A Post-Failure Analysis of Mobile Payment Platforms

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Abstract

Despite on-going efforts over the past decade, mobile payments are yet to take off successfully. Repeated failures show that mobile payment platforms are complex to launch. The objective of this paper is to unveil factors explaining the failure of past mobile payment platforms. The use of a multi-level framework aims at enriching the variety of issues investigated. In order to explore the reasons of failure, we selected four cases from different countries happening at different times. Our results show that these cases share many of the same failure factors: lack of collaboration between the stakeholders, no technology standard, and low value-added for consumers and merchants compared to existing payment solutions. Even though the list is not exhaustive, the uncovered factors in our study seem to be necessary (but not sufficient) for the further developments of mobile payment platforms.

1. Introduction

The idea of paying for physical goods and services using mobile phones emerged more than a decade ago. Numerous firms saw the commercial potential in operating mobile payment platforms. On one side, mobile network operators (MNOs) could generate additional revenues by enriching their portfolio of value-added services and by increasing stickiness of their customers. On the other side, financial institutions could see the potential of mobile payments to increase the use of electronic transactions, for which they could charge a commission.

Since early 2000s, optimistic analysts and researchers have declared that mobile payments could be the next killer application for mobile commerce [1, 2]. At the same time, more skeptical experts started to see the challenges for mobile payments to become a reality [3, 4]. The growing number of failed initiatives raised concerns for the future of mobile payments. Trials and pilots rarely made it to commercial implementations. In early days, analysts explained the failures by the lack of appropriate technology and standards [5].

The number of attempts increased during mid to late 2000s when Near Field Communication (NFC) emerged as a possible standard to conduct mobile proximity payments. This technology based on RFID (radio frequency identification) aims at bridging the digital and physical worlds. In Japan, similar technology (i.e., Felica) was proven to be effective for mobile payments [6]. Thus, industry and academic experts became more optimistic as NFC solved the technical issues [7]. Despite the justified optimism about NFC, once again, most mobile payments initiatives have failed. This time, the main causes of failures did not only involve technological aspects. The lack of success revealed how the complexity of launching mobile payments challenged many of the sharpest and most experienced industry and academic experts.

Today, in developed countries, analysts have woken up to the depressing reality that no commercial solution has succeeded in reaching out to the mass market, except of a few cases such as Osaifu-Keitai in Japan. A significant number of analysts have started questioning the feasibility of mobile payments. More than a decade after the initial attempts, the actual value of mobile proximity payments processed worldwide was merely $1.1 billion in 2012. The popular sentiment behind mobile payments over the years can be best summed up by the tone of the reports on mobile payments published by two popular technology news agencies. In 2004, CNET asked the question: "Will your phone become your credit card?"; while in 2012, the question became: "Mobile payments: A solution in search of a problem?". Similarly, Techcrunch stated in 2010 that "Mobile payments will rock 2011". Later, in 2012, it stated that "mobile payments solve a problem that does not exist".

The use of mobile payments has taken off in some niche markets (e.g., parking, public transportation).
Remote payments using SMS or payments on the mobile Internet to purchase digital contents and physical goods are commonly performed. Moreover, in developing countries, mobile payments have been adopted to compensate the lack of other payment instruments available. Operating modern telecommunication and banking infrastructures does not seem to be sufficient to fertilize the ecosystem for mobile payment platforms to emerge in the developed countries.

In this paper, the objective is to investigate why commercial implementations of mobile proximity payment platforms have failed. We propose the use of a multi-level framework to unveil and analyze the factors that contribute mobile payment platform failures. We use several representative cases from different countries and describe how they failed. In addition, we use one longitudinal case to illustrate how a platform could evolve after failing multiple times despite massive investments and quite a favorable context.

Although prior research has extensively studied the adoption factors of mobile payments, much less research has focused on the failure factors. Unveiling a number of common failure factors between cases could help to avoid repeating the same mistakes. In order to structure the analysis, we propose to use a multi-level framework, which classifies the factors in different categories. This research aims at providing a better understanding of past failed initiatives, as well as prescribing a number of necessary, but not sufficient factors to increase chances of success of future mobile payment platforms.

In the next section, we discuss the concept of mobile payment and related research. We also identify some issues that we want to address with our study. In Section 3, we present our framework, methodology, and our cases. Section 4 provides a description and analysis of each case. Finally, Section 5 concludes the paper with discussions and proposes further research.

2. Background

Although the term ‘mobile payments’ is used for different types of scenarios, in this paper we focus on mobile proximity payments: i.e., paying for goods and services using a mobile phone at a physical point of sale (POS) terminal. These payments do not necessarily require online access to a remote network. Payments can be conducted in an offline mode as the mobile device embeds the payment means, such as debit/credit card or stored value accounts (i.e., prepaid). Often, these systems are referred as mobile wallets. Nowadays, an increasing number of transactions are conducted using contactless cards (e.g., Visa Paywave, Mastercard Paypass) for micro-payments in contexts when transaction speed is key (e.g., fast food, transit).

Academics from different disciplines conducted research on various mobile payment issues for more than a decade. A literature review [8] shows that most of the early work on this topic has focused on technical aspects (e.g., security, protocols, systems architectures). Traditionally, researchers in computer science and engineering disciplines have investigated these aspects. In information systems, researchers have been focusing on other dimensions. A number of studies aimed at understanding what factors could influence consumers’ adoption and intention to use mobile payment platforms in different countries (e.g., [9-11]). More recently, trust has been a recurrent topic studied [12-14]. Fewer researchers have focused on explaining the challenges at the ecosystem level [15-17]. In spite of a number of studies on mobile payments, this emerging phenomenon still raised numerous questions. The complexity of the questions calls for multi-perspective analyses [18]. Unfortunately, explaining one dimension or a level at a time only offers a partial understanding on what the challenges are. In order to elevate the level of abstraction required for a better overview, some researchers tackled the economic [19] and strategic aspects [20]. For example, Au and Kauffman [19] identified the relevant stakeholders of the mobile payment ecosystem and proposed applicable theories to analyze different issues related to consumer, firm, business process, market, industrial and social levels. Dalhberg et al. [20] provided an integrated framework to analyze institutional, economic, business, and technology factors while taking into account the resource dependencies and the nature of the relationship between the different stakeholders.

The efforts of investigating mobile payments from multiple perspectives improved the general understanding of past ecosystems. However, more research has to be done to fully grasp the current issues that need to be solved in order for mobile payments to enter the main market and reach mass adoption.

3. Framing mobile payments systems as multi-sided platforms

In order to study mobile payments, it is essential to understand the concept of multi-sided platforms. Most of the current high technology products and
services including mobile payments are examples of technology platforms [15]. A platform is defined as "a set of stable components that supports variety and evolvability in a system by constraining the linkages among the other components" [21]. The mobile payment system and the infrastructure involved are the set of stable components while the other components are the merchants and consumers who are connected by a buyer-seller linkage. In other words, mobile payment platforms are multi-sided as they bring together more than one group of users of the platform (sides): consumers and merchants. For multi-sided platforms to grow, the chicken-and-egg problem needs to be solved [22]: consumers would not be willing to join the platform unless there are enough merchants already on board who in turn would not be interested to join the platform unless there are already enough consumers. This problem can be solved using different strategies, including subsidizing one or more sides (i.e., discounting merchant side, consumer side, or both at the same time) and/or using existing relationships with one or more sides (e.g., consumers are already customers of MNOs and banks; merchants are customers of banks).

A distinctive property of mobile payment platforms is that they usually require a complex coordination between multiple interdependent actors hailing from different industries. This requirement increases the complexity of orchestrating the ecosystem. Depending on their architecture, mobile payment platforms can involve (or not) actors such as mobile network operators (MNOs), banks, financial institutions, payment networks, payment service providers, technology providers, mobile handset manufacturers, payment terminal manufacturers and other third parties (e.g., Trusted Service Manager).

Eisenmann et. al. [23] classified the different actors involved in a platform as platform sponsors (i.e., group who exercise property rights, determine platform participants and develop technology), platform providers (i.e., group who serve as the primary point of contact of the platform users with the platform) and demand-side and supply-side platform users (i.e., end users and users offering complements employed by end users in tandem with the core platform). This classification of actors leads to three distinct levels: i) sponsor level, ii) platform level, iii) user level.

In our case, the sponsor level encompasses the roles and dynamics involving platform sponsors such as MNOs and financial institutions. The platform level includes the different points of contact of the users with the platform including the technological solution itself and payment terminals. Standardization issues and the economics involved in deploying the platform are also included at this level. User level is concerned with the two groups of users of the platform: consumers and merchants. It also includes the value gained by the users and the economics in joining the platform. Figure 1 summarizes the different actors who could be involved in mobile payment platforms at each of these three levels.

![Figure 1. The actors involved at the different levels](image)

4. Analysis of the mobile payment cases

We selected four cases of mobile payment platforms: in Germany (Paybox), Spain (Mobipay), Switzerland (Postfinance) and South Korea (Moneta). These cases of mobile proximity payments were either launched commercially on a large scale or the providers had publicly announced their intentions to do so. These cases were recognized as failures and withdrawn from the market. In the case of Moneta in South Korea, there were three consecutive failed attempts and a current one with an undecided fate.

Due to the constant evolution of the mobile payment ecosystem it is challenging to obtain primary data on current and past cases. Organizations are also reluctant to share their usage statistics as they might give bad publicity. Moreover, many of the past initiatives were so limited in scope that the experiences accumulated are hardly generalizable, and therefore difficult to exploit.

We observed the evolution of the four selected cases in real time over a decade (2002-12) as the cases were evolving. We regularly collected archival data including consulting reports, press articles and
internal corporate documents. For the case of Postfinance, we also conducted a series of interviews with key experts from 2003 to 2008. For the case of Moneta, we conducted a series of interviews in 2012 with executives involved in mobile payment initiatives in South Korea including SK Telecom as well as a few financial institutions and market research analysts. In the following subsections, we analyze these cases in a chronological order using the Sponsor-Platform-User framework.

4.1. Paybox

One of the earliest mobile proximity payment platform was offered commercially by Paybox AG in May 2000 in Germany [24]. 50% of Paybox AG was owned by Deutsche bank, one of Germany’s largest bank, which was responsible for payment clearing and settlement [24]. At the time of its launch, Paybox held a world patent on authentication and identification systems for mobile payments [24].

Paybox intended to be an open and neutral payment intermediary which was not tied to any particular mobile network or bank account [24]. It was built to be MNO-independent and to attract other banks to join the alliance [24]. As the major shareholder, Deutsche bank wanted to control the entire value chain of mobile payments [24, 25]. Therefore, MNOs provided their communication infrastructure but did not play an active role during a payment transaction.

Paybox only processed direct debits and transactions were drawn from the customers’ bank account since they were cheaper to process than credit card payments. Paybox was a server-based solution which linked a mobile device to a bank account that has been pre-registered. Once a consumer subscribed to the Paybox service, he/she could use it for a wide range of transactions including proximity payments at merchant locations, payments for e-commerce, P2P transactions (i.e., with other Paybox users) and payments to bank accounts. Consumers were charged a small subscription fee (5 euros per annum) and merchants were charged an average commission of 3% for each transaction which was comparable to the commissions for credit cards [24].

On 23 January 2003, Paybox announced that it was closing down all mobile payment processing activities as it was unable to find new partners and funding [26]. At its peak, Paybox was serving 900,000 customers and 10,000 merchants across Europe and was the largest player in mobile payments in Europe [25]. At the sponsor level, Paybox was practically owned by Deutsche bank. Shortly before closing down its services, Paybox had sought for new partners to invest 10 million euros in external funding to provide operating cash and to replace Deutsche bank’s dominant holding [25]. However, Paybox could not attract any funding and failed primarily due to lack of cooperation from other potential partners in the mobile and financial services industries [27, 28]. These potential partners saw Deutsche Bank as a competitor and were deterred by its substantial stake in Paybox [25]. It was indeed a vicious cycle for Paybox since it could not have been formed without Deutsche bank’s major investment and payment processing capability at a time when the concept of mobile payments was untested. Another factor which contributed to Paybox’s failure was the poor economic climate plaguing Europe during those times when firms were wary of investing in risky projects which could affect their own businesses [26]. Rather than complementing other potential partners’ businesses, Paybox was perceived as a threat (i.e., a substitute).

At the platform level, Paybox did not face any major problems. Since the solution could be used by any consumer or merchant owning a mobile phone, there were no issues of implementing additional hardware or technology to create the platform. The system worked perfectly from a technical view. After the failure of Paybox, Gartner stated that the technology behind Paybox’s platform was very attractive for enterprises interested in implementing large-scale mobile payment solutions [26].

At the user level, Paybox did not offer a sufficient advantage over established systems like credit cards to attract customers and merchants [26]. Although the early adopters who were curious about mobile payments did join the platform, the growth stalled, while Paybox was trying to obtain external funding to grow further [25]. Moreover, the diffusion of mobile commerce and payments was extremely slow in Europe during that time [26]. The only areas in which mobile payments were successful to some extent were in niche applications such as parking and payments for digital goods like games and ringtones which did not need a general purpose payment system [26]. For merchants and customers to abandon existing payment schemes which were working quite well, Paybox had to offer a significant advantage but it failed to do so. Moreover, Paybox’s approach was not cost effective for consumers since it involved SMS and voice based communications which were added costs in comparison to traditional payment schemes [27]. Furthermore, Paybox did not offer the option to link credit cards to their system.
4.2. Mobipay

Because of antitrust regulations in Spain, two competing mobile payment projects: Movilig (backed by a major MNO, Telefonica and bank, BBVA) and Pagomóvil (backed by the remaining two MNOs and another bank, BSCH) were merged to form Mobipay España S.A. in July 2001 [29, 30]. This venture was a partnership between the three major MNOs of Spain (owning 40%), over 30 financial institutions (owning 48%) and the three national card processing companies (owning 12%) [30]. It covered 100% of Spanish mobile customers and 80% of bank customers [29].

Mobipay offered the possibility of both proximity and remote SMS/voice-based payments using a range of payment instruments: credit cards, debit cards or the mobile operator’s account. Customers could load up to nine different payment instruments in their virtual wallets and could choose the appropriate instrument each time they made a purchase. For proximity payments, the merchant would scan the customer’s phone number (through a special barcode reader to read a tag on the customer’s phone) and initiate the payment. The customer would then receive a message with the payment amount which he or she could confirm using a PIN. The transactions were controlled by the Mobipay server while the payment processing was routed to the respective financial institution [27, 30]. Customers did not incur any fees for using Mobipay and the merchants were charged the normal commission associated with the payment instrument used. Mobipay paid the respective MNO a fixed amount for each transaction (0.15 euro for operator billing or 0.08 euro otherwise) for using its communication channels. To cover its costs, Mobipay charged a fixed amount to its shareholders, which participated only to offer a new payment method, as they did not obtain any revenues in return. The solution was marketed by the MNOs and financial institutions involved in the project and not directly by Mobipay [30].

Mobipay launched the solution nationwide in late 2002. Despite having the potential to be successful, the solution got off to a sluggish start by only acquiring 17000 customers and 4500 merchants in the first year. Six years after the launch, 400,000 users registered for the service (less than 1% of the Spanish population) and very few of them were active (less than 2000 transactions were processed daily) resulting in the failure of Mobipay [30].

At the sponsor level, most major MNOs and banks were participating to the collaborative effort. This was due to governmental regulations. Firms were forced to collaborate instead of working on their own solutions. However, the negative effect of this regulation resulted in a lack of competition. Instead of working together to make the solution a success, firms were worried about others benefiting from their investment. Hence, stakeholders did not give a wholehearted effort. It was clear from the beginning that no single firm could gain a competitive advantage over the others through this venture. The banks and the MNOs did not share the same goals since the MNOs thought that they were doing a favor to the banks, while the banks were in fact the major shareholders in this joint venture. Another failure factor emerged as the banks and MNOs could not agree on an optimal value sharing between them. Telecoms were normally used to high margins while banks are content with low margins. Finally, a major reason for the failure of Mobipay was the lack of marketing. Since Mobipay gave the responsibility of marketing to its shareholders, none of them made a significant investment towards marketing. Consequently, most of the Spanish population was not aware of the solution, which resulted in sluggish adoption [30].

At the platform level, the solution was technically sound. Mobipay was so confident of the capacity of the solution that it patented some of the ideas related to the solution in 66 countries. The solution did not require any special upgrades to be undertaken by the consumer except sticking a tag on the back of their phones. For the merchant, the possibility to install a barcode reader was optional (since merchants could manually input the phone number of the consumer) and only large retailers installed these terminals to reduce the probability of errors while inserting the phone numbers. For these large retailers, an extra terminal was an insignificant investment.

At the user level, Spain is a highly banked country. Spanish customers were already using payment cards extensively for making purchases and these cards worked without any hassles. Therefore, in order to convince customers to adopt Mobipay, more value should have been offered to the customers. Similarly, there were no clear benefits for the merchants when adopting Mobipay. Hence, some of the important merchants including the largest department store chain (El Corte Inglés) and the national airline (Iberia) did not offer the possibility to consumers to pay using Mobipay [30].

4.3. Postfinance

One of the first known mobile payment scheme in Switzerland was provided by Postfinance, the financial services unit of Swiss Post. Postfinane dominates the payment traffic in Switzerland with
more than 3.3 million accounts. It had the ideal position to be the first-mover in Switzerland and to launch mobile payments because of its large customer base as well as merchant base (almost 60% of market share). It tried to enter this arena by launching a mobile proximity payments trial in Bern in 2005 [31]. Postfinance had plans to roll out the solution nationwide after the trial. PostFinance sought to create a fairly large network of points-of-sale (POS) by involving major merchants such as the two largest retailers (Coop, Migros) as well as the Swiss national railways (SBB). By doing so, Postfinance solved the chicken and egg problem associated with multi-sided platforms.

Using an SMS-based solution, customers initiated the payment by scanning the barcode on the back of their phone and typing a PIN on a special terminal installed at the merchant location. The merchants then entered the payment amount, which was transmitted to Postfinance servers. Finally, the consumer would receive a barcode (data matrix) as a SMS which was read by the terminal to confirm the transaction. The solution was offered free of charge to consumers and merchants paid the normal fees associated with card based transactions. Postfinance was the sole investor in the planned deployment of infrastructure as well as marketing campaigns.

Postfinance opened its solution and planned to license it to other financial institutions and MNOs. It aimed to set a standard for mobile payments in Switzerland by being the first-mover and keeping the solution open. However, this attempt never advanced past the trial stage and Postfinance failed to launch commercially their platform nationwide as planned.

At the sponsor level, Postfinance had hoped that MNOs and other key financial institutions would join its open platform. As a result, the platform would become a de facto standard. Postfinance could then extract more rent from it through the licensing fee. However, none of these potential partners joined the platform. They adopted a wait-and-see approach, willing to join only if others joined. This unwillingness to join was justified by the fact that other financial institutions were wary of strengthening the platform completely owned by one of their rival. Another issue in Switzerland is that MNOs and financial institutions do not have much respect for each other due to drastically different industry cultures.

Due to lack of interested partners, Postfinance was left with the option of going ahead on its own. This implied a massive investment in both the deployment and the marketing of the solution. The likelihood of success was also reduced in the absence of other partners. Consequently, Postfinance abandoned its plans of a commercial launch after the trial.

At the platform level, Postfinance chose to offer a solution based on SMS. Because of this decision, potential partners as well as merchants and consumers were wary of using their solution since there was no industry standard for mobile payments. Although Postfinance had the ambitious goal to become the national standard, the choice of its technology inflicted a major blow to its aspirations.

At the user level, Postfinance had the same fundamental problem faced by other solutions. The platform failed to offer any additional benefits than existing payment schemes. Moreover, Postfinance’s solution was not even at par with the existing schemes. For the consumers, the solution was slower and more difficult to use. Furthermore, the sticker on the back of the phone looked cheap. Merchants found the payment processing was too time consuming and the additional payment terminals were bulky for their current POS space. Adopting this platform would have resulted in increasing financial costs and operational complexities.

4.4. Moneta

In 2002, SK Telecom, the major South Korean MNO, launched its mobile proximity payment solution called Moneta (adopted from Juno Moneta, a Greek goddess of money). SKT demonstrated persistence by investing massively in three successive attempts for mobile proximity payments.

4.4.1. Attempt 1 (Feb 2002). During early 2000s, all mobile handsets in South Korea were CDMA-based without SIM cards. Moneta in its first attempt involved uniquely designed mobile phones with a full size smartcard reader along with a Moneta credit card. The Moneta card was co-branded by Visa and issued by five major domestic credit card companies and banks. The card reader could only read the Moneta card. Consumers had to carry both a phone and a card to make a purchase. About 300,000 Moneta handsets were sold and 1 million plastic cards were issued. However, the users who bought the compatible handsets rarely used the mobile payment service.

4.4.2. Attempt 2 (Nov 2003). SKT started introducing SIM slots on CDMA phones even though they did not require one for mobile communication. A SIM-sized financial chip could be inserted into this slot to pay via mobile phone. This chip was issued directly by banks and credit card companies. Six
major credit card companies participated in this project. Consumers had to purchase specific phones to be able to use Moneta’s services at affiliated stores, equipped with Moneta. The solution was based on RFID and merchants had to attach a dongle supplied by SKT to their existing POS terminal. These dongles were proprietary and could only be used for Moneta’s services. The customers could trigger the payment by waving the phone over the dongle. The service could also be used without the dongle. A separate Moneta card linked to the same credit card account could be used with any payment terminal. As a result, 400,000 merchants (out of a total of 2.5 million member companies) were equipped with the dongles. SKT tried to push the technology to consumers by making most of their handsets compatible with Moneta. By 2005, SKT sold more than 4.9 million Moneta-enabled handsets. However, only 300,000 Moneta chips were issued to consumers who registered for the service. Moreover, only 21% of these registered users actually made a purchase using their handsets [30].

4.4.3. Attempt 3 (2006-07). In 2006, the mobile communication network evolved from CDMA to WCDMA. In WCDMA service, mobile phones required a SIM card to function. SKT supplied multi-functional SIMs, which stored credit card data, downloaded over the air. Customers were able to store multiple cards onto the same SIM. Most of the third generation phones were compatible with mobile payments. During the same time, Visa and Mastercard launched PayWave and Paypass proximity payment platforms, respectively based on NFC. These standard platforms were available for contactless cards as well as for mobile payments. The payment ecosystem in South Korea could now use standardized terminals. This was an improvement as each MNO had its own proprietary mobile payment solution with incompatible dongles. In May 2007, SKT formed an alliance with Visa and started issuing SIM cards with a contactless payment feature. These cards could be used with NFC-enabled phones. Moreover, the payment system did not need dongles anymore at the merchant POS. Merchants gradually started to upgrade their terminals to be compatible with Paywave and Paypass so that consumers could use their contactless cards. As a result, consumers could also use mobile payments at all these terminals. Initially there was resistance from banks and financial institutions to offer their credit card applications over the air to be downloaded onto the SIMs. However, in April 2008, SKT formed an alliance with Shinhan bank, one of the largest banks in South Korea, to jointly offer and market Moneta. Furthermore, SKT also started offering the possibility of downloading other applications like T-money, South Korea’s widely used contactless payment service for public transportation. This was the first time that a genuine attempt was made to completely merging a mobile phone and a wallet. This third attempt was quite promising with 2.6 million subscribers in 2007. All users with third generation handsets were eligible and SKT did not have to supply dongles anymore. The technology issues were solved. Despite impressive inroads into mobile payments, the usage of Moneta’s services remained low and the service failed [30].

At the sponsor level, SK Telecom needed the cooperation of financial institutions for Moneta to become a success. As a mobile wallet, Moneta required the aid of financial institutions to make their cards available for download over the air. Moreover, financial institutions could promote the benefits of Moneta to their clients. Unfortunately, financial institutions did not share the goals of SKT regarding mobile payments. They perceived the platform as a threat to their traditional business [30]. During the first attempt, SKT manufactured the Moneta card by itself. In the next attempt, SKT tried to convince financial institutions that Moneta was not a threat to their core business by offering them the possibility to manufacture their own SIM-sized chips. However, in the third attempt, the chip was again located on the SIM card owned by SKT. Consequently, banks were afraid of losing customer ownership. Additionally, SKT wanted to take 1% of the total 2.5% transactions fees charged to the merchants but the financial institutions did not accept losing revenues [30].

At the platform level, there were multiple problems during the first two attempts. Firstly, consumers had to buy specific phones to subscribe to Moneta. SKT offered a narrow range of mobile handsets for the consumers to choose from which did not satisfy consumers. Secondly, SKT had to install dongles on top of existing terminals at the merchant site. There were multiple proprietary mobile payment solutions being offered by other players (K-merce by rival MNO KTF, ZOOP by a start-up Harex). Merchants had to install multiple dongles at their POS. This was a significant setback for merchants in terms of additional financial and operational costs. Both consumers and merchants were wary of adopting any of these proprietary solutions until one of them emerged as the winner and became the de facto standard nationwide [30].

During the third attempt, NFC emerged as a standard. All rival proprietary solutions became interoperable with each other. Merchants no longer had to install additional infrastructure. They simply
had to upgrade their terminals to be NFC compatible. Almost all third generation phones were NFC-enabled and consumers had a wide range of choices available while upgrading their handsets. As a result, there were no clear problems at the platform level during the third attempt.

At the user level, during the first attempt consumers had to carry both a card and a mobile handset to make a purchase. Hence, there were no added benefits for the consumers to switch to mobile payments. After the phone and wallet merged during the second attempt, consumers again did not see any additional benefit to switch to Moneta. They had to purchase a new phone from a narrow portfolio of handsets compatible with Moneta. This was an important investment for no clear benefit. The merchants also had to invest significantly to be compatible with Moneta during the first two attempts. These issues were resolved in SKT’s third attempt. Users were eligible to subscribe to Moneta regardless of the new handset purchased. Moneta offered various additional applications including the popular T-money (for public transport). Consumers found extra benefits to use. For the merchants, Moneta offered additional services such loyalty-based couponing. Such feature was not available previously with traditional credit cards. Merchants had better incentives to allow their customers to pay using Moneta.

4.4.4. Post-Moneta: Lessons from the past failures.
SKT learnt from previous failures and addressed some of the failure factors identified in the previous attempts. The failure factors seemed to have been solved at the platform and user level. However, the sponsor level was still plagued by the lack of cooperation with financial institutions. SKT and financial institutions had different goals and aspirations. Both were suspicious of each other. In order to bypass this issue, SKT secured a 49% stake in Hana card, a top-three Korean credit card company, and rebranded it as Hana SK card in February 2010\(^6\). SKT addressed issues at all three levels. As a result, SKT was able to attract 500,000 subscribers for the Hana SK card’s mobile wallet within the first year, touted as the biggest figure for mobile wallets in the world. As of January 2013, SKT was leading the mobile wallet race in South Korea with a combined annual growth rate of 661.7%\(^7\). Moreover, NFC-enabled handsets (which are compatible with the mobile wallets) were being adopted at a staggering pace in the country, with just the top two MNOs selling 13 million handsets by November 2012. At the same time, 200,000 merchants had already upgraded their POS terminals to be compatible with NFC\(^8\). These figures pointed to a more optimistic future for mobile payments in South Korea, with the potential to achieve mass adoption.

5. Discussions and Conclusion

Using four mobile payment cases, we uncovered a number of failure factors in all three levels of the platform. In Table 1, our results show that the cases share many of the same factors responsible for their failure.

<table>
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<th>Table 1. Summary of the failure factors</th>
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<tr>
<td><strong>Sponsor</strong></td>
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<td>Malfunctioning collaboration</td>
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<td>No win-win business model</td>
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<td>Lack of support &amp; promotion</td>
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<td><strong>Platform</strong></td>
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<tr>
<td>Inadequate technology &amp; standard</td>
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<td><strong>User</strong></td>
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<td>Low value compared to existing solutions</td>
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PA = Paybox; M0 = Mobipay; P0= PostFinance; M1,2,3= Moneta

At the sponsor level, a major challenge is to make firms from different industries with diverging views collaborate effectively. MNOs and financial institutions had difficulties to find a shared view of what mobile payments should be. This issue impeded the establishment of business models that satisfy all the stakeholders in the ecosystems. In many cases, it was not clear who should pay and who gets the money at the end. A recurrent problem is also the lack of support and promotion of the firms involved. The financial institutions actively participate to the initiatives but do not have enough incentives to push them further. Many do not want MNOs to control the lucrative payment market. Therefore, they join to keep some control but do not foster further developments of mobile payment platforms.

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\(^7\) http://www.celent.com/reports/mobile-payments-south-korea-succeeding-diversified-market

At the platform level, many technological and technical issues hampered the development of mobile payments. Consumers did not own a proper device for proximity payments. Merchants also had to install new payment terminals in most cases. As the initiatives did not use standardized technology, users were reluctant to invest in a platform which might not be interoperable with existing payment platforms. The emergence of the NFC standard reassured a number of actors in the ecosystem. However, NFC came with its own implementation challenges (e.g., location of the secure element, compatibility with existing contactless payment and transit systems).

At the user level, several issues seem to hinder the growth of mobile payments. The payment process with a mobile device has not been easier or cheaper to conduct than with an existing payment card. Up to now, mobile payments have not created more value for users than existing payment cards. In order to convince users to switch, the mobile payment platform providers should find a key value-added feature that would change the consumer behavior and convince merchants in adopting a new payment infrastructure.

This study also revealed that solving one level at a time does not prevent failure. However, there seems to be a temporal dimension in the process of design a mobile payment platform. Following our multi-level framework, the sponsor level issues should be addressed first. Stakeholders are interdependent on their resources and capabilities. Without an effective collaboration and the establishment of a business model that satisfy all parties, it is unlikely that the platform will thrive. The technology at the platform level is a problem that can be dealt in an easier manner if the stakeholder agreed to collaborate (e.g., establishment of a common standard and interoperability between the different systems). Once the industry and technology is ready, it is essential to convince merchants and consumers of the added value of mobile payments for them. Merchants should be involved early in time as they are the ones who can promote the use of the platform at the POS. Further research should investigate the variations of design processes that can lead to the successful implementation of a commercial mobile payment platform.

Although the perspectives discussed in this paper are rather pessimistic, there is still hope. Issues at the platform level are being solved with technology standards (e.g., NFC) and the interoperability with global payment networks (e.g., Mastercard Paypass and Visa Paywave). At the user level, the widespread adoption of NFC smartphones and the higher penetration rate of contactless payment readers at the merchants’ POS are certainly contributing to the design of new mobile payment platforms. As mobile payments alone will not bring enough value for the users, firms are now promoting mobile wallets with loyalty and coupons schemes along the payment feature. At the sponsor level, firms are getting more familiar with each other after more than a decade of discussions. However, they still struggle to share the same vision. It can take much more time and efforts before the different stakeholders in the ecosystem find a win-win business model. In some cases, the regulator might have to intervene if actors cannot manage to orchestrate the collaboration effectively themselves.

The list of failure factors unveiled in our study is not exhaustive. The factors represent a shared list of issues that happened at different times in different contexts. As they partially explained the failure of the cases, we could consider them to be necessary conditions (but not sufficient) to succeed. Yet, a rigorous empirical study of these conditions should be performed in order to validate them. Moreover, other factors such as the regulatory environment and other contingency dimensions still require further investigation. A specific study of the regulatory, economic, social, and technologic contexts will help to unveil other factors that are dependent on specific contexts. Complex socio-technical systems such as mobile payment platforms should be aligned with their environment. A successful commercial implementation in one country does not necessarily means that this platform would work in another country. Therefore, more research is required on the alignment of mobile payment platforms and their contexts.

10. References


