

# Mobile payments – reloaded

After much hype in the late 1990s, mobile payments again stand out as one of the most interesting options for **enabling a new breed** of non-voice mobile services. This is especially true in Europe, owing to a regulatory breakthrough that is liberalizing the payments sector and encouraging new players – namely, telecom operators – to **enter this new area**.

► **MOBILE PAYMENTS** have been hyped since the late 1990s, but only Japan and a few other countries have successfully launched this service. Many attempts by operators, especially in Europe, have failed because of regulatory barriers; lack of interoperability with banks and other operators; service complexity and bad user experience, in turn generating weak interest from consumers.

In the last two years, however, m-payments have become a hot topic again, as GSMA initiatives show. To understand why mobile payments are again resurfacing, let us review the status of worldwide deployment, and then focus on new options available to operators.

There is no accepted definition of mobile payments across the telcom or banking industry, or even among analysts. In the following, the term “mobile payments” or “m-payments” will mean a basic service involving an electronic money transaction between two peers (human or machine),

enabled through mobile phones. Another way to describe the service is “peer-to-peer (P2P) payments.” Based on this definition, it is possible to imagine an m-payment transaction as a basic service that enables more complex value-added services such as m-commerce, m-banking, or mobile remittance. The obvious analogy is with SMS, which as a basic service allows text messaging but can also enable premium services such as ringtones.

The idea of mobile payment dates back to the early days of global mobile communications, when it became clear that a mobile handset – being a personal yet networked device – could be the ideal way to authenticate end users and generate monetary transactions. This is exactly what happens in real-time, prepaid charging systems. But regulatory constraints have almost everywhere left a rigid separation between “(prepaid) phone credit” and electronic money.

Table 1 shows relevant m-payments

cases worldwide. Felica Mobile in Japan is probably the best-known case. Two important reasons for its success – not easy to replicate elsewhere – are the presence of a pre-existing, pervasive contactless infrastructure (Felica readers/writers, used by contactless cards, for example, at railway gates), and the possibility for operators to define handset specifications.

Felica apart, many m-payment cases can be defined as first-generation m-payments, based on legacy service request and authentication methods such as interactive voice response (IVR) callback or SMS.

PayPal has been an innovator in the payments area during the last decade, choosing to be as operator-independent as possible in order to facilitate a global approach.

Europe has seen several other attempts to launch mobile payment services. Most of them failed because of immature regulation and high protective barriers, the closed approach pursued by some operators,

**[TABLE 1]**  
M-payment cases worldwide

Service Name	Country	Year of Launch	Type	Involved MNO(s)	Key supported use cases	Service request method	Results
Felicia mobile	Japan	2004	proximity	NTT Docomo, KDDI, Softbank	Contactless payments, transport ticketing, m-commerce, access, etc.	physical interaction (proximity)	50% enabled handsets (end 07)
M-Pesa	Kenia	feb-07	remote	Safaricom (Vodafone)	DMT, IMT	SMS, IVR	14% penetration (Q1 -08), generating ar. 50% of non-voice ARPU end -08
G-Cash	Philippines	2004	remote	Globe	DMT, IMT	SMS, IVR	1.5Mil subs
PayPal Mobile	US, UK, (EU)	2006	remote	MNO-independent	client-merchant, m-commerce, charity	IVR call-back (initiated via SMS, IVR or POS), WAP	57.3 Mil adaptive Paypal accounts, end -07
Paybox	Austria	2003	remote	Mobilkom, ONE, (T-mobile and tele. ring from end-08)	Client-merchant, transports, parking, vending machines	IVR call-back, IVR or POS	4 Mil subscribers (end-08) 1 Mil active users (end -07)
MobilPay	Spain	2002	remote	Telefonica, Vodafone, Orange	m-commerce, client-merchant	SMS, IVR	N/A
PayFortit	UK	2006	remote	Vodafone, Orange, O2, T-Mobile, H3G	m-commerce: mobile and web check-out for micro-payments (<10€)	WAP	N/A
Poste Mobile	Italy	nov-07	remote	PosteMobile (MVNO)	PA payments (taxes bulletines), DMT m-banking etc.	SIM based	200k subscribers (mid-08)

Source: Ericsson based on Ovum, Juniper, Pyramid

and being too cumbersome to use. SimPay's attempt to build an ecosystem resulted in a major failure that caused the consortium to collapse in 2005, spreading skepticism about the whole area.

However, something survived from these early attempts:

- ▶ The PayBox model in Austria (recently being promoted also in Germany) is showing good results, as a consequence of clear vision, ability to execute, and a cooperative operator-approach led by Mobilkom Austria.
- ▶ PosteMobile in Italy is an interesting, early example of second-generation remote payments, coupling payments with a mobile digital signature infrastructure able to support new, advanced mobile services.

**PROXIMITY AND REMOTE PAYMENTS**

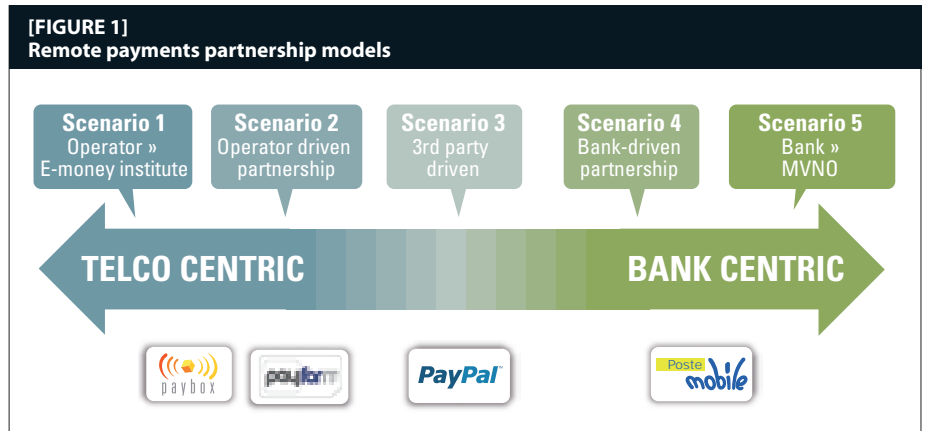
M-payments can be broadly categorized into two classes: proximity payments and remote payments.

Proximity payments require the payer and payee to be a short distance apart. The most common and promising form is contactless payment, in which the mobile handset communicates with a reader/writer (for example, a Point of Sale, POS) or with another handset with similar capabilities, through a short-range radio interface, usually at a distance under 0.1m. Felica in Japan is the most prominent example of contactless payment service.

In the area of contactless applications (including payments, but also other services such as access control, identification, and ticketing), mobile-NFC (near-field communication) is the forthcoming standard being promoted by the global trade association (GSMA), plus standardization bodies, bank associations, card companies, and handset makers.

Remote payments are a mobile service through which monetary transactions are performed remotely, typically via interactive voice response or SMS. Because remote payments do not require a new infrastructure (unlike contactless payments) and enable payment transactions regardless of distance, this service is growing in developing countries as the best or only way of performing domestic or even international money transfer, in areas where there is little – if any – bank infrastructure.

The two most interesting remote-payment success stories so far are G-Cash, commercialized in the Philippines by operator Globe, and M-Pesa in Kenya (promoted by Safaricom), with the service



becoming increasingly popular in other developing countries.

**NEW PARTNERING OPPORTUNITIES**

One of the key issues with m-payments has always been the hybrid nature of “mobile” and “payments” service. That is, m-payments are a family of financial services that in principle could be provided by a mobile operator, a bank/financial institution, or a combination of them in partnership.

Figure 1 summarizes the possible partnership models between mobile network operators and banks.

**Scenario 1** is at one extreme: An operator acquires a financial license (in Europe, a license such as E-Money Institute [EMI] would be required) in order to provide m-payment services on its own. **Scenario 5** is at the other extreme: A bank acquires an operator license, or most likely becomes a Mobile Virtual Network Operator (MVNO), in order to autonomously provide the service.

The scenarios in between include different degrees of partnership between one operator or more, one bank or more, and eventually (**Scenario 3**) a third party such as a service broker, decoupling operators from banks and effectively allowing for multi-operator, multi-bank interaction.

The third scenario allows maximum interoperability between players,<sup>1</sup> while being the most complex in terms of transaction handling, service provisioning, activation, assurance, and – above all – security management, because three parties are involved in each process.

**BARRIERS LIFTED**

Unfavorable regulation has always been a barrier for operators wanting to enter the payments market. In many countries, payments have been considered a financial service with a level of risk requiring heavy-handed prudential regulations – basically,

a business that only banks and established financial institutions are allowed to conduct. This approach limited operators willing to enter the business, and in many countries the only monetary transactions that can be handled by mobile operators are those related to prepaid top-up, and the sale of digital content such as ringtones or music.

The situation continues to change, however. Since the late 1990s the European Commission and the European Central Bank (ECB) have envisioned the need to progressively deregulate and open the payments market. Two important reasons for this change are the “war on cash” concept; the political will to sharply decrease cash transactions in favor of electronic transactions and the will to encourage competition in a payments market dominated by banks and financial institutions.

The first sign of deregulation has been EU regulation on electronic money, (EU directive 2000/46/CE), which now allows nonbank entities called E-Money Institutes (EMI) to be licensed as e-money issuers, able to perform a wide range of financial operations for their customers.

The second step – and a bold one – toward the sector’s liberalization has been the adoption of the Payment Services Directive (PSD), at the end of 2007 (EU directive 2007/64/CE). The PSD constitutes the legal infrastructure for the Single Euro Payments Area (SEPA) process, and defines a new legal entity that will be allowed to offer payment services: the Payments Institute, or PI. New players will not be requested to set up ad hoc legal entities as

1. A possible alternative to a Trusted Third Party (TTP), in order to guarantee interoperability, would be to leverage peering agreements such as roaming agreements. However, while in the telco world the peering model works due to limited number of potential peers, realizing an interoperable ecosystem encompassing both operators and banks based on peering agreements would be difficult, owing.

PIs but will be allowed to become licensed PIs themselves.

The PSD is being implemented by national authorities across the Eurozone, and will become effective by November 1, 2009.

The entry barriers to becoming a PI are expected to be relatively low. Conversely, once the new regulation is in place, PIs will be allowed a rich range of operations, such as:

- ▶ Performing direct debit and money transfers.
- ▶ Retaining and operating payments accounts.
- ▶ Issuing debit cards, when associated with the payment account.
- ▶ Provide credit and implementing revolving reimbursement schemes (limited to 12 months when operational at EU level and strictly related to payments).
- ▶ Operating a payment system (e.g. a financial clearinghouse).

In order to operate in an effective way, it is likely that Payment Institutes will access relevant banking infrastructures, such as inter-bank networks and circuits.

Based on the previous considerations, it is possible to identify key requirements for success, and sketch a proposal for next-generation mobile payments such as SIM-based P2P payments.

#### KEY REQUIREMENTS FOR OPERATORS SUCCESS

Interoperability is clearly a precondition for market development. As shown in Figure 1, models based on a trusted third party seem to be the best solution in order to guarantee interoperability between all players in the value chain. Consumers would be able to use their mobile to pay for services or to transfer money, regardless of which operator they subscribe to and which bank holds their checking account.

Interoperability is not only between operators and banks. A mobile payments ecosystem should be open to external service providers so they may easily develop new vertical applications – of course being compliant with a standard and common set of rules for user identification, authentication, and transaction authorization.

One must consumers a clear reason why they should pay using their mobile, instead of using cash or debit or credit cards. For example, a key reason why Felica has been successful in Japan has been the convenience when paying for public transport.

As well, a simple and effective user experience is mandatory for success in every

mobile service. A payment transaction should request only basic information, such as destination, amount, and a security PIN number. Making payment transactions should be as similar as possible to sending an SMS.

Because mobile transactions are a target for frauds and malicious applications, the proposed payments platform should offer high security protection for transactions, including the capability of ensuring authentication, confidentiality, integrity, and nonrepudiation of transactions. As an example, standard Wireless Public Key Infrastructure (WPKI) technology can be used.

From a merchant perspective, transaction fees should be comparable to the cost of other electronic transactions performed with traditional methods such as payment cards. Fees for micropayments are expected to decrease from the current 1.5–2 percent to 1–1.2 percent. Mobile operators can be expected to have an advantage of scale over traditional players in their real-time charging systems.

#### A MOBILE PAYMENTS ECOSYSTEM

The first strategic choice to be made is which service concept to focus on. While most of the attention in the past has been on proximity payments and NFC technology, most analysts now agree that NFC technology will require at least five years to become widely available. Setting up a mobile NFC ecosystem will require the replacement of mobile handsets, SIM cards, and POS infrastructure. This implies a long deployment cycle.

Payment services currently available are usually based on “legacy” technologies such as SMS or IVR. Web browsers or Java clients have been proposed as convenient ways to create payment services. Software clients may present some advantages, but we propose instead to use a SIM-based approach because it is handset-independent, more secure (two-factor authentication) by supporting strong authentication methods and mobile digital signatures. It also paves the way to mobile NFC evolution.

For operators, a SIM-based approach would solidly anchor m-payments evolution within the telecom industry space.

- ▶ **M-payments and mobile digital signature in one platform.** Integrating a basic payment transaction capability with vertical applications such as parking, transportation, or m-government may acquire strong authentication methods, or even a legally binding digital signature

infrastructure. Thus, having one logical platform that supports both payments and mobile digital signature seems the right combination.

- ▶ **Interoperability through a Payments Broker.** Interoperability and openness are crucial for long-term market development. In order to achieve them easily and effectively, it is suggested to select a broker-centric approach (see Scenario 3 in Figure 1). In this scenario, a Payments Broker acting as Trusted Third Party (TTP) ensures open connectivity and interoperability among all involved parties.
- ▶ **Payments Broker as Payments Institution for quick time-to-market.** This is probably the key choice of business model, and the most critical one. Defining the Payments Broker as a PI would allow the Payments Broker to quickly offer a broad range of services without having to implement complex agreements between operators and banks; for example, on the revenue-sharing level for each transaction. This choice would simplify the value chain and improve time to market. Furthermore, being able to capture the largest part of the whole transaction fee for mobile payments would improve the overall business case for the Payments Broker.

#### THE NEXT-GENERATION SERVICE PLATFORM

These requirements and choices lay the groundwork for a Next-Generation Service Platform (NGSP), the technical infrastructure on which a Payments Broker should rely, in order to launch and operate SIM-based P2P payments.

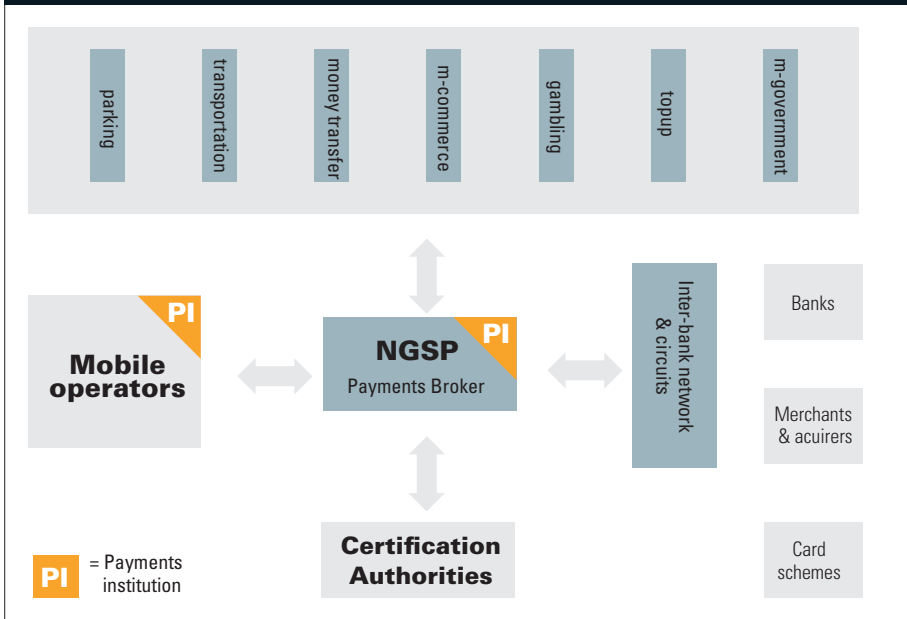
The key feature to be provided by an NGSP is the ability to support money transactions between two peer entities, ensuring mutual authentication as well as integrity, confidentiality, and nonrepudiation of transactions. The ability to support these transactions in real time, and to provide timely notifications of transaction status to all involved parties, is another important feature.

The NGSP should be the central hub in a multi-operator, multi-bank environment, allowing interoperability and supporting innovative services. This infrastructure should combine payments transaction processing and mobile digital signature capabilities into one interoperable framework.

The NGSP should include four technical capabilities into one integrated, logical platform:

- ▶ dynamic SIM management
- ▶ mobile digital signature support (e.g.,

[Figure 2]  
Next Generation Service Platform



**The Single Euro Payments Area: SEPA**

▶ SEPA is a self-regulation effort undertaken by European banks to harmonize all electronic payment transactions and related procedures across an area encompassing EU 27 countries (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom), EEA countries (Norway, Iceland, Lichtenstein), and Switzerland. As an effect of this regulation, between 2009 and 2012 all differences in costs, value days, procedures, and so forth between national and international (cross-border) banking transactions will disappear within SEPA.

**The PayPal case**

▶ PayPal, an eBay company and non-bank entity, is one of the most interesting cases of service innovation in the payments industry in the last 20 years. PayPal was first to introduce P2P payments. In PayPal's service concept, each payer creates his or her own wallet with multiple payments tools (debit cards, credit cards, bank accounts), then uses PayPal to transfer money to a peer entity, usually as the result of a commercial transaction on eBay. The real innovation is on the recipient (payee) side, where the receiver can easily receive the money in a PayPal account without having to use expensive and slow methods for international money transfer provided by banks, such as wiring money. Widely successful at the global level, with approximately 160 million personal accounts worldwide, PayPal has since 2006 been trying to replicate this success on mobile, both by enabling mobile access to PayPal accounts (PayPal Mobile) and by introducing mobile-specific payment services.

through a WPKI technology infrastructure)

- ▶ transaction processing
- ▶ financial clearinghouse.

In addition, the NGSP would act as a single integration and reporting point for operators, banks, service providers, certification authorities (if needed), and relevant security and surveillance entities. It is worth considering that being based on open-standards technologies makes the NGSP open to both fixed (internet) and mobile peers.

The NGSP can assume a central role within a mobile secure-transactions ecosystem, where m-payments are only one of the services being provided. By combining the abilities to process transactions in real-time and support mobile digital signatures, the NGSP could enable several new services, such as P2P payments, m-parking, transportation and ticketing, m-government, and m-commerce. It would also facilitate mobile gambling, a promising service that in many countries is hard or impossible to launch because of strict regulations regarding user identification, age verification, and traceability of money transactions.

Contactless payments can also be supported on an NGSP platform, because some of the capabilities requested (key exchange/key management, dynamic SIM management, identity management, integration with relevant banks' internet servi-

ces and infrastructure) make an NGSP the natural candidate to host – or integrate with – a “trusted service manager” (TSM) function in a mobile NFC ecosystem.

For all these reasons, mobile payments are becoming a hot topic once again. Operators can start focusing on remote payments and defining a strategy to ensure long-term success. A credible strategy must first address how to ensure that end users will keep using their mobiles to pay for something, and then pave the way to full interoperability at ecosystem level, which is critical for long-term market growth. The NGSP concept may be considered a target model, and should be taken into account even for short-term tactical initiatives driven by a single operator. ●

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