a business model design framework point-of-view.

In this chapter the research method approach is presented and argued in order to provide a firm base on the steps followed to reach an answer regarding the formulated research questions.

3.1 - Research Approach

In the payments market we find organizations fitting in numerous roles and offering a wide range of services. When considering the organizations of this network as interconnected, interdependent and

dynamically co-evolving, we find ourselves with a notion of a Business Ecosystem definition. (Peltoniemi, 2006). In MPs, an ecosystem view of the organizations/actors delivering value is a way of identifying suppliers and distributors of services in the market as well as less immediate but powerful influencers of companies business (i.e. Government, Regulatory bodies etc.) (Anggraeni, Hartigh, & Zegveld, 2007).

It is also important to look at the structure and interactions of the organizations presented in ecosystem models as well as getting to understand the big picture by moving the analysis from the product level to the system level (Zhang, 2011). Therefore, a business ecosystem analysis has been the chosen approach for answering how the Mobile Payments market is structured and who the key stakeholders are. In this interconnected organizational network players can have multiple strategic roles. Iansiti & Levien (2004) suggest a framework for ecosystem strategy analysis (Figure 12) in which uncertainty and complexity dimensions define five common strategic roles in business ecosystem.

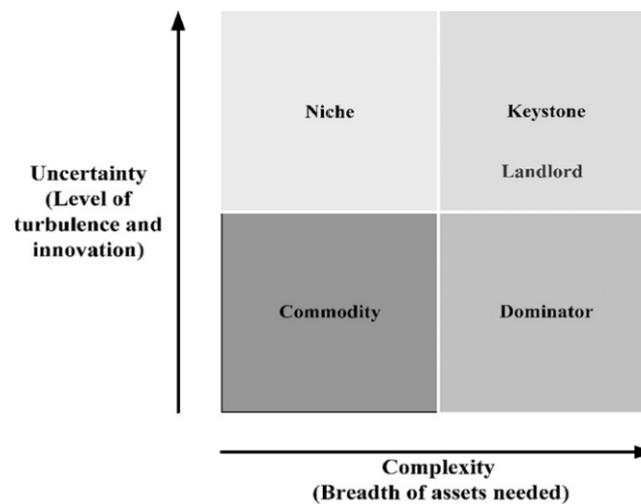


Figure 12 – Ecosystem Strategy analysis (Iansiti & Levien, 2004)

Namely the roles are:

- **Niche:** narrow domain focus, specialized assets and capabilities development
- **Keystone:** key ecosystem hub control, joint work for value creation, value sharing with contributors
- **Landlord:** key ecosystem hub control, maximum value extraction
- **Commodity:** lowest cost offering
- **Dominator:** vertical or horizontal integration where key assets can be controlled and maximum value extracted

Therefore, in business ecosystems actors control value and information flows while also extracting value from the network and services offered. Answering how the ideal state of UMPS can be reached from the current market's state needs to address the way in which organizations offering MP services operate. According to Hartley (2004) data rich analysis providing organizational strengths and weaknesses, as well as a framework for managing them, together with understanding the context as a factor of organizational behavior, are achieved through case study research. Therefore we conduct

a case study research approach for addressing the connection of existing MP solutions to UMPS. After constructing an ecosystem model and performing case study research, resulting views are analyzed towards research questions initially proposed and examined for further deriving conclusions.

The research approach followed in this thesis project is depicted in Figure 13.

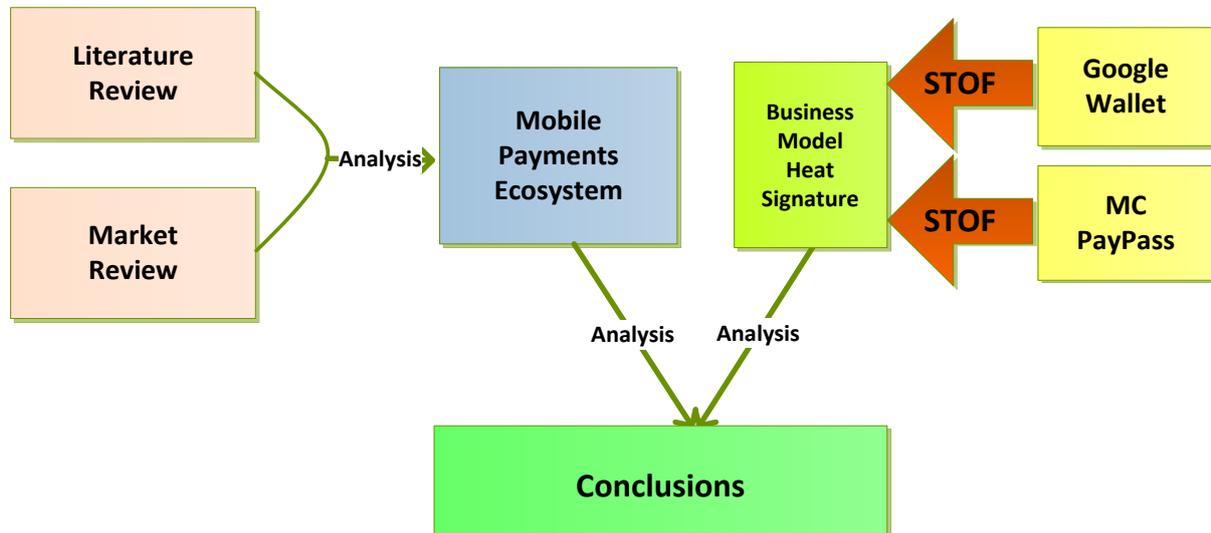


Figure 13 – Research Approach

3.2 - Data Collection

In pursuance of answering the research questions, a literature review was conducted on the topic of Mobile Payments where the theoretical framework for the research could be selected while also roles, prerequisites, challenges and market preferences are comprehended (Englund & Turesson, 2012). Literature review was based on research in the field of MP coming from academic journals, conferences, books, thesis projects, white papers from MP related organizations. Selection of literature was based on up-to-date information that could be extracted from the content but also included relatively old (more than 5 years) content which was found to be still valid for today's circumstances. At the same moment we addressed issues of the theoretical framework to be used which was not directly related to MP and found the theoretical foundations upon which our research is based. Scienedirect.com and Google Scholar (scholar.google.com) together with suggestions from the supervisors of this research were the main source of literature selection. Most common search terms used included "mobile payments", "mobile money", "mobile business models", "mobile payments consumers", "mobile payments merchants", "mobile payments procedures", "mobile payments literature", "business ecosystems", "business stakeholder analysis", "network externalities", "case study research". This way each aspect of the literature research was addressed and answered.

On the market review part volatility of the MP arena showed new services and updates about existing ones coming up almost every week. Therefore, data is gathered from press releases, officially traded information and other online sources. The websites used as sources were mostly NFCWorld.com, NFCTimes.com and PYMNTS.com. These online sources act as aggregators of news

and redirect to official organizations' press releases and information. In all cases the pursuit has been for sources that are of high quality and reliability levels.

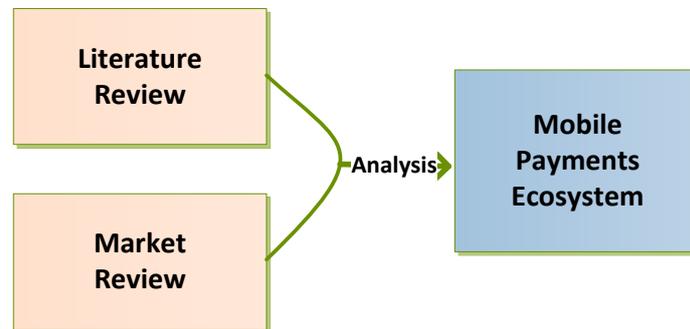


Figure 14 - Mobile Payments ecosystem approach

For the two case studies, data gathering was based on publicly available information as well as market insight coming from internship experience at a consulting company in the Netherlands. Additionally, interviews with the related project executives helped in validating business model parameters used in the stress test tool and verify the correctness of the resulting views which are used for answering the research questions. MP executives who were interviewed will remain anonymous. Their roles were the following:

- Project manager in MP initiatives in Europe (Interviewee 1)
- Senior MP project leader (Interviewee 2)
- Independent MP project manager working as a freelance consultant (Interviewee 3)
- International university academic professor focused on MP research (Interviewee 4)
- Project executive involved in the case studies of our research (Interviewee 5)
- Project manager involved in business model innovation (Interviewee 6)

The case studies examined are Google Wallet (further presented in 4.2) and MasterCard PayPass (further presented in 4.1). Despite the fact that both cases offer MP solutions for proximity and remote transactions, we only examine RMP. Case study companies were opportunistically selected for their convenience to reach, by matter of contacts, but also convenience of finding data available online.

The two case studies are examined from a theoretical framework point of view in order to extract information needed to address the research questions regarding MP diffusion and “distance” from UMPS. In order to address this topic we use a stress test tool (based on STOF (Faber et al, 2003)) which generates, so-called, Heat Signature maps where business models' design critical issues can be identified. Tool's inputs are business model characteristics and related uncertainties. Output is a color-map representation of the described business model. Further information about the theoretical framework is found in the next part of this chapter.

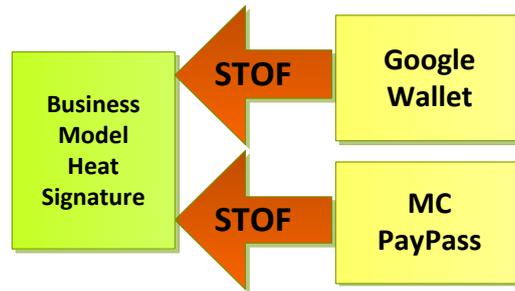


Figure 15 - Case study approach

3.3 - Theoretical Framework

3.3.1 - Case Selection

An interesting framework (Ondrus & Pigneur, 2006) presents a classification matrix for MP depending on their type (proximity or remote) and the service enabler. One could consider this framework as outdated because of its age and the rapid advancements in MP, but its implications are valid since a universal standard has not yet been developed and market status can be expressed through this matrix. The suggested framework talks about PMP but we can extend the classification matrix based on common sense, saying that it describes the options in RMP solutions on cells II and IV since the only difference occurring is the network through which the payment is executed. From the matrix we can see that the four cells depict different cases for MP business models.

	Card Based	Phone Based
Operator Driven (Banks, MNOs)	I	II
Self-Organized (Newcomers, Intermediaries)	III	IV

Figure 16- Payment solutions classification matrix (Ondrus & Pigneur, 2006)

Cell I describes smart card payment schemes which are driven by FIs or MNOs.

Cell II describes phone-based payment systems operated by FIs or MNOs.

Cell III describes independent payment schemes using cards.

Cell IV describes independent MP solutions using a mobile phone.

In this framework MNOs are grouped together with FIs, as they are the operators of payment transactions. This shows that we can also consider them as one stakeholder who offers “Operator Driven” solutions. Ondrus & Pigneur (2006) classification matrix can be combined with the previously presented quadrants in order to create a universal matrix that would describe the solutions available

as well as the related stakeholders while taking into account the mobile payments' characteristics and the payment market's characteristics. This matrix is presented in Figure 17.

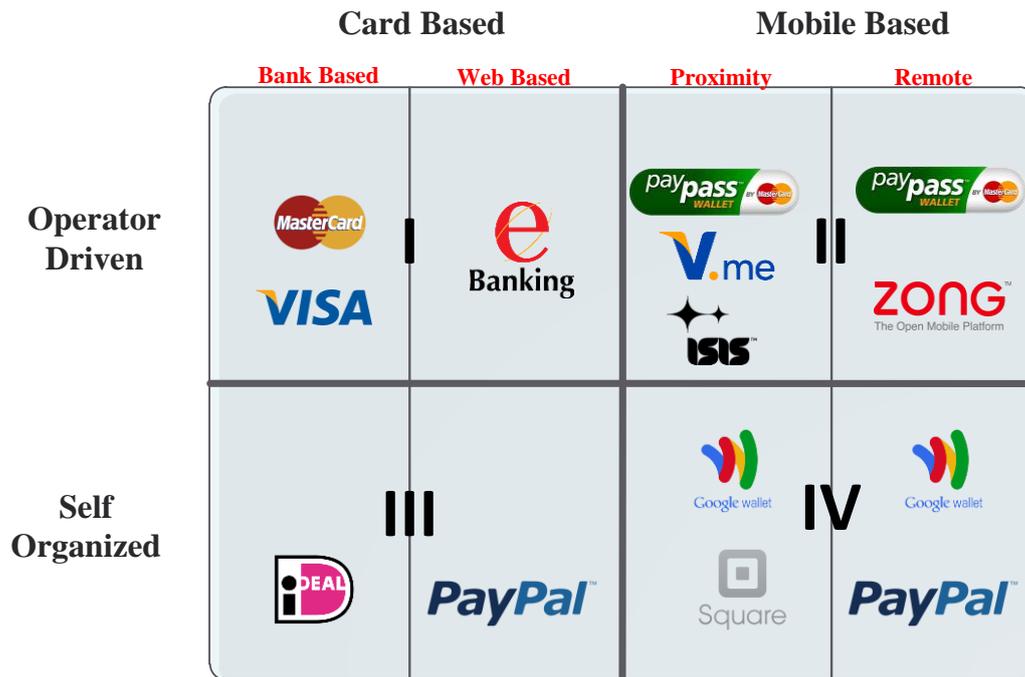


Figure 17 Universal Mobile Payments matrix

Figure 17 matrix presents in a unified way the Ondrus & Pigneur (2006) classification together with indicative examples of the solutions currently available in the market while also taking into account the platform used for the execution of a payment. Our research is going to focus on cells II and IV as these are the cases related to Mobile Based (device-wise) solutions. Although card based solutions classify as MPs due to their contactless ability in completing payment transactions, further focus on these topics would complicate the scope of the research.

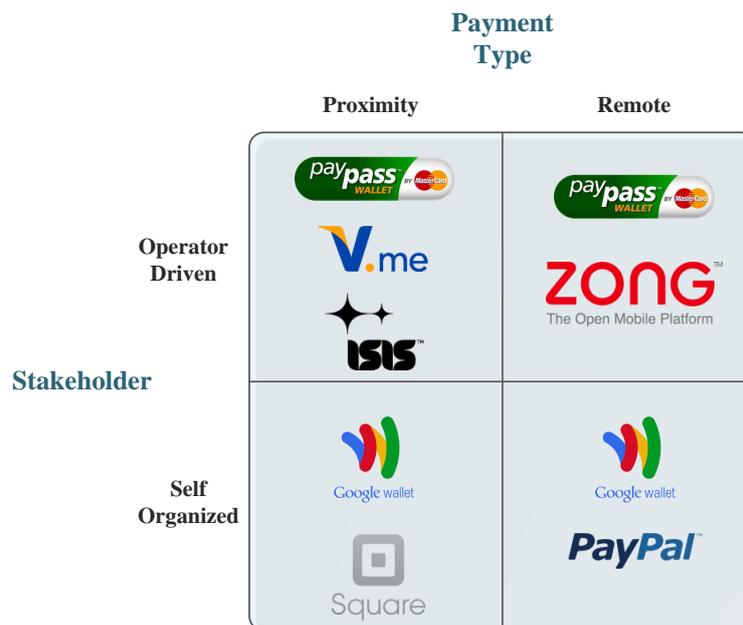


Figure 18 Mobile Based Payments classification matrix

Furthermore, we choose to focus in Remote Mobile Payments and therefore select only this part of the available service solutions. Ondrus & Pigneur's (2006) research helps in choosing Google Wallet and MasterCard PayPass for the case study research. Comparison of a self-organized solution over an operator driven approach can depict differences and commonalities deriving from the fact that organizations having different strategic positioning offer the same solution to the market.

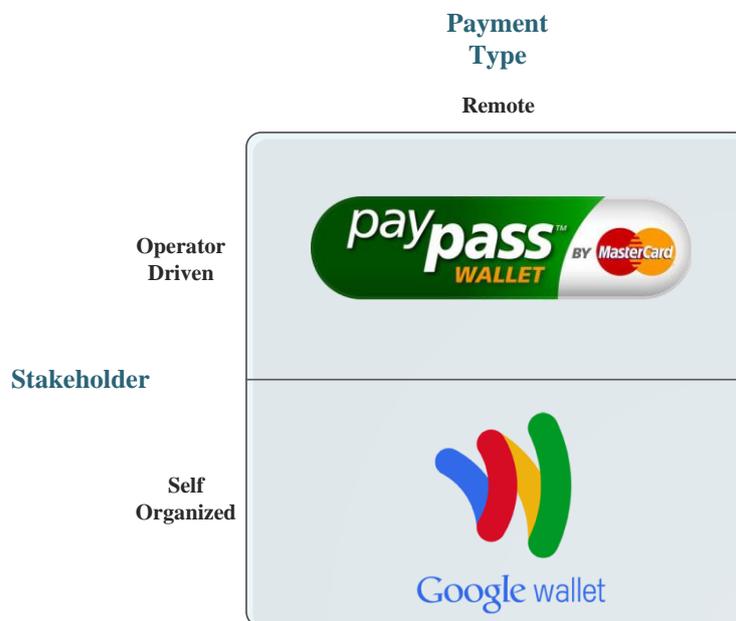


Figure 19- Remote Mobile Payment case study examples

3.3.2 - STOF Framework

Designing business models is a complex undertaking because different requirements (e.g. technical, user, organizational and financial requirements) need to be accommodated and balanced while design choices in one domain may affect those of other (Faber et al., 2003). In our research interrelatedness arising from business model design issues is addressed through case study examination of two popular market solutions. In order to challenge this prospect a theoretical framework needs to be used for examining business models.

Literature review shows that business model design frameworks for mobile ICT services are limited (Faber et al., 2003). In this research we use the STOF framework proposed by Faber et al. (2003) as it is created by identifying, comparing and analyzing common factors of various business model design frameworks and definitions. Other business model design and analysis frameworks such as Osterwalder's Business Model Canvas were considered but not selected. This is due to the direct connection of the STOF framework with mobile ICT cases, as well as the supervision of W.A.G.A Bouwman (one of STOF creators) in this research.

In STOF framework, STOF stands for (Faber et al, 2003):

- **Service design:** "a description of the value that the value network offers to a specific target group of users, in particular in terms of service offering."

- **Technology design:** “a description of the fundamental organization of a technical system, the technical architecture, which is needed by the firms in the value network to deliver the service offering exhibited in the service design.”
- **Organization design:** “a description of the configuration of actors that is needed to deliver a particular service, the roles that each plays, making clear how the network creates value for end-users.”
- **Finance design:** “a description of how a value network intends to capture monetary value from a particular service offering and how risks investments and revenues are divided over the different actors of the value network.”

STOF framework is an approach to multiple domain variables which are influenced by managers’ decisions and tries to understand the dynamics of business models. Our research uses a stress testing tool that creates business model representations. These representations are called “*Heat Signatures*” and can help in examining the robustness of a business model and identify potentially negative design decisions.

Using the STOF framework as a business model analysis method and the associated stress test tool we create the *heat signature* maps for our two case studies and examine the stated research questions.

The stress test tool is an approach in which one fills in business model characteristics as required by the STOF model together with uncertainties related to the business model under examination. Uncertainties represent any risky or vague factor that can influence viability and operation of a business model. In the next step one should evaluate how each business model design characteristic ranks against each uncertainty.

This way an uncertainty can:

- Have no negative effects (Green color)
- Require attention (Orange color)
- Be a showstopper (Red color)
- Be not relevant at all (Grey color)

against a business model design issue.

Examining all design characteristics and the way they challenge uncertainties is a process based on which the stress tool generates visual representations about business model robustness, heat signature and best-worst case scenario views.

The uncertainties used for stress testing are extracted from Ondrus et al. (2009) success factors, mentioned in §1.2. Namely these are:

- The need for an alliance strategy between financial institutions and MNOs
- Involvement of sellers and business intermediaries, providing added value to customers that would act as an incentive to join the service
- Involvement of the manufacturers in order to offer interoperability and scale the system
- Dealing with regulatory issues (restrictions, legislation etc.)

The aforementioned success factors are translated to the following uncertainties:

- Merchants involvement
- Value provision for retail consumers
- Technology manufacturers involvement
- Regulatory issues affecting service provision

3.3.3 - Network externalities on multi-sided markets

The case of diffusion in MPs market can be seen through the lens of network externalities theory. Network effects and network externalities exist when consumers derive utility from a product based on the number of other users; conventional wisdom suggests that such effects should driver faster market growth due to the bandwagon effect (Goldenberg, Libai, & Muller, 2010).

Mobile payments fall under the type of direct network effects since the number of adopters drives utility directly because the higher the number of adopters is, the higher is the utility of the service (Goldenberg et al., 2010). Network externalities theory explains how merchants' adoption drives consumers' adoption and vice versa. Utility is created for consumers when the number of users is higher because merchants' acceptance is higher and therefore more points of acceptance for mobile payments exist. On the other hand higher consumers' acceptance drives merchants' acceptance as consumers' preference over one payment option creates the need to support this preference on the merchants' side.

Network externalities theory is also useful for thinking about the source, which creates such a situation, where environment adoption drives and affects utility and individual adoption. Past literature points on two types of effects in this regard, namely local and global. Under global externalities, a consumer takes into account an entire social system when considering the impact of the number of adopters on utility, whereas under local externalities, a consumer considers adoption in relation to his close social network (Goldenberg et al., 2010). In this thinking there exist many analyses that try to explain how choice of adoption for the use of one product service is formed and could potentially explain geographic patterns of adoption in MPs solutions (Asia, Africa), or low adoption rates seen in other areas and use contexts. It is also interesting to have in mind how mobile payments as a service/product gets numerous competing solutions and standards so often that early adopters take the risk of adopting the "wrong" standard, so we see many stakeholders wait until the winning standard is clear (Goldenberg et al., 2010). Network externalities theory can address and examine these issues successfully but such a level of diffusion analysis is out of the scope of this project and will not be further addressed.

Chapter 4 - Case study results

In this chapter the empirically gathered qualitative data for two solutions in Remote Mobile Payments are presented. The data has been gathered from publicly available information and through semi-structured interviews with key stakeholders for each of the cases as well as independent consultants and MPs executives. All information has been translated in regards to relevancy with this thesis project and presented accordingly.

For each one of the two cases the business model is described and followed by a representation of its “building blocks” according to the STOF framework (Faber et al., 2003).

4.1 - MasterCard PayPass (Online)

MasterCard (hereafter “MC”) is an American multinational financial services provider organization. Throughout the world, its principal business is to process payments between merchants’ acquirer FIs and issuing FIs of purchasers’ who use MC branded credit or debit cards.

MC PayPass (hereafter “MCP”) is a payment service platform provided by MC for the execution of mobile and online payments. The platform works both for card based and phone based mobile payments as well as computer based online payments. As explained in “limitations”, our focus is on the part of Remote Mobile Payments, so we consider mobile-based online payments of MCP as the topic in question.

4.1.1 - Service design

MCP targets retail merchants who want to accept payments from retail consumers for purchases made through their stores (physical or online), as they are the end-users of the service. Although merchants and consumers are the main target group of MCP, because MC is mainly a Business to Business (B2B) organization, they are reached through MC partners’ network. In order to show the importance of MPs MC created a dedicated MC mobile partners program for organizations and business firms to join in and collaborate with MC for the promotion of mobile payments. The organizations to join such an effort are related or enablers of mobile financial services. Typical examples would be: Issuing or Acquiring banks, Mobile Network Operators, mobile handset manufacturers, card/OS/payment application vendors, POS systems/terminal hardware vendors, technology component providers, processing & related payment service providers, mobile application developers/providers, mobile marketing agencies etc.

According to MC, MCP is a solution for merchants who want to use a service for easy, fast, secure and convenient checkout procedure in RMP. MC considers the service easy as a step-by-step guide is provided for integration of the services’ API to the merchant’s existing checkout process, fast as it does not require extensive additional modifications in order to operate, secure as it has three layers of security protecting payment information as they transferred from MCP network to merchant’s network, and convenient as a universal checkout experience is provided to all devices connected with the service. Merchants’ access to the service is free and the value proposition is on having an

additional (on top of their existing ones) service channel for accepting payments from consumers. This way a merchant is able to use a service without having to cover financial costs. Merchant's effort is needed in creating an account and integrating the solution to his system. MC's relationship with the merchant is limited to service provision regulated through an online account.

On the consumers/purchasers side, MC offers access to the service platform by signing-up for a MCPP account in which one can select to register his preferred payment credit/debit card to be used and his preferred shipping address, so that this info is passed on to the merchant when the purchaser wants to checkout an order. On this service MC accepts almost all card issuers (MasterCard, Visa, American Express, Diners Club International, Discover Network) over its platform, without charging fees for not a using an MC branded card. Security, convenience and speed of the checkout experience are the goals of MC with this service offer. Security is ensured with a multi-layered authentication procedure, convenience is coming from the ease of selection over the card to be charged and shipping address while speed is guaranteed from the fact that the user does not have to fill in additional forms for each different merchant since all the required information is available through MCPP. Same as in the case of merchants, MCPP provides a universal checkout experience for any connecting device (such as mobile in our case) and retains the data accessible through a universal account. The service is free for the consumer/purchaser and bears no costs but the effort of registering for an account, recalling the password/passphrase and having network access for logging in and making a payment. Same as in merchants' case, MC's relationship with the consumers is limited to service provision regulated through an online account.

For MC partners, MCPP is a service platform which can be tailored and marketed as their own and according to their preferences while staying in connection with MC as the service provider. MC, as a B2B oriented company, considers partner organizations and businesses as the main target group of MCPP. For partners MC provides two ways of giving access to the platform for partners' customers (end-users such as retail merchants and customers). It provides a "white-labeled" digital wallet which the partner can tailor and market it as his own. This wallet is an instance of the MCPP service which is built and hosted by MC while giving the credit to the partner for the service provision to end-users. The second option is for the case in which a partner has already developed a digital wallet, where access to the MCPP API is given for the service to be integrated in the wallet and get hooked on the MCPP network. Therefore, for partners the value proposition is the additional service channel they can provide to their own customers through MC's service platform. Availability of a complete digital wallet solution or integration to an existing digital wallet covers most cases in the current market state where MC makes an offer to organizations and businesses for adopting MCPP and eventually "creating traffic". Parts of MCPP service offering related to service's operation (speed, convenience, security etc.) are still valid in the case of partners who are benefited by marketing these characteristics as advantages for the solution they promote. Partner's effort and investment is mostly related to development and maintenance of their own part in the digital wallet solution. MCPP platform access for partners is free of charge and probably included in the bundle of other value-added services for which connection with MC is pursued.

Based on the information presented above we filled in business model variables of the service design part of the STOF framework that is shown in Table 1.

Table 1- MC Service design

Service design		
Business model variables	Description	Remarks
Customers and/or end-users	Retail Merchants; Retail consumers; MC platform partners;	
Target group (primary; secondary)	Retail Merchants; Retail consumers; MC platform partners;	Retail Merchants are the ones who want to enable their customers paying through the service platform; Retail consumers gain from value from an additional platform for completing payments and order check-out; MasterCard partners gain value from providing a service platform for their customers (mostly merchants but consumers as well) to fulfill the check-out end of the interaction between them;
Value proposition	Mastercard PayPass: Remote Mobile Payments platform; Digital wallet API;	Retail merchants: a service platform for accepting payments/additional payment platform; Retail consumers: easy, safe, interoperable payment service platform; MasterCard partners: customizable digital wallet API/ additional payment service platform option for digital wallets;
Service offering	Mobile Payments platform; Digital wallet;	Retail merchants: multiple wallet acceptance/ 3-tiered security against fraud; Retail consumers: platform for order checkout/same, streamlined checkout experience across all connected devices/ access to all payment and shipping information/3-step checkout/safe transfer of data through encryption; MasterCard Partners: "white-labeled" digital wallet platform for merchants-partners to brand it and market it as their own/ API openly available for integration to partner's wallet/ secure authentication/customization according to the customer's business needs/ developers' access for promoting third party innovation possibilities;

Context of use	Retail consumer can use the platform for paying merchants who are registered on the platform; Merchants and MC partners can use the platform as a payment tool for their own customers	Retail consumer wants to pay a merchant, merchant and consumer both need to be registered on the platform; MC has partners who need payment tools. MC partners can use PayPass API, customize it and offer it to their own customers as a service platform-tool for their customers' needs;
Effort for the customer	Retail Merchants integration on shopping; Retail Consumers registration on platform,3-tier authentication effort for use; MasterCard partners development of own solution, customization of wallet API;	Retail merchant needs to integrate the solution in his existing shopping cart solution; Retail consumer needs to register with the platform; The MC partner can develop his own solution using the available API for the platform, which means tailoring and branding the solution from MasterCard; Each one of the platform's actors/users needs to customize account settings on the platform before using the platform All end-users participating need to have network access, a mobile device and a bank account in which transaction's funds are credited/charged.
Customer relationships	MasterCard connection with all ends in transaction execution; Online relationship with end-users; Online and offline relationship with partners	Consumer, merchant and service partner are all connected through MasterCard PayPass platform. This creates a universal experience for all three customers of the platform. Retail merchant has a PayPass account which he accesses online. Retail consumer has a PayPass account which he accesses online. MasterCard partner is affiliated online and offline with the platform owner (MC) in order to support platform operation.

4.1.2 - Technology design

Technology realization of the service platform for supporting the checkout process can be examined by each stakeholder's view in order to understand the reasoning of the supported functionalities.

From merchant's side the platform supports integration to existing widespread online shopping cart and other e-commerce software solutions. The merchant's main requirement is to have accurate billing and shipping information for completing order checkout since this is the reason of existence (from a usability point of view) of the service platform. MCPP supports this functionality by giving three possible technical system options to the merchant who decides to use it.

For a check-out to be completed through MCPP a consumer needs to authenticate and select his preferred card to be charged as well as the shipping address. From the technology perspective this means there should be a service platform (MCPP) that the customer accesses to make his selection, a database having the consumer's authentication data for providing access to the service platform and a database having the consumer's payment and shipping information that will be passed on to the merchant's payment processor for completing the financial end of the transaction.

MCPP can work with the following three "profiles" for the procedure described above:

- Service provision: hosted by MCPP, Authentication: hosted by MCPP, Payment & shipping information :hosted by MCPP
- Service provision: hosted by MCPP, Authentication: hosted by MCPP, Payment & shipping information: hosted by Merchant's Choice
- Service provision: hosted by MCPP, Authentication: Merchant's Choice, Payment & shipping information: hosted by Merchant's Choice

MC is therefore the organization hosting the service provision but not necessarily the related information for the service provision. This gives flexibility in choosing among different profiles depending on merchant's or partner's business requirements. The aforementioned "profiles" are an indicative example of the way in which a partner can tailor the MCPP service according to his needs. It is good here to mention that payment processing can be done through MCPP by MC or another payment processing organization, but this is a part of the process which we do not take into consideration for this research.

Consumers have access to the platform through their account, which is provided by MC upon registration. Consumers can also register through MC partners' network and still be able to access the platform, as shown in the three technical "profiles" mentioned above. Consumer's technology implementation includes an interface for authentication, communication and sufficient information provision for enabling order check-out. Consumer does not have control over the profile used for the completion of his order.

MC partner is the party implementing the different profiles and providing the technical systems that enable website and mobile application to conduct online transactions. Partners get access on the platform's API and tailor their digital wallet in order to support connection with the platform. A partner can choose who hosts the information needed for successful platform operation (authentication/payment/shipping information) based on his business requirements and is free to

accordingly change the final form of the platform he uses on the solution provided to his (the partner's) customers.

All processes executed over MCPP are directed towards data transfer and communication; they are time critical as immediate verification is needed for completing the order check-out and arranging delivery to the consumer. MCPP can be accessed and operated from any device having internet access and supporting web browser execution or a partner's digital wallet installation. Each end of the platform provides a personalized and secure environment for conducting transactions (consumers) and accepting billing and shipping information (merchants).

Based on the information presented above we filled in business model variables of the technology design part of the STOF framework that is shown in Table 2.

Table 2- MC Technology design

Technology design		
Business model variables	Description	Remarks
Applications	Communication; Time critical; Personalized; Secure platform for transaction data communication;	Application is accessed by the device of the retail consumer and communicates with platform on merchant's online solution. Needs to process data in time-critical manner as immediate confirmation over the transaction is needed. Each end of the platform is personalized and secure.
Devices	Any device having internet access	Any device having internet access
Service platforms	Mastercard PayPass service platform	Platform for transaction execution is personalized and secure. In order to preserve security platform has open (developers' API) and closed (checkout system) parts. Authentication, Billing and customer data management services are provided by the platform but are not necessarily hosted on the platform. Payment processing is done by the payment processor chosen by the merchant or the MC partner.
Channels	Internet; MC Partner's choice;	Channel for platform's operation is the internet. Channel for platform provision is decided by the wallet issuer who brands the solution.
Additional functionalities	Developers' access to API; NFC availability;	MasterCard developer zone for developers to customize and create new services to help digital wallet take advantage of the latest innovations.

4.1.3 - Organization design

Looking at the actors participating in the execution of a transaction we see that the ones related and connected with MCPP are the merchant, the consumer/purchaser, possibly a MC partner offering the digital wallet and MC as the platform operator. In this scheme MC provides the service platform for transaction execution, merchant/consumer are the end-users and MC partner is the communicator of the platform and end-users as traditionally MC does not have a direct connection with end-users (MC is a B2B organization).

In this network consumers are the value creators and merchants are the ones who follow consumers' value by offering them their products and services. MC and partners facilitate this connection through MCPP or solutions such as a digital wallet that incorporates a payment platform for enabling financial transaction execution between consumers and merchants. This way the platform acts as a field for transaction clearance and the related information are further communicated in other related parties according to the scheme in use.

MC provides MCPP for free to other stakeholders in order increase the transaction volume going over its network. MC's main strategic interest is to use the service as a branding method for strengthening its presence in the financial services market and therefore reduce churn. MCPP operation promotes, at the same time, a universal service platform for mobile payment transaction execution by providing a seamless, secure and guaranteed (by MC or MC partner) checkout experience for the end user.

Based on the information presented above we filled in business model variables of the organization design part of the STOF framework as presented in Table 3.

Table 3- MC Organization design

Organization design		
Business model variables	Description	Remarks
Actors	Retail Merchants; Retail consumers; MC platform partners; MasterCard;	MasterCard provides a platform for transaction execution. Retail merchants and consumers can use the platform while MC partners can customize it and release or incorporate it to/with their existing solutions.
Actors' resources & capabilities	Merchants payment transaction volume; Consumers transaction value; MC partner's solution/wallet; MC platform;	Consumers are the value creators in the ecosystem. For a transaction with a merchant the MC PayPass platform can be used. MC Partners can choose to offer the platform as part of their own solution offered to the market (merchants-consumers)
Actors' strategic interests	Branding; Reducing churn; Promoting unified platform; Seamless and secure transaction experience;	Merchants want to provide a seamless and secure transaction experience to consumers who also seek an easy and convenient solution for performing order checkout. MC partners and MC try to reduce churn over other payment platforms and provide a universal solution to all actors involved.
Organizational Arrangements	MC operates platform; Merchants and Consumers are the end-users; MC partners offer digital wallet solutions to end-users;	MC is the platform operator. Merchants and consumers settle their financial relations over the platform. MC partners choose between offering MC platform in their own branded wallet or add it as functionality. MC partner's solution with MC is defined by the activities related with partner's operations.
Value activities	Channel of communication between Merchant-Consumer and their FIs	For a consumer to pay a merchant the platform is used as a secure communications channel over which transactions can be executed. MC is the operator of this channel while MC partners are service providers.

4.1.4 - Financial design

Financially MCPP is an investment of MC without direct profit streams deriving from its operation. MC covers service platform development costs as well as marketing costs for promoting platform adoption among target groups. From merchant's side investment is needed in terms of time and a one-time development effort in order to integrate with MCPP. No financial investment is required as the service is provided for free. Same in the customer's side, no financial investment is needed and the customer needs to only spend time in configuring his MCPP account. MC partners, same as MC, need to invest in developing and marketing costs but not in paying MC for creating a product out of the service platform.

Platform operational costs are covered by MC. This means that technology, personnel and legal costs related to MCPP are MC's responsibility. Each stakeholder of the platform willing to implement additional features (such as MC partners) covers the costs for the associated functionalities. As mentioned earlier, no financial revenue exists for MC and the purpose of promoting platform use is brand recognition and reduction of churn. It is not uncommon, though, for such efforts to remain free until a significant transaction volume is reached. At that point MC would probably take advantage of lock-in effects and start profiting from the platform by asking a fee for its use.

The financial arrangements between stakeholders in the MCPP are defined by the business needs of each stakeholder. MC and merchants/consumers have no financial relations, in regards to MC charging for platform provision. MC and partners' financial arrangements depend on the case of the partner and its business service purpose and role. MC is responsible for covering misuse and fraud related costs, depending on the conditions under which these costs may occur. These cases are out of the scope of this research as they are based on situational conditions and arrangements between MC and issuing/acquiring FIs participating in the transaction. Therefore, liability varies by the occasion.

Based on the information presented above we filled in business model variables of the financial design part of the STOF framework as presented in Table 4.

Table 4- MC Financial design

Financial design		
Business model variables	Description	Remarks
Investments	Platform marketing; Platform development; Merchant's time; Consumer's choice; Partner's time;	MC invests in platform marketing and development for realizing the platform. Since the platform is provided for free to all target group actors it is just a matter of time investment for being able to use it.
Costs	Operational costs	Operational costs (IT-platform, personnel, legal and financial costs) of the platform.
Revenues	Brand recognition	Since the service is provided for free revenues come from side channels as the possibility for merchant to choose MC as the payment processor, consumer to recognize MC and MC partner for promoting MC solutions.
Risks	Misuse; Fraud;	Misuse of the platform could work against the intention of branding MC. Fraud is both a financial as well as marketing threat for MC and the participating actors.
Financial arrangements	Platform mediates actors' financial relation	Platform is an intermediary in the financial relation between merchant and consumer. Platform facilitates the connection between merchant's acquirer and consumer's issuer FIs. MC and MC partner act as platform providers with no direct financial arrangement deriving from platform use (with the value creators).

4.2 - Google Wallet (Online)

Google is a U.S.A. based multinational Corporation which provides Internet related products and services. Google's initial business operation was that of an internet search engine. This operation led to provision of online advertising solutions which led to a rapid growth success path reaching today's state where Google is an internet search, advertising, software and cloud computing services' company.

Google Wallet online (hereafter "GW") is a mobile payment system allowing the execution of payment transactions by using credit or debit cards from affiliated FIs. The remote mobile payments system, which we examine in this research, can be used both through computers as well as mobile devices and supports payments to connected retail merchants. In the business model description that follows we investigate the online part of GW used for order checkout part when interacting with an online merchant.

4.2.1 - Service design

GW is a solution for the merchants who want to accept payments through their online commerce channels as well as customers who want to check-out their orders over merchants' e-commerce platform. Therefore, GW targets retail merchants and consumers as the platform's customers and end-users. Google supports GW by promoting its use from merchants' and consumers' side through regular service updates with new features and additional functionalities. As explained in our search limitations, we only consider the part of remote mobile payments and therefore will only deal with GW online payments business model and business issues.

By offering GW as a service Google tries to approach wallet digitization and does this in a four-tier way. According to Google, GW transfers the wallet in the "cloud", makes the (smart) phone a wallet, enables one to "carry" his wallet on the web and gives the option of having a wallet which can be locked. Wallet transfer to the cloud refers to the online storage of card information in which Google servers host all the related information. Turning a phone to a wallet and "carrying" it on the web, is a reference in the MP options offered for proximity and remote payments through GW service platform. In addition to the service platform for transaction execution GW gives the option of remotely disabling a wallet for cases of security information breach (lost phone, leaked password etc.).

GW is Google's effort for a fast, convenient and secure checkout service platform to be used in online commerce. Speed is ensured by being able to access a GW through a one-form sign in procedure. Convenience comes from access to all registered cards and addresses after account login. Security is ensured by Google's encrypted financial data storage. These are the three features that Google considers for the GW service platform and offers as value to end-users.

Together with end-users, GW also looks in approaching developers and other partner organizations who can work towards the promotion of the service platform. This way FIs, MNOs, mobile handset manufacturers etc. partner with GW in order to accept GW as a platform and support it through their network according to different agreements, depending on the business requirements of each partner. An indicative example of such a case is that of MasterCard PayPass POS terminals for which Google has come into agreement so that they accept GW proximity transactions. This way they jointly

operate under the same hardware configuration. Although this is an interesting example, it falls under the category of PMP and therefore is out the scope of this research. Of course in the online part of their digital wallet products, Google and MC compete and therefore do not share common service provision channels.

GW is a service platform for sending and accepting payments from the network of other GW users. The platform provides access (through its API) to anyone who wants to integrate it on an existing e-commerce software solution. The effort needed from the merchant's side is the integration and customization of the service platform. Consumers need to customize their account by filling in billing and shipping information to be used in the check-out process.

Google's relationship with end-users is mainly related to the user's Google account through which GW access is also provided. This way GW is, in most cases, an additional service the user benefits from. It is important to mention that Google supports GW operation and usage by having a GW help center as well as help forums.

Based on the information presented above we filled in business model variables of the service design part of the STOF framework as shown in Table 5.

Table 5- GW Service design

Service design		
Business model variables	Description	Remarks
Customers and/or end-users	Retail merchants; Retail consumers;	Retail merchants; Retail consumers;
Target group (primary; secondary)	Retail merchants; Retail consumers; Developers; Partner organizations;	Retail products merchants (including digital content) with an online commerce part for accepting orders; retail products consumers having a Google account and a Google Wallet compatible mobile device. Developers and other partner organizations can use Google Wallet as a service platform for their own benefit.
Value proposition	Remote mobile payments platform-Google Wallet	Service platform for performing payments (consumers) and accepting payments (merchants)
Service offering	Remote Mobile Payments	Interoperable platform for accepting payments from the network of Google Wallet users. The platform is open (provides API) for integration to existing online payment infrastructure/solution. Consumers are facilitated by using their Google account to perform payments in addition to other existing services.
Context of use	Consumer who wants to pay with a mobile device a retail vendor who is registered on the platform, anytime anywhere	Although the application works on other electronic devices we consider the part dealing with mobile devices as "initiators" of the payment; internet network access is needed; The context under which the application is used is that in which a retail consumer having a Google account wants to perform a payment to a registered Google wallet merchant. Application can be used anytime, anywhere from end-users.
Effort for the customer	Incorporate Google Wallet platform API	Compatible mobile device availability; network access (internet); Google account; Bank account;
Customer relationships	Google account	Consumer's account with Google services is the essential necessity of every transaction performed. This provides a unified experience to end-users. Google offers a help center and help forums for Google wallet end-users. This summarizes service's relationship to customers as mostly online.

4.2.2 - Technology design

GW operates through its own platform for service provision, but application-wise it is only supported in Google issued or affiliates issued devices. The application installed on the device of the retail consumer and communicates through GW platform with merchant's online solution. Data is processed in a time-critical frame as immediate confirmation over the transaction is needed while each end of the platform during a transaction is personalized and secure.

GW compatible devices are multi-purpose and operate in a network intelligent way. Data storage is provided by the network infrastructure and software needed for operation is embedded on the device. Google uses only compatible devices for GW service provision because Google holds the keys for the Secure Element hardware component, which is used for ensuring advanced transaction security in during service operation.

Billing and customer data of a transaction are information hosted by the platform and so exist within the network of GW despite the fact that the platform might not be used for payment processing but just as a technology service channel for transaction data communication between consumer, merchant and payment processor.

Platform operation is based on internet access and is the channel through which end-users access it. Depending on the case and agreement with different payment processors or other partner organizations, Google might not use internet as the channel of platform operation for clearing and settlement of a payment order.

GW is offered as a bundled service supporting as well proximity mobile payments through NFC, merchants' loyalty programs and discount coupon use. For the merchant Google gives the option of performing also payment processing together with transaction data transfer.

Based on the information presented above we filled in business model variables of the technology design part of the STOF framework as presented in Table 6.

Table 6- GW Technology design

Technology design		
Business model variables	Description	Remarks
Applications	Communication; Time critical; Personalized; secure	Application is installed on the device of the retail consumer and communicates with platform on merchant's online solution. Needs to process data in time-critical manner as immediate confirmation over the transaction is needed. Each end of the platform is personalized and secure.
Devices	Compatible mobile devices (Google issued, affiliates issued)	Compatible devices are multi-purpose and operate in a network intelligent way. Data storage is provided by the network infrastructure and software needed for operation is embedded on the device.
Service platforms	Google Wallet checkout payment platform	Platform for transaction execution is personalized and secure. In order to preserve security platform has open (developers' API) and closed (checkout system) parts. Billing and customer data management services are provided by the platform.
Channels	Internet	Application is available on OS software centers (Google Play) for end-users and API is available online for merchants who use the platform. Platform operation uses internet as the data channel.
Additional functionalities	NFC availability; Coupons; Loyalty programs; Payment processing	A customer is able to use additional functionalities such as in-store proximity payments (NFC), discount coupons and loyalty programs for the end-user to be able to operate all services within one application. Platform adoption from the merchant's side also gives the option of payment processing.

4.2.3 - Organizational design

The organizational network formed around GW includes Google as the service provider, merchant, consumer and merchant's payment processor. One step more far are situated Issuing and acquiring FIs who perform the actual fund transfer between consumer and merchant, as ordered from the payment processor. Google in this case is the transaction handler and platform controller offering the interface for consumer-merchant connection. Together with that GW connects with merchant's payment processor transferring financial information needed for completing the monetary part of the transaction.

Google owns the network infrastructure used for the interface and service platform provision, the customer base in which the service is offered and the connection with payment processors and FIs for completing payments. Merchants and consumers, as end-users, offer their transaction volume in order to be granted access to the network and are benefited by GW's resources for facilitating the interaction between them.

In this role of the communicator between the stakeholders participating in an order check-out process, Google's main strategic interest is data acquisition and popularity coming from digital service provision. As mentioned earlier, Google is an internet services corporation offering a wide spectrum of products to consumers and merchants. Through GW customers get one more service to use while Google gets transaction data, which can be very useful for other business operation of the corporation (such as advertising).

One of the arrangements for platform participation includes providing Google the right to use data, which is going through GW on its own interest, of course under strict privacy regulations regarding exposure of data to third parties.

Based on the information presented above we filled in business model variables of the organization design part of the STOF framework as presented in Table 7.

Table 7- GW Organization design

Organization design		
Business model variables	Description	Remarks
Actors	Google; Payment processor; Issuer; Acquirer; Merchant; Consumer;	Google is the transaction handler and platform controller. Merchant can use his own payment processor or ask the platform owner (Google) for this service as well. Retail merchant and consumer connect through the platform. Payment processor connects merchant's acquirer FI with consumer's issuer FI.
Actors' resources & capabilities	Existing Network infrastructure; Existing customer base; Payment transaction volume; Process handling; FIs connection network; Marketing and sales;	Google has a large network infrastructure to support payment platform's operation. Existing customer base is an advantage for service diffusion. Additionally, marketing and sales for the platform diffusion is performed by Google. Payment processing can be performed by Google and in this case Google takes the role of communicator between issuer and acquirer, therefore is the process handler.
Actors' strategic interests	Payment data gathering; Process fees revenues; Unified service provision;	Google from this service gains payment data information which can be used in its own interest. In the case of providing additional functionalities revenues can be generated from fees. Payment platform provision strengthens the role of digital service provision for Google, which has already a wide online services spectrum
Organizational Arrangements	Google operates service platform; Consumers and merchants are the end-users; Google transfers transaction data to payment processor;	Google operates service platform where consumers' and merchants' transaction financial relations are settled; Google transfers transaction data to payment processor for performing the fund transfer requested by end-users.
Value activities	Funds transfer; Data communication;	The service platform (Google Wallet) serves as a communication means between consumers and merchants for settling their financial transactions. Service platform is a communication channel for consumer-merchant connection while securely communicating transaction data to the related payment processor organization (chosen by the merchant).

4.2.4 - Financial design

Google being an internet services corporation is able to cover investments such as development costs, marketing costs and infrastructures through its already existing operational resources. This fact makes investment needs for GW a minor issue and facilitates the decision for free GW service provision to end-users. Operational costs are respectively low as they only include a number of topic experts employed to help with service advancement and management.

No direct revenue streams directed to Google derive from GW platform operation but revenue is expected to be generated from the data acquired from successful critical mass platform operation. In such a case Google as an internet search, advertising and, through GW, payment service handler would be able to connect what consumers do, what they search for and what they actually buy. This triplet of “do-want-spend” is an information pack which is directly related to Google main business operation, advertising. Google is liable for risks deriving from platform operation such as fraud or misuse and this is why Google is responsible for platform security and safety.

Based on the information presented above we filled in business model variables of the financial design part of the STOF framework as presented in Table 8.

Table 8- GW Financial design

Financial design : business model variables	Description	Remarks
Investments	Platform marketing; Platform development; Merchant's time; Consumer's choice;	Google invests in service marketing and development for provision to customers/end users. Service is provided for free to end-users.
Costs	Operational costs	Operational costs (IT-platform, personnel, legal and financial costs) of the platform.
Revenues	Payment data acquisition;	Platform's reason of existence is payment data coming from platform's operation. This data is useful for Google's main revenue creating service which is advertising.
Risks	Fraud; Misuse;	Fraud is a financial risk which Google might have to bare in some cases
Financial arrangements	Platform mediates actors' financial relation	Platform is an intermediary in the financial relation between merchant and consumer. Platform facilitates the connection between merchant's acquirer and consumer's issuer FI.

4.3 - Cross-Case analysis

After presenting the business model design characteristics for both cases on the following section we compare each domain of the case studies in order to extract their commonalities and differences. By this we try to understand the steps which will enable the two cases to mutually operate on the same platform and still pursue each organization's strategic interest.

4.3.1 - Service Design

Table 9 MC-GW Service design

Service design		
Business model variables	MC PayPass	Google Wallet
Customers and/or end-users	Retail Merchants; Retail consumers; MC platform partners;	Retail merchants; Retail consumers;
Target group (primary; secondary)	Retail Merchants; Retail consumers; MC platform partners;	Retail merchants; Retail consumers; Developers; Partner organizations;
Value proposition	Mastercard PayPass; RemoteMobile Payments platform; Digital wallet API;	Remote mobile payments platform-Google Wallet;
Service offering	Mobile Payments platform-digital wallet;	Remote Mobile Payments;
Context of use	Retail consumer can use the platform for paying merchants who are registered on the platform; Merchants and MC partners can use the platform as a payment tool for their own customers;	Consumer who wants to pay with a mobile device a retail vendor who is registered on the platform, anytime anywhere;
Effort for the customer	Retail Merchants integration on shopping; Retail Consumers registration on platform,3-tier authentication effort for use; MasterCard partners development of own solution, customization of wallet API;	Incorporate Google Wallet platform API;
Customer relationships	MasterCard connection with all ends in transaction execution; Online relationship with end-users; Online and offline relationship with partners;	Google account;

Differences in the service domain design decisions exist in the customer’s effort for connecting to the platform and relationship of the service provider (MC/Google) with the respective customer. On the customer’s effort, MCPP follows a multilayered authentication process providing thus a high secured service. Google on that end follows a single level authentication for access to the platform resulting in a more convenient but less secure service. Regarding the other aspects of customer’s effort we should also mention MCPP’s white-labeled digital wallet solution. A partner willing to customize the wallet on his own is enabled to use MCPP. MC connects with its customers through different account types depending on the role of the customer (merchant/consumer). Google has the same connection with both merchants and consumers, although it is a common case for a merchant to select Google as payment processor and thus leverage their connection.

The service design domain is similar in both cases. MCPP and GW have the same target groups and approach the same end-users. The essential service offering of both solutions is the same; a service platform over which remote mobile payments are executed. On this platform merchants and consumers connect and complete the monetary end of their commercial transactions. Therefore, the context of use is identical for the two solutions.

4.3.1 - Technology Design

Table 10 MC-GW Technology design

Technology design :		
Business model variables	MC PayPass	Google Wallet
Applications	Communication; Time critical; Personalized; Secure platform for transaction data communication;	Communication; Time critical; Personalized; Secure;
Devices	Any device having internet access;	Compatible mobile devices (Google issued, affiliates issued)
Service platforms	Mastercard PayPass service platform;	Google Wallet checkout payment platform;
Channels	Internet; MC Partner's choice;	Internet;
Additional functionalities	Developers' access to API; NFC availability;	NFC availability; Coupons; Loyalty programs; Payment processing;

MCPP and GW follow a less resembling approach on the technology domain business model decisions. They both offer a platform to mediate the connection of the consumer with the merchant (for the part of payment completion) which is accessible through an application. Therefore, MCPP and GW offer a service platform for performing/accepting remote mobile payments. Used application has the same direction with regards to operation, security and privacy for both cases.

MCPP can be operated by any device having internet access while GW can be installed only in Google supported devices. This gives MCPP an advantageous position towards interoperability but can also be translated to Google having an advantageous position towards customer lock-in effects (reference). Both platforms operate mainly online. Although, MCPP through its white-labeled wallet provision to partners leaves an open track for other channels to be used, depending on the partner’s decision and connection with MC. Regarding additional functionalities, GW offers a range of merchant related service such as NFC support (in devices equipped with NFC hardware), loyalty programs support and coupon code redemption. MCPP offers NFC support as well together with an Application Programming Interface (API) for developers to create value-added applications.

In general terms both solutions operate in a similar way. Supported devices and additional functionalities are indeed differentiating factors but cannot be consider significant as they do not affect service provision. An important technological difference lies in the way data is tunneled through each platform as in the case of MCPP authentication and payment data are hosted in Google owned servers while in the case of MCPP it is upon the merchant or MC partner to select the data storage architecture.

4.3.2 - Organization Design

Table 11 MC-GW Organization design

Organization design		MC PayPass	Google Wallet
Business model variables			
Actors		Retail Merchants; Retail consumers; MC platform partners; MasterCard;	Google; Payment processor; Issuer; Acquirer; Merchant; Consumer;
Actors' resources & capabilities		Merchants’ payment transaction volume; Consumers’ transaction value; MC partner's solution/wallet; MC platform;	Existing Network infrastructure; Existing customer base; Payment transaction volume; Process handling; FIs connection network; Marketing and sales;
Actors' strategic interests		Branding; Reducing churn; Promoting unified platform; Seamless and secure transaction experience;	Payment data gathering; Process fees revenues; Unified service provision;
Organizational Arrangements		MC operates platform; Merchants and Consumers are the end-users; MC partners offer digital wallet solutions to end-users;	Google operates service platform; Consumers and merchants are the end-users; Google transfers transaction data to payment processor;
Value activities		Channel of communication between Merchant-Consumer and their FIs;	Funds transfer; Data communication;

MCP and GW have different approaches with regards to the choices made for the organization design domain.

The roles and participating actors in the organizational design domain of MCP and GW are rather stable. Retail merchants, consumers and other payment service intermediaries (payment processor, card scheme owner, FI etc.) are parts of the “supply chain” for the two RMP solutions. Different platform implementations though lead to differences in the connection between actors and the platform. But MCP and GW follow similar arrangements with their affiliated actors in the service ecosystem, which can be considered as an outcome of them performing the same value activity.

Regarding strategic interest the two cases have clearly a different focus. MCP focuses on brand recognition while Google is interested in the data of each transaction. This is evidently connected to each organization’s main business activity, MC being financial services and Google advertising. MCP is MC’s tool for preserving their brand name acceptance in the evolving field of mobile payments. Google introduced GW as an effort to gather data related to purchases of every end-user. Through GW Google will be able to connect users’ searches and final purchases. Therefore, actors’ resources and capabilities are similar but interpreted in different ways by each solution.

4.3.3 - Financial Design

Table 12 MC-GW Financial design

Financial design : business model variables	MC PayPass	Googe Wallet
Investments	Platform marketing; Platform development; Merchant's time; Consumer's choice; Partner's time;	Platform marketing; Platform development; Merchant's time; Consumer's choice;
Costs	Operational costs	Operational costs
Revenues	Brand recognition;	Payment data acquisition;
Risks	Misuse; Fraud;	Misuse; Fraud;
Financial arrangements	Platform mediates actors' financial relation	Platform mediates actors' financial relation

It is clear that MCP and GW follow the same financial strategy as they have the same investments and platform costs, risks and financial arrangements. They offer their service platform for free to other actors who want to connect. This way they try to promote adoption upon their target groups and suggest using the platform instead of other payment means. This is a common scenario for services which need to reach a critical mass in order to become profitable and effective. We understand this by looking at each service’s anticipated revenue. Brand recognition and payment data can be significant when end-users’ adoption is high. Small rates do not lead to high recognition and give low reliability results when trying to draw conclusions based on the related data.

4.4 - Chapter Summary

Following the analysis of business models' design characteristics we depict each aspect of the two cases that makes up the service that is provided to the market.

MCPD introduces a platform over which payments can be executed and cares about end-users' selection of the platform. Devices participating in the platform are of no importance as the goal is to raise recognition and use of the platform, which ultimately affects recognition of MC following the simple equation saying "the more the end-users, the higher the percentage of people who know that MC is providing the service". Since brand recognition is the key interest of MC we see the clear connection in MC's pursuit of high end-user acceptance. Examining MCPD's business model design issues we understand the way that brand recognition direction is followed. Service design focuses on reaching as many stakeholders as possible. Technology design follows the same line of thought by providing a secure platform where any device can be connected. Organization design comprises "loose" arrangements between stakeholders, promoting this way the idea of easy adoption. Financial design is focused on adoption as well, leaving out direct revenue streams that could come from charging for service provision and taking up platform operations related costs.

GW is a competing platform that has the focus of high adoption as well. In GW's case though, main interest lies in the volume and quality of data going through the platform. GW's goal is to gather as much data as possible about transactions of consumers and merchants. GW's business model characteristics are structured accordingly focusing on maximization of adopters as data "generators". Service design shows a clear focus to the end-users' side as a direct connection with them is sought after. Technology design decisions show the direction towards quality of service and the related data, permitting installation of GW service only through Google "issued" (Google being the SE manager) devices. Organization design is directed on promoting selection of Google as the service provider for yet another service, monetary in our case, and addresses related actors as ends who need Google as a mediator for their successful transaction execution. Financial design is focused on high adoption rates that are expected to lead in high data volumes, thus offering the service for free to end-users.

The two cases under close examination follow different strategic interests through offering the same service. Therefore, we see that existing solutions can have different reasons of existence but provide the same value to end-users who want to complete financial transactions. Thus, the idea of a UMPS over which all existing MP solutions could unite is visible but strategic interests of stakeholders make unclear how agreements in this topic can be reached.

Chapter 5 - Uncertainties Mapping

In this chapter the business model design characteristics of the case studies are mapped over each one of the uncertainties in order to give the appropriate input for the creation of “heat signatures” according to the STOF stress testing tool. The mapping process is based on publicly available information and interviews with key stakeholders, to which business model design issues were presented and discussed in depth.

In the following part, the heat signatures of the design domains for both cases are presented and the mapping process is described.

5.1 - MasterCard PayPass (Online)

5.1.1 - Service design

MCPD acts as an intermediary service platform for the connection of retail merchants to retail consumers who want to pay for the purchased goods and complete an order check-out. Service is accessed by the consumer through the merchant’s e-commerce solution or the merchant’s payment service provider digital wallet.

Low acceptance by the merchants would imply a limited availability for consumer usage and potentially drive MC in stopping the service. MC’s executives recognize the platform as a tool for brand recognition and merchants’ negative adoption is a strong demotivator for future support, Interviewee 5 admits. It is important to keep in mind that merchants’ and consumers’ adoption are related according to network externalities theory, as one group’s choice drives the other group’s preference. Therefore, low consumers’ adoption shows a potentially problematic situation. Consumers, in the role of value creators for the service, do not select MCPD for performing their payments thus limiting the transaction volume of the platform. This is interpreted by MC as an indicator of low perceived value and raises the need for attention as it can lead to low service usage. On the opposite side, high consumers’ acceptance can lead to high merchants’ acceptance, and vice versa. Interviewee 3 validated this opinion by making clear MC’s interest in the transaction volume of MCPD. As merchants need to serve consumers, consumers’ choice is a lead for merchants’ choice. Following the same line of thought, merchants’ wide adoption of MCPD can be offered to consumers as a standardized way of transaction execution.

The actual service provided to end-users does not change depending on the number of adopters. Although, limited adoption makes it hard to find merchants who accept MCPD as a form of payment and therefore raises the needed effort for the consumer to use the service. On the contrary, high merchants’ adoption increases the value of the service and therefore can affect consumers’ choice over adoption. Interviewee 5 indicated that MCPD is a service primarily offered to merchants as a solution for accepting payments. Most interviewees agreed on the additional weight given to merchants’ adoption of the service compared to consumers’ adoption of the service.

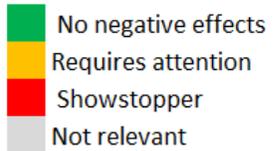
Target group reach can become limited in the case of technology incompatibility between mobile devices and MCPD. In that scenario, merchants willing to use the service would need to own specific

devices or follow specific technology protocols. Consumers' access to the service cannot be guaranteed either, in technology bounded solutions, as they would need to have compatible devices.

Moreover, such a case consequently raises the effort of the end-users for gaining platform access and operation. Thus MCPP would be offered in a bounded market that uses compatible technology. For these reasons interoperable technological implementations are preferred by the platform which maximizes the reach to compatible end-user devices while also minimizing the effort for platform access and use. MCPP, as an online operated service, is available to any device with a browser application, while partner organizations create digital wallet applications that are available to a wide consumer base (each partner's customer base). According to Interviewee 5, technology providers' involvement is pursued through the involvement of business intermediaries (MC partners) who need to arrange technology issues for their digital wallet development. MC offers a white-labeled version of a digital wallet for partner organizations to use and label on their own. This way, compatibility between different partners' wallet versions is ensured. Mobile device manufacturers' involvement is not pursued at this stage as MCPP online does not go after device hardware security element provision. MC partners developing digital wallet solutions need to come into agreement with device manufacturers or MNOs for the case of holistic MCPP service provision (proximity and remote). As our focus is in RMP this issue is not further discussed. It is unquestionable that involvement of technology manufacturers in MP services' development and provision can help scalability through standards interoperability and ease of use offering.

MCPP is a business service which has to comply with governmental and regulatory bodies' legislation in each geographical area that it is available. Incompliance to regulations can lead in limited or no access to merchants and consumers. Value proposition of MCPP is directly affected in that case as the service will not operate in a legal framework. Of course, service compliance to regulations ensures access to the market and consequently end-users. MCPP follows monetary and fiscal policies of every region that it is offered but does not necessarily have to comply with standardization bodies' suggestions. Compliance guarantees that the service is compatible with other complying services offered by different organizations but incompliance can create unique access channels for end-users to connect to the platform. The advantages and disadvantages of such a move are not further analyzed but it is important to keep in mind that interoperability is not necessarily the means as brand recognition is the key strategic interest.

Following the aforementioned description of MCPP service design we get the generated heat signature shown in figure 20.



	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement.		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service noncompliance</i>	<i>Service compliance</i>
Service design : business model variables								
Customers and/or end-users								
Target group (primary; secondary)								
Value proposition								
Service offering								
Context of use								
Effort for the customer								
Customer relationships								

Figure 20 - MC Service design Heat Signature

5.1.2 - Technology design

On the aspect of technology design MCPP implements a digital platform layer in order to serve the role of the intermediary connecting merchants, consumers, business intermediaries, acquirer FIs, issuer FIs and other payment service providers, all related to the settlement of a fiscal transaction between the merchant and the consumer.

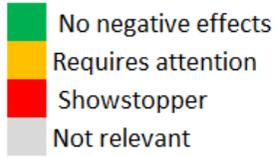
Related applications, devices, service platforms or channels are not affected by low merchants' or consumers' adoption. On the other hand high end-users' adoption can load the network of the service platform with traffic which can have an effect on the time aspect of communication over it. Additionally, increased end-users' participation brings together security threats for the platform due to the volume of information transferred and their associated value. This is an aspect that requires attention as a potential security breach can negatively affect the reputation and technological viability of MCPP. One important aspect of the increased merchants' participation is the related volume and the power that this bears for the related digital wallet used, as interviewee 5 notes. The possibility of a digital wallet showing increased adoption can give bargaining power to the wallet issuer. This fact puts in danger MC's power over the service platform and might require attention if such a future state becomes valid.

Developers' access to the API, is an important additional functionality which cannot negatively affect technology service provision in both low and high end-users' adoption. Developers can introduce solutions providing value-added services, thus increasing the functionality of the platform.

For the uncertainty factor of technology providers' involvement, as far as technology design issues are affected, interviewee 1 mentioned the potential negative effects that can rise from low involvement. Technological viability of an implementation over the platform is related to the number of end-users participating in the platform and using it for their desired service provision. Low involvement of technology manufacturers can result in differentiated functionality over multiple devices and platforms as well as multiple applications' versions. Such factors can impede the progress of platform adoption and use. On the contrary high technology providers' cooperation can ensure the aim for interoperability through standardization. Following the previous argumentation, developers' access to the API and any additional functionality can only positively affect MCPP.

Over the issues related to MCPP's compliance with legislation and other regulations, on the technology design, the biggest threat lies in the combination of service incompliance with standardization bodies' suggestions which could effectively limit the reach of the platform. A limited reach can lead in MCPP's failure as there would be no adequate traffic to justify its existence as a MC's brand acceptance tool. This acts as a potential showstopper for the service platform and as a threat for the channel over which the MCPP's service is provided. Regarding service platform selection, even the case of legislation and standards' compliance can create incompatibility over the functionalities offered in multiple locations promoting different standardization options.

Based on the information presented above the corresponding uncertainties mapping for the technology design part of the STOF framework is presented in figure 21.



	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement.		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service noncompliance</i>	<i>Service compliance</i>
Technology design : business model variables								
Applications		Requires attention		Requires attention	Requires attention	No negative effects		
Devices					Requires attention	No negative effects		
Service platforms					Requires attention	No negative effects	Showstopper	Requires attention
Channels		Requires attention			Requires attention	No negative effects		
Additional functionalities	No negative effects	No negative effects	No negative effects	No negative effects	No negative effects	No negative effects		

Figure 21- MC Technology design Heat Signature

5.1.3 - Organization design

Organization design issues of the MCPP business model are extensively influenced by merchants' and consumers' adoption. This is an expected result of the extent of end-users' adoption. Low adoption puts in danger MCPP's target groups' formation, as measures to resolve such issues might include shift in the target groups focus and therefore instability. By extension, actor's related resources and capabilities are affected, as the platform does not operate in the anticipated success level that would help achieving the actors' strategic interests. On the contrary, high end-users' acceptance of MCPP means that transactions performed over the platform deliver the expected value to all involved actors and work positively over the strategic interests of each one. We should note that organizational arrangements of MCPP are a topic requiring attention both for the cases of low and high end-users' acceptance. Such is the case because of the way in which each actor's strategic interests are promoted in every combination between merchants' and consumers' adoption of MCPP. Interviewee 3 admits that *"MC controls the market and follows a rather business-to-business approach but with RMP they found a new way to increase their sales"*.

In the same line of thought, technological implementation of the platform through low and high involvement of technology manufacturers shows multiple dynamics. The volatility of participating actors, depending on the technological implementation, defines the resources and capabilities each one offers to the platform. Actors' strategic interests respectively face the threat of not being achieved due to lack of interoperability. Value activities of MCPP are defined by the resources and capabilities of the participating actors' and therefore require attention in order to prevent limited service provision. High technology providers' involvement helps in accessing the desired actors for participating in the platform through interoperability of technological implementation. In that case merchants transaction volume can be channeled over the platform for performing consumers' desired funds transfer to merchants and ultimately checkout. The positive effect on achieving actors' strategic interests is clear as the platform operates on its intended cause. In the same manner, value activity provision is ensured as the platform acts in the form of connection channel for merchants, consumers and related FIs and other payment service providers. Organizational arrangements stay unaffected in both cases as the service offering remains the same.

As stated earlier, incompliance to regulations and standards can limit actors' access and therefore requires attention in the deployment of MCPP. Actors' resources and capabilities are not affected but MCPP's strategic interests, organizational arrangements and value activities can face law or market opposition due to the opportunistic behavior of incompliance. Such a case could act as a showstopper for the service.

MCPP's compliance to regulations and standards has a positive effect on actor definition and access as well as value activity provision due to the effective service operation. It requires, though, MC's attention regarding strategic interest achievement and organizational arrangements as regulations (e.g. anti-competition law) might result in altering platform's intended way of operation.

Based on the information presented above the corresponding heat signature is shown in figure 22.

- No negative effects
- Requires attention
- Showstopper
- Not relevant

	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement.		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service noncompliance</i>	<i>Service compliance</i>
Organization design : business model variables								
Actors	Requires attention		Requires attention	No negative effects	Requires attention	No negative effects	Requires attention	No negative effects
Actors' resources & capabilities		No negative effects		No negative effects		No negative effects		
Actors' strategic interests	Requires attention	No negative effects	Requires attention	No negative effects	Requires attention	No negative effects	Showstopper	Requires attention
Organizational Arrangements	Requires attention						Showstopper	Requires attention
Value activities					Requires attention	No negative effects	Showstopper	No negative effects

Figure 22 - MC Organization design Heat Signature

5.1.4 - Financial design

Financial design aspects of MCPP business model are largely influenced by merchants' and consumers' adoption. In low end-users' acceptance, merchants' and consumers' time and effort for the platform are disproportionate to marketing and development costs of MCPP. This creates a gap between these metrics which can be translated in non-performance of MC's investment, therefore raising the need for attention. In MCPP operation, costs covered by MC are those related to the connection of end-users' and other stakeholders over the platform. As other MCPP operational costs are also covered by MC, low merchants' acceptance poses a danger since the associated revenue, although in the case of MCPP it is not fiscal, is negatively affected. On the contrary, revenue is positively affected for the consumers' side even in the case of low acceptance since brand acceptance is achieved, although in low "rates". Fiscal revenue of the platform is for the moment unimportant as interviewee 5 admits by saying that *"MCPP is and acceptance brand and not a cash cow. MC tries to market MCPP as good as possible in order to preserve its presence in the payments market along mobile devices' proliferation"*.

For the case of high end-users' acceptance investments show a positive outcome as acceptance is the driver for revenue generation and therefore revenue is also positively affected. Related costs remain a threat as acceptance means increased transaction volume which could consequently increase operational costs to the level of not creating proportionately important revenue. Revenue is still positively affected, but the relation of cost and revenue is what will define fiscal viability of MCPP.

Risks and financial arrangements related to end-users' acceptance remain unchanged both in low and high instances. This is because misuse and fraud are always a threat for MCPP and are proportionately related to the number of platform participants. Financial arrangements, on the contrary, remain unaffected as the role of the intermediary MCPP holds does not change in any of the cases.

Regarding technology manufacturers' involvement, financial design is affected in the investments' design feature. Low technology manufacturers' involvement and the resulting technology bounded solutions lead to limited market reach which can negatively affect marketing and development costs. In a possible scenario there would have to be a different version for every device/OS/e-commerce solution etc., showing the positive outcome of an interoperable universal solution. Moreover, risks are still a threat, but the case of a fraud over an interoperable platform version is a potential showstopper as it could create a universal security breach.

For regulations and standards' incompliance investments, operational costs and revenues are financial design factors negatively performing in the long-term. This is due to limited actors' reach and access as well as through running the danger of service ban in some markets. This respectively affects financial arrangements between actors for the service provision, which need to be able to comply with potential turbulence as an outcome from the operation under incompliance.

On the other hand, operation in compliance with regulations and standards ensures brand recognition in a certain level and therefore positively affects the business models' "revenue" while also guaranteeing more stable financial arrangements, compared to the incompliance case.

Based on the mapping described above the corresponding visual graph is presented in figure 23.

- No negative effects
- Requires attention
- Showstopper
- Not relevant

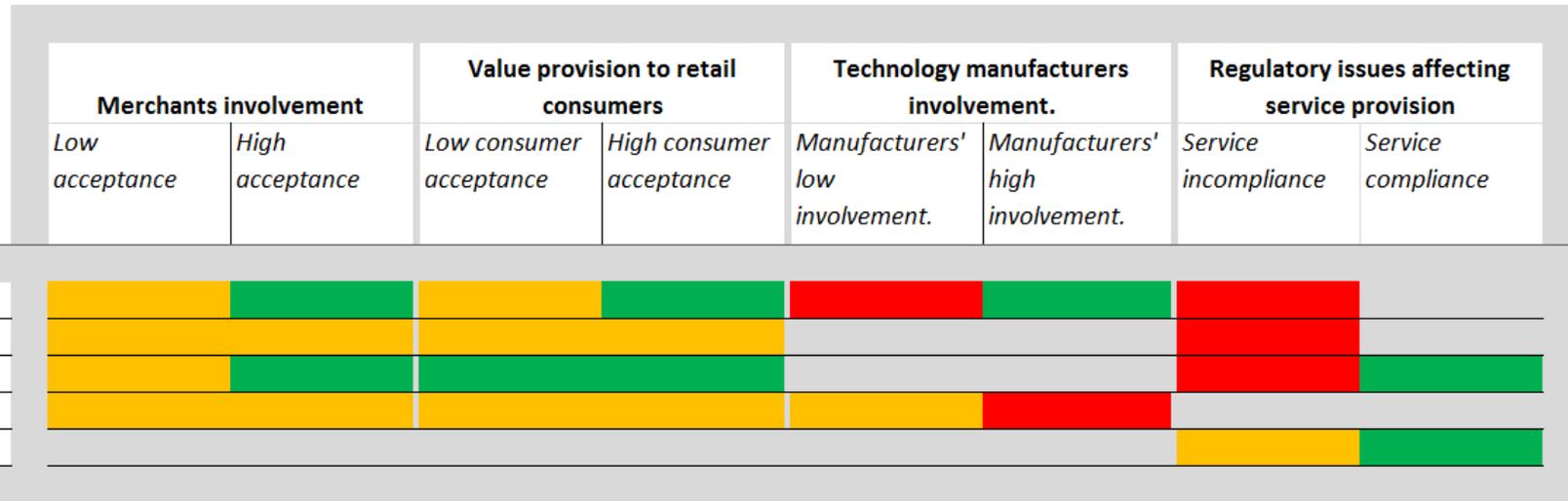


Figure 23 - MC Financial design Heat Signature

5.2 - Google Wallet (Online)

5.2.1 - Service design

GW is a service offered to retail merchants and consumers who need/want to perform the monetary part of their business transaction over a digital platform. GW is giving merchants and consumers the same importance and positions itself as an intermediary in their business communication. The case of end users' (retail merchants and consumers) low acceptance needs the attention of GW managers. Actions resolving such situations might require re-definition of target groups where the roles remain the same (merchants-consumers-developers-partners) but actors change. GW's value proposition, service offering, context of use, effort and relationship with the platform remain unchanged in the case of low end-users' adoption.

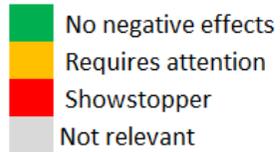
In high end-users' adoption, GW's target groups need for a platform to complete transactions, is fulfilled. Therefore, target group parties access the platform and value proposition is gratified. Similarly, end-users' effort for service use is minimized as the number of merchants' gives a wide base for consumers to perform payments while a high number of consumers' participating in the platform gives a wide base to participating merchants accepting payments. According to interviewee 2 the platform's role is to *"bring the buyers and sellers together while capitalizing in the process, which is something that can be best done in high end-users' adoption rates"*.

Uncertainty of low technology manufacturers' involvement requires the attention of GW business management as technology bounded service provision enables only compatible actors to participate in the platform. This factor might raise the need for alterations in target groups. Moreover, GW's value proposition can be affected as the service is not universally accessible. Consequently the effort of the interested actor is raised triggering caution regarding service's ease of use, as interviewee 4 verifies.

On high technology manufacturers' involvement, standardization or universal service provision through different GW implementations, can give platform access to a wide user group. Value proposition is therefore fulfilled while also the related effort of participating actor is minimized.

Regarding regulatory and standards compliance GW's in-compliance can affect the access of actors willing to participate in the same manner as in manufacturer's involvement. In this case value proposition is incrementally influenced because of the importance of regulations and standards as they are suggested by a related organization rather than chosen by the manufacturers for the sake of universal service provision. For this reason in-compliance to regulations and standards can invalidate GW's value proposition and therefore act as a potential showstopper. Subsequently the service offering can be limited in an in-compliance scenario but widely accepted in the case of regulations and standards compliance.

Based on the information presented above we present the corresponding heat signature of business model variables for the service design domain in figure 24.



	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service non-compliance</i>	<i>Service compliance</i>
Service design : business model variables								
Customers and/or end-users	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Grey
Target group (primary; secondary)	Yellow	Green	Yellow	Green	Yellow	Green	Yellow	Grey
Value proposition	Grey	Green	Grey	Green	Yellow	Green	Red	Grey
Service offering	Grey	Grey	Grey	Grey	Grey	Grey	Yellow	Green
Context of use	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
Effort for the customer	Grey	Green	Grey	Green	Yellow	Green	Grey	Grey
Customer relationships	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey

Figure 24-GW Service design Heat Signature

5.2.2 - Technology design

Uncertainties' influence deriving from end-users' involvement affect technology domain variables mostly in the level of service provision related design characteristics (service platform, channel) rather than the technology base for platform deployment characteristics (application devices).

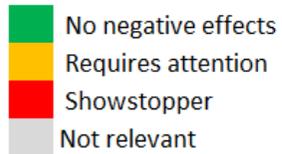
Low merchants' acceptance of GW can lead to the idea that technology decisions need to be re-evaluated and altered. This can be a result of limited reach from compatible devices, raising thus a concern over the selection of the technology that is supported by the platform. Similarly, channels used for platform operation are affected by low end-users' adoption and call for actions that can lead in higher traffic. High end-users' involvement is translated in successful operation of the platform from which the customer base gains the anticipated value. In the same line of thought channels prove to successfully handle the generated transaction volume, promoting each participating actor's strategic interest.

In both cases of low and high end-users' involvement GW's additional functionalities cannot be negatively affected. Services offered through additional functionalities target the platform's proliferation and are positioned as added-value services (or complementary such as in the case of NFC) for the end-user.

As far as technology manufacturers' involvement is concerned, technology design domain characteristics are all under concern in the case of low involvement. Applications need to exist for different OS and will need to have different implementations. All application versions have to achieve the same results regarding communication with the platform in a time-critical way while ensuring security and safety of transmitted data. Supporting devices are limited to the ones that comply with the corresponding application versions and especially in the case of GW they need to have Google as their security element keys handler. Service platform remains operationally the same as described in service offering but has limited compatibility supporting compliant devices and application versions. Channel for data transmission is dependent on GW's arrangements, although internet is up until now the only channel used. Additional functionalities are also limited from resulting technology bounded solutions as the reach of the platform is smaller than that of interoperable solutions. GW's additional functionalities are evidently favored from interoperable solutions coming from high technology manufacturers' involvement with the platform. In the same line of thought available channels and service platform operation gain additional end-user reach, this can be considered as added-value for GW. Regarding applications and devices, high involvement has again a positive footprint although it needs to be treated with concern as it might affect other design issues such as organizational and financial arrangements.

Incompliance to regulations and standards needs attention as far as devices are related. Offering the service only to some devices might infringe with standardization suggestions in some market situations. In the same line of thought, service offering might be limited in such a case and so service platform will not be able to operate in the intended way. A typical scenario of this case is non-support of cards issued from another country's FI than the one in which the merchant has an official business presence. In the case of compliance to regulations and standards such issues are arranged according to the practices decided by the corresponding organizations, thus taking away the liability from GW.

Based on the information described above we show the related heat signature in figure 25.



	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service non-compliance</i>	<i>Service compliance</i>
Technology design : business model variables								
Applications					Requires attention			
Devices	Requires attention	No negative effects	Requires attention	No negative effects	Requires attention		Requires attention	No negative effects
Service platforms					Requires attention	No negative effects	Showstopper	No negative effects
Channels	Requires attention	No negative effects	Requires attention	No negative effects	Requires attention	No negative effects		
Additional functionalities	No negative effects		Requires attention	No negative effects	Requires attention	No negative effects		

Figure 25-GW Service design Heat Signature

5.2.3 - Organizational design

For the organization design domain end-user's involvement is an important factor influencing the actors participating in the GW ecosystem. Low end-user's involvement projects a weak presence of the two most important actors in the ecosystem as merchants and consumers are the value creators for the platform. Therefore, their low adoption is a factor which in the long term influences the viability of the service platform. The limited resources and capabilities offered raise a concern over organization design decisions that need to be taken in order to grow participation. In the same time, GW's strategic interests are not promoted as low adoption leads to low transaction volume and therefore low transaction data. For this reason, organizational arrangements among the platform actors need to be re-arranged in order to manage such a situation.

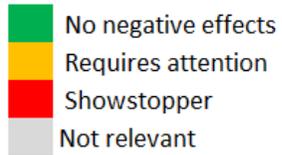
In the progression case of high end-user's acceptance consumers strengthen their presence in the ecosystem and reason the platform's existence. Same goes for the merchants' side but it is important to carefully address merchants' connection as increased transaction volume can potentially give the merchants additional power over platform decisions.

As far as technology manufacturers' involvement is concerned, low involvement in development and deployment needs attention regarding future arrangements as their interest over the platform can blow out. This can lead to a state where technology manufacturers will no longer find value from their participation in the platform and decide to resign. In a high involvement case, manufacturers' fuel their interest as a matter of presence in inter competent business case but the platform is favored by this as it gains in service provision and participators' power. Technology interoperable solutions help in strengthening the actors' connection with the platform while also promoting each ones' strategic interests.

Regulations and standards compliance is a matter of concern both in the case of incompliance as well as in the case of compliance as far as actors are concerned. This derives from the way in which the organizational arrangements are dictated by regulations in which GW needs to fit in. In the case of incompliance strategic interests might not be promoted and therefore show signs of service's failure as consequently GW's value activities are not provided to end-users.

In the case of compliance strategic interests are promoted and the actors organizational arrangements are regulated based on the guidance from government of other regulatory and standardization organizations. This means that the platform is operating as intended and value activities benefit both participators and the platform itself.

Based on the information described above the corresponding heat signature is presented in figure 26.



	Merchants involvement		Value provision to retail consumers		Technology manufacturers involvement		Regulatory issues affecting service provision	
	<i>Low acceptance</i>	<i>High acceptance</i>	<i>Low consumer acceptance</i>	<i>High consumer acceptance</i>	<i>Manufacturers' low involvement.</i>	<i>Manufacturers' high involvement.</i>	<i>Service non-compliance</i>	<i>Service compliance</i>
Organization design : business model variables								
Actors								
Actors' resources & capabilities								
Actors' strategic interests								
Organizational Arrangements								
Value activities								

Figure 26-GW Organization design Heat Signature

5.2.4 - Financial design

Low merchants' acceptance is an indicator over the outcome of platform marketing and development investments. Although for Google, being an advertising company, these actions are covered from its existing departments and operations. Together with that GW still bears the operational costs which are related to service provision although the expected revenue is not generated (transaction data volume). In the case where the expected revenue continues in the long term to underperform compared to the related investments the threat of terminating service provision exists. Risks from platform operation are a situation which needs attention both for low and high merchants' adoption. In the financial arrangements part, low merchants' adoption needs attention. Alterations in the decisions regarding financial issues might be needed as an effort to affect the low rate of adoption. High merchants' adoption still bears concern over investments and platform operational costs as market growth needs to be achieved. Although, when merchants' involvement with GW is revenues are substantial and positively affect any related financial arrangements. It is important to note interviewee's 2 opinion that *"the service provided is not necessarily the business case, but knowing what people do-want-spend"*.

In the same line of thought for the consumers' involvement, who are the actual value creators, low rates pose a threat for the service's investments. Such a case can prove to be a showstopper in the long term as investments surpass the generated revenue out of the collected data. High consumers' acceptance still raises the need for concern over the investments made on the platform as this creates even more claims for growth of the platform which needs to be sustained. Same as in the merchants' case platform's costs and risks remain proportionate to adoption rates and require concern. It should be noted, though, that in the case of high consumers' adoption expected revenues are generated and translated into profit for the company.

On the technology manufacturers' involvement, low rates determine a strong concern over investments on platform development as the manufacturers' support for service provision in a technology bound situation is needed. Consequently, the outcome related to revenue would suffer from factors such as representation of specific customer segments (technology supported customers). Both these concerns are eliminated in the case of high manufacturers' involvement where interoperable solutions are introduced. Investments would create revenues in a universal customer base since a wide range of devices/technologies is supported. Risks over platform operation remain proportionate to the service's reach and therefore require close attention both for the case of low and high manufacturers' involvement.

Regulations and standards incompliance raises concern over the platform operational costs as close attention is needed to prevent issues such as fines posed by the government. In such a case the related transaction volume could be threatened as it would be acquired under "non-permitted" circumstances. This issue is eliminated in the case of compliance to regulations and standards as the acquired data would be verified and backed up by the standardization bodies' requirements.

Based on the information described above the corresponding heat signature is presented in figure 27.

- No negative effects
- Requires attention
- Showstopper
- Not relevant

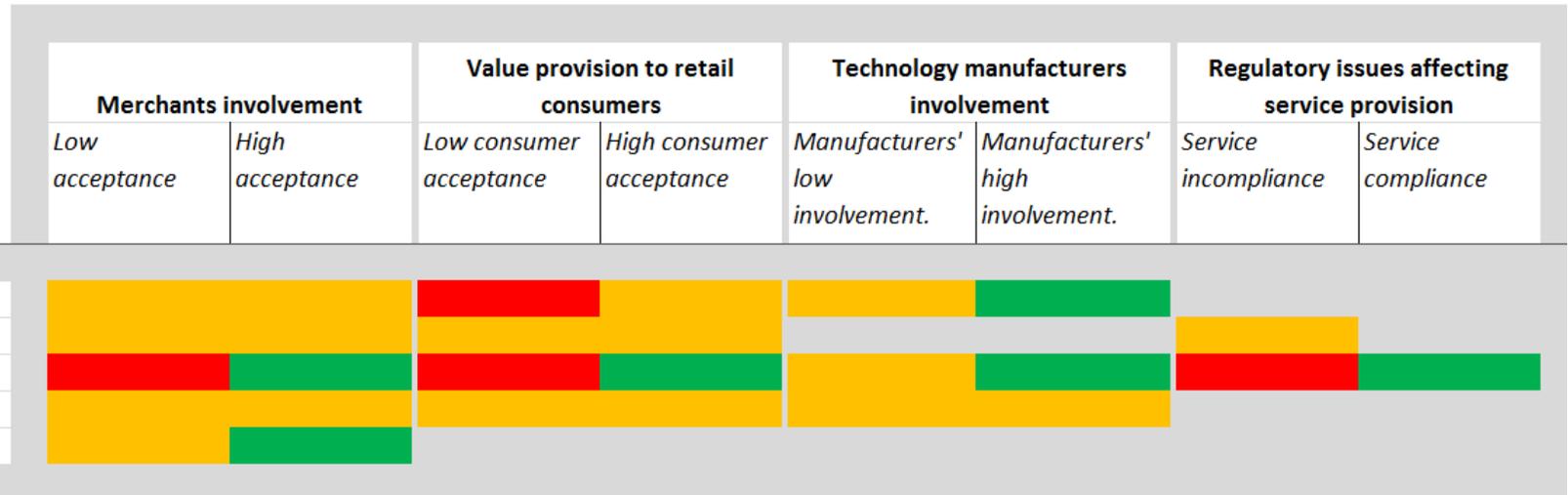


Figure 27-GW Financial design Heat Signature

5.3 - Chapter Summary

In this chapter we can see a form of a risk analysis for the case study examples of our research. Each business model design characteristic is examined towards the impact that an uncertainties can have over the related business model. In order to understand the way in which the mapping was done we give the following example:

The heat signature's uncertainties mapping of figure 20, "Effort for the customer" design characteristic for the "Merchants' involvement" uncertainty is described by the following sentence *"... limited adoption makes it hard to find merchants who accept MCPP as a form of payment and therefore raises the needed effort for the consumer to use the service. On the contrary, high merchants' adoption increases the value of the service and therefore can affect consumers' choice over adoption..."* Low merchants' involvement leads to higher effort for consumers to reach the platform and is therefore labeled as "requiring attention", while high merchants' involvement raises places of acceptance of MCPP and attracts attention to MCPP, therefore the corresponding block is labeled as having "no negative effects". The same line of thought is followed for uncertainty mapping for the two case studies and explains how each block is labeled.

MCPP and GW face the same uncertainties and score similarly against them. The key finding of our uncertainties mapping process is the positive effects of high end-users' involvement and adoption. This is clearly related with the way in which strategic interests of MC and Google are achieved through high adoption, but also shows that both platforms benefit from the same circumstances.

It is important to note that interviewee 6, who has been directly related to the development of the stress test tool used in this research, explicitly suggested not to proceed in a cell-by-cell comparison of the two business models' heat signatures as the results of such a procedure would hardly represent the uncertainty mapping of a joint case.

Chapter 6 - Discussion

Mobile Payments is a field which meets great turbulence in the last years having many parties who try to participate in it and develop solutions for end-users. The quick rise in use of mobile devices can be seen as a driver for the interest towards MPs, which could be the successor of e-payments. In this research we support the advancements in MPs but propose that a UMPS is possible. A UMPS can help in uniting all prospect MPs users in performing their transactions over the same platform. Such a case could offer extended usability as all MP solutions could work together to support the process in focus, monetary transactions over mobile devices.

In this direction we examined the payments ecosystem. Paper based and non-paper based means are existing solutions that still take up a large part of the payments market. MP can also complete the transactions in which other payment means are used but the transition to a MP standard is yet to seen.

Looking at MP from a closer distance we can see FIs, MNOs, TSMs, merchants, consumers, technology manufacturers and regulatory bodies being the evident stakeholders forming the MP ecosystem. Merchants and consumers are the value creators in MP and all the other actors try to orchestrate the way in which interaction is achieved and transactions are performed. Different stakeholder strategic interests rise up on the service offering of each one, resulting in conflicts between them, which have negatively influenced the development of MP in some cases (Ondrus et al., 2009).

Having this in mind we selected to examine two cases offering Remote Mobile Payments solutions. Namely; MasterCard PayPass and Google Wallet. Our selection was based on the classification matrix of Ondrus and Pigneur (2006). Together with that we can see that the differentiation in direction between the two organizations, offering these MP solutions, could help us better understand how each one addresses the end-users who are harder to reach. On one hand we see MCPP which traditionally has a strong connection with merchants and directly affects their decisions about accepting payment options. MC's PoS terminals and extended business network of financial services handling has put them in a leading position. Therefore MC has an important reach over merchants, one of the primary stakeholders in MP ecosystem. MC's connection to consumers is strong as well but is mostly managed and regulated by affiliated FIs who host the financial services provided by MC. The consumer might own a MC branded card, but this card is issued from the FI of his choice and it is the FI that regulates transactions performed through MC's cards. On the other hand we see GW who offers a number of online services to any end-user interested in Google's line of business. Google is a very successful corporation with a big reach over end-users and GW service offering can be seen as an additional service in the organization's product line. Although Google doesn't have an extensive reach to merchants, but quite a substantial one coming from its advertising business, it can be said to have an extensive reach to consumers. Google's Android mobile operating system is a market dominator and consequently has an extended reach over these users. Therefore, Google has an advantage over direct consumers' reach which drives accordingly the strategy of GW.

In our research we examine the part of Remote Mobile Payments for these solutions as the inclusion of Proximity Mobile Payment solutions, even from the same companies, would substantially extend the length of this thesis project and negatively affect time constraints. In our effort to examine how "far" existing solutions are from UMPS we used Faber et al.'s (2003) framework for business model design (STOF framework). STOF framework analysis of the business models depicted the reach of each organization over different stakeholders. The breakdown of Service, Technology, Organization and Finance design helped in separating the different building blocks of each business model. Such a breakdown approach was found to be appropriate for our research.

By examining the building blocks of MCPP and GW business models through STOF we saw the way in which each service's strategic interest is promoted through design choices. At the same time the approach of the stress testing helped in understanding the conditions under which the related requirements are met. MCPP and GW focus on the role of the "middle-man" in MP transactions and position their solutions as the most appropriate for completing such transactions. Their similarities are more than their differences as can be seen in the cross case analysis of 4.3. It is evident how they follow resembling service design choices as they address the same value proposition. Technology design choices are different in some aspects, but this is normal since each organization develops a solution according to its own reach in the market. Therefore MC develops a white-labeled digital

wallet and API for merchants while Google offers a GW solution which is available only for Google supported devices running Google's operating system. Organization and finance design of the cases have many commonalities as they address the same stakeholders' group. We should notice though that MCPP has a more strong inclination towards MC partners, which could work as promoters for the platform. Financially both platforms do not directly create fiscal revenue. This way the two cases are investments of MC and Google in the direction of offering the service to end-users in an effort to reach critical mass. Currently no predictions exist regarding future service fees charges for using MCPP or GW.

The comparison of a self-organized and an operator driver solution such as GW and MCPP respectively helped us understand the differences that derive from the nature of the service offering organization. The most important outcome is the high level of resemblance between the two business models and the differentiated strategic interest for platform provision.

Chapter 7 - Conclusion

In this chapter the conclusions of the research are presented. First RQs of Chapter 1 are answered. Next, limitations of the research are presented and the research's reflection is estimated. In the end, we present suggestions for future research.

7.1 - Research objective

The objective of this research was to "examine the steps needed to move towards universality in Remote Mobile Payments". For this reason we posed to research questions that would help in finding an answer for the objective. These are:

- ❖ **RQ1:** How is the payment systems market structured and where do mobile payments stand regarding stakeholder involvement?
- ❖ **RQ2:** How do existing solutions challenge the success factors of Ondrus et al. (2009), and which are their business model design characteristics that help in the direction of UMPS?

RQ1 is examined in Chapter 3 where a thorough analysis of the payments market is presented. Cash payments, card payments, check payments, credit and debit transfer payments are some of the currently used instruments to perform a fiscal resources' transfer between a payer and a payee. By looking closer at usage statistics on the geographical dependency we see differences deriving from the markets' maturity (WPR, 2011). A more interesting approach is that of temporal comparison in the statistics of the used instruments that shows how technology advancements drive payment preferences to lower use of paper-based instruments and can explain the shift to electronic and ultimately Mobile Payments.

Mobile Payments is an evolution of the shift to electronic payments. The classification criteria used to distinguish the multiple solutions offered are mostly concerned with the distance between the payer and payee in a transaction. Close distance payments are *proximity mobile payments* and payments where the distance is not important are *remote mobile payments*. Distance factor defines the possible technology infrastructures which can be used in order to complete a mobile payment transaction. Other factors used complementary or combinatorial to the distance are the value of the

transaction and the organization introducing the solution to the market. Payments on the value of 10 USD/EUR or lower are considered *micro payments* and payments over this value are *macro payments*. Mobile Payment solutions offered by natural candidates (Financial Institutions, card issuers and Mobile Network Operators) are operator driven solutions. Solutions offered by newcomers or other intermediaries are self-organized solutions (Ondrus, 2006).

Examining all the stakeholders (actors) which could potentially be involved in Mobile Payments we look into each stakeholder's role for the Mobile Payments ecosystem. Payment service provider's role can be implemented by different organizations. This reveals the starting topic of conflict between the multiple organizations as FIs compete with MNOs and other intermediaries capable of performing the role. The hybrid actor labeled as Trusted Service Manager is introduced as a solution for FIs and MNOs to face the flexibility of self-organized solutions. In the same picture merchants', consumers', technology providers' and regulators' interests are drivers for service requirements that need to be met by a mobile payment solution.

From this we get the different business models implemented through mobile payments. These are mobile-at-PoS (Point of Sale) in which the mobile device is used as a digital wallet at the PoS, mobile-as-PoS where mobile device is used instead of a PoS and mobile as a node in a separate payment platform where mobile device is used as a node in a bounded payment platform permitting transactions among the parties of the platform.

Therefore, we get a description of the payments market, positioning of mobile payments and associated stakeholders for the service provision. From this track we reach to a concluding Mobile Payments ecosystem. In our ecosystem view merchants and consumers are the drivers of business design decisions as they set the requirements that need to be met in order to cover their transactions' needs. FIs, MNOs and TSMs design solutions based on the aforementioned requirements and comply with the limitations set by government, technology providers and other regulators related to Mobile Payment service provision.

Payments' market structure is described when presenting payment methods and the associated statistical metrics. Our ecosystem view together with the stakeholder description and analysis presents the positioning of mobile payments within the payments' market. The interest of Mobile Payment stakeholders is depicted by roles' description and the candidate actors willing to take up the responsibility of arranging service provision for end-users.

RQ2 is addressed in chapter 4 and 5. We follow a case study approach where we examine one operator driven and one self-organized remote mobile payments initiative, namely MasterCard PayPass online (MCP) and Google Wallet online (GW). For each case we decompose the corresponding business model according to STOF theoretical framework (Faber et al., 2003) and then challenge the success factors of Ondrus et al. (2009).

In the decomposition process we distinguish all the business model design characteristics that build up our case study solutions. Through this process we are able to understand the results of each design issue and map its importance over service offering and overall reason of existence in the business case. This mapping further helps in the next step, which is uncertainties mapping. Uncertainties mapping is presented in chapter 5 and depicts the way in which each design characteristic scores against factors that existing literature supports as prerequisites in order to

reach success in mobile payments. The answer to RQ2 is therefore not straightforward but described along chapters 4 and 5.

Regarding the way business models' design characteristics face towards Universal Mobile Payments System, results show that Google and MasterCard have the same service offering over different implementations. Therefore both services are found to use very similar design characteristics but the fact that they have different strategic interests influences service deployment, and ultimately participating actors.

On the direction to a Universal Mobile Payments System both solutions could be combined over the same platform or sustain their differences but be tweaked to support both platforms' end-users. In such a case their customers' base would be combined and therefore raise the ease of access for end-users. (pp. size of the platform drives adoption). Additionally, for both platforms end-user base is a metric positively related to platform performance so in the case of a common service provision by both companies they would both gain additional benefit.

In such a scenario there are issues like branding which impede advancement over a common solution. Our opinion is that since the strategic interests of Google and MasterCard (transaction data and brand acceptance respectively) do not clash there could be a hybrid solution over branding issues in order to move towards UMPS which could serve the purpose for both end-users and service providers.

As shown in the cross-case analysis (4.3.) commonalities between the two business models surpass differences and validate the ease of transition to a common platform.

7.2 - Limitations

The results of this study need to be interpreted with regard to the limitations under which it was performed.

The sources upon which information related to this research was extracted from are:

- Academic literature for the domains related to the different fields of interest of this research, namely; business model design, mobile payments, market externalities, etc.
- Five month internship in a transaction security company involved in projects of mobile payments in US, Netherlands, UK, Norway and Germany.
- Semi-structured interviews with key executives and academics related to mobile payments projects and the business model design science.
- Publicly available information about the case study companies and their related mobile payments initiatives.

The results of the research are based on a small sample size as there are only two case studies examined. Although, the nature and importance of the cases, due to the fact that they are introduced by two very powerful (in resources and position in the market) companies, strengthens the importance of the findings and reasons the lack of extensive information over specific aspects of their business models as there are many design issues which remain strictly confidential until announced to public. Therefore, the validity of the research is not limited but improved due to the importance of available information regarding the case studies.

7.3 - Reflection

The research performed for this thesis project is of value for the literature of Mobile Payments. The evolution of Mobile Payments as a scientific and business topic follows a turbulent path as organizational arrangements between service providers and other actors in the ecosystem are formed under the pressure of time and market needs. This results in having many different solutions which provide the same service to end-users through multiple implementations.

Our research examines the case of two prominent solutions and shows the design issues of their business models. By this approach we seek and answer on understanding how the business models are structured and lessons learned from past cases affect future moves. We offer in this way feedback for future business models to be designed. By comparing the cases we show how service provision can converge to a single service platform.

7.4 - Future Research

The numerous cases in which Mobile Payments can be used and the different implementations leave space for future research to be performed in the direction of other initiatives. There is a gap in related research to be performed in the domain of Proximity Mobile Payment solutions. Such a research would examine how existing solutions in PMP can move towards a Universal Mobile Payments System.

Another issue which needs further attention is the difference in strategic interest between multiple mobile payment initiatives. An indicative example of this case is shown in our research but we believe that future solutions will compete over the same strategic interests. A research regarding the possibility of convergence between multiple solutions where each solution achieves its strategic interests is an interesting aspect of universality in Mobile Payments.

Regarding the use of the STOF model stress testing tool there are tweaks which could be made in order to be able to use the tool depending on the needs of the stakeholder at hand. Our suggestion for further research in this direction would include the introduction of a score system connected to the uncertainties mapping. This score system could help in a quantitative representation of the business model design issues and the way they are affected by uncertainties.

References

- Alliance, S. C. (2007). Proximity Mobile Payments: Leveraging NFC and the Contactless Financial Payments Infrastructure. *Smart Card Alliance*.
- Anggraeni, E., Den Hartigh, E., & Zegveld, M. (2007). Business ecosystem as a perspective for studying the relations between firms and their business networks. In *ECCON 2007 Annual Meeting*. Retrieved from <http://www.chaosforum.com/docs/nieuws/bes.pdf>
- Bauer, P. W., & Ferrier, G. D. (1996). Scale economies, cost efficiencies, and technological change in federal reserve payments processing. *Journal of Money, Credit and Banking*, 28(4), 1004–1039.
- Business Dictionary [BD] -What is cash payment? definition and meaning. (n.d.). Retrieved December 1, 2012, from <http://www.businessdictionary.com/definition/cash-payment.html>
- Clarkson, M. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of management review*, 20(1), 92–117.
- Dhar, S. (2006). *Case Studies on Growth Strategies - Vol. II*. ICFAI Books.
- Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications*, 7(2), 165–181.
- Englund, R., & Turesson, D. (2012). *Contactless mobile payments in Europe: Stakeholders' perspective on ecosystem issues and developments*. KTH. Retrieved from <http://kth.diva-portal.org/smash/record.jsf?pid=diva2:537698>
- Faber, E., Ballon, P., Bouwman, H., Haaker, T., Rietkerk, O., & Steen, M. (2003). Designing business models for mobile ICT services. *Workshop on concepts, metrics & visualization, at the 16th Bled Electronic Commerce Conference eTransformation, Bled, Slovenia*.
- Goldenberg, J., Libai, B., & Muller, E. (2010). The chilling effects of network externalities. *International Journal of Research in Marketing*, 27(1), 4–15.
- Google Wallet (GW) - A smart, virtual wallet for in-store and online shopping . (n.d.). Retrieved December 1, 2012, from <http://www.google.com/wallet/>
- Hartley, J. (2004). Case study research. *Essential guide to qualitative methods in organizational research*, 323–333.

- Hancock, D., Humphrey, D. B., & Wilcox, J. A. (1999). Cost reductions in electronic payments: The roles of consolidation, economies of scale, and technical change. *Journal of Banking & Finance*, 23(2), 391–421.
- Herzberg, A. (2003). Payments and banking with mobile personal devices. *Communications of the ACM*, 46(5), 53–58.
- Hoofnagle, C., Urban, J., & Li, S. (2012). Mobile Payments: Consumer Benefits & New Privacy Concerns. Available at SSRN 2045580. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2045580
- Iansiti, M., & Levien, R. (2004). Strategy as ecology. *Harvard business review*, 82(3), 68–81.
- Innopay. (2011). *Mobile Payments 2012*. Innopay.
- ISIS - Welcome to Isis. (n.d.). Retrieved December 1, 2012, from <http://www.paywithisis.com/>
- Kalakota, R., Robinson, M., & Ebrary, I. (2002). *M-Business: the race to mobility*. McGraw-Hill New York.
- Karnouskos, S. (2004). Mobile payment: a journey through existing procedures and standardization initiatives. *Communications Surveys & Tutorials, IEEE*, 6(4), 44–66.
- Kountz, E. (2010). *2010: A crossroads For NFC Mobile Payments*. Cambridge: Forrester, 2010
- Kreyer, N., Pousttchi, K., & Turowski, K. (2002). Standardized payment procedures as key enabling factor for mobile commerce. *E-Commerce and Web Technologies*, 383–390.
- M-PESA | Safaricom - Relax, you have got M-PESA. (n.d.). Retrieved December 1, 2012, from <http://www.safaricom.co.ke/personal/m-pesa/m-pesa-services-tariffs/relax-you-have-got-m-pesa>
- Matthäus-Maier, I., & Von Pischke, J. D. (2009). *New partnerships for innovation in microfinance*. Springer. Retrieved from http://books.google.nl/books?hl=nl&lr=&id=aodmg64Kac4C&oi=fnd&pg=PR2&dq=new+partnerships+for+innovation+in+microfinance&ots=Jk9fS_mnAd&sig=jgqMZNLi9KRy4Smfkn1t7Hu3I_s
- Mallat, N., Rossi, M., & Tuunainen, V. K. (2004). Mobile banking services. *Communications of the ACM*, 47(5), 42–46.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments—A qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413–432.

- Mallat, N., & Tuunainen, V. K. (2008). Exploring merchant adoption of mobile payment systems: an empirical study. *e-Service Journal*, 6(2), 24–57.
- Markendahl, J. (2011). *Mobile Network Operators and Cooperation: A Tele-Economic Study of Infrastructure sharing and Mobile Payment Services*. KTH.
- NFC Times | Dutch Telcos and Banks Drop Plans for NFC Joint Venture | NFC Times – Near Field Communication and all contactless technology. (n.d.). Retrieved December 1, 2012, from <http://nfctimes.com/news/dutch-telcos-and-banks-drop-plans-nfc-joint-venture>
- NFC Word - Mobile payments to overtake cards within ten years • NFC World. (n.d.). Retrieved December 1, 2012, from <http://www.nfcworld.com/2011/09/14/39931/mobile-payments-to-overtake-cards-within-ten-years/>
- Ondrus, J., & Pigneur, Y. (2006). Towards a holistic analysis of mobile payments: A multiple perspectives approach. *Electronic Commerce Research and Applications*, 5(3), 246–257.
- Ondrus, J., & Pigneur, Y. (2007). An assessment of NFC for future mobile payment systems. In *Management of Mobile Business, 2007. ICMB 2007. International Conference on The* (pp. 43–43). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4278586
- Ondrus, J., Lyytinen, K., & Pigneur, Y. (2009). Why mobile payments fail? Towards a dynamic and multi-perspective explanation. *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on* (pp. 1–10).
- Ondrus, J., & Lyytinen, K. (2011). Mobile Payments Market: Towards Another Clash of the Titans? In *Mobile Business (ICMB), 2011 Tenth International Conference On* (pp. 166–172). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6047067
- PayPal Mobile Payments - Send Money from Your Mobile Phone. (n.d.). Retrieved December 1, 2012, from <https://www.paypal.com/us/webapps/mpp/mobile-payments>
- Peltoniemi, M.(2006).Preliminary theoretical framework for the study of business ecosystems. *Emergence: Complexity&Organization*, 8(1), 10–19
- Prasanth, K., & Gupta, V. (2004). *PayPal.com 's Business Model* (No. 904-046-1). Hyderabad, India: ICFAI.

- Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, 9(3), 209–216.
- Square - Accept credit cards with your iPhone, Android or iPad – Square. (n.d.). Retrieved December 1, 2012, from <https://squareup.com/>
- S.W.I.F.T. (2012). Mobile Payments: Three winning strategies for banks. S.W.I.F.T. Retrieved from http://www.swift.com/resources/documents/SWIFT_white_paper_Mobile_Payments.pdf
- Taga, K., & Oswald. (2010). *Global M-Payment Report*. Arthur D. Little.
- Visa payWave. (n.d.). Retrieved December 1, 2012, from http://www.visaeurope.com/en/cardholders/visa_paywave.aspx
- World Payment Report (WPR) 2011; Retrieved April 1, 2012, from http://gbm.rbs.com/docs/gbm/insight/gts/perspectives/WPR_2011.pdf
- Zheng, X., & Chen, D. (2003). Study of mobile payments system. In *E-Commerce, 2003. CEC 2003. IEEE International Conference On* (pp. 24–27).
- Zhang, J., & Liang, X. J. (2011). Business ecosystem strategies of mobile network operators in the 3G era: The case of China Mobile. *Telecommunications policy*, 35(2), 156–171.
- Zong | Buy digital goods with your mobile – easy, safe mobile payments | Zong. (n.d.). Retrieved December 1, 2012, from <http://zong.com/>

Appendix A- Interview sheet

These are the questions used in the semi structured interviews. The questions were used as guiding lines for the conversation between the interviewer and interviewee in order to trigger answers in the required direction.

Interview form for thesis project “Towards a Universal Mobile Payments System”

Case Company:

1. Name:
2. Job title/responsibilities:
3. Time with the company:
4. What would be your own definition of the platform?

5. Who do you consider as your target group and what is the service you intend to offer?

6. What kind of customer relationship are you after?

7. Which are your arrangements with other actors of the platform?

8. What do you consider as your strategic interest within this network?

9. How do you technologically implement the solution regarding service platforms, applications used and channel of communication?

10. What are your investments for this platform and how do expect to cover the costs?

11. What are your arrangements with the other “actors”?