

A Disruption Analysis in the Mobile Payment Market

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Abstract

Mobile payments are predicted to have a bright future as m-commerce becomes more popular. However, this promising application has not been as successful as anticipated. This can be partially explained by the infancy of the market and a lack of standards. Moreover, technological and business issues create a market uncertainty that mobile network operators and financial institutions have difficulties managing. Thus, the evolution of the mobile payment market is subject to many speculative scenarios. This paper analyzes two possible disruptions of the mobile payment market.

1 Introduction

With the growing prevalence of electronic commerce and the widespread use of mobile devices, a new type of channel is emerging, called mobile commerce. Furthermore, the pervasiveness of wireless networks is creating new opportunities to offer innovative mobile services. Since mobile operators are heavily in debt due to massive investments in 3G licenses, designing a killer application so as to generate substantial revenues rapidly, is becoming a priority. It has already been predicted that mobile payment will become a successful mobile service [5][7]. However, the reality of the market shows that numerous issues need to be solved before expecting mass adoption. The mobile payment industry is currently facing not only technological problems but also deficiencies in finding profitable business models [17].

The digitalization of the payment process is essential because of the success of e-commerce. Moreover, the recent emergence of m-commerce is likely to require real-time cashless wireless payments to buy physical and digital goods anywhere at anytime. Therefore, the development of mobile payment systems is becoming essential. However, even if mobile payments are crucial for, they are not limited to, m-commerce [14].

As already implied, the trend towards a cashless means of payment can be observed in the virtual realm as well as

in the real world. The extensive use of credit and debit cards for proximity purchases has already demonstrated the possibility of considerably reducing the volume of cash-based transactions. This conversion from physical to virtual payment has already brought significant benefits to consumers and merchants alike [11].

We define mobile payments as wireless transactions of a monetary value from one party to another using a mobile device whose physical form can vary from a mobile phone to any wireless enabled device (e.g. PDA, laptop, key ring, watch) which are capable of securely processing a financial transaction over a wireless network. Various dimensions, such as payment size, location of purchase, and time of payment are used to characterize a mobile payment system. In addition to depicting the limitations of each payment scheme, these dimensions facilitate the classification of mobile payment systems, and therefore help to give a better overview of the current market.

In this paper, we decided to focus more particularly on two major dimensions, size and location. Hence, mobile payment systems that are suitable for proximity and micro-payments are further studied. The justification for this choice relies on the great opportunity for mobile payments to reduce the number of small purchases paid with cash. Several successful mobile payments systems have already been launched in order to enhance the convenience of micro-payments for daily local expenditures. These solutions have been principally adopted by various quick-service oriented industries [12] such as public transport (e.g. Octopus), toll booths (e.g. EZPay, FasTrak), gas stations (e.g. ExxonMobils Speedpass), fast-food restaurants (e.g. McDonalds), retail vending machines (e.g. Sonera Mobile-pay) and ski resort ticketing (e.g. Skidata).

As discussed above, the present tendency towards supplying an efficient alternative payment system to cash raises technological as well as business issues. At this time, there is still an uncertainty as to whether the adoption and use of mobile payments will prevail; an uncertainty primarily due to the lack of standards and the immaturity of the market. However, financial institutions and mobile operators

are trying to overcome these issues by launching isolated initiatives to respond to current specific market needs. One consequence of this is that collaboration between banks and mobile operators is limited, as both want to control most of the value chain so as to increase their revenue. To avoid long, complex negotiations and as they have relatively fast reaction time capabilities, some newcomers also propose mobile payment solutions where financial institutions and mobile operators are used only as tools to enable the service. For this reason, some well-known proprietary solutions have been launched successfully in specific industries such as mass-transportation payment systems.

This paper also aims to analyze two possible disruptions in the mobile payment market. Firstly, a disruptive analysis is conducted to detect a possible sliding from the current e/m-payment cards initially introduced by financial institutions to the newly designed mobile payment schemes involving mobile phones and supported by mobile operators. Secondly, another analysis intends to observe a possible switch from an integrated market driven by dominant actors to a more or less self-organized market where mobile payment solutions are offered by intermediaries and newcomers.

As a research methodology, we first define a two-by-two matrix as a framework to classify current payment systems and to investigate two possible disruptive innovations. Then, for each cell of the matrix, we describe selected case studies which will be further used in our disruption analysis, based on the approach suggested by Rafii and Kampas [15]. Moreover, as empirical data on mobile payments were missing due to the infancy of the market, we use a more qualitative approach based on several exploratory interviews with key Swiss experts involved in different initiatives in mobile systems.

In section 2, we introduce a classification matrix to position payment schemes. In section 3, we present some existing payment solutions mostly tailored to micro and proximity payments. In section 4, we formulate and analyze two hypotheses related to possible disruptions in the proximity micro-payment market. Lastly, in section 5 we give a conclusion and discuss further possible research.

2 A Classification Matrix

The payment market can be examined in terms of payment service providers and technology. Payment service providers are typically financial institutions, such as banks and card issuers. In a mobile payment context, mobile network operators (MNOs) are considered natural candidates to offer payment services. Therefore, there are obviously two dominant types of actor present on the mobile payment market: financial institutions and MNOs. They can choose to collaborate and cooperate, but also compete. Other actors

such as newcomers and intermediaries can also be serious competitors.

In reality, the previously launched initiatives showed that there are no particular rules to enhance success. In South Korea, for example, MNOs have successfully offered mobile payment schemes (Moneta, K-merce, and ZOOP) that compete with classic payment instruments supported by the financial institutions. In Spain, a collaboration between MNOs and banks led to great success with MobiPay. With a market penetration near 70 percent of the seven million Hong Kong's citizens in mid-2001, Octopus cards can be considered as one of the most successful electronic payment schemes. This independent payment system has even succeeded in a market where e-cash systems launched by credit cards issuers (Mastercard Mondex and Visa Cash) [4] have failed. Therefore, even with current market experiences, it is premature to affirm which payment model will prevail.

We propose the use of a matrix to segment the payment market depending on the technology used and the service providers involved. These two axes of decomposition should provide a better overview of the market with its different initiatives.

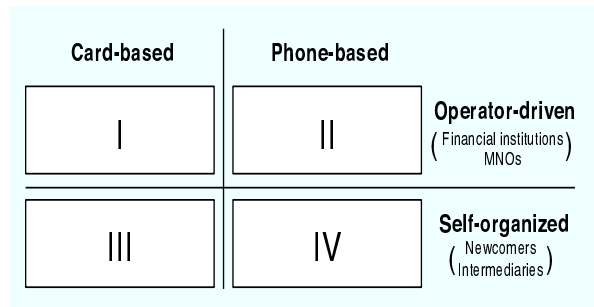


Figure 1. Classification Matrix

As can be seen in the matrix, there are four cells used to classify payment schemes and analyze the market. The cells on the top represent the solutions launched by banks and MNOs together or separately. On the bottom, the cells correspond to the payment systems offered by newcomers and intermediaries. On the left, payment solutions are based on card technology. On the right, the cells symbolize payment schemes using mobile telephony.

3 Case Studies

In this section, certain payment systems are selected to illustrate each cell of the matrix introduced in the previous section. Most of the case studies are taken from the Swiss market. However, to provide sufficient illustration, we also describe several initiatives launched in other countries.

3.1 Smart Card Payment Schemes Driven by Financial Institutions (Cell I)

We decided to include smart card payment schemes even they are not directly considered as mobile payment instruments. The major reason was that the "mobile" feature could be easily implemented using a wireless technology, such as RFID (Radio Frequency Identification). As a result, these cards would become contactless cards, meaning that no physical contact is needed during the payment process.

These schemes use stored value cards as electronic purses. For our case study, we chose to depict the CASH card introduced in 1997 on the Swiss market. This card-based solution launched by the Swiss banks and the Swiss Post is operated by Telekurs Multipay, the leader in the acquiring business in Switzerland. The aim of this initiative was to offer a simple cash-less micropayment scheme using a smart card. As the multi-purpose CASH card is based on a prepaid model, the card can be reloaded in any ATM or postal banking machine in Switzerland. Moreover, to avoid having many payment cards to carry around, the CASH chip has been embedded on debit cards such as Maestro card and Postcard. Therefore, the number of CASH-enabled cards on the Swiss market is relatively high. Moreover, These cards are accepted at manned and unmanned POS (point-of-sale) such as public transports, parking, convenience stores and vending machines.

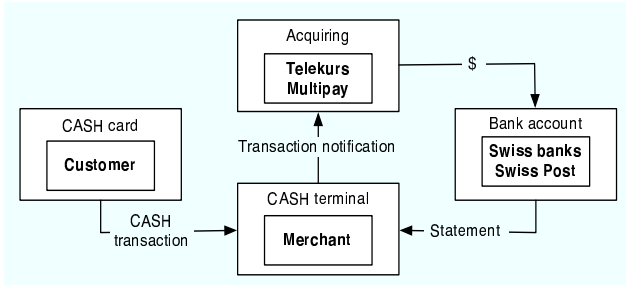


Figure 2. A CASH transaction processing

A typical CASH transaction is shown in Figure 2. The customer first needs to load the CASH card in an ATM. Once some value is stored, a transaction can be made with a merchant. When the transaction has been completed, the merchant stores the data concerning the transaction in the payment terminal. At the end of the day, the merchant connects to Telekurs Multipay using the terminal's built-in modem to upload all of the day's transactions. Then, Telekurs Multipay does the clearing and the amount is credited to the merchant's bank account.

Telekurs Multipay has demonstrated the flexibility of CASH by customizing the scheme to meet specific requirements demanded by some customers. As a pilot project, the

Montreux Jazz Festival (MJF) used the CASH card as a micropayment instrument, where purchases could be paid with its own currency (JAZZ) or the electronic CASH card. The MJF needs to operate its JAZZ to monitor revenue streams and transaction cuts (i.e. commissions) from the food and commerce stands but also for security reasons [13]. Since 2004, Telekurs Multipay decided not to sponsor the MJF since no marketing investment has been planned for the CASH card. Therefore, the MJF will have to find another payment scheme which will correspond to their specific needs.

This micropayment scheme has not been as successful as anticipated by the card issuers. A few reasons can explain why CASH has not succeeded in Switzerland. When the financial institutions launched the scheme, they did not have a strong partnership with merchants, which were the most likely adopters of a micropayment system. Therefore, the number of points of acceptance was too low in order to successfully introduce the CASH card on the market. Since few merchants accept this card, consumers are not comfortable loading and storing money on it as they do not know where they could use it. Moreover, Swiss consumers still seem to prefer cash as a payment instrument. Hence, when they go to an ATM, instead of reloading the card, they withdraw cash as the card would have to be inserted twice. Therefore, the process of reloading remains a serious issue that financial institutions have not yet been able to overcome.

3.2 Phone-based Payment Systems Operated by MNOs (Cell II)

As MNOs try to generate more revenue with value added services, mobile payments become more and more crucial to enable m-commerce. The role of MNOs in the mobile payment market has not yet been defined. It is clear that their position in the value chain is an advantage for them. However, they do not have the expertise to manage the financial risks. Therefore, it seems more advantageous for MNOs to partner with banks and other financial institutions.

Mobile payments using a mobile handset can be enabled in many ways [3] (Table 1).

However, to avoid requiring a special phone for mobile payments, MNOs have found a way to overcharge a SMS. This mechanism is called Premium SMS. The SMS cost is equal to the price of the good purchased plus the normal cost of a SMS. Another way is to use reverse-billed SMS. A SMS received costs the price of the good. This has been implemented for services such as email notification and news alerts. Thus, the amount spent using a mobile phone is aggregated on the monthly mobile phone bill or deduced from the prepaid card.

In Switzerland, Swisscom Mobile introduced a mobile payment scheme to purchase beverages in vending ma-

Table 1. Ways to Enable Mobile Payments Using a Mobile Handset

Multi-application chip card	SIM and WIM (Wireless Identification Module) combined in a single chip card
Dual-SIM phone	Both the SIM and WIM have their own slot inside the mobile phone
External WIM card reader	An external card reader can be connected to the handset
Dual-slot phone	The mobile phone has a built-in smart card reader. Consumers insert their existing debit or credit card into the phone
Payment software in the phone	The functionalities of the WIM would be inside the phone memory

chines in 2002. This service was available only for Swisscom Mobile users. A special USSD (Unstructured Supplementary Service Data) number was written on each vending machine. The consumer had only to dial this number and select the desired drink. The system used USSD instead of SMS because it has been considered simpler and faster. This solution was limited only to beverages. An attempt to sell CDs and DVDs in vending machines was launched without success. There were too many fraudulent transactions and Swisscom Mobile did not want to continue enduring the financial risks and the heavy losses. For now, Swisscom Mobile sells digital content (ring tones, news, and so on) over their Vodaphone Live platform. They also have implemented some other trials for public transport ticketing and parking. In the near future, they would like to find a mobile payment solution to top up their prepaid card. In fact, convenience stores which sell reload scratch-cards take a ten percent margin on the price. Therefore, MNOs want to find a cheaper solution. A project regrouping the Swiss MNOs and the Swiss banks was supposed to launch a mobile payment solution in 2004. This project called m-Maestro has the objective to extend the capabilities of the Maestro card (debit card). However, the Swiss banks decided that the market was not attractive enough. They claimed that the cost of staff training and marketing was too high for the low volume of transactions expected. Therefore, without the support of the banks, this solution has not been planned to be launched on the Swiss market.

A Maestro user would be able to subscribe to the mobile payment scheme by linking the SIM card of the handset to the Maestro card. A m-PIN (different from the Maestro card) would have been chosen to enable this solution. To enhance security, no card or bank information would be stored in the mobile phone [6].

A similar scheme called Mobipay was successfully launched in Spain. It is the result of a cooperative mobile

payment solution joining MNOs and financial entities.

In Europe, Simpay is an alliance between four major MNOs that includes Orange, Telefonica Moviles, Vodafone and T-Mobile. These MNOs alone represent 280 million customers and there are already other MNOs interested in joining the alliance. The objective is to create a trusted brand for mobile payments in Europe. Simpay would allow consumers to pay for low priced purchases through their mobile phone bill. Moreover, they also plan to offer a mobile payment scheme using existing payment cards. As this scheme would be open and interoperable, this would probably contribute to the development of m-commerce in Europe.

3.3 Independent Payment Schemes Using Cards (Cell III)

Independent solutions consist of all the payment cards that are not issued and directly operated by financial institutions. This type of scheme usually exists in industries which already have a fairly large customer base. Most popular initiatives are deployed in the public transports. Since payment processing should be fast, contactless cards seem to be adapted to the needs of this particular industry. As briefly introduced before, a very successful mobile payment scheme was launched by the Mass Transit Railway Corporation in Hong Kong. Octopus is an automated fare collection system using contactless cards. Nowadays, the Octopus chip can be even embedded in devices such as rings and watches. These devices can be recharged not only in the public transport stations but also in more than four hundred 7-Eleven convenience stores and in about two hundred Maxim's shops [4].

In Switzerland, the TL (Public Transports of Lausanne) issued a smart card to pay for bus and metro tickets. This card called Galaxy was a prepaid card. The only incentive to adopt this scheme was a value bonus representing ten percent of the amount stored on the card. The problems encountered with this prepaid solution were that reloading was not planned and payment capabilities were limited to public transports and cinema tickets. Later, the TL introduced a contactless pass which can be revalidated using public terminals located at major stations and other public sites. This revalidation can be done using debit or credit cards. This public transport pass (Galilée) also offers some privileges such as a better rate at movie theaters, cultural events and even for car pooling.

Other initiatives are offered by newcomers such as SportAccess. They propose multi-purpose contactless cards for payments at particular locations such as temporary events (e.g. festivals, conferences and expositions), campuses, sport centers, hospitals and companies. They implement payment schemes using corporate cards usable inside

company buildings for access control and local purchases. These proprietary schemes are not implemented for the national market since they are limited to specific purposes. As they provide personalized payment systems that are flexible and cheap to operate, SportAccess have a strong position on the Swiss payment market. Their solutions are attractive for communities needing their own payment system.

For now, most of these solutions are limited since they are only implemented for specific markets. However, Octopus successfully extended its scheme for more generic purchases. Therefore, Octopus became a real threat for classic payment means as the number of consumers and the volume of transactions are great.

3.4 Independent Mobile Payment Solutions Using a Mobile Handset (Cell IV)

Even if MNOs control the mobile network infrastructure as well as the mobile handset of the user, there are still opportunities for newcomers and intermediaries to offer mobile payment schemes. Usually, these solutions have the advantages of being operator-independent. Thus, mobile phone users can register to this type of payment system independently of their MNO's membership.

As an example in Europe, Paybox is one of the most famous mobile payment scheme introduced on the market. Paybox was a payment intermediary not tied to any particular network or bank account. Paybox only processed direct debits, which is cheaper than to process credit card payments. The consumer had to register to Paybox in order to use the service. Once the application was approved, the consumer could use Paybox for a range of transactions, including [1]: payments for e-commerce, Person-to-Person (P2P) transactions, payments to bank accounts, and payments in the mobile world (e.g. taxis).

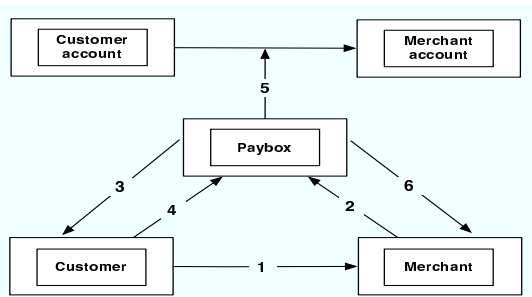


Figure 3. A Transaction Using Paybox

A typical payment transaction (see Figure 3) using Paybox would go like this: (1) The customer gives his or her mobile phone number to the merchant. (2) The merchant transmits to Paybox the phone number and the price. (3)

Paybox calls the customer and a voice message asks for authorization of payment. (4) The customer authorizes the payment by entering his or her PIN. (5) Paybox informs Deutsche Bank to settle the payment via the traditional payment system (direct debit). (6) The transaction is confirmed by an automated voice or SMS.

In summary, the customer's requirements for using Paybox are the possession of a mobile phone, a bank account and a Paybox registration.

The advantage of such a system is that only the mobile phone number, not the bank account number or credit card details, are transmitted. Moreover, consumers can even request a Paybox alias phone number if they do not feel comfortable giving their mobile phone number to merchants. Therefore, Paybox tries to improve the customers trust and payment security.

In Switzerland, several mobile application service providers are offering independent mobile payment systems. Echovox propose micro billing schemes (i.e. echoPAY and SmartPAY) primarily for purchases of digital contents. They use SMS technology (i.e. premium and reverse-billed) as a payment instrument. Echovox's advantage is their cross-operator capability. However, their disadvantage resides in MNOs' comfortable margin of forty to fifty percent for any digital good purchased with SMS. Moreover, Echovox has to give a fair part of the rest to the content provider while keeping only the small remnant. Therefore, their activity is only profitable when processing a high volume of transactions. Quick&More is another similar solution developed by Publicitas in partnership with Swisscom Mobile. The objective is to offer a payment instrument for online content such as newspaper articles.

Moreover, SMS technology can be used for other purposes in mobile payment. Several public transportation companies, such as the Helsinki City Transport in Finland, provide SMS tickets that could be bought with mobile handsets. Apparently, this scheme was very successful as mobile ticket users are satisfied and the number of free riders reduced [10].

4 Disruptive innovation in m-payment

In this section, we formulate two hypotheses of possible disruptive innovations in mobile payment, based on the matrix represented in Figure 1.

4.1 Disruptive technologies

A technology is considered disruptive when its utilisation allows the design of products, services, and processes, with different attributes that have not been valued by existing customers [2] [16]. Disruptive technologies typically allow simpler, cheaper, more convenient-to-use innovations,

offered by a disrupter or insurgent. Initially they underperform existing products in mainstream markets and are adopted by unsophisticated customers at the low end of the market. Eventually, the innovations can improve and become a competitive threat, dramatically transforming the marketplace and displacing the incumbents.

Different methodologies, instruments and decision-support systems have been proposed to identify and forecast potential disruptive technologies [2] and other discontinuous innovations [8], using, among others, technology roadmaps [16], text mining [9], and multi-criteria decision-making [15].

A promising approach is proposed by Rafii and Kampas [15]. They suggest that a disruption innovation process consists of the six following stages: "Foothold market entry", "Main market entry", "Customer attraction", "Customer switching", "Incumbent retaliation", and "Incumbent displacement". They claim that a disruption introduced by an insurgent can fail or seriously damage an incumbent's business at each stage. They propose a decision-making instrument for identifying, rating, and weighting the contributing factors that make the disruption more or less likely to succeed in each stage. This analytical methodology aims at scoring and graphing the disruptiveness profile with its disabling and enabling forces.

To evaluate the different contributing factors present at each stage, we conducted several exploratory interviews with Swiss mobile payment experts. These practitioners work for different mobile payment service providers such as financial institutions, MNOs, mobile application service providers (MASP) and contactless smartcard system providers. Each of them was questioned about one of the possible disruptions on the mobile payment market. These interviews consisted in open and semi-open questions and took place between April and June 2004 and each lasted in average two hours.

4.2 Disruption I: Sliding from card-based to phone-based payment systems

As mobile phones may become payment instruments, we assume that there is the possibility that cards could be replaced by mobile phones. Even though it could be an eventuality, this disruption (Figure 4) does not necessarily mean that card issuers would totally disappear to leave MNOs as leading payment providers. In fact, another scenario where financial institutions would use mobile networks as a new channel is also possible. As already described, there are several technical options to combine current payment cards with mobile handsets (Table 1).

As a possible result of any of these proposed disruption scenarios, mobile phones could become electronic wallets which would hold all the information necessary for finan-

cial transactions. Therefore, the actual physical form of magnetic cards would probably disappear to be replaced by small chipsets and RFID tags, which could be embedded in almost any mobile device.

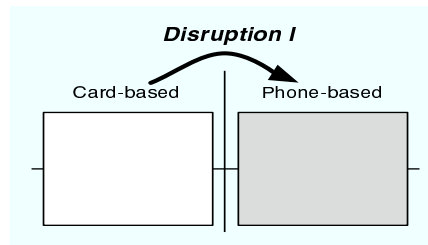


Figure 4. Disruption I: From card-based to phone-based payment schemes

In the next subsections, we use the six steps proposed by Rafii and Kampas methodology [15] to study this first identified disruption.

4.2.1 Step 1: Foothold market entry

In this stage, we try to evaluate if mobile phones supported by MNOs could enter a foothold market below the main payment market, which is currently dominated by card-based systems. The interviewee working for a major Swiss MNO asserts that the mobile payment market can be attractive and profitable for two main reasons. Firstly, mobile payments would generate extra revenue through the carrier channel. Secondly, mobile payments would enable certain mobile services (e.g. ring tones, games, news), which would be easier to bill to consumers. In terms of profitability, the scheme has to be used on a large scale, as millions of transactions could be profitable. Therefore, an alliance which would offer global coverage (i.e. cross-operator and cross-border) would be a crucial strategic decision for MNOs. The advantage, reported by both the MNO and the financial institution interviewees, that MNOs have on banks in Switzerland is their large customer base. There are about a hundred and fifty banks as opposed to only three operators with a mobile phone penetration of more than seventy percent of the population. Hence, MNOs already have a relationship with many potential mobile payment adopters.

4.2.2 Step 2: Main market entry

To enter the main market, MNOs need to overcome barriers including legal, financial and practical. In fact, the MNO project manager mentioned that there are legal concerns, especially with the prepaid account. MNOs can only sell airtime with this scheme. Otherwise, this prepaid card

would become a store value account regulated by the banking license. Concerning postpaid billing, mobile payments are in a gray area as it is not very clear what the MNOs can do. However, the financial risks of credit linked with postpaid schemes are too important as MNOs do not have the expertise to manage them. Since the margin taken would only represent two to five percent, the risk would be much higher than the margin taken. MNOs could act as financial intermediaries between the merchant and the consumer. However, they cannot legally hold the money.

The position of the financial institutions on the payment market could be a difficult barrier to overcome. However, in Switzerland, MNOs are likely to partner with banks. This is a shared opinion suggested by a manager working for the Swiss leading acquiring institution and a MNO mobile payment project manager. Therefore, they would provide a new channel for classic payment means. However, MNOs could acquire a bank but this is not a current plan as the MNO manager commented.

Another issue is merchants' acceptance. As there would be an extra cost generated by the required infrastructure to provide mobile payments at the POS, physical merchants are not as interested as virtual merchants in offering mobile payments to their customers.

4.2.3 Step 3: Customer attraction

To attract merchants and consumers, the mobile payment scheme needs to be simple, easy to use, convenient, cheap, reliable, standard, and perform effectively. Moreover, mobile payments have to offer a better value than classic payment schemes. In certain industries (e.g. public transport), mobile payment schemes can provide better performance in terms of speed and simplicity.

The MNO and the acquirer managers agreed that education of the user can be a serious issue. However, this temporary problem will disappear in few years as the next generation of users are becoming more comfortable with the new features of mobile phones. Nonetheless, mobile payment procedures still need to be simplified.

The requirement of registration could also be a reason for failure since consumers do not like to have extra things to do to activate new services. Thus, this procedure has to be very simple not to immediately displease the potential adopters.

Furthermore, the cost can be very repulsive. Consumers do not want to pay an extra fee to use their mobile phone to make payments. Merchants would have to pay the transaction cost and adapt their prices as they are already forced to do with credit card purchases due to the high commissions.

The MNO mobile payment expert postulated that an undeniable advantage would exist for consumers as their wallet would in effect be digitalized. Therefore, they will not

have to carry a phone and a wallet in their pocket.

4.2.4 Step 4: Customer switching

To convince consumers to adopt a new payment instrument, the cost of switching has to be as low as possible. This switching cost can be financial, physical, cultural, and psychological. MNOs and financial institutions claim that behavioural issues are strong barriers. Switzerland is a country where consumers still like cash-based transactions. To change this behaviour, which is probably linked with the culture, it takes a lot of marketing effort and time. This was observed with the CASH card which was not as successful as expected. Another issue comes from the user-unfriendliness of today's phone interface. The MNO interviewed think that this is probably a temporary problem as mobile phone turnover occurs usually every two years. Moreover, youths have already adopted mobile payments to purchase digital contents. Thus, switching from a classic payment means to mobile payments using a mobile handset would be very easy for this new generation.

4.2.5 Step 5: Incumbent retaliation

The suggested advantages financial institutions have over MNOs are their brand names. In fact, consumers trust and are loyal to classic payment schemes. If banks decided to extend the use of their payment systems to mobile payments, they would have instant recognition from the consumers since they already know the brand and they have been using it on many occasions without any problems. They would likely have less concerns about security and privacy as banks based their reputations on these quality features.

4.2.6 Step 6: Incumbent displacement

As stated by the MNO, there is a dependence on banks. Therefore, the MNO does not assume that they truly represent a threat. Furthermore, MNOs are generally more interested in micro payments as opposed to banks which are more attracted to macro payments. Moreover, banks would have technical issues if they were to launch their own mobile payment solution without MNOs. In fact, a major bank in Switzerland was interested in dual-slot phones. However, they would have to sell their mobile phones to their customers. Therefore, this scheme would be very limited to a niche market with a very low transaction volume.

As the interviewed MNO does not want to get a banking licence, the collaboration between banks and other Swiss MNOs seems to be a good option since the scheme would be standard and accessible for most mobile phone users.

4.2.7 Conclusion for disruption I

The mobile payment project manager working for a major MNO assumed that MNOs do not want to displace financial institutions on the current mobile payment market. They just want to promote m-commerce to generate extra revenue, enable new mobile services, and also to find an efficient and cheaper way to top up prepaid account. As they do not have the expertise to manage financial risks, they would prefer to collaborate with banks.

Disruption I: From card-based to phone-based schemes			
Stage	Forces disabling disruption	Evaluation	Forces enabling disruption
1. Foothold market entry	- Required: large scale scheme and high volume of transactions	➔	- Generate extra revenue - Enable new services - Existing large customer base
2. Main market entry	- Legal concerns (prepaid) - Financial risks - Strong position of banks	➔	- Gray area for postpaid scheme - Possibility to acquire a bank
3. Customer attraction	- Education of users - Cost of mobile payments	⏸	- Better performance in specific industries
4. Customer switching	- Behavioral issues - Cultural issues - Better user interface needed	➔	- Payment of new digital content mainly adopted by youths
5. Incumbent retaliation	- Bank's strong brand names - Loyalty and trust in banks	➔	
6. Incumbent displacement	- MNO's dependence on banks - MNO's preference to collaborate with banks	➔	- Market segments (micro vs macro)

Figure 5. Evaluation of Disruption I

The comments on contributing factors made by the interviewed MNO and financial institutions (Figure 5) show that this disruption is not likely to happen on the current market. They seem to have converging opinions about the Swiss market. However, we do not exclude the possibility that once MNOs get a comfortable position in the mobile payment value chain, they would have enough clout to rule this market.

4.3 Disruption II: Shifting from operator-driven to self-organized payment schemes

The high commissions taken by MNOs and financial institutions for transactions motivate others to provide or implement their own payment schemes. As these newcomers and intermediaries have fast reaction and personalization capabilities, they could be serious competitors for the two current dominant actors (i.e. financial institutions and MNOs) on the mobile payment market. They could create a disruption on the market by offering mobile payment schemes that have lower performance and less functionality, but at a much lower price.

With regard to what has been done before, we propose to evaluate the contributing factors for the second disruption using the same methodology.

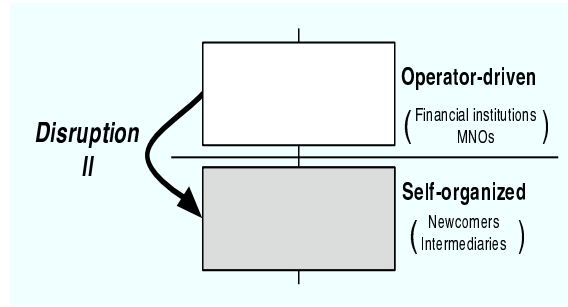


Figure 6. Disruption II: From operator-driven to self-organized payment systems

4.3.1 Step 1: Foothold market entry

The demand for cheap and independent payment schemes adapted to a particular market need exists. Therefore, some newcomers and intermediaries try to offer payment solutions to respond to this demand. As they provide payment solutions for niche markets, the interviewed newcomers do not consider themselves to be currently a real threat for financial institutions and MNOs. This would primarily depend on the willingness to extend the solution to the national market.

4.3.2 Step 2: Main market entry

Several barriers are present to prevent newcomers and intermediaries from entering the main market. Firstly, they usually do not have a large customer base. In Switzerland, a contactless smartcard system provider interviewed claims that it is technically possible to offer a global independent payment scheme. However, to succeed at the implementation stage, a consortium with merchants gathering a large customer base would have to pilot the project. It would be impossible for an independent payment service provider to deal with each merchant independently. Secondly, they have the same legal issues that MNOs have concerning store value accounts. Thirdly, smart card system integrators provide two types of smart card: a public and a private card. The private chip is usually intended for security use such as access control in company buildings. Therefore, they do not want to widely spread their technology that is offered to corporate customers as some malicious users could try to crack their smart cards.

4.3.3 Step 3: Customer attraction

As there are not any commissions to pay to financial institutions, merchants using an independent payment scheme can offer value bonuses to their customers. Therefore, this in-

centive can motivate consumers to adopt an independent solution over a classic payment instrument. It is almost a win-win situation as merchants do not have to pay for expensive terminals and transaction fees, and customers get a rebate among other benefits (e.g. loyalty programs) when using an independent payment system. As the payment system is customized for a specific payment process, it could have several great advantages (e.g. speed, convenience, easy of use) that classic means of payment do not have. However, consumers could be reluctant to adopt independent schemes as they are not standard.

A mobile payment scheme offered by a newcomer has the advantage for merchants and consumers of being cross-operator. Therefore, an independent solution can get a very large customer base as any mobile user can subscribe to the service. As independent payment service providers have a faster clearing, an undeniable advantage for merchants is that they will get their money faster compared with financial institutions or MNOs.

4.3.4 Step 4: Customer switching

A crucial issue with independent payment schemes is registration. The simplicity of this process is a key factor of success. Concerning phone-based solutions, technical requirements need to be as standard as possible in order to activate the service for any current mobile phone user.

4.3.5 Step 5: Incumbent retaliation

The competitive advantages financial institutions and MNOs have are their brand name and their large customer base. Therefore, with their marketing and financial power they could counterattack an emerging independent solution by offering their own brand names (and trusted) scheme. Concerning independent mobile payment schemes using a mobile network, MNOs could possibly increase their fees to prevent newcomers from entering the market. Moreover, one interviewee stated that MNOs want to keep total control of the SIM card in the mobile phone. This protection limits newcomers who would like to upload software into this chip.

4.3.6 Step 6: Incumbent displacement

Independent mobile payment service providers consider their solutions as complements and not substitutes. They are not currently able to displace the two dominant actors on the mobile payment market and it is clearly not their objective. However, as soon as they reach a critical number of subscribers (customers and merchants) and their volume of transactions increases, the interviewed financial institution agrees that newcomers could become real threats.

4.3.7 Conclusion for disruption II

Since most independent solutions are not standard, they are not ready to reach a global coverage. Therefore, they are not likely to cause a major disruption on the mobile payment market. However, an industry with a large customer base and its own payment scheme can become threatening if extended to other purchases. The wide acceptance of the payment means at the POS is crucial.

Disruption II: From operator-driven to self-organized schemes			
Stage	Forces disabling disruption	Evaluation	Forces enabling disruption
1. Foothold market entry		➔	- Existing demand for personalization
2. Main market entry	- Large customer base missing - Cannot manage a global implementation alone - Legal issues (prepaid)	➔	- Independent payment systems are already widely used in specific contexts
3. Customer attraction	- Not a standard means of payment	➔	- No commissions - Benefits due to personalization - Operator independent - Fast clearing
4. Customer switching	- Registration process	➔	- Device not necessarily expensive (can be free)
5. Incumbent retaliation	- Bank's strong brand names - MNOs margin - MNOs control the SIM card	➔	
6. Incumbent displacement	- Complements and not substitutes - No global solutions	⊥	- Transaction volume can be threatening

Figure 7. Evaluation of Disruption II

In conclusion (Figure 7), the success of a new independent payment scheme depends mainly on the side of the merchants. If the payment solution become standard, consumers would probably adopt the system en masse.

5 Conclusion

Mobile payments are still predicted to be a natural evolution in the payment market. Various industries are working hard on technologies and standards that would enable mobile payments. However, there is still uncertainty about the way actors should position themselves in this market. Obviously, financial institutions are natural candidates for macro payments whereas MNOs and newcomers may find a more sustainable position for micro payments and specific purchases.

Even though numerous statements were made about the fact that MNOs and financial institutions are in serious competition, in Switzerland, they are more likely to collaborate than compete. This can be partially explained by the fact that MNOs and financial institutions have their own competencies which are complementary for mobile payments. MNOs are clearly interested in rapidly launching a mobile payment system even if financial institutions adopt a "wait and see" strategy.

Independent payment solutions are not yet in competition with classic payment providers in Switzerland. They position themselves as complements as they are used in specific markets. Moreover, one reason of their existence is for loyalty program purposes. However, as stated above, as soon as an independent scheme gets a critical mass-adoption and a great volume of transactions, it can become a serious threat. Therefore, financial institutions should not underestimate this potential disruption.

Our analysis indicates that these two disruptions are not likely to occur on the actual payment market. Moreover, the interviews we conducted showed that mobile payment experts share the same opinions on contributing factors. Nowadays, mobile payments are considered either a new channel or good complements for the actual payment means. Hence, the tendency for each actor is to try to pick the right business model to maximize its market share rather than trying to lead this market.

As for future research, this first analysis and set of interviews could be extended by a deeper evaluation of the contributing factors to these two potential disruptions. The next step of our research should be to use a more quantifiable approach, such as suggested by Rafii and Kampas [15], for rating, weighting and analysing the disruptive innovations and their contributing factors.

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