The Future of M-payments
– Business Options and Policy Issues –

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Abstract

The task of this background paper is to show that m-payments are likely to become an important section of the retail payment sector and to identify future policy issues related to their development. Both the current market penetration of mobile phones and the expected growth of m-commerce make it highly likely that m-payments will grow considerably within the next few years. While there are many actors that might provide m-payment services, banks and telcos are the most obvious candidates. Telco entry into the payment market would increase competition and could foster more efficient cross-border payment solutions. Telcos already have some experience in providing payment services to third parties. A move into large-scale payment provision, however, would provide considerable challenges in risk-management. Another possibility is that customers will simply use the mobile phone as another access device to bank accounts. This would leave banks in charge – provided they do in fact offer mobile solutions. A third option is co-operation between telcos and banks. Whichever option prevails, an effective functioning of m-payments will require co-operation and interoperability. This raises a number of competition policy issues in particular with respect to pricing. Finally, their increased payment activities may force telcos to become banks or EMI. However, they may also offer payment instruments that do not fall under banking or EMI regulation. In this case, there would be strong competition between differently regulated industries.
1 INTRODUCTION

1.1 THE ROLE OF THE PAPER

The task of this background paper is to show that m-payments are likely to become an important section of the retail payment sector and to identify the future policy issues that this development will raise. What makes m-payment particularly interesting is that this type of payment service may well be provided by telcos (telecommunication operators) and not by the established banking system. The possibility that telcos (or other non-banks) may capture a substantial part of the market for retail payments raises a number of issues, which we would like to prioritise with a view to getting feedback from the Steering Group. This paper focuses on the following competition and payment regulation issues:

- To what extent will there be competition between players from different sectors?
- Is there scope for competition between different payment networks?
- What are the competition policy implications of interconnection?
- Could m-payments improve the efficiency of cross-border retail systems?
- Does regulation have to be changed in response to increased use of m-payments?

Some of these issues have been dealt with in more detail in the ePSO Newsletter (see the Bibliography at the end of the paper). Other issues such as interoperability and standardization, as well as privacy and security, are still on the agenda.

1.2 MOBILE PAYMENTS

Mobile payments, or “m-payments”, are expected to become an important part of retail payments. M-payments are defined as payments that are carried out via the mobile phone. In principle, the mobile phone can be used at the real POS (point of sale), in e-commerce and in m-commerce. Today mobile phones are already approaching penetration rates of close to 80 per cent in some parts of the world. In others, penetration is considerably lower but growth rates are high. High market penetration and a number of technical features make mobile phones very interesting as a device for making payments. Just like e-purses most mobile phones have an embedded chip that can be used to store value or provide secure authorisation and identification. In addition, the mobile phone provides communication services. Thus, it does not have to rely on a card reader plus PC plus modem or a POS terminal. Therefore, it is not surprising that some experts believe that the mobile phone will substitute smart cards as a payment medium.
The case for m-payments looks even more promising when one considers that the new third generation (3G) networks and applications offer the opportunity of selling completely new products such as multi-media messaging and location-based services. It is expected that these new services will strongly expand mobile commerce. M-commerce, in turn, calls for mobile payment solutions and further strengthens the case for m-payments.

Mobile telephone operators are the natural candidates for the provision of mobile payment services. They have the customer base, they already do billing and they have the technical expertise. They are also looking for business models that allow them to create enough revenue to justify the investments into the expensive 3G networks. Therefore, mobile operators are keen to enter the market. However, they are not the only ones. Banks, in particular, are also interested in extending their payments services to m-payments.

Increased payment activities by telcos raise a number of issues. Firstly, becoming a full-scale payment provider will be quite a challenge requiring inter alia new approaches to risk management. Risk in the retail payments business (telcos providing payment services for customers) and in the wholesale business (telcos clearing and settling payments with each other) would increase considerably. Secondly, an efficient m-payment system will require co-operation between different providers to achieve interoperability. Such co-operation could easily become collusive price-behaviour. Thirdly, if telcos enter the market, they will be in direct competition with banks. This opens the possibility of competition between players from differently regulated sectors. Fourthly, data protection will be a major issue as mobile operators providing payment services will have large amounts of confidential data on customers (including location-specific information).

2 MARKET FORECASTS

Two related developments that are particularly important for the future of m-payments are the ongoing spread of mobile telephony and the expansion of m-commerce.

Principally, m-payments can be used for m-commerce, e-commerce and in the real world. In the real world, it is the sheer number of mobile phones that makes them a promising payment device. In 2001 the number of mobile users will probably pass the one billion mark. It is estimated that by 2003 there will be 1.7 billion subscribers and 2.3 billion by 2005 (see table 1). Penetration rates (users as a % of the population) in Europe are expected to reach 80%, almost universal coverage, in 2005 (Barnett/Hodges/Wilshire...
2000). Even on a global scale, penetration rates of over 30% are expected in 2005 (UMTS-Forum). Phone-based chip cards clearly outnumber payment cards with chips. In 2000 the chipcard industry shipped 370 million micro-processor cards to the telecoms industry and 120 million to the banking industry (EuroSmart).

Given that in some areas of the world almost everybody will own a mobile phone equipped with a chip, one may well ask whether a separate e-purse is still required for making payments. It is at least conceivable that the mobile phone will take over a large part of the retail payment market at the real POS.

**Table 1: World cellular subscribers**

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2002/3</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>570 million</td>
<td>1 billion</td>
<td>1.6 billion</td>
</tr>
</tbody>
</table>

Source: EMC World Cellular Database

The spread of mobile phones also bodes well for the future of m-commerce. Indeed, the industry is highly optimistic. So far, mobile phones are mostly used for voice traffic. SMS, however, has caught on with surprising speed and already contributes 10% of revenues for some mobile subscribers (Barnett/Hodges/Wilshire 2000). M-commerce is still held back by the limited uses provided by the current generation of networks and mobile phones. In 2000, trade via handy, pager and handheld has created revenues of EUR 1.3 billion in Europe and is expected to rise to EUR 3.8 billion in 2003 (BITKOM 2001). The corresponding estimate for global m-commerce in 2003 is USD 13 billion (Barnett/Hodges/Wilshire 2000).

When compared to the vast investments for 3G licences and new infrastructure these figures do not look impressive. However, better business opportunities are expected once 3G networks have been installed and a new generation of 3G multimedia devices hits the market. The UMTS Forum estimates that by 2010 half of the mobile subscribers will also be mobile Internet subscribers (UMTS Forum 2000a). In 2004, an estimated 350 million people will use mobile ticket purchasing and mobile retail ordering, almost 350 million will use mobile banking and more than 50 million are expected to use mobile financial trading. By 2005 data traffic is expected to become more important than voice traffic.

Experts believe that these large numbers of users will increasingly spend money over the mobile phone leading to impressive growth in revenues. Revenues from Customised Infotainment, Mobile Intranet/Extranet Access and Multimedia Messaging Services are
expected to reach USD 164 billion in 2010 (UMTS-Forum 2000b). It is forecasted that all mobile services together will generate revenues of about USD 270 billion in that year (see table 2). For Europe, Forrester (2001) predicts a volume of mobile payments of 26 billion Euro (including m-payments at the real POS).

Table 2: Global m-commerce revenues

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2003*</th>
<th>2010*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 billion</td>
<td>13 billion</td>
<td>270 billion</td>
</tr>
</tbody>
</table>

*: Forecast

These numbers should be interpreted with care. The development of e-commerce has shown how difficult it is to make forecasts in new markets – and that it can be very hard to make money in the virtual world. Nevertheless, the industry is optimistic that m-commerce will take off.

3 IN SEARCH OF A BUSINESS MODEL

Telcos need a sound business model in order to get a large share of the market. In principle, they have the following options:

- serve simply as a carrier providing data transportation services for customers
- increase existing involvement in support services (billing, hosting, dispute resolution, customer support, etc.)
- move on to other services such as location-based services or financial services (including general payment services)
- produce content (such as news) themselves
- become simply a network service provider without own infrastructure

Since pure transport of data is likely to become a commodity business with low margins this option does not look very promising. Moving further into customer services promises much higher margins. Customer Relations Management (CRM) may be the key to profitability. However, competitors from other sectors are also well placed to take over part of the value chain:

- portals
- ISPs
- the financial services industry
- the content industry
Some of these players might even contemplate a go-it-alone strategy. In this respect, the success of NTT DoCoMo’s i-mode looks encouraging for other telcos. I-mode has launched a very successful packet-switched mobile service. It has created its own portal and offers billing services to the merchants who use the portal. However, telcos are not the only organisations that are integrating vertically. Banks like Merita Nordbanken have already moved into hosting and building portals. Once a fully developed wholesale market for 3G capacity has evolved they could even expand into mobile telephony (as Virtual Mobile Network Operators). However, given the particular strengths of each group of players, the formation of strategic alliances is still an option worth considering.

4 THE CRUCIAL ROLE OF PAYMENTS

Payments are not just one of the possible value-added services a telco can target. The existence of convenient and cheap means of payment for “mobile goods” is a pre-condition for the take-off of m-commerce. The lack of a convenient means of payment would hit telcos in two ways: it would depress the volume of traffic in their networks and it would reduce revenues from the sale of value-added services.

Mobile telcos are natural candidates for providing payment services since they will be involved in billing for voice and data transport services anyway. However, compared with current billing activities, future payment activities will be more difficult to manage. Increased roaming and “Quality of Service” (QoS) make billing much more complex. Thus, even if a telco restricts itself to “billing”, it has to perform a whole range of tasks in an efficient manner (UMTS-Forum, October 2000):

- rating by volume or content,
- charging (including real-time transaction info and conventional billing),
- paying by all methods,
- revenue distribution.

Providing payment services to third parties will not only become more complex, it will also increase risks for telcos, as will be shown below.

5 TELCO’S CURRENT PAYMENT-RELATED ACTIVITIES

When considering the potential involvement of telcos in the payment system it should be noted that they already provide payment services to some extent.
5.1 TELCOS BILL OWN CUSTOMERS FOR VOICE SERVICES

For a long time the standard model has been billing on a monthly basis. At the end of the month telcos send bills to their customers and customers have to pay within a certain period. Payment can be by cheque, direct debit, etc. This method involves the extension of credit to customers over the period of one month. However, in a fixed line world, telcos necessarily know where their customers live. In addition, if having a bank account is a necessary condition for a telephone contract, this serves as a rudimentary credit check. In the mobile world, telcos feel less secure and in some countries credit checks have been used. As a consequence, many people have been unable to get a contract. For instance, in Australia up to 40% of applications have been rejected (see OECD 2000, 48).

To get round the credit problem and to make mobiles more attractive for customers who do not wish to get tied in by a contract, telcos have offered pre-paid cards. Pre-paid cards eliminate the credit-problem for telcos. As sellers of pre-paid cards they are the ones who now receive an interest-free loan from their customers. Pre-paid schemes have, however, introduced their own problems. Fraud has been one of them, fitting pre-paid schemes into the roaming architecture another.

5.2 TELCOS BILL OTHER TELCOS’ CUSTOMERS FOR VOICE SERVICES

In some cases telcos bill their customers for voice services delivered by other telcos. One example is the incumbent that has to do the billing for competitors who offer special numbers to enter the network. Another example is roaming. If a customers of telco A roams in the network of telco B, telco A will bill its customer accordingly and reimburse B for the fraction of the call carried over telco B’s network.

5.3 TELCOS PROVIDE BILLING SERVICES FOR THIRD PARTIES

To some extent, lack of suitable payments mechanisms has hampered e-commerce and provided a business opportunity for telcos. Telcos have made it possible for merchants to provide content over the Internet (or proprietary networks such as Btx in Germany or Minitel in France). Such systems have allowed customers to rely on a trusted billing-relationship with a telco and made it unnecessary to provide private information to a merchant. For merchants, the benefit is that billing is also a viable solution for low-value market segments. However, little is known about the absolute volume of these transactions and the profitability from the point of view of telcos. According to press
reports, Deutsche Telekom has had to deal with many charge backs and customer complaints.

Billing activities for third parties have also been extended to the mobile world. The best-known example is NTT DoCoMo’s i-mode in Japan. DoCoMo offers to bill customers that purchase content from one of the 600 (in mid-2000) official content partner sites.

5.4 MOBILE OPERATORS ARE STARTING TO OFFER M-PAYMENTS

Mobile operators have already started to offer m-payments. Most of these schemes are still pilots or roll-outs at a very early stage. However, it is interesting to note that some operators team up with banks while others prefer to manage m-payments on their own (table 3).

It is noteworthy, however, that not all m-payment schemes involve mobile operators. Banks and retailers also have entered the field (see table 4).

Table 3: Mobile payment systems

<table>
<thead>
<tr>
<th>SUPPLIER</th>
<th>TYPE OF TRANSACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banko.max (Austria)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>Bibit (Holland, international)</td>
<td>M-commerce (WAP-enabled)</td>
</tr>
<tr>
<td>Cellonet (Sweden, Netherlands)</td>
<td>Parking</td>
</tr>
<tr>
<td>Cingular DirectBill (USA)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>EMT (Estonia)</td>
<td>Parking</td>
</tr>
<tr>
<td>GiSMo (Sweden, UK, Germany)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>Metax (Denmark)</td>
<td>Real POS (gas stations)</td>
</tr>
<tr>
<td>Mint (Sweden)</td>
<td>Real POS</td>
</tr>
<tr>
<td>NTT DoCoMo (Japan)</td>
<td>M-commerce (subscription)</td>
</tr>
<tr>
<td>Omnitel Onphone (Italy)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>Orange Mobile Payment (Denmark)</td>
<td>Purchase of mobile air time</td>
</tr>
<tr>
<td>Oskar (Check Republic)</td>
<td>Payment for prepaid and invoice</td>
</tr>
<tr>
<td>Paiement CB sur mobile (France)</td>
<td>Mail order and virtual POS</td>
</tr>
<tr>
<td>Paybox (Germany, international)</td>
<td>Real and virtual POS</td>
</tr>
<tr>
<td>PayDirect (USA)</td>
<td>Virtual POS, P2P</td>
</tr>
<tr>
<td>Payitmibile (Germany)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>Payline (France)</td>
<td>Virtual POS</td>
</tr>
<tr>
<td>PayPal (USA)</td>
<td>Virtual POS, P2P</td>
</tr>
<tr>
<td>Phonepaid (UK)</td>
<td>Virtual POS, P2P</td>
</tr>
</tbody>
</table>
| Sonera Mobile Pay (Finland, Sweden) | Real POS (including vending machines)
| StreetCash (Germany)      | Real and virtual POS                 |
| Telenor Mobil (Norway)    | Tickets                               |
| Telia Payit (Sweden)      | Virtual POS                           |
| VisaMóvil (Spain)         | Real and virtual POS                 |
| Swisscom Sicab (Switzerland) | Virtual POS                      |
| Waaap Pag (Brasil)        | Real POS, top-up prepaid             |

In bold: mobile operators are participating

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1 A more detailed description of these schemes can be found in the ePSO inventory. Other projects that have been announced or are tested in pilots: EMPS (Sweden, Finland), iCash (Sweden), Genion M-payment (Germany), Movilpago (Spain) and mobilpay (Germany).
5.5 SETTLEMENT WITH OTHER TELCOS

Many of the billing activities described above involve revenue sharing, i.e. telcos pass some of their revenue on to other telcos. This is usually the case whenever the customer of one network communicates with the customer of another network or when customers roam. Revenue sharing creates financial flows between telcos and makes periodic clearing and settlement necessary. This is the “wholesale” side of telcos’ payment related activities.

6 CHALLENGES AHEAD

Although telcos are already active in providing payment services, moving into m-payments poses great challenges for them. On both the retail and the wholesale (telco-to-telco) side they will have to adapt their business procedures.

6.1 PAYMENTS: THE RETAIL SIDE

Once telcos no longer sell just voice minutes or volumes of data (basically commodities) but specialised and often personalised services, Customer Relations Management (CRM) and Quality of Service (QoS) are of major importance. QoS implies that telcos will have to be able to deliver and monitor pre-defined levels of quality, document fulfilment, integrate QoS into their billing systems and translate shortcomings of quality into lower charges.

This is no simple task and it will be further complicated by the fact that customers will demand ubiquity of service. Thus, once the customer leaves the reach of his network, another network provider will have to take over. As long as the only service is voice this is relatively simple. With a wide range of services and QoS, however, the whole problem becomes highly complex. Basically, what happens is that “voice roaming” is supplemented by “data roaming”, “service roaming” and “payment roaming”.

Involvement in payment activities always involves risks (see Box 1 for details). This can be easily demonstrated with the traditional phone bill. Since the customer has to pay only at the end of the month, he is basically granted an interest free credit by the telephone company. In the case of voice services this risk was limited. A customer who made $500 worth of calls and then could not pay up did not create costs of $500 for the telco. Indeed, with marginal costs close to zero, this customer hardly created any additional costs at all. Even if the customer made a lot of foreign calls this did not hurt the telco because international calls were not cleared on a call-by-call basis.
Box 1: Billing and Fraud Risk

To keep the analysis of fraud risk as simple as possible, it is assumed that telcos are operating at zero profits and that, up to the capacity limit, marginal costs are zero. The upper two t-bars illustrate the risk of a telco in the “old times”, when calls were mainly within the same network. Then there was also risk involved in granting customers a one-month credit. Thus, fraud or customers’ financial difficulties could lead to a fall in revenues causing financial losses for a telco (see a.). However, in many cases, fraud and imprudent behaviour may have increased the number of calls. Since operators were operating close to zero marginal costs, this did not affect their overall costs. Thus, in this case, the damage to a telco was close to zero (see b.). However, once customers make a lot of calls to other networks or in other networks (roaming), every additional call leads to liabilities vis-à-vis other providers. In this case, more calls imply higher costs (see c.). Of course, the same is true if a telco provides payment services. If a customer makes fraudulent payments, a telco has to pay the merchant (if it guarantees payment). This case is particularly important because attempted fraud is likely to rise once criminals gain not only air time but purchasing power as well (see d.).

However, better billing systems and third party billing have changed this. A customer who terminates a call in a different network, or who originates and terminates a call in a different network (“roaming”), will create additional costs for the telco. The same is true if a customer lets an e-merchant debit a purchase to his phone bill (if the telcos guarantee payment) or if pre-paid balances can be used for third party payment. Since both activities are likely to become more important the risks involved will increase. Consequently, billing is not just a technical challenge. Telcos also have to change their risk-management procedures accordingly. In particular, they will have to:

- monitor customers
- monitor merchants
- install safe procedures for recording, storing and transferring information
Thus, telcos will have to perform typical banking tasks.

If telcos increase their payment related services – possibly offering financial services in general – they will look increasingly like banks. In particular there will be many similarities to electronic banking. In October 2000, the BIS published guidelines for the conduct of electronic banks (BIS BCBS 2000). These guidelines also offer reasonable advice for telcos that are more active in payments.

The BIS notes that the current technological development offers great opportunities but also makes banking and payments more risky. Use of communication channels like the Internet extends the reach of service providers beyond their physical presence. It follows that service providers may do business with customers situated in locations with different jurisdictions, supervision rules, anti-money laundering rules, consumer protection laws, etc. Outsourcing of certain parts of the business is seen as another important challenge. If vital functions are out-sourced there must be an efficient management of the relationship with partner companies in place. Privacy issues are also becoming increasingly important as service providers store more and more data about their customers. Service providers should protect these data thoroughly and think carefully about how to use these data. In the case of misuse, legal and reputational risks may be considerable.

To deal with these risks, three basic elements have to be in place:

- Assessing risks - The sources of risk and the potential size of risk have to be determined
- Controlling risks - Proper procedures have to be in place to deal with risks.
- Monitoring risks - Efficient information systems have to be installed that can indicate the current level of risk and potential breaches of correct procedures.

6.2 THE WHOLESALE (TELCO TO TELCO) SIDE: GROWING INTERDEPENDENCE

Provisioning of third party payment services will lead to growing financial interdependence between telcos. In the days of geographical monopolies, clearing and settlement was largely confined to international traffic. All local or national calls were within the same network (A or B) and only international calls made some kind of revenue sharing necessary (graph 1). Given the fairly high relative costs of international calls, the share of shared revenues was not very high.
Graph 1: International traffic

A

a

b

B

“a” is a customer of network A and “b” is a customer of network B

However, deregulation and the rise of mobile telephony have changed the telecommunication landscape fundamentally. Inter-relationships between different telcos have become much more important. The costs of international calls have come down and there is competition within regions. Thus, even a local call may involve two networks (see graph 2).

Graph 2: Competing networks

A

a

b

B

Unless a “biller keeps all” rule applies this increases the fraction of revenues that go into “sharing”. Due to roaming the share of revenue sharing is also likely to increase. For instance, in the example illustrated in graph 3, network A would charge customer a for all calls he makes (assuming “caller pays”). However, since customer a uses network B to make these calls network A has to pass on part of its revenues to network B.
Both, the increasing mobility of the population as well as the large number of telcos make roaming and revenue sharing much more important. As will be argued below, the provision of specialised payment activities is likely to further increase the significance of sharing.

In all likelihood, there will be structural credit and debit positions of particular telcos. To see why this is the case, one has to look at the difference between voice services and payment services. On a conceptual level, many services, including most payment services, differ from voice traffic. A pure voice network can be described as a two-way network (Economides 1996). The upper part of graph 4 displays a voice network with two local switches connected by a long distance line. In this network, anybody can call anybody.

Many forms of payments and many other services differ from communication because they usually create one-way networks. One kind of participant, i.e. merchants (I, II, III in the lower part of graph 4), receives payments and a different kind of participant, i.e. customers (a1-a3 and b1-b4), makes payments. This difference becomes obvious in the different functions of acquirers and issuers in credit card systems. Acquirers make contracts with merchants and issuers make contracts with customers. While most banks are active on both sides of the market, there is often a clear specialization. Some banks are more active on the acquiring side, others on the issuing side. A similar division of labour is also likely for telcos. Some telcos will be more active on the acquiring side, others on the issuing side. For instance, a telco that has created a highly popular portal will also find it easier to sell payment services to the merchants in this portal. This causes certain asymmetries. Telcos with a large merchant base (like S1 in Graph 4) will receive net payments in the settlement process, whereas telcos with a small merchant base will be net payers.

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2 The classic examples being television and radio.
The growth of revenue sharing and the possibility of structural credit and debit positions in the intercarrier settlement process will require more bank-like approaches to risk management with respect to telco-to-telco payments. In particular, if an increasing share of revenues goes into risk sharing, telcos will also have to consider clearing and settlements more carefully. Telcos will have to be more prudent with respect to counterparts. The settlement systems used should be efficient in terms of costs and designed in a way to minimise risks for the participants. Possible models of clearing and settlement are:

- bilateral
- multilateral (joint clearinghouse)
- using intermediaries
Box 2: Roaming Clearing Houses

Clearing houses such as MACH, DanNet, Cibernet or GTE/TSI are an essential part of the roaming architecture. Their basic function is to transfer, process and transform data between roaming partners. Using a clearing house cuts costs for operators because they need to make roaming agreements with a large number of other operators if they want to offer international roaming on a large scale. This creates problems for operators because different operators use different data formats and these formats change over time. Clearing houses specialise in ‘translating’ these data and processing them in a way that makes it easier and cheaper for operators to deal with such a large amount of data from different sources. Apart from this basic function, clearing houses also offer training, advice on the design of roaming contracts, and they act as brokers. Broking enables roaming between two networks that do not have a contractual relationship. Related to these services are other services that come close to those offered by a financial clearing houses: fraud detection, monitoring of counterparts or multi-lateral clearing. Some clearing houses even offer a payment guarantee to their customers.

The services of mobile clearing houses will also be essential for the creation of an open m-payment infrastructure. As long as mobile operators only wish to provide closed payment solutions, i.e. where the consumer (the payer) and the merchant (the payee) need to have a contract with the same operator, clearing houses are not involved in mobile payments. However, a solution that allows the customer of operator A to pay for content purchased from a merchant who has a contract with operator B, would involve mobile clearing houses. In such a case, the challenge is that the information going through the clearing house is no longer ‘minutes’ but content. Information must be processed on what was bought and what the value is. DanNet, a Danish clearing house is currently testing a scheme in which customers of two Danish mobile operators pay for parking in Copenhagen with their mobile phones (Taage 2001).

Given the large number of mobile operators, bilateral agreements seem to be impractical. That leaves the use of a joint clearing house or intermediaries (brokers or large operators). The clearing house or intermediary would perform functions like the inter-bank clearing and settlement system. The BIS has developed guidelines for these clearing and settlement systems (BIS CPSS 2000).

The BIS rules have been explicitly formulated as guidelines for banks. Their aim is to reduce systemic risk in order to safeguard macroeconomic stability and the effectiveness of monetary policy instruments. However, the BIS rules can also be read as a guide for prudent behaviour for every institution that participates in large value clearing and settlement systems.

The BIS stresses that such systems require strong legal foundations. These systems will be used by players from many countries, and must, therefore, have a well-founded legal basis within all relevant jurisdictions, with clear and transparent rules and procedures. The settlement period is also an important issue. Banks are encouraged to settle every day

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3 Other public policy objectives are crime prevention, competition policy and consumer protection.
(or even more often). Telcos have traditionally settled less frequently, usually once a month. Once payment becomes an important part of their business, however, they may have to consider settling more often. Finally, in addition to issues such as operational reliability and the choice of settlement media, the BIS addresses an important competition policy issue. The system must permit fair and open access, otherwise it could be easily used to protect the established providers against competition by new-comers.

7 BASIC STRUCTURE OF M-PAYMENT SYSTEMS

In spite of the differences between the various m-payment schemes, most of them are similarly structured. In each case, a customer who wants to make an m-payment needs to be connected with the payment intermediary (mobile operator, bank, other). The customer contacts the intermediary, the merchant tells the intermediary to contact the customer, or the merchant forwards the customer to the server of the intermediary. The connection is established using the voice channel, SMS (Short Message Service) or USSD (Unstructured Supplementary Services Data). Once the connection is established, the customer authorizes the payment (usually using a PIN code). Afterwards the customer and the merchant receive a payment confirmation. In a somewhat different model, not requiring prior authorization, premium rate SMS is used (Durlacher, Strand Consult 2001).

Merchants usually receive the funds into their bank accounts. For the customer, there are a variety of ways of carrying out the actual transfer of funds. The intermediary debits the customer’s bank account, the credit card account, or a prepaid account or the intermediary aggregates this payment together with other payments and bills the customer at the end of the month.

Graph 5: The structure of mobile payments

![Graph 5: The structure of mobile payments](image)
Technically, m-payment solutions can be implemented in the following four ways:

- conventional GSM phones could be used without any further software or hardware. Thus, no payment card is involved.
- a payment application could be loaded onto the SIM card. For instance, payment related data, decryption and encryption keys could be stored on the SIM. This, the SIM would also become a payment card.
- the mobile phone could contain two SIM cards, one of which would contain the payment application. In this case, the issuer of the second SIM would not have to be the mobile operator.
- the mobile phone could contain a second slot that allows to insert a conventional payment chip card (e-purse or chip based debit/credit card).

8 M-PAYMENTS AND COMPETITION IN RETAIL PAYMENTS

The effect of m-payments on competition in retail payments largely depends on the strategy of those non-banks (in particular telcos) that wish to enter the market. They could co-operate with banks or set up an alternative payment network. Finally, there is the possibility that mobile phones become just another access device to the customers’ bank account.

8.1 THE BANK-DOMINATED MODEL

One possible scenario is that mobile phones or PDAs simply become additional access devices for users to access their bank accounts. Such a solution would require banks to integrate access via mobile phones with voice and Internet access. In this case, payments would be firmly bank-based and telcos would simply perform the task of data transport. Such a situation is illustrated in graph 6. Devices marked with an asterisk may require the use of a smart card in order to make payments. In the bank-based case, this card would be issued by a bank.

Smart cards are not essential. It would also be possible to use pass codes and PIN authorisation as in e-banking. However, a smart card based solution would enhance security of data storage and transmission and allow for strong identification. For the consumer it would be more convenient because he would not have to type in pass codes and account information every time he wanted to make a purchase.

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4 The fact that payments would be firmly bank-based in such a system does not mean that bank would produce all services themselves. Banks have to rely increasingly on technical service providers.
As far as mobile devices are concerned, there are various technical possibilities for implementing a bank dominated smart card based solution. The phone could be a dual-slot phone, as in the French system “Paiement CB sur mobile”, where a normal payment card, also suitable for POS terminals or ATMs, can be inserted. Another possibility would involve a separate payment chip embedded in the mobile phone. This is the architecture proposed by the Mobey Forum (2001).

As long as banks are the issuers of the chips that enable the payment function they control the whole payment process and they “own” the customer (essential from the point of view of Customer Relations Management). In this case, banks would have privileged access to customers.

Consumers would benefit from more convenient access possibilities. Since consumers trust banks most they would also welcome the fact that banks continue to be the main payment service providers. However, a bank-dominated set-up would leave the competitive situation in the payment system more or less as it is. Since recent investigations into the payment system found evidence of uncompetitive practices this would be a clear drawback. It must also be remembered that banks have been slow, so far, to come up with efficient solutions for cross-border retail payments and it is not clear that further engagement in m-payments would change this.

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8.2 THE EMERGENCE OF NEW PAYMENT SERVICE PROVIDERS

The bank-dominated model is just one possibility. A different scenario is also conceivable. Telcos or other non-banks could offer payment services and use the Internet, the mobile phone, or the PDA as access devices just like credit card companies. As with credit cards, ultimate payment would be via bank transfer. However, banks would no longer be involved in the consumer-to-merchant or consumer-to-consumer side of the payment. Banks would only provide “commodity capabilities” (Rosingh, Seal and Osborn 2001). Customer contact would move to a large extent to the intermediary. In principle, such intermediaries can offer a wide array of payments: pre-paid accounts, pre-paid cards, billing (“post-paid accounts”) as well as traditional payments such as credit card payments or bank transfers (the German m-payment scheme PayBox would be an example of the latter).

The second scenario is much more likely to increase competition in the retail payment system. Even if new players eventually have to become banks, new entry would be beneficial. Furthermore, new intermediaries may be less reluctant to offer services across borders. For instance, telcos that operate internationally may find it easier to offer international payment systems.

**Graph 7: Mobile devices as business opportunity for new intermediaries**

![Diagram showing bank account, intermediary, and various access devices](image)

* : possibly used together with a smart card

While some of these opportunities are open to non-banks, others might require them to acquire an EMI (Electronic Money Institute) licence or even a banking licence (see next section). Alternatively, these non-banks could co-operate with a bank. For telcos co-operation would have the advantage of freeing them from concerns with payment
regulation. Furthermore, they would lock in a trusted brand and the risk-management know-how of banks. For banks there are two advantages in cooperating with telcos. The banking sector as a whole has an interest in co-operating in order to prevent telcos from entering the market on their own. Individually, banks may see co-operation as beneficial because it helps them to gain customers and keep costs down. Most mobile operators subsidise the price of mobile handsets. If telcos want consumers to use a handset that is suitable for their m-payment schemes (for instance a dual slot phone), they would either have to subsidize handsets themselves or co-operate with telcos.

8.3 THE ROLE OF NETWORK EFFECTS

In the longer run, however, competition problems may arise because of network effects. There is little scope in the payment services market for a large number of m-payment solutions. The usefulness of a payment system increases with the number of users. Therefore, users have a high preference for ubiquity. Ubiquity has two dimensions: first, all users want the ability to send (receive) money to (from) any other user; second, a user wants to be able to use the payment function wherever he is (i.e. even beyond the reach of his service provider). The demand for ubiquity favours large providers and ultimately interoperability. (The longer it takes to achieve interoperability, the higher the concentration rate in the market.) Interoperability, in turn, requires a certain amount of standardization.

Graph 8: Joint production of network services

![Graph 8: Joint production of network services](image)

There will be strong pressures from users for co-operative solutions. If users want to make payments to other networks’ customers, or if they wish to make payments while

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6 Alternatively, in a one-way system, any consumer wants to be able to send money to any merchant.
travelling beyond the reach of their own network, there will be a demand for “payment roaming”. In principle, ubiquity of service can be achieved by a centralised solution (one big provider or one intermediary) or by co-operation. Co-operative solutions might involve a joint clearing house or the use of intermediaries/brokers (at the wholesale level). Both the centralised and the co-operative solution may lead to reduced competition. The co-operative solution provides opportunities for anti-competitive price setting. In particular, a co-operative solution raises the question of how inter-carrier fees are determined. This problem has a lot in common with the setting of an interchange fee in credit card networks. It basically arises in all schemes where different network operators provide one network good.

Such a case is illustrated in graph 8. Customer $a$ can be thought of as an agent who wishes to transact with customer $b$ who has a contractual relationship with a different provider. The transaction can be a bank transfer, a phone call or a credit card payment. In each case, customer $a$ relies on network $B$ in order to complete the transaction. But since network operator $B$ does not have a contractual relationship with customer $a$, he cannot charge $a$ for the services. So, either $B$ has to charge customer $b$ or $B$ has to charge network $A$ (which in turn can charge $a$). The amount that $B$ charges $A$ may have been bilaterally negotiated, or multi-laterally with other providers (and possibly intermediaries). None of these solutions is without problems.

It is no coincidence that the European Commission and the European Parliament are conducting parallel investigations into roaming charges, charges for cross-border bank transfers and multi-lateral interchange fees. All of these examples involve prices for network services. Particularly interesting is the fact that pricing principles vary considerably in these cases. For credit cards there is a collectively agreed interchange fee (for a particular brand), in the case of roaming there are collectively agreed guidelines on how to set prices, and, in the case of international bank transfers, the two banks involved usually charge their respective customers. The fact that overcharging may be an issue in a system without a collectively agreed interchange suggests that, in the case of network goods, the absence of co-operative price setting does not necessarily benefit consumers. This raises the question of whether competition policy alone is sufficient or whether there is a need for more regulatory supervision.

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Once there is a dominant solution in the market, open access becomes of critical importance. For instance, if there is a widely used m-payment system and the customers of a particular mobile operator cannot use this system, it will be difficult for this operator to compete. In the m-payments sector, there has already been one intervention of the competition authorities to ensure open access. In Spain, the Tribunal de Defensa de la Competencia ruled that Movilpago, the m-payment system developed by Telefonica and BBVA, needs to be an open system that can be used by customers of any bank or any mobile operator (see Box 3).

**Box 3: Case Study Movilpago**

Although m-payments are a fairly new field they have already received the attention of the competition authorities. In Spain, Movilpago - a joint venture by Banco Bilbao Vizcaya Argentaria S.A. (BBVA) and Telefonica Moviles S.A. – was scrutinised by the Spanish competition authorities. This joint venture required the approval of the competition authorities (Servicio de Defensa de la Competencia “SDC”). When considering approval of the joint venture, the authorities made the following assumptions. As an m-payment venture, Movilpago affects the market for e-payments as well as the market for mobile telefony. Whereas there are no important barriers to entry in the market for e-payments, barriers to entry are important in the market for mobile telefony. Barriers to entry in the mobile telefony market may be due to the lack of open standards, patent ownership, a large client base, financial strength, and a large distribution network. M-payments may become the most important payment form in e-commerce. A unified and widely used m-payment system is in the interests of the consumer. BBVA already has a strong position in the e-payment market. On the basis of these assumptions, the SDC approved the joint venture on the following conditions. Firstly, other mobile operators must be allowed to participate and adapt their technical systems. It must also be possible to use the system with any mobile operator and any financial institution. Contracts with Movilpago may not limit customers in their freedom to choose services of other operators or financial institutions and, finally, interchange fees between the involved financial institutions must be subject to the approval of the SDC. The decision of the SDC has prompted negotiations between the different mobile operators and a number of banks. These market participants now have to agree on a common platform. This implies that Spain might get an m-payment scheme that is supported by all major banks and mobile operators. The price to be paid, however, is that the roll-out has to be delayed further – possibly until 2002.


**9 REGULATION ISSUES**

**9.1 IMPLICATIONS OF CURRENT PAYMENT REGULATION FOR TELCOS**

*a. Extending current billing services*

To some extent, telcos will have to comply with general financial sector regulations (like anti-money laundering laws). However, the interesting question is which payment services they can provide as a telco, which services require an EMI licence and which
activities require a full banking licence. (When does a telco become a bank?) Third-party billing is usually possible without a banking licence. However, any scheme involving prepaid devices will either require an EMI or a banking licence.

b. Applying for an EMI licence

In the days of fixed-wire telephony, the monthly bill was the standard payment procedure. However, in the new world of mobile telephony pre-payment has taken the market by storm. This implies that the “easy” solution of extending the billing relationships and allowing customers to put purchases on their phone bill is clearly limited. Furthermore, other participants like ISPs have offered billing service to e-commerce merchants and may consider doing the same for m-commerce.

Once pre-paid balances can be used for payments of goods and services provided by third parties, telcos will need to acquire a banking or EMI licence or they will have to team up with a bank. The EMI directive aims to provide a simplified regulatory framework for institutions that want to provide payment system based on “electronic money”. However, it is not always clear where to draw the line between e-money and deposits (the latter would require a banking licence). A case in point is the server-based wallet. If such a wallet contains pre-paid balances, how should these balances be characterised – as account-based funds administered by the issuer or as value stored on an electronic device in the possession of the customer? In the first case, they would be regarded as deposits, in the second case as e-money. Thus, telcos and other non-banks face a certain amount of ambiguity. Hopefully, this ambiguity will be reduced in the process of implementation of the EMI directive in EU member states.

c. Becoming a bank

Finally, a telco could acquire a banking license. Given the regulatory burden, such a move would only be advisable if the telco wanted to move beyond payments into financial services in general. Some telcos seem to be considering such an option and at least one, Mobilcom (Germany), has applied for a banking license (see McClune 2000). It is interesting, however, that Mobilcom has also been seeking a partnership with a bank. Given the complex transformation necessary in order to become a fully-fledged bank, it is questionable that many telcos will, indeed, choose this option.
9.2 REGULATORY CHOICES

a. Regulation of institutions versus regulation of services

In most European countries regulation focuses on banking institutions (Lelieveldt 1997). With the emergence of e-money, policy makers (in particular, the EU Commission) saw the need to open the field to non-banks via the creation of a new institution, the Electronic Money Institute. While the idea to open electronic payments to non-banks is laudable, it would be worth considering a regulatory approach that is not so institution-oriented (regulating “banks”, “e-money institutes”, etc.), but focuses on functions such as retail payments, wholesale payments, making loans, security trading etc. This would provide a unified regulatory framework for all types of institutions involved in retail payments. It might also make it easier to adapt regulations to technological changes in the payment system.

b. Tighter regulation versus more competition

Industries with large network effects provide a particular challenge for policy makers. The existence of network effects calls for interoperability between the systems of different network operators. Interoperability can only be achieved by co-operation. This is not necessarily a bad thing, though the possibility of collusive behaviour does arise which could harm customers. Therefore, many network industries are supervised by a special regulator. Traditionally, payment system regulation has been part of banking regulation and/or monetary policy. Thus, most countries have not created a special body for regulating payments. However, a recent government report in the UK (Cruickshank Report) called for a special regulator of the retail payment system. The report explicitly cites network effects as a factor that can limit competition and make supervision necessary.

The case for a special regulatory body looks less compelling, however, where there is competition between different payment networks. This should be considered before creating a new regulatory agency. The emergence of new players, such as telcos, and new networks in the payment market may lead to payment provision via alternative networks. This may provide enough competition in payments and make a special regulatory body unnecessary.
c. Standardization

The current multiplicity of standards and solutions should be seen as an opportunity rather than a problem. The market for mobile payments still is in an experimental period. In the medium term there will be consolidation and strong incentives to make systems interoperable. Mandating standards at an early stage may not only result in sub-optimal standards being chosen, but may also delay the roll-out of mobile payment solution. The example of Movilpago where there was a need to agree on a single standard and to coordinate the activities of many different market players demonstrates this.
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