MOBILE PAYMENT
AS KEY FACTOR FOR MOBILE COMMERCE SUCCESS

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Abstract
Mobile commerce was expected to flourish with the advent of 3G technologies. Nevertheless, this business has been growing very slowly and up to now has not reached a real success. This paper shows the importance of the mobile payment systems for the mobile commerce success. It describes some relevant solutions, emphasizing in their business models. The main conclusions are that the lack of very useful services and usability are the most determining factors in mobile payment adoption.

Key Words
m-commerce, mobile payment

1. Introduction
Since many years mobile commerce has been a business that apparently would change the way we use both Internet and the mobile phones. Nevertheless, up to now there are very few approaches that have proven to be successful. Mobile payment is one key factor that would enable its success. There are many aspects which have determined this situation: consumer behavior, economic and security aspects. All in all, the already released payment services have not had a big impact because they have not offered big benefits to end users. However, the growth of mobile phone users represents an opportunity by itself. The total of m-commerce transactions per year is expected to rise from 498 million globally in 2006 to 4.8 billion in 2010, and the average m-commerce transaction value is expected to increase from $7 in 2006 to $13 in 2010 (Hu, 2008).

This paper will understand mobile payment as: “the type of payment transaction processing in the course of which – within an electronic procedure – (at least) the payer employs mobile communication techniques in conjunction with mobile devices for initiation, authorization or realization of payment” (Pousttchi, 2003).

This study will first show the participants in any mobile payment solution, as well as a criterion how to describe and analyze all the different services that nowadays are available. Then, Chapter 3 will show the business models used in the most important mobile payment solutions. Chapter 4 explains the most relevant aspects that will allow us to compare and determine the services that would be successful in the short time. Finally, the study will present some conclusions and recommendations to improve the new mobile payment services.

2. Characterizing mobile commerce services
There is a group of aspects that must be previously explored to analyze the mobile payment business models: The participants in mobile payments, and the criteria for analysis of these systems.

2.1 Participants in mobile payment
The exact list of participants differs between the solutions, but in general terms these five appear in any mobile payment business model:

Consumers. This is the group of persons who buy some good or service using a mobile phone. This is the group to be satisfied by any business model.

Merchants. This is the group of companies that offer the products to be bought. Merchants are in turn consumers of some payment system, so they will select the approach that is more profitable.

Payment providers. These are normally intermediaries between financial institutions and telecommunication providers. In most of the cases, these are the real “experts” in mobile payments, but they are usually associated with banks or mobile phone manufacturers.

Financial service providers. Banks, credit card companies, or money exchange institutions, which are experienced and specialized in processing the money transfer.

Telecommunication providers. This is the group of companies that deliver the technological platform to transmit the data being processed. This includes both operators and virtual operators.

Besides those, there are others whose roles normally do not appear in a business model but also have strong influence in this market:

Mobile phone manufacturers. These companies are important since they provide the technology that is available in the phones and that can satisfy some business idea’s expectations. They have the challenge of producing on time inexpensive handsets that include all the functionalities that the mobile payments require to success.
Regulatory agencies. Both financial and telecommunications, the governmental agencies can determine how mobile payment system can operate in every different country.

2.2 Criteria for the analysis
With the aim of analyzing and comparing the diverse services, it is necessary to define a criterion. This is composed by:

Technology.
Mobile payment chiefly employ essential technologies present in the mobile scenario, and certain approaches add some distinctive elements.
The common technologies the customers handle are: mobile browsing, SMS, credit cards, etc. Needless to say, the bearer technologies are 3G flavors and GSM. On the other hand, the main per-system specific technologies are: dual-slot payment systems, RFID, NFC, IC card, and Bluetooth. For example, IC card technology is used in i-mode’s Osaifu-Keitai service. NFC-based mobile payment service is a technology that has recently started to operate (GSM World, 2007). The following table (Ondrus, 2005) shows a brief description of several of the aforementioned technologies.

<table>
<thead>
<tr>
<th>Table 1: Ways to Enable Mobile Payments Using a Mobile Handset</th>
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<tbody>
<tr>
<td>Multi-application chip card</td>
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<tr>
<td>Dual-SIM phone</td>
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<tr>
<td>External WIM card reader</td>
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<tr>
<td>Dual-slot phone</td>
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<tr>
<td>Payment software in the phone</td>
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Business model.
As the logical characterization of how a technology produces value, this is the most important aspect to describe and analyze in each system.

Real service.
This describes the service from the consumer’s point of view, how it is perceived, and assuming a non-technical user’s understanding.

Payment size.
According to the amount of money carried during the transaction, the payments can be classified as: picopayments (less than 5 cents), micropayments (less than 2 €), small payments (up to 20 €), and macropayments (more than 20 €) (Kadhiwal, 2007). Small payments can be totally handled by mobile operators, meanwhile macropayments need the use of credit cards or bank accounts.

3. Main Mobile payment services
This section describes the current main mobile commerce services. The list is by no means complete because there are many approaches that cannot be covered.

3.1 PayPal Mobile
This is a proprietary solution, owned by PayPal, and working mostly in USA and Canada.

Technology
It only requires a mobile phone and a PayPal account. As most of the solutions to be described, no additional hardware is required. A PayPal account needs a credit card (or some other physical payment means) to be activated. The phone must be able to connect to Internet, and the PayPal uses a credit/debit card when register the new users. The bearer services are mobile web and SMS.

Business model
PayPal Mobile acts as a trusted party between the consumer and the merchants. PayPal charges the receiver only, so the sender does not pay for the service. The way how the participants interact is described in Figure 1.

Real service
The real service allows three different ways to pay: (1) by mobile web browser, (2) by text message, or (3) phone call. The second one, called “Text To Buy” (TTB), is the most interesting service PayPal has (Payment News, 2006). This is how TTB works:
(1) The user sends a SMS text, for example To: 63543, and Message: dvd.
(2) Some seconds later the mobile phone will receive a message with the link to buy the specific item.
(3) The user buys by logging into PayPal and accepting the transaction.
3.2 PayforIT
This is the solution currently supported by all UK operators.

Technology
The user does not need either a credit card or a bank account, only the mobile phone.

Business model
Besides users, operators, and merchants, PayforIT’s business model comprises a layer of participants called “accredited payment intermediaries”. This is described in Figure 2 (Hunter, 2008).

3.3 Paybox
This is a company that work on several services for mobile commerce, including content, marketing, and payments. Currently offers different payment solutions in different countries. The original service, which is described, has a bank-centric model (Card Technology Today, 2002). It is important to specify that there are two companies with the same name, one in Germany and the other in France. This paper describes the German approach.

Technology
The user just needs a mobile phone, a bank account, and a Paybox registration.

Business model
The actors in this scheme are: Paybox, the customers, and the merchants. The scheme is fairly similar to PayPal Mobile. The difference lies in the real service.

3.4 i-mode Mobile Payment - Osaifu-Keitai
iMode provides some different mobile payment systems. Within those, Osaifu-Keitai—that literally means Wallet Mobile—is a service that makes use of IC cards (NTTDoCoMo, 2008).

Technology
The user needs an i-mode compatible mobile phone with a contactless IC card.

Business Model
The merchants in i-mode offer products and services to the consumers. Once a transaction is done, all the charges are transferred to DoCoMo, who is in charge of billing to the users. Then all the bought items will be included in the user’s bill, together with the phone charges. The interrelation between participants of this service is depicted in Figure 4.
Real service
The way how Osaifu-Keitai works can be described in
the following way. First of all, the user must subscribe
to this service. i-mode shows a great list of merchants
and services as e-money, ID card, loyalty card, fare
collection of public transits (including railways, buses,
and airplanes), or credit card.
For instance, Edy (the e-money application) works like
this:
1. Install Edy application in mobile phone
2. Enable Edy via i-mode menu.
3. To charge money in the Edy account, the user must
   enter his i-mode password.
4. To pay, the user just place the mobile phone near to
   the reader in the shop until this produces a sound.

3.5 Other solutions
Obopay is one of the other successful mobile payment
solutions in USA (Obopay, 2008). However, in general
terms this country is much less developed than Asia or
Europe in Mobile Payment systems (Lai, 2006).
w-HA is a solution currently working in France. w-HA
is a France Telecom’s subsidiary and acts as “technical
manager of online payments”. The user must first
subscribe to some operator. For the user, he does not
really pay online. He just buys and during that process,
he does not send any personal or banking data. He is
invoiced from his phone bill, debited from his prepaid
credit or bank account. The users buy in “two clicks”:
1. Select the product, and (2) Accept or Confirm. This
   is an advantage of this solution (w-HA, 2008).
Mobipay is a successful solution currently working in
Spain. (Mobipay, 2008).
In Finland, the most successful service has been
purchase of tickets for Helsinki City Transport via SMS
(Mallat, 2004).

4. Aspects that influence in mobile payment
systems success
This section describes the aspects that will help us to
discuss the previously reviewed mobile payment
systems.

4.1 Standardization
The overall view is that the mobile payment systems are
not following a clear standardization path. This is
evidenced with the large number of heterogeneous
solutions.
The most important standardization alliance was
Simpay, which in February 2003 grouped Orange,
Telefonica Moviles, T-Mobile and Vodafone. However,
this alliance announced the discontinuation of its
activities on June 2005. The other big alliance was
PayCircle, formed on January 2002 by HP, Lucent,
Oracle, Siemens and Sun. This was closed in March
2005 after completing its mission (PayCircle, 2005).
The final PayCircle’s specification was then submitted
to OMA (Open Mobile Alliance).

4.4 What the big players are doing
It is also important to follow what the big manufacturers
and operators are planning to do, and which
technologies they are going for. A quick surf through
Nokia web pages shows very few references about
mobile payments, which means that it is not important
right now for the company. Probably Nokia expects that
the content providers and financial institutions are those
who have to develop these services.
On August 2007, Google has patented a mobile
payment approach called Gpay (Riley, 2007). This
demonstrates that the big players are indeed interested
in the mobile payment market.

5. Discussion
This section aims to determine under which
circumstances the described payment business models
would be commercially successful.

PayPal Mobile has as main advantage that all current
PayPal users can easily start paying by phone besides
by web pages, employing their accounts. For the
company, it can take advantage of this huge database of
users worldwide. TextToBuy is also perceived as a
good service, even though it implies several steps
before the purchase is confirmed. On the other hand, the
main disadvantage is that the system does not work in a
presence fashion, as paying in a POS.

PayforIT shows how a very well organized mobile
market can join forces to launch a successful service.
Another advantage of the system is that users do not need a credit card. Nevertheless this implies that macropayments are not allowed.

Paybox is quite similar to PayPal Mobile, but its main advantage is that offers more services to the end users. The use of financial instruments allows this, via macropayments.

i-mode shows the most comprehensive mobile payment solution. One disadvantage of Osaifu-Keitai is that the mobile wallet can be used even without mobile connection, what would be a problem in case of a theft. Also, the handsets that support Edy are more expensive.

In general, the success has been occurring in micropayments, for very useful services as bus tickets. The use of sophisticated phones has been still unsuccessful, as happened with dual-slot phones. Despite of this, some experts claim that IC cards should be included in any mobile payment solution (Longino, 2006).

Something that the current systems have in common is that avoid sending any personal data. So, the registration is a previous step that is present in almost all the described systems. The usability still has to be improved in some services, especially regarding to sending personal data, and to reducing the number of steps the user must follow to confirm a purchase.

As the reader may have noticed, there is a heterogeneous list of mobile payment operators. All these differ in world coverage, payment means accepted, payment size, number of steps needed to buy, etc. This made hard to compare in a symmetric fashion.

6. Conclusions

The most successful systems are based on micropayments, which are billed by the phone operators. This implies that financial institutions are the participants who should be more concerned about the slow growth of this market.

Nationwide mobile payment solutions are prevailing over worldwide due to the differences in the financial markets within each country.

This study has showed how mobile payment greatly influences mobile commerce. If mobile payments are not widely used, mobile commerce will not be totally successful.

Finally, the main conclusion is that a mobile payment system would have a big likelihood to be commercially successful if:

1. The usability is improved. Long payment procedures and transmission of personal data must be either avoided or improved.
2. The system offers services that are perceived as useful by the consumers. This strongly depends on how the mobile payment market works in the specific country.
3. The system does not require too expensive or complex handsets that will not be reached by a big mass of consumers.

7. References


