

# Mobile payments breakthrough is just around the corner

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We Finns, the world's most enthusiastic mobile phone users, use our phones not only for making calls but also for surfing on the Internet, listening to music, and taking photographs. We even compete in the Mobile Phone Throwing World Championships. We have not, however, been willing to use our phones as a means of payment – or how else can we explain the fact that so many mobile payment initiatives have not got beyond the experimental level?

When the future of payments is discussed, mobile payment is an inevitable part of the debate. The ubiquitous mobile phone that can be used everywhere has been seen as a step towards more efficient and user-friendly payments. The promises of the visionaries have, however, not yet been fulfilled. The most sceptical commentators have been ready to discard the entire concept of mobile payment. What does mobile payment actually involve? And what are the basic preconditions needed for using the mobile phone for payments?

The introduction of a technical innovation is usually welcomed with excitement, and new applications spring up in abundance. Mobile payment has already for several years been at this stage of development. Hundreds of various types of pilot programmes have been created around the world, including several in

Finland. Some of these programmes cover proximity payment, some remote payment, and the number of technical solutions is high. By comparing these innovations with other available payment methods we can identify which characteristics a mobile payment application needs in order to succeed.

## The first generation of mobile payments

The first mobile payment applications were SMS text messages or calls to toll numbers for services such as purchasing ring tones or making a donation to some charitable cause. Purchasing a tram ticket in Helsinki by SMS message has become fairly popular. What these payment methods have in common is that the SMS message is an authorisation by the customer to invoice, and payment takes place only when the mobile phone invoice is paid.<sup>1</sup> The telephone operator credits the payments to the service provider based on a mutual agreement. These types of payment methods are thus primarily invoicing systems, not payment systems.

Payment methods based on invoicing by operators have several characteristics that prevent them from becoming widespread. Increased invoicing would increase operators' credit risk, while the purchasing of services is restricted by the high number of people using company



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<sup>1</sup> If a prepaid connection is used, the payment is made by deducting the amount from the balance.

phones. People easily make mistakes when writing SMS messages and some users find them clumsy. Perhaps this is why these types of payments are mainly used for supplementary mobile phone services.

#### **Paying by SMS message is clumsy**

The Digiraha and Mobiliraha programmes tested by Finnish banks resemble the above-mentioned invoicing systems. The payer transfers funds to a separate mobile payment account and is able to make payments from this account via SMS message. This does not create a credit risk for the payment transmitter, who simply transfers the payment to the merchant's account (which has joined the system). The user experience is similar to that with operators' invoicing systems, but the payer must transfer the funds to a zero-interest mobile payment account in advance. From the viewpoint of the consumer, the payment process is thus equivalent to a payment made via a prepaid connection.

The Austrian payment service Paybox provides a number of alternatives for making a payment. Upon payment, the customer gives his mobile phone number to the retailer, who will then call him. The customer confirms the payment by punching in his personal identification number (PIN). The actual payment is effected by direct debit or by invoicing the customer in connection with his mobile phone invoice. The service has, however, only a limited number of users.

The most popular service in Europe in terms of the number of users is the Belgian service Banxafe, which requires an updated SIM card. Banxafe allows the customer to recharge his prepaid balance either directly from his bank account, by direct debit or by card payment (via SMS message). Upon payment, the retailer sends an SMS message to the payer detailing the payment information, and the payer confirms payment with his PIN. Banxafe commenced operations in 2003. In 2007, the service was extended by the Pay2me service, in which registered private individuals can make payments to each other. The Pay2me service is used by eg self-employed persons who do not have a payment terminal for handling card payments.

Compared with operator-based invoicing, the other SMS-based payment methods have the advantage that they can also be used via a company mobile phone. In principle, they are suitable for both proximity and remote payment, ie for paying at a store and at home. With the exception of some types of payment situation, the above-mentioned payment methods are viable alternatives to cash and card payments. But they just as often lose the competition with cash and cards.

From a consumer's point of view, opening a separate account or purchasing a specific SIM card means extra effort, as the payments can be made by other means as well.

Moreover, sending even a short SMS message takes a longer time than punching in your PIN at a payment terminal, and SMS messages are susceptible to disruptions. These payment methods require that merchants acquire specific payment terminals. The threshold to invest in new technology is high, due to the continuous obligatory updating of payment terminals and customer-bank interfaces ever since the turn of the millennium.

Our experience is, that a new payment card will become widespread if a sufficient number of end customers start using it at an early stage. When that happens, merchants find it sensible to acquire the payment terminal required for verifying the card. Other new payment methods will most probably go through the same process.

Mobile phone payment is most widespread in the Far East, particularly Japan and South Korea. The Japanese mobile phone operator NTT DoCoMo has created a completely new method for proximity payment. This was launched successfully to customers and merchants, as a result of the company's strong marketing effort and solid market position. The mobile phones sold by NTT DoCoMo have a separate chip that can be read via the merchant's data terminal. The technology resembles that of the travel card available in the Greater Helsinki Area.

NTT DoCoMo's payment chip is reported to have 5–10 million users.

The chip is accepted in numerous locations, and the operator has supported merchants in acquiring the required data terminals. Currently, payment is effected via a prepaid chip, but the plan is to extend the service to account-linked and invoiced applications. Similar near field communication-based (NFC) proximity payment applications are also in use in other countries of the Far East.

#### Proximity payment by mobile phone instead of a plastic card

In addition to operators, international payment card companies have also been actively developing NFC-based proximity payments. Both Visa International and MasterCard International have been testing a solution in which the chip is embedded on the cover of a mobile phone, instead of a plastic card. Most of these experiments have taken place in the Far East and the United States. As a payment transaction, this type of payment resembles card payment – from the viewpoint of the consumer it is irrelevant whether the chip is embedded on a plastic card or a mobile phone. The situation is similar for the merchant: payment card transactions are credited to the merchant using existing systems. NFC-based payment has been modelled on several successful public transport applications.<sup>2</sup> News reports suggest some of these programmes

*For the consumer, it ultimately makes no difference whether the payment chip is located in a plastic card or a mobile phone.*

<sup>2</sup> Eg Octopus in Hong Kong, EZ in Singapore and Oyster Card in London.

*Proximity payments via a mobile phone chip could provide added value for both consumers and merchants.*

are to be extended to other types of payment. They are well suited to this: consumers already have a considerable number of cards and have learned to use them. Shops located on commuter routes would be a natural place to use these NFC-based cards.

In Europe, progress has been hampered by the Electronic Money Directive<sup>3</sup>, which imposes strict requirements on electronic money that can be interpreted as common forms of payment. The European Commission is currently updating regulation on electronic money. This will hopefully pave the way for new proximity payment initiatives in Europe as well.

Experiences gained with public transport applications and in the Far East indicate that NFC-based payment may provide real added value to both consumers and merchants. The payment transaction is quick, and with small payments no separate confirmation is required. The user experience is that this payment method is as easy to use as card payment, or even easier. If the actual payment is effected using card payment technology, merchants do not have to make big investments because the chip reader will be attached to the existing payment terminal. If the service fee charged from consumers and merchants is no higher than that levied on payment card transactions, the application could be a success.

<sup>3</sup> Directive 2000/46/EC.

NFC-based payment could be the second generation of mobile payments. But has the service anything to offer payment service providers, banks and payment card companies?

The only hindrance to the widespread use of NFC-based payment is that the chip has to be installed in the phone. Several currently used applications are based on a separate chip embedded on the cover of the phone. Acquiring such a chip requires extra effort from the user, particularly if the NFC phone is not automatically compatible with all the applications offered by service providers. Should the customer know already when he is choosing the phone whether he wants to pay by Visa or MasterCard?

A solution to this problem could be new multifunction chips that include the mobile phone's SIM application and one or several payment applications of the customer's choice. These could be updated over the air, enabling the consumer to acquire and switch payment applications. This would require a technically compatible chip, standardisation of its operation, and agreed practices for administering the chip and the included applications. All these requirements will probably be fulfilled in the near future when ETSI<sup>4</sup>, the organisation responsible for standardising communication between chips

<sup>4</sup> European Telecommunications Standards Institute, <http://www.etsi.org/WebSite/homepage.aspx>.

and phones, and the Mobey Forum,<sup>5</sup> which is preparing the chip administration model, complete their work. There is still a long way to practical applications, but they are definitely now a possibility.

### Developing countries have specific needs

The largest mobile phone market is in the developing countries, where the most innovative payment solutions are also to be found. One of the most successful new payment methods is M-Pesa, which was launched in Kenya in 2007. The application is operated by Vodafone and Safaricom.

More than half the Kenyan population has no access to banking services. While mobile phones, too, are not universal, their number is growing rapidly, and mobile phone networks cover even the most remote regions. The livelihood of many Kenyans is dependent on funds sent by relatives working in the cities or abroad.

Whereas money was formerly transferred via costly money transfer agencies, slow postal money orders, or sent with relatives or local busses (Matutu), with M-Pesa, funds can be transferred via SMS message. An M-Pesa account operates like a prepaid connection, but as a separate application. Funds can be transferred to the account or can be collected in cash at M-Pesa sales points or M-Pesa's partners.

Kenya has a population of over 35 million, approximately 450 bank branches and 600 ATMs, and only some 27% of the population has a bank account. In a short time, Safaricom has already established 1,600 M-Pesa service points, located at Safaricom sales points, shops and service stations. The M-Pesa service is suitable for paying wages and salaries, for safeguarding money during travel when there is a considerable threat of being robbed, for purchasing goods that are located far away (the goods, eg medicine, are transported to the customer by local bus), for transferring tuition fees and for many other purposes.

M-Pesa's near-term challenges relate to the framing of legislation, because according to international practice its operations correspond to the issuing of electronic money, which thus far is not covered by Kenyan banking legislation. Safaricom has expanded its services to neighbouring countries, and Vodafone has launched a similar service in Afghanistan. These types of services have also been launched in other African countries and in the less developed regions of Asia, eg to support micro-crediting.

These kinds of services are expected to gain rapidly in popularity because they offer the hundreds of millions of people without access to banking services a reliable and reasonably-priced method of transferring funds, both micro-payments and larger payments of tens of dollars.

*The mobile phone network reaches places that would otherwise have no banking services.*

<sup>5</sup> [Http://www.mobeyforum.org/](http://www.mobeyforum.org/).

The social benefit gained is much greater than the risks caused by the current insufficient level of regulation and supervision. Authorisation and supervisory issues will hopefully be solved in a way that does not hamper the development of the service.

### The future of mobile payments is twofold

What conclusions can we draw from these diverse developments? Many payments effected by mobile phone are in fact only new ways of using existing payment methods, credit transfer or card payment. We should thus perhaps talk about payment by mobile phone or mobile banking services, instead of mobile payments. Only when we have a payment application that is included in a mobile phone's multifunction chip and utilises the phone's security features can we talk about genuine mobile phone payments.

In developed countries, existing payment methods have a strong foothold, and the mobile phone's user interface is most suitable for confirming a transaction (which only requires punching a few numbers). The future of mobile payments thus lies in the support functions of electronic banking services, ie the mobile phone will be used for customer identification in online banking or for confirming a payment, or in contactless proximity payments.

Payment by mobile phone will probably be developed in the

direction of NFC-based payment – either contactless micro-payments or larger payments confirmed separately with a PIN. These thoughts seem to be shared by the expert group of the European Payments Council appointed to prepare the single euro payments area. Several open issues concerning chip administration still exist, but they can be solved. International payment card companies are leading developments.

By contrast, in developing countries, electronic money applications used via mobile phone and developed by mobile phone operators create new opportunities to support economic activity. There is a need for appropriate regulation and supervision by authorities in order to ensure the reliable functioning of the applications and to enable further development of the service. The future of mobile phone payments is thus twofold, lying both in NFC-based payments and in money transfers. The expectations for mobile phone payments seem set to be finally fulfilled.

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