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# Mobile Payment Technology and Competitiveness In the Credit Card Chain

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**ABSTRACT:** This paper discusses the value creation sources of Mobile Payment concept into the Credit Card Chain. A case-study was developed based on the Transaction Cost Theory, Value Chain Analysis, RBV, Schumpeterian Innovation, and Strategic Network Theory. The results illustrate the technology potential to modify the configuration of Credit Card chain.

**KEYWORDS:** Mobile Payment, Credit Card, Service Chain

## 1. INTRODUCTION

Payment transactions among people and organizations using paper money and coins have been replaced by electronic payment with magnetic cards via phone and Internet. More recently, the telecommunication companies and the financial institutions have integrated the mobile phone as a payment method, known as mobile payment. Mobile payment can be defined as any kind of payment that involves the convergence of a telecommunication network, a bank network, and a credit card (Zhang; Dodgson, 2007).

Successful experiences related to mobile payment can be found in the United States with the use of pay-pal-payment platform for e-bay and in Canada with the use of Obopay. In Philippines, 85% of

the mobile phone users make payments using their phone device. In South Africa and other countries in Africa, there have been several similar experiences. Although it is a worldwide phenomenon, the mobile platforms are more developed in countries where there is less access to bank transactions.

In Brazil, the mobile payment concept was applied to the Credit Card Chain. Paggo is the pioneering company in a credit system where transactions between clients and retailers are carried out through mobile phones. The credit card industry has been growing around 20% per year. The main players in the chain are the retail banks that attempt to explore their customer base and the credit card issuers like Visa and MasterCard that operate globally.

This work analyzes the competitiveness and the value creation of the mobile payment technology into the credit card chain. An exploratory, descriptive case study was carried out at the Paggo Company in the year of 2007. It aimed to understand the competitive differentials of the company based on two models. The first was proposed by Amit e Zott (2001) and it is based on the Transaction Cost Theory, Value Chain Analysis, Resource –Based View, Schumpeterian Innovation, and Strategic Network. It attempts to elucidate the sources of value creation in virtual chains. The second model used in the analysis is related to the operation performance criteria, as proposed by Hill (1985). Hence, this study analyzed fully the insertion of the company Paggo and the mobile payment technology in the credit card chain, as well as it raises questions about how they can affect the traditional global players in the chain.

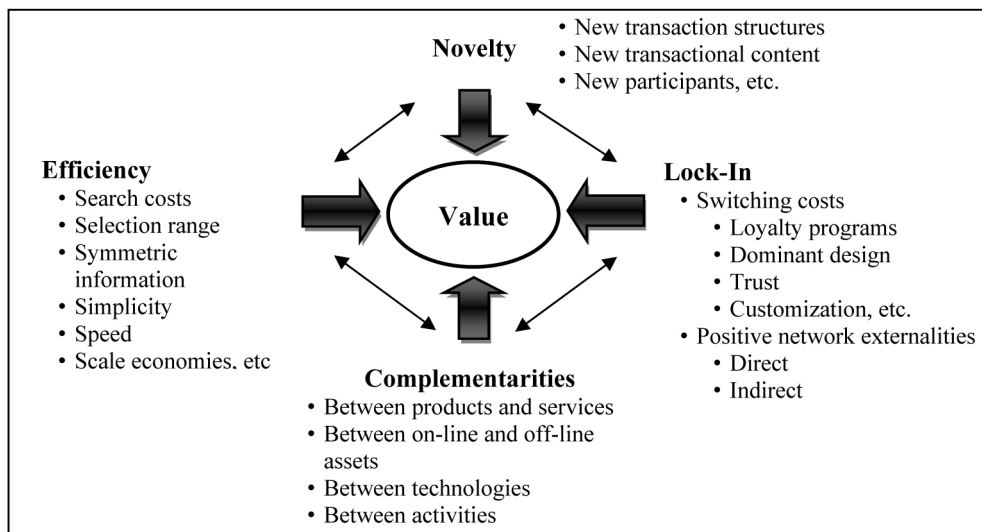
This article includes four sections. The first and the second present the theoretical models used in the analysis of the case study. The third one presents the methodological procedures chosen to achieve the study goals. The results of the case study analysis compared to the theory are presented and discussed in section four. The final section presents a consolidated analysis of the competitiveness of this new credit-card chain member.

## 2. VALUE CREATION IN VIRTUAL TRANSACTIONS

Amit and Zott (2001) model was used to analyze value creation in the credit card chain. To do that, four value creation dimensions are used: (i) novelty, (ii) lock-in, (iii) complementarities, and (iv) efficiency. The authors argue that value generation in the virtual world goes beyond the value that can be created through the establishment of the value chain (Porter, 1985), the strategic network among companies (Dyer; Singh, 1998), or through exploring the company resources (Barney, 1991). Such theories could not fully explain the value creation in virtual chains. However, each of them provides an important value creation proposition. Amit and Zott (2001) suggest an integration of the strategy and entrepreneurship models.

Some researchers have found significant results by integrating those theories. Gulati (1999) and Afuah (2000) successfully joined Resource-Based View (RBV) and Strategic Network Theory, and highlighted the importance of partners' resources and capabilities to the company performance. Herterly and Borgatti (1997) joined the Strategic Network Theory and the Transaction Cost Theory focusing on a relationship based on reliability and cooperation despite of specific assets, demand uncertainty, complexity and frequency issues.

**Figure 1: Sources of value creation in e-business**



Source: adapted from Amit and Zott (2001)

Figure 1 shows the model proposed by Amit and Zott (2001). In this case, *value* refers to the total value created in the virtual transaction; no matter if this value is appropriated by the company, the consumer, or any other participant involved in the business. The four dimensions presented in the model and the theories on which they were based are detailed below.

## 2.1 Efficiency

Amit and Zott (2001) suggest that it is one of the first dimensions able to generate value in virtual businesses, which is related to Transaction Cost Theory. This cost is associated with make-or-buy decision. According to Williamson (1975), transaction costs are defined by uncertainty levels, by the transaction frequency, and by the specific assets involved. One of the greatest effects of transactions on network environments (i.e. virtual networks) is cost reduction (DYER, 1997). Lucking-Reiley and Spulber (2001) exemplify such savings in time spent by managers in the search for consumers and suppliers, communicating with other parts involved in transaction, travel's cost, physical space for meetings, document processing and costs related to inventory.

## 2.2 Complementarities

Complementarity means that a set of resources provides more value working together than working separately (Amit/Zott, 2001). Thus, the RBV highlights the role of complementarity among the strategic assets. The combination of complementary and specialized resources and capabilities (the ones that are heterogeneous, valuable, scarce, difficult to imitate, and have perfect mobility) can lead to value creation (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993).

Another theory that contributes to the understanding of complementarity is the Strategic Network Theory, that refers to the importance of complementarity between the participants in the network (Gulati, 1999). Complementarity can occur in two different ways. It can be vertical, a post-sales service for example, or horizontal, the sale of digital cameras or memory card. They can occur by different companies and partnership (Amit/Zott, 2001). In addition, the authors propose the complementarity of the on-line and off-line assets and argue that the consumers want the complementarity of goods that are not directly related.

Amit and Zott (2001) model presents the relationship between the value generating resources. The efficiency provided by the information technology leads to exploring the complementarities of e-business. The combination of different resources and capabilities of different companies is particularly interesting when there is low cost transaction.

## 2.3 Lock-in

Amit and Zott (2001) state that the creation of value in the virtual chain is directly related to motivat-

ing consumers to repeat the transaction and to the willingness of partners to maintain the partnership. Creating such attributes to generate value can be achieved by lock-in.

Lock-in occurs when the cost of changing a brand or technology is considerable, i.e. when there is some limitation on their free exchanging. Amit and Zott (2001) suggest three types of lock-in: (a) fidelity programs (bonus for purchase repetition); (b) development of a dominant design in the market; and (c) establishing a reliability relationship with the consumers. The definition changing cost is based on the Transaction Cost Theory (Williamson, 1975). Based on RBV, it can be said that the company strategic resources such as the brand name and its relationship with the suppliers can contribute to the lock-in.

According to Shapiro and Varian (1999) the value created results from network externalities. The industrial era depended on economies of scale while the information economy depended on network economy. In both of them, failure multiplies failure and success multiplies success, which is the essence of positive feedback loop. The power of the network is on positive feedback from satisfied clients who make recommendations, which is in fact their perception of the best product or technology available in the network and how to aggregate this value to the client.

## 2.4 Novelty

The potential of innovation for creating value was firstly discussed by Schumpeter (1934) while the introduction of new products or services, new methods of production, distribution or marketing, and the discovery of new markets have been reported as the traditional value creation sources. Amit and Zott (2001) suggest that e-business innovation also occurs based on the way the transactions are structured. The e-business companies create value connecting the chain agents that had been isolated eliminating the inefficiencies in the purchase and sale process through innovative transactions satisfying clients' latent needs and/or by creating new markets (Amit/Zott, 2001).

Novelty and lock-in, two of the four dimensions of the Amit and Zott (2001) model, are related in two ways. Firstly, the innovative companies have the advantage of attracting and retaining customers, especially by building a strong brand. Secondly, being the first mover is an essential requirement to be successful in markets characterized by crescent return.



The company that innovates can start the dynamics of positive feedback cycle which results from the positive the network externalities (Shapiro;Varian, 1999). Novelty is also related to complementariry. The greatest innovation in virtual markets is the combination of complementary elements such as resources and capabilities (Schumpeter, 1934). Lastly, it is worth mentioning the relationship between novelty and efficiency. Productive process innovations, such as in assets, can improve the exploration of resources in the company and thus create value in the virtual chain (Amit;Zott, 2001).

### 3. METHODOLOGY

In order to accomplish the objectives, an exploratory, descriptive case study was conducted. The company studied was Paggo, the pioneer and the only company to use the mobile payment technology for credit transactions. The study was conducted in the second semester of 2007.

The techniques and data collection instruments were determined and used according to needs of each phase. At first, the researchers conducted a literature review on the main themes relevant to this study using scientific articles, books, newspaper and magazine articles, and other publications aiming to: (a) obtain relevant and updated data on the credit card chain; and (b) search on the Operations Management and Strategy literature for theoretical models about competitiveness that could be used to guide the analysis of the case studied. Theories were applied to the study in agreement with the study of Gupta, Verma and Victorino (2006), considered a common practice nowadays.

After selecting the appropriate models for the study, a new literature review was conducted in order to deepen the knowledge about the theories used to develop them. Concerning the primary data, firstly a documental research was carried out investigating manuals and documents that included mission, objectives, strategies, programs, norms, and procedures of Paggo to have an understanding of its formal dimension. Next, semi-structured interviews were held with the company directors, more specifically with the General Administration and Financial administration departments. The interview script was prepared based on two theoretical models presented in the previous section and focused on identifying the competitiveness elements and value creation of the company in the credit card chain.

A qualitative data analysis was performed to verify the adherence of the Paggo shares to the theoretical models used in this study. The data collected were combined with the credit card sector literature review, mainly the studies by Heemann (2002) and Di Serio, Oliveira and Miotto (2005) in the Credicard Company, the biggest credit card issuer company in Brazil. Therefore, a parallel was drawn between the traditional credit card chain and the Paggo chain.

### 4. THE CASE

#### 4.1 Paggo Company<sup>i</sup>

Paggo started its activities in 2003 along with the proposal of a technology that allowed financial transaction over a mobile phone. Since then, the company founders got the intention of applying such technology in credit card transactions. In 2005, a pilot project was launched, with good results according to the administrators. The company needed then to establish partnerships with other companies that had a big customer base and a potential for the acquisition of financial services.

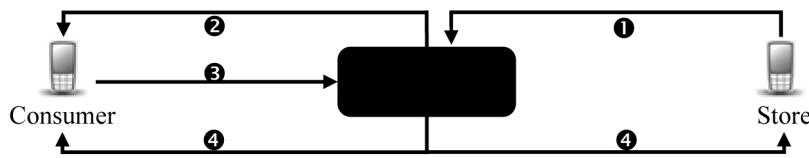
After presenting the technology to some companies, Paggo established partnership with Oi, a telecommunications company founded in 2002. It is the fourth mobile company in the country, and it accounts for 13% of the market (behind Vivo-28%, TIM-25%, and Claro- 25%, ANATEL, 2008). Oi has 16 million clients in 17 different states in Brazil. Since October 2008, the company has started its activities in São Paulo, the greatest consumer market in Brazil

The partnership between Paggo and Oi resulted in the creation of OiPaggo, a credit company that offers the virtual credit card to all clients (pre-paid and post-paid plan). The system started its operation in 2006 and in 2007 it had one million registered clients (230 thousand active ones) and 40 thousand affiliated establishments.

The transactions are conducted through a SMS text message from the client's mobile phone to the store's. For the transaction to occur, both have to be licensed with Paggo Figure 2 shows the mobile payment transaction at Paggo.

<sup>i</sup>2009: change in company's name, from Paggo to Freeddom. The Credit Card brand (OiPaggo) has not changed.

**Figure 2: Paggo Credit transaction**



Source: elaborated by the authors

The processes shown in figure 2 are the following:

1. The process begins with the client's desire to use Paggo mobile payment system as a means of payment. The store access the software based on the Java®, technology previously installed in his/her phone set;
2. Paggo verifies the data sent by the store and send a text message to the client with the transaction data;
3. The client checks the transaction data, dials his/her personal password to validate the transaction, and send it to Paggo;
4. The store and the client get a text message from Paggo confirming the transaction.

Paggo proposes the credit transaction over the mobile phone eliminating the use of a plastic card. On top of that, the company does not make use of any traditional agents in the credit card chain such as Credicard, Visa, Mastercard, and others. This business model results in a more integrated and verticalized chain than the traditional one due to the innovative over the phone transaction technology. According to Christensen (2003), when innovation fulfills the lack between what the clients expect from the product/service and what it actually delivers an integrated architecture is more adequate since it favors performance instead of flexibility. Thus, the companies that compete with the integrated and independent architectures should be verticalized in order to control the whole process.

Paggo credit transaction is related to the private label concept. The card are generally issued by retailers in order to create true client loyalty offering benefits such as installment plan, bonus rewards, among others (Basile, 2000). In Brazil, there were 142 million cards like this accounting for US\$ 39.4 billion in 2007. Hence, the growing credit market attracts new players that are financially stable and have a great customers' base.

## 4.2 Mobile Payment and Value Creation

The value creation sources of the Mobile Payment technology will be analyzed according to Amit and Zott (2001). Based on the variables related to each model dimension (Novelty, Complementarities, Efficiency, and lock-in), it was possible to identify how the organization of the subject of the study generates value in the credit card chain.

### *Novelty*

In this dimension, Paggo business has good adherence to the model concepts. The innovation proposed by the company consists of a way of conducting the business transaction without focusing on a new product or service, which is a characteristic of e-businesses.

Paggo technology provides the convergence of its service into a very popular device – the mobile phone avoiding the use of a plastic card. The card is virtual and is aggregated to the phone set. Likewise, the merchant does not need to have a specific equipment for card transactions.

The mobile payment technology allows the insertion of new agents in the chain by eliminating some inefficiencies of the traditional chain, which led to understand the latent customer needs. Such inefficiencies are related to the cost of a credit card machine for a commercial establishment and its limited mobility. Paggo system has low cost of sales point licensing, and good mobility since it uses mobile phone network. According to company reports, this allows the insertion in the chain of autonomous merchants, door step selling companies (e.g. Avon, Natura), and informal economy agents such as street vendors and final customers that commercialize used goods.

It is worth mentioning that the Paggo business has brought to the chain not only center tier agents, related to commercialization, but also those at the beginning of the chain, the card issuers. The partnership with Oi allowed a mobile phone company

to offer financial to its clients. It is worth mentioning that Oi clients are generally from social classes C and D, which have less access to bank transactions and have had more advantages with the expansion of the Brazilian credit card industry.

In sum, the directors think that pioneering the mobile payment technology in the credit card chain can empower the brand name and help restructuring the transaction pattern used in the chain.

### *Complementarities*

The complementarity in the Paggo business can occur in three different ways: in the network, offers, and assets. Network complementarity is related to the insertion of new agents to the credit card chain, upstream or downstream as mentioned earlier.

Complementarity can also be identified in the offer of the company that issues the card in the Paggo system. Nowadays, the only partner is Oi, but there are a number of possibilities. The company that issues the card, together with its own offer, offers a financial service, characterizing a horizontal complementarity.

Finally, there is the complementarity between online and offline assets, which occurs in three different ways: (a) in the team and resources responsible for the licensing and support of the point-of-sale; (b) in the team and methods used to analyze the credit to be granted to clients – in the partnership with Oi, Paggo uses the pattern of behavior of clients' phone bill (pre and post paid lines, and fixed lines when possible), and (c) in the team and everything that is necessary to serve the client.

### *Efficiency*

This dimension was introduced in the model as an item to be compared with the traditional market and the virtual market competition. Paggo does not have direct competition in the mobile payment market. If it is compared with the credit card traditional market, there is little difference concerning flow of information since the difference is the way the transaction is available for the final users –store owners and consumers. Therefore, other efficiency differences between both markets will be discussed.

One advantage of the Paggo system over the traditional one is related to the cost of the credit card machine since there is no need of specific equipment in point of sale for the payment to be made. In fact, the system uses a device that in general, the merchant

already owns, a mobile phone. This means a lower fixed cost in the transaction, which results in lower administration taxes than in the traditional chain generating value in the chain.

One aspect highlighted by the Paggo directors was the easiness to use the system to pay for long distance purchase. The credit card holder does not have to be physically present during the transaction. As an example they mentioned that a maid can go shopping for groceries and inform the boss's mobile phone number, who can authorize the purchase from anywhere using a cell phone.

Value generation can also be noticed due to the fact that Paggo allows access to new clients, either merchants or final clients, as mentioned earlier. In addition, the system allows card issuers, company from other sectors, to explore their clients with a financial service characterizing another efficiency source, and consequently, generating value.

### *Lock-in*

The search for the Paggo clients lock-in is based on the private label issuer company. In the case of Oi, the attempt to create true client loyalty occurs with the complementarity between the phone line and the credit card. Hence, the costs with phone services are reverted into bonus points for future purchases.

According to Paggo administrators, acquiring new clients involves low cost. The direct cost of processing new accounts is less than 2% of the total net revenue. The indirect costs represent less than a hundredth of the net revenue. It is worth mentioning that in the case of credit card companies, the marginal effort to obtain additional accounts after the product had been launched tends to zero.

The low costs to acquire new clients combined with the product launching in the market can explain the company focus on acquiring new clients instead of trying to make them stay. The administrators believe that the positive externalities in the Paggo chain can establish the mobile payment as the standard payment in the credit card chain in a few years.

## **5. FINAL CONSIDERATIONS AND RECOMMENDATIONS**

The objective of this work was to analyze the competitiveness and mobile payment technology value creation. Firstly, it was investigated how the technology and business model of Paggo generated value



for the chain members. Moreover, the company performance concerning the criteria related to its operations was investigated.

Value creation is not restricted to a single agent of the chain only. Although Paggo's chain is more verticalized than the traditional chain, the benefits are extended to different agents. Considering the card issuer tier, the value generation depends on a financial service to diversify its businesses. In addition, the clients' purchase behavior can be better understood since it has access to their expenses profile in different situations other than the company offers.

Concerning the sales point, the technology generates value allowing a lower cost transaction without requiring specific equipment. Due to inefficiencies of the traditional system, the mobile payment can bring to the chain certain commercial establishments or people who desire to trade goods or services via credit card and who have no access to this payment means.

To the final client, the value means easiness, convenience, and service mobility aggregated to a device that he/she already owns. It agrees with the concept of virtual convergence and can be an important fact to the competitive advantage generation. In the importance-performance matrix it can be seen how Paggo operations are structured.

It can be said that in this chain the focus is discussing the technology pattern that the market will adopt in the transactions.

Further research is recommended to discuss aspects of the creation and sustainability of the competitive advantage of the case studied in this paper and other mobile payment companies. They are, in general, small size companies that develop an innovative technology to deal with large size companies markets. This is the case of Paggo, object of this study, although the value generation and its competitiveness potential had been identified. Further studies should include other analysis models to investigate the reactions of big players in this market in developing similar technology. Other studies could also investigate the adoption of the mobile technology by the consumers.

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