

Mobile Payments: Moving Towards a Wallet in the Cloud?

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Abstract: This article deals with mobile payments in developed countries. Even though it only accounts for a relatively small share of the market (between 10% and 20%), mobile payment merits in-depth analysis in developed countries as there are many economic and technological issues that still need to be addressed.

Key words: M-Payment, M-Banking, Remote payment, Proximity payment, M-commerce

■ A complex reality: typology of mobile payments

Mobile payments are integrated within a wider range of services such as Mobile Marketing (attracting, cross-selling and keeping a customer via mobile), Mobile Commerce (buying digital content, goods or services via mobile), Mobile Banking (monitoring and managing finances), and Mobile Authentication (identity verification).

The exact definition of a mobile payment is sometimes open to interpretation; we define Mobile Payments as the act of paying for goods or services with a mobile device (currently mobile phones).

There are many different and often competing categories of mobile payments. The distinction between the methods of mobile payment is mainly based on the location of the mobile user in relation to the merchant:

- remote payment over the mobile e.g. paying for digital goods by SMS or physical goods via a mobile web retailer;
- proximity payment using the mobile terminal at a physical point of sale;
- receiving money over the mobile: using the mobile terminal to read debit or credit cards.

Remote payment on the mobile

In this case, the customer can buy digital or physical goods or services. They are several methods of payment:

- **Payment charged on the carrier's bill.** This service has been used since the beginning of mobile telephony to pay for ringtones and wallpapers. There are still many methods to do that:

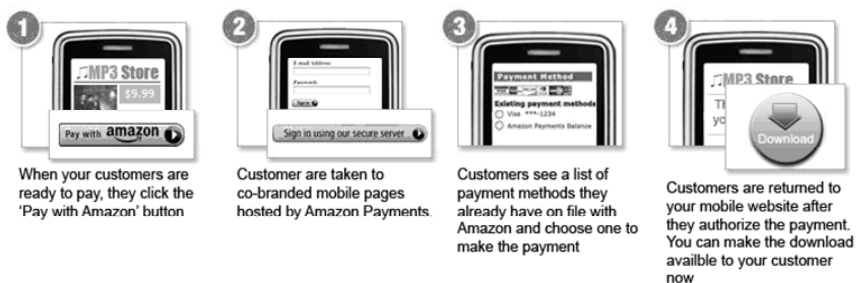
- SMS+: the client sends an SMS or USSD to a short number, the merchant is informed and delivers the good,
- direct billing: after an authenticating procedure, the payment is charged on the bill,
- mobile internet: the client uses websites or applications, and is charged on his telecommunications bill.

- **Entering CB or bank account number** on a mobile web site (one spot)

- **Registering on merchant's websites** such as Amazon or energy provider. The payment is then made via a CB number, or via direct debit of the bank account.

- **Using electronic wallets** such as *PayPal* or *Amazon Checkout*. This service could also be used to make C2C transactions, i.e. to transfer money between two accounts.

Figure 1 - Remote payment: Amazon checkout case study



Source: AMAZON, 2010

Proximity payments using the mobile (at a point of sale)

The mobile should integrate contactless capability such as Near Field Communications (NFC), the payment is made as the user passes the mobile next to the receiving terminal. An authentication code may be needed to

end the transaction but it is usually not required for small transactions. This type of payment takes place within the wider framework of the contactless services, especially ticketing and authentication (entering a home or a professional area) where the functionalities are held on a smart card. Contactless technologies have been widely used in public transport with smartcards: Oyster card in London, Passe Navigo in Paris, etc. Visa has also developed contactless credit cards that could be swiped in front of readers. Many trials of NFC mobile payments have been performed worldwide, and are currently taking place in Nice (France). However, Japan is the only country to have actually deployed the solution.

Figure 2 - Payment with the mobile terminal



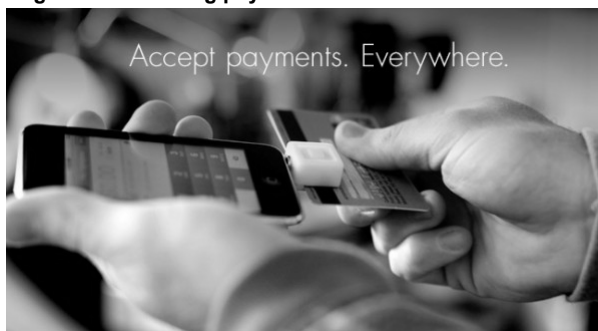
Source: Vivotech, 2010



Source: Suica, 2010

Receiving money via the mobile

Figure 3 - Receiving payment with the mobile terminal



Source: Apple

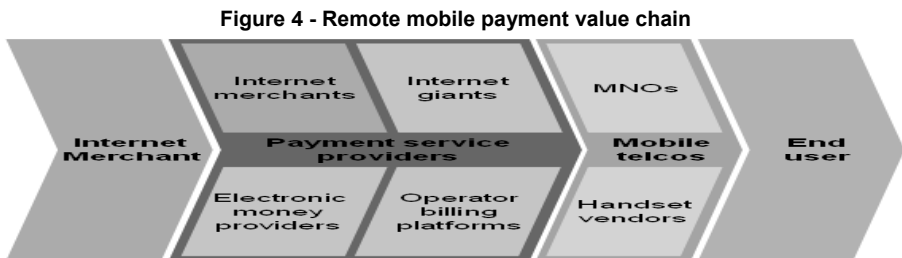
The last way to make mobile payments is to use the mobile phone to read credit cards. Apple has developed a product called "Square" that is

connected on the audio input jack, and can accept payment cards with magnetic bands. This could be useful for people, such as repairmen, working outdoors or at a client's premises.

■ A complex value chain involving a wide range of actors

Remote payment on the mobile

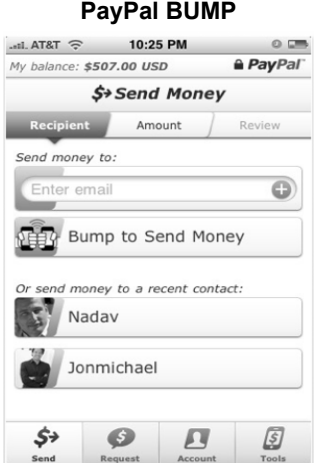
In the case of mobile payment on the mobile, the value chain can be thought of as a mobile version of the fixed e-commerce value chain. It is also common for the big players to play end-to-end in this chain; for example Apple can act as a merchant offering the goods, provide its own payment service with iTunes and also have a place in the mobile market with the iPhone.



Up to now, mobile operators were used to charging for payment services on their customer's bill, but in the emerging mobile payment ecosystem they are in competition with internet giants who already provide electronic wallets for fixed Internet: PayPal, Amazon check-out, Google Checkout, iTunes. Internet giants such as PayPal who already provide solutions for the fixed Internet have extended their solution to the mobile market. Many other start-ups, like Boku and Zong, are also entering the competition.

Case study: PayPal mobile

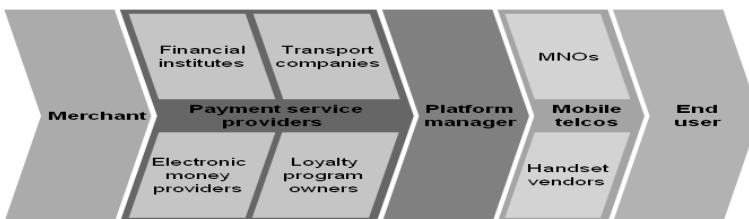
PayPal, which is a subsidiary of EBay, launched a mobile application for iPhone in 2010, that will be soon available for Android 1.0. EBay reported that its mobile channel accounted for \$600 million in sales in 2009 and predicts that mobile sales will hit \$1.5 billion this year.

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| <p>PayPal Mobile functionalities</p> <ul style="list-style-type: none"> - Possibility to pay on eBay using the mobile. - API PayPal launched in 2010, that could be directly integrated in application development. - Currently developed: payment buttons to be integrated on merchant's mobile websites. - BUMP: this CTC application allows customers to exchange money simply by tapping two iPhones together and entering the amount of the transaction. |  |
|--|---|

Proximity payment over the mobile (at the point of sale)

Technology enabling mobile payment with the mobile phone has already existed for some time now, especially in Japan. The value chain has new players, which are specific to this market, as well as the obvious mobile operators and the financial institutes, although the latter are not the only ones who can provide the payment service.

Figure 5 - Proximity mobile payment value chain



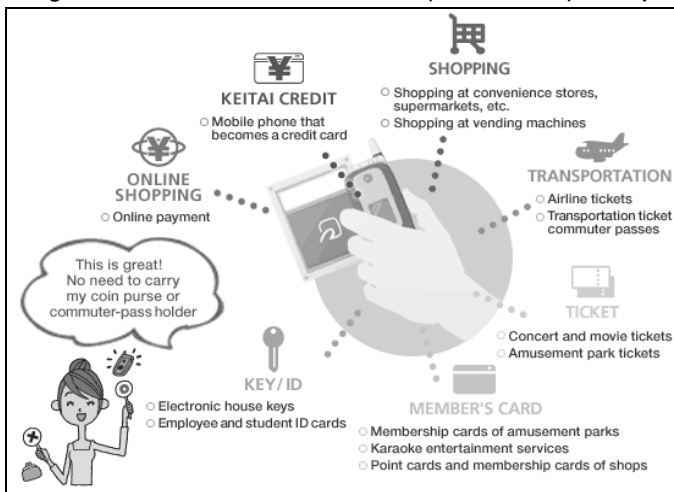
Source: IDATE

Case study: Osaifu Keitai (mobile wallet in Japan)

In July 2004, NTT DoCoMo developed a wallet-phone concept based on Mobile FeliCa, called the "Osaifu Keitai" (literally "mobile wallet"), and has since built a network of partnerships and business models. FeliCa is offered by FeliCa Networks, which is a subsidiary company of both NTT DoCoMo and Sony. Both KDDI and SoftBank have since followed suit, licensing

FeliCa from FeliCa Networks and Osaifu Keitai from DoCoMo; they too now offer the mobile contactless service under the same name, Osaifu Keitai. The Osaifu Keitai is at the core of NTT DoCoMo's (and KDDI's and SoftBank's for that matter) mobile payment business. It serves, as the name suggests, as a wallet within the mobile, offering services ranging from credit provision transportation tickets to identification. It is, in effect, the overall service name for all FeliCa services.

Figure 6 - NTT DoCoMo's Osaifu Keitai (mobile wallet) concept



Source: NTT DoCoMo

■ Key factors of development

Whatever shapes the mobile payment market finally takes, there are still many challenges to meet, some of them being specific to NFC payment.

- First of all **a new ecosystem must be established** for the different players: in many cases, mobile payment requires players to be the incumbent in their core business: banks, mobile operators, handset manufacturers, and this adds complexity to revenue sharing negotiations, as each one is accustomed to being in a dominant position. Japan has proved that the model could work with strong relationships between players.

- **Prove added-value** for the customer: for instance to be able to pay for a game while playing without leaving it or to consult their account balance before making a purchase. Or to get rid of all the cash in their pockets.

- **Address the fears related to security.** According to a survey conducted online in 2009, more than half of mobile subscribers are wary of making mobile payments, as they think it is not safe to make a purchase through their cell phone (source Harris interactive). The authentication process provides a dilemma for NFC mobile payment: on the one hand, the technology is supposed to provide users maximum convenience for shopping, yet on the other hand this raises security concerns. In most cases, convenience is the priority and thus no authentication process is required. However, users are encouraged to use security measures to limit the risks, and to lock all NFC applications whilst not using them, and unlock them with a PIN code or password upon their use. Some mobile phones come embedded with fingerprint and/or face/voice recognition features, which further simplify the locking and unlocking process.

- **NFC handset compatibility:** regarding proximity mobile payment, the generalisation of compatible NFC handsets is critical. Today, about 5% of mobile phones shipped have NFC capacities and is growing very slowly. However, Apple has filed a patent to embed NFC on the iPhone, and Nokia has recently made an announcement concerning the NFC integration in handsets. Another solution could be to use the microSD memory Slot to transform a mobile phone into a mobile contactless payment device.

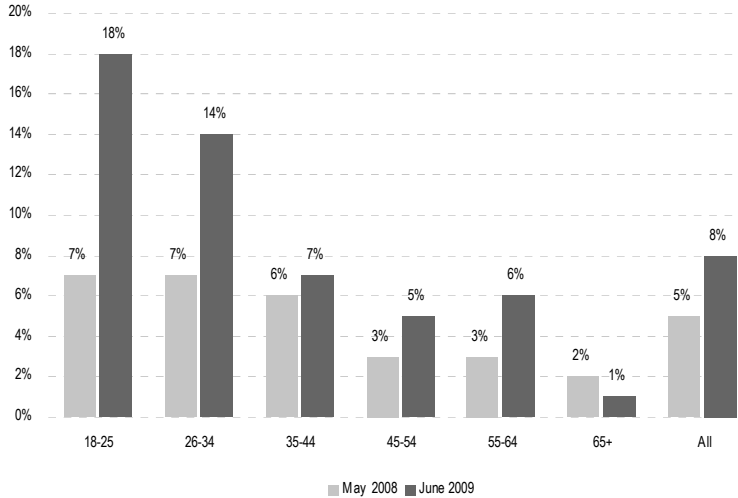
Although, mobile payment has been slow to take off, consumers are now beginning to adopt it, especially young people: according to Marcatus, 8% of American people have already used their mobile to pay or send fund in 2009, compared with 5% one year before.

Figure 7 - Fingerprint, voice and face recognition offered by NTT DoCoMo



Source: NTT DoCoMo

**Figure 8 - Use of mobile payment or fund transfers
(not including purchasing ring tones, games or wallpaper)**



Source: Mercatus- USA

■ Moving towards a wallet in the cloud?

At the beginning of the article, we mentioned that mobile Payments were defined as paying for goods or services with a mobile device. We also supposed that the mobile device was a mobile phone or a smartphone. However, in theory, it could be any device: connected handheld game console, connected tablet or laptop. We could even foresee a unified system of payment available on mobiles as well as on fixed (and soon to be connected) devices such as TV sets.

Mobile payment could be the first step towards a ubiquitous means of payment, which the end-user could access via different handset, mobile or otherwise: tablets, game consoles, TV sets, or even in a car. This would imply a "wallet in a cloud" which one could access anywhere and using any device. This system would rely on a standardized platform based on the principle of openness.

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