

# A Proposal for a Multi-perspective Analysis of the Mobile Payment Environment

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## Abstract

*Mobile payment is a very promising service which is still in an early stage of development. Various solutions have been proposed with disparate success. This can partially be explained by the immaturity of the market, by the inexistence of proven business models for the various actors, and by the presence of several unresolved technological and business issues. As these aspects are all relevant and interrelated, the purpose of this paper is to discuss the importance of analyzing the mobile payment environment using multiple perspectives. We therefore present an original approach based on a technology environment assessment framework which combines the appraisal of different perspectives: namely the market, the actors and the issues that characterize the environment.*

## 1. Introduction

The widespread adoption of digital mobile devices has paved the way for the development of many innovative applications. Among them, one intriguing possibility is to use mobile devices for payment purposes. Today most people never leave home without their mobile phone. Its storage, computing and transmission capabilities makes it an ideal device for containing everything we normally carry in our wallet, including cash and credit cards. This represents an incredible opportunity to enable mobile devices as a universal payment method and get a share of the market.

Mobile payment is a very exciting service which had been predicted some years ago by a number of research institutions [4, 1] and researchers [5, 6] to become a killer application capable of generating a huge amount of revenues and boost the whole mobile business industry. In line with that belief, many enterprises such as financial institutions, mobile operators, start-ups and technology providers have conducted a variety of standardization and commercial efforts aimed at grabbing this opportunity [7].

Nowadays, however, the situation does not seem as good as had been predicted and the reality of the market shows

that numerous issues, such as market uncertainties, viable business models, and technical issues, need to be solved before these predictions can be realized. The mobile payment industry is indeed still immature.

In spite of the considerable research efforts which have been conducted to better understand these key aspects of mobile payments, we feel that the integration of their precious contributions can be improved by combining the various viewpoints in a more structured way. In fact, it appears that the success of mobile payment can hardly be predicted by considering only one single dimension, but rather requires to unite the considerations which can be obtained from different angles.

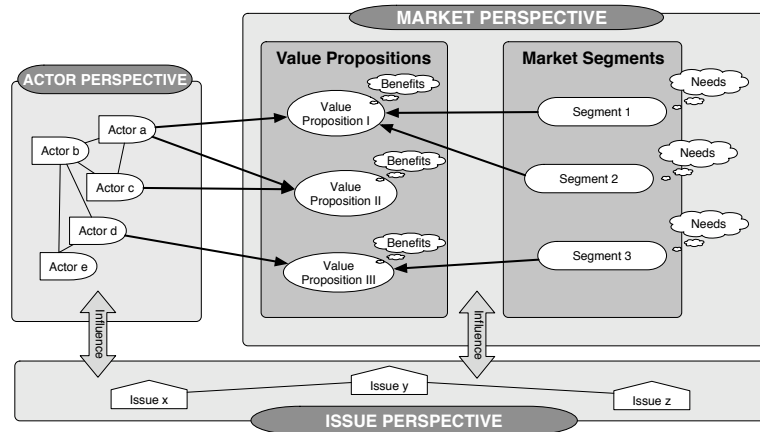
The main goal of this paper is to suggest the use of a multi-perspective research framework for analyzing the mobile payment industry so as to generate useful ideas for stimulating and directing further research efforts in the mobile payments field.

The paper is structured as follows. In the next section, we introduce our multi-perspective research framework which can be applied to the mobile payment environment. We briefly present the three perspectives and develop each of them in the following subsections. Finally, we conclude the paper with a short discussion about our first insights obtained with our multi-perspectives analysis approach.

## 2. A multi-perspective analysis framework for the mobile payment environment

In order to analyze the various relevant aspects of the mobile payment environment, we propose to refer to a technology environment assessment framework, sketched in [2], which suggests that the assessment of a technology-based environment should combine three relevant and complementary perspectives: the market, the actors and the issues (see Figure 1).

The **market perspective** deals with customers and demand uncertainties. Its analysis is vital because the success of any firm in the environment depends on its ability to create and maintain profitable relationships with customers by



**Figure 1. A multi-perspective technology environment assessment framework**

offering suitable value propositions that provide an answer to their needs.

The **actors perspective** deals with strategic uncertainties by assessing the roles taken by the actors in the value system and the pressure relations between them. Its analysis comprises all the actors who can affect the industry's economic structure and competitive conditions.

Finally, the **issues perspective** deals with the major uncertainties which will determine the future evolution of the environment under study.

While we present these perspectives as separate, they are in reality interdependent and linked to each other by influence relationships whereby elements in one perspective can influence elements in another. It is hence fundamental to consider these relationships as well.

## 2.1 Market perspective

We propose to begin by analyzing the market component of our model. The immaturity of the market and the consequent unresolved technical, strategic and demand issues make the adoption of mobile payments highly uncertain. In particular, although many mobile payment solutions are already available, most are unsuccessful because they fail to provide the right value proposition to customers. This requires us to investigate the needs and wants that may drive customers to adopt a mobile payment solution as well as their grouping in market segments. Some research has been conducted in order to discover the most important adoption factors for consumers [8, 12, 10]. This should also help to evaluate the different solutions with these selected criteria. In our case, the idea is to match the needs of a particular market segment with existing value propositions.

A market segment could have specific needs, such as ease of use and low transaction cost, for example. This

could typically be consumers who need to pay quickly and easily small purchases. Another segment could ask for good security for more important payments. Typical consumers within this segment are mostly people using mobile payment transactions as a replacement for credit cards.

The next point is to analyze whether the value propositions offered to these customers match some of their needs.

A value proposition could address needs totally or partially. In fact, there are currently several available mobile payment solutions to satisfy the customers' needs for mobile payments. In reality, however, few of them have been successful so far. We contend that this is due to the fact that providers have difficulties to offer value propositions answering the specific needs of the customers within their selected market segment.

For instance, newcomers such as Paybox and Mobipay proposed phone-based payment schemes supposed to be a new convenient way to pay at e-shops and mobile merchants such as taxi drivers. However, the ease of use, convenience and usefulness of these services, compared to alternatives such as cash or credit cards, can be questioned. In view of this, it is not surprising that these solutions failed to attract a sufficient number of subscribers to be profitable so far.

In contrast, there are needs for ease of use and low cost transactions for everyday services such as transportation that were well addressed. Mobile payments schemes such as E-ZPass and Octopus were indeed more successful as they provided a solution to specific customer needs. The former, a North American wireless toll collection system, dramatically improved the convenience of paying tolls since cars did not need to stop at the toll lanes anymore. The latter, a contactless card-based payment service originally aimed at public transportation in Hong Kong, provided a very fast, convenient, and cheap payment method particularly adapted for paying transportation fares. Now, Octopus

is also widely used in retail stores, its usage is widespread and the adoption rate is great [3]. Moreover, its users are satisfied with the service and plan to continue to use it [9].

These examples show that mobile payment schemes that are launched for specific needs are more appropriate since they improve the payment process in some way. This also demonstrates that it is probably better to launch a good complement than an underperforming substitute for actual payment instruments. In other words, new payment schemes should not be intended to displace the established payment schemes.

## 2.2 Actor perspective

This perspective describes and analyzes the different stakeholders that are involved in the mobile payment market.

On the one side, there are the regulators which set a legal framework and controlling compliance. Moreover, technology suppliers are in charge of providing the technology to the players. Both have a great influence on the market since they design the future of mobile payments.

On the other side, we have the players that make up demand and the supply. Merchants and consumers represent the demand. They are very important since success of a mobile payment scheme necessarily depends on the adoption of both groups. Therefore, they need to be convinced that mobile payments are good for them.

Mobile payment service providers correspond to the supply. Payment service providers are typically financial institutions, such as banks and card issuers. Moreover, Mobile Network Operators (MNOs) are also considered natural candidates to offer payment services. Therefore, there are obviously two dominant types of actors present on the mobile payment market: financial institutions and MNOs. They can choose to collaborate and cooperate, or compete. Other actors such as newcomers and intermediaries can also be serious competitors.

Each provider has its own advantages. Financial institutions are very powerful on the payment market. They have their financial networks and licenses. Moreover, they have expertise in risk management. On their side, mobile network operators have a large customer base due to the high penetration of the mobile phone. Furthermore, they control the mobile network infrastructure and the end-user device. Newcomers have the advantage of fast reaction time and interoperability, as they are usually operator independent. However, their weakness is that they usually do not have a strong established brand name.

Just as each actor has advantages, each has the power to influence the others. For example, financial institutions are so present on the payment market that it would be hard to totally avoid their involvement in a mobile payment scheme.

Therefore, they could put pressure on the mobile payment services providers with excessive transaction fees, for example. Some mobile payment solutions are also using a traditional payment instrument offered by the financial institutions (e.g. credit card). This gives them a new channel for their existing financial network. On their side, mobile network operators could greatly affect the development of new mobile payment solutions by raising the connection fees on their network. There are various models including one or more providers. However, given their respective advantages and weaknesses, there should be a trend towards collaboration. Whereby, each actor can benefit from the advantages of the others. This is probably the only possibility to obtain a win-win situation on the mobile payment market.

This market is also open to competition with newcomers. Some specific industries with an important customer base could offer a profitable mobile payment scheme. In the public transportation industry, there are some successful schemes because the consumers found the payment solution efficient for purchasing fares.

The immaturity of the market still leaves some space for speculations. Various models and scenarios could be imagined. However, some actors can better draw the market lines as they can benefit from their dominant position.

## 2.3 Issue perspective

Due to the infancy and immaturity of the mobile payment market, there are many issues. Tarasewich proposes a set of issues concerning m-commerce in general. He classifies a number of possible issues within five categories: mobile client issues, wireless communications infrastructure issues, other wireless technology issues, m-commerce application issues, and m-commerce global issues [11]. This list of issues can be useful while trying to analyze the market using the issue perspective. For our analysis, we selected some relevant issues that are concerns for mobile payment service providers.

One issue which could be of concern is the **physical form** of the device used for mobile payments. Today, there is still an uncertainty about which device will prevail. Mobile phones seem to be a good candidate since the market penetration is very high. However, contactless cards are also very attractive for many types of purchases. Moreover, they are cheap and more reliable than mobile phones in general. Therefore, there is an important issue surrounding the device problem. Furthermore, financial institutions prefer using a device they operate, as opposed to the SIM card that is totally controlled by the mobile network operators. Still, contactless card technology (e.g. RFID) could be embedded in mobile phone.

Another issue is the **size** of the payment. Micropayments are interesting only if the volume of transaction is high as

the profit margin is usually very small. In contrast, micropayments are conducted for purchases with a higher margin and therefore more profitable. However, the level of security should be higher as the risk of fraud for financial transactions always exists. We can deduce that mobile payment operators might be more interested in micropayments since they do not have expertise of risk management contrary to the financial institutions.

The **location** of purchase is also an issue that mobile payment service providers need to consider. There are two types of purchase: proximity and remote. Proximity payments are done on a face-to-face basis while remote payment implies that the buyer and the seller are not in the same place during the transaction. This could be an e-commerce payment transaction, for example. Mobile phones are well suited for such a transaction since they are able to communicate remotely and they already have security features embedded, such as PIN code.

The issues described above are important concerns for mobile payment service providers before launching a solution. These issues could be influenced by the actors and the market, and conversely the actors and the market could be influenced by the issues.

### 3. Conclusions

In this paper, we suggested the pertinence of using a multi-perspective framework in the context of the mobile payment industry. We found that most studies often focused on only one specific aspect of mobile payments. This certainly provides valuable insight on some particular aspects of the domain, but often fails to provide a good overview of the big picture. We stress that the success or failure of mobile payments cannot be explained by considering only one single aspect, but rather needs to take into account several complementary perspectives.

The market perspective shows that the existing solutions had mixed success. The most successful ones appear to be those that match the specific needs of a particular market segments. In contrast, universal solutions aimed at a broad audience are less successful as they are not perceived to deliver a distinctive value to their target customers.

The actors perspective shows the role and relations of the many players and their respective strengths and weaknesses. While some have managed to offer a payment solution alone, collaboration seems to be the key to offer an universal solution.

Finally, the issues perspective highlights some unresolved critical issues such as the physical form of the device, payment size and location that may affect the future developments of the mobile payment field.

The point of this article is that while the different perspectives offer useful insight alone, it is better to taken them

as a whole due to their respective influence relationships. This may raise original research questions such as what are the consequences on value propositions and actors positioning if mobile phones and contactless cards merge on the same device, or what value propositions may stem from the collaboration of mobile operators and financial institutions.

As further research, we seek the possibility of applying a more formal approach. In fact, we are exploring the potential of multi-criteria decision making methods to assess the mobile payment market combining multiple perspectives.

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