



MOBILE PAYMENTS AND CONSUMER PROTECTION

*Policy Briefing by Robin Simpson
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About Consumers International

Established in 1960, CI is the world federation of consumer rights groups. Our goal is to ensure that consumer rights can never be ignored. With over 240 member organisations spanning 120 countries, we serve as the only independent and authoritative global voice for consumer rights. We are a registered UK charity.

Mobile payments, financial inclusion and consumer protection

Introduction

There are as many bank accounts in the world as there are adults, and the World Bank estimates that 150 million new consumers join the market for financial services every year. Yet over half the adults in the world are 'unbanked'¹. Many are in countries with low levels of consumer protection, which may well discourage higher levels of uptake of the services that are on offer thus reinforcing the vicious circle of poor service and poor uptake. And yet recent technological developments allow opportunities to bridge this apparent gap. About one billion people in developing countries in recent years, did not have a bank account, but do have a mobile phone, and that number was expected to have reached 1.7 billion by 2012². Indeed, the number of mobile phones is expected to exceed the world's population in 2014, with 7.3 billion phones estimated to be in circulation³. Mobile subscriptions in almost all countries have now exceeded internet/broadband penetration, with wider gaps observed in developing countries such as India, Somalia and Kenya. This fast growing mobile phone penetration also brings with it increasingly sophisticated mobile devices, which outpace ordinary computers.

Background

The growth of mobile payments

The use of mobile phones in money transfer and indeed in mobile banking, suggests a significant opportunity for expansion of financial access. The combined market for all types of mobile payments was expected to have reached more than \$600 billion globally by 2013 by which time active users of mobile money services were expected to exceed 200 million worldwide⁴ with one in five mobile users registering for mobile money services in some developing regions by 2013⁵. Other sources suggest that the mobile payments market will almost triple in value by 2015 reaching \$670bn, and the number of mobile payments users will grow by 40% to reach 2.5 billion people globally by 2015.⁶ Such rapid increases indicate buoyant demand, responsive supply and a rapidly maturing market. Africa has led this technological revolution. Three quarters of the countries that use mobile money most frequently are in Africa⁷, and of the 20 countries in which more than 10% of adults say they used mobile money at some point in 2011, 15 are in Africa⁸.

Although it is not yet flourishing in the West, M-Commerce suits current trends and lifestyles and the increasing use of smart phones for a range of new tasks. Although approximately only one per cent of

¹ CGAP *Financial access 2009, measuring access to financial services around the world*. CGAP/World Bank 2009. p. 2; O.P. Ardic, M. Heimann & N. Mylenko: *Access to financial services and the financial inclusion agenda around the world*; policy research working paper 5537 WB/CGAP 2011. p. 6

² Access through innovation sub-group of the G20 Financial Inclusion Experts Group, *Innovative financial inclusion: principles & report*. 2010.

³ International Telecommunications Union, Global mobile phone projections, Press release February 2013, http://www.itu.int/net/pressoffice/press_releases/2013/05.aspx#.Ut5MdUpFDIV

⁴ <http://mobithinking.com/mobile-marketing-tools/latest-mobile-stats>

⁵ <http://juniperresearch.com/press-releases.php?category=70&pg=3>

⁶ Juniper Research Forecasts (Total Mobile Payments to Grow) 2009

⁷ Xen Technologies: Mobile Payments – Opportunities and Challenges <http://www.xenglobaltech.com/mobile-payments.pdf>

⁸ *The Economist*, Apr 28th 2012

adults use mobile money in countries with more developed financial systems⁹, significant growth is already underway. The remote mobile payment market in North America was \$5.8 billion in 2008, and was expected to grow 10-fold by 2013 according to Juniper Research, in 2009.

According to the MasterCard Mobile Payments Readiness Index (MPRI), all markets globally – either highly scaled and integrated ones like the United Kingdom or compact and technology-driven ones like Singapore – are making progress towards reaching the point where mobile devices account for an appreciable share of the payments mix. The leading countries are: Kenya, India, Philippines, Singapore, Brazil, Nigeria, Egypt and the US.

The Kenyan example illustrates the potential of mobile phone technology to support the extension of access to financial services. The mobile phone money transfer service M-Pesa operated by Safaricom was launched in 2007 and by just 2009 had over eight million registered users, 40% of the adult population. In contrast, access to formal banks in Kenya only rose from 18.9% to 22.6% of adults between 2006 and 2009. The G20 financial inclusion expert group attributes the increase in non-bank financial access to M-Pesa¹⁰. This chain reaction indicates that mobile telephony and mobile transfer of money is a catalyst for other financial services.

For example, mobile coupon redemption is expected to exceed \$43bn globally by 2016, mobile payments for physical goods to exceed \$170bn globally by 2015, and Near Field Communication (NFC) mobile payments are expected to drive contactless transactions and reach nearly \$50 billion worldwide by 2014¹¹. (See annex for technical explanations).

It is of note that further potential benefits downstream are beginning to show up in East Africa, where payment by mobile phone is being introduced for public utilities such as water and electricity. For example, Kenya Power has introduced a system of payment through M-Pesa. Recent evidence shows that consumers have become used to using the service for ever smaller transactions as they became familiar with the system¹². (The use of such payment systems for utilities is cross-referred in the ISO standard 14452 on network services billing). Such systems can help to avoid transitional problems such as those when poor consumers are connected to such services for the first time. For low cost payments by mobile phone at short intervals may not only save consumers the time and expense associated with old-fashioned queuing systems, but also improve payment levels and reduce arrears. This improved payment technology thus brings potential benefits to sectors far removed from financial services.

Remittances:

Extending back beyond recent technological developments there are long standing and serious issues of consumer detriment in the field of international remittances, and these could be eased by greater recourse to new technologies with their potential to improve competition. The World Bank estimates that remittance flows in 2009 totalled over \$400 billion out of which around 80% went to developing countries, mainly sent by family members working abroad primarily in OECD countries¹³. The consumers who send remittances, however, are often unable to compare prices or to determine the

⁹ FinancialReview http://afr.com/p/technology/out_of_africa_mobiles_move_more_1SZaZiA9qC2bipLKRXQt1N

¹⁰ G20 Financial Inclusion expert group. *Innovative financial inclusion*. 2010.

¹¹ <http://juniperresearch.com/press-releases.php?category=70&pg=3>

¹² *O Morawczynski & M Pickens*. Poor people using mobile financial services: observations on customer usage and impact from M-Pesa. *CGAP Brief August 2009*.p.3

¹³ *Outlook for Remittance Flows 2011-13* by Sanket Mohapatra, Dilip Ratha and Ani Silwal (Migration and development brief 16, Migration and development Unit, World Bank) 23 May 2011.

actual cost of sending funds due to the opaqueness of remittance industry pricing. There is lack of transparency in communicating *all* applicable fees, including the currency conversion rate applied to the consumer (vs. the wholesale price at which the merchant purchased the foreign currency). Improved competition, enabled by mobile technology, could lead service providers to operate in a more transparent manner, or lose market share.

CI has advocated measures on transparency of pricing and the application of competition policy and law to correct present imbalances.¹⁴ For example, we have said there is a need to explore whether or not the current licensing and regulatory frameworks could be modified to allow new remittance actors in, be it microfinance institutions, cooperatives or telecoms operators, whilst taking the necessary precautions to assure this does not pose a risk to the financial system. This process should include investigation of measures to enable increased competition from telecoms, such as allowing telecoms to have direct access to clearing systems and foreign exchange licences, such that international person-to-person transfers can occur with mobile-phone technology and without mediation through money transfer companies.

For the less competitive sectors tend to have the higher transaction prices. Prices in lower-volume remittance corridors, such as those communicating with Africa, tend to be significantly higher. For example, in the first quarter of 2011, according to the World Bank, it cost on average 6.87% of the transmitted sum to send funds from the United States to Mexico but 38.94% to send money from Ghana to Nigeria, and 47.24% to send money from Tanzania to Kenya¹⁵. These differences may well reflect the higher percentages incurred by smaller transactions, a syndrome widely observed across many sectors and which contributes in turn to the 'poor pay more' syndrome. However, lower transaction costs and charges, enabled by more flexible technology, could diminish the effect of this pattern. The G8 meeting in Aquila, Italy in 2009 agreed the '5x5 statement' that set the target of reducing the global average of remittances costs from the present 10% average cost to 5% within five years through enhanced information, transparency, competition and cooperation. Without a technological challenge, it is not clear how this will happen; it took the challenge of mobile telephony for the fixed line sector to reform.

Regulatory debate

The mobile telephony/money transfer sub-sector is witnessing a major debate between advocates of regulation through banks and other forms of regulation. There are issues surrounding whether such services should be bank-led (as in India, where registered micro-finance institutions (MFIs) and post offices can be agents, but otherwise restrictions are tight) or more diverse as in the Philippines, where mobile operators and banks have taken the lead and small retail outlets can be agents too*. The Telecom Regulatory Authority of India has taken the initiative to fix tariffs for banking and other FS on mobile phones to ensure affordability of m-banking for poor rural households. In Africa, there are similar variations in approach. Kenya has adopted the more open approach, as in the Philippines, while South Africa has approached telephone money transfers through bank regulation. Both approaches have their advocates. M-Pesa also took the strategic decision to develop its own

¹⁴ CI *The remittances game of chance: playing with loaded dice*, 2012.

* 'Bank correspondents' or 'agents' are increasingly used to bring poor consumers into the reach of financial services in countries where 'brick and mortar' bank networks are still relatively undeveloped. They are often commercial institutions such as car dealers, supermarkets or pharmacies, even lottery payment centres, often outnumbering more conventional service agency points such as post offices. Other financial institutions, such as credit cooperatives and microcredit institutions, can be agents.

¹⁵ <http://remittanceprices.worldbank.org/>.

regulations and to behave as if it were a regulated entity, and now offers savings accounts through a partnership with Equity Bank in Kenya¹⁶.

Having worked on the above issues in recent years, CI has not taken a single position on matters of regulation. On the one hand there are dangers that too demanding a regulatory regime may stifle developments even though the evidence shows that new technology such as mobile telephony has massively increased access in poor countries in recent years. Restriction in access could have negative knock-on effects.

On the other hand, there is a need to regulate risks to consumers and extend consumer protection to these emerging sectors. Existing international instruments are not yet sufficient. For example, the General Principles on Remittances were issued by the Bank for International Settlements and the Committee on Payment and Settlement Systems in 2007 to set out public policy objectives to guide policy makers and regulators to achieve “*safe and efficient international remittance services. To this end the markets for the services should be contestable, transparent, accessible and sound*”¹⁷. While they are a useful set of principles, consumer protection only figures as a part of one of the stated principles, and then jointly with transparency. The principle, dealing with ‘*sound, predictable, non-discriminatory and proportionate legal and regulatory framework in relevant jurisdictions*’, uses the language normally used in the context of preventing discrimination against particular service **providers** rather than against particular **consumers**. The principles also cover ‘*Roles of remittance service providers and public authorities*’, but the recommendation for industry participation in governance is not accompanied by any parallel recommendation for consumer participation. So the BIS/CPSS principles clearly have some way to go before they could be described as consumer orientated.

The OECD G20 Task Force high level principles on consumer protection in financial services¹⁸ make passing mention in footnotes of these emerging sectors, but do not deal with their specifics except to say that regulation should be ‘*proportionate*’ and that ‘*authorised agents*’ should be ‘*appropriately regulated and/or supervised*’. We agree with these statements as far as they go but they are so high level as to give little guidance in practical terms. We set out later our priorities for more detailed interventions in this arena, which we hope may prove to result in more concrete measures.

Consumer security compared with corporate security:

Many industry colleagues accept that security and limited liability protection are essential for universal acceptance by consumers of the use of the new devices and applications. They have expressed general concern to us that the security (and hence privacy) perspective of mobile phones is very poorly addressed for consumers in terms of the development of international standards. Corporate security standards can be summarised as: “don't use mobiles you don't control in corporate systems”, yet the role of mobiles in providing service to *consumers* is not tackled in current security standards. This said we must bear in mind that many of the *existing* methods of money transfer, including physical transport of cash, are inherently risky.

¹⁶ *Financial inclusion and integration through mobile payments and transfer*. African Development Bank & Yes Bank. 2012.

¹⁷ CPSS/WB, *General principles for international remittance services*. CPSS publications no. 76 BIS 2007

¹⁸ OECD *G20 high level principles on financial consumer protection*. October 2011.

Data protection:

Added to the above is a concern that CI has expressed about data protection and privacy. CI have endorsed the OECD privacy guidelines as revised in 2013, which list eight basic principles including data collection limitation, limitation of uses for which data collection is used, and scope for access to one's own data plus the facility for correction. We elaborate on this below.

Consumer protection issues

Types of mobile payment

Mobile payments can be used for the following three types of transactions:

- Mobile payment – (Paying for goods and services: shopping, paying bills, etc.)
- Mobile remittance (Sending money to or receiving from an individual, (person-to-person) especially from abroad; very popular in East Africa) They can be intra- or inter-national.
- Mobile banking (Withdrawals, transfers and other transactions on actual bank accounts)

Here are consumer protection issues which have been brought to CI's attention by members and by industry colleagues:

1. **Lack of tangible proof of payments** (e.g. receipts), with the consequence that in the case of a dispute the consumer will have no evidence to support a claim that a specific payment has been made. This evidently exposes consumers to abusive billing or "double-charging". CI advocates billing standards to enable tracking of transactions.
2. **Unreliable mobile account crediting systems.** In India for instance, many mobile accounts are credited by cheques which are dropped in the drop boxes (like public letter boxes), processed by subcontractors. Many cheques are reported lost, with no clarity as to who should bear liability for this loss. Lost cheques need service standards to trigger ICT-style security investigations in order to validate claims and deal with compensation.
3. **Lack of technology standard.** Mobile payment technical platforms are not properly standardised or regulated. This can mean that there is no universal and cohesive mode of payment. The danger is that there is a lack of traceability and the possibility that consumers' money is "lost in translation" when it transits from one mobile payment system to another. This lack of interoperability between various mobile payment interfaces has also raised concerns over privacy and security when confidential details are shared through fragmented versions of mobile payment platforms.
4. In many cases, as noted, there is **no specific regulatory framework** concurrently engaging the main partakers in the provision of mobile payment services, i.e. the bank, the network provider and the mobile device manufacturer. Kenya, where M-commerce is booming as we have seen, boasts of very light regulation on this. But the consequence is that the contract between the consumer and the mobile network provider is in practice, a normal phone contract, offering no legal basis for the right to redress or compensation should money be lost during transactions or due to technical faults. Worse, pay as you go customers, who are the great majority in many low income countries, will not even have a personalised contract. In rich countries too, it is reported that agencies are failing to coordinate their activities in rapidly moving areas such as identity

theft, leading to financial theft. A further ambiguity resides in the status of 'shadow banking' activities, under neither telephone nor banking regulation¹⁹.

5. **No independent ombudsman.** In many countries, due to the novelty of the phenomenon and especially the easy assimilation or confusion with e-commerce, mobile payments seem to be a "no man's land" where the service provider would be both the judge and party, in any case of dispute with individual consumers or consumer rights groups.
6. **Lack of currency.** Although Mobile payments may allow parties to make economic exchanges, they do not take the form of legal tender in the sense that they lack the status of other payment instruments such as cash, which is a medium of exchange that is authorized, adopted and guaranteed by the government. At best mobile payments have to be backed by the issuer's promise to pay.
7. **Dormant assets.** What happens to consumers' money when they lose touch with it is an important issue in mobile payments, just as it is in financial services such as bank accounts, pensions and insurance policies. The exact definition of when money/assets become dormant needs to be determined. In mobile payments the treatment of dormant assets in the case of number termination, loss of phone and death is not adequately addressed. Although the amounts that can be stored in e-wallets, e-purses, credit on phones and potentially in other areas such as apps, are relatively small on an individual basis, the aggregate amounts could total hundreds of millions of dollars, maybe billions in due course as mobile payments increase their share of payment transactions.

There is a variety of reasons for assets becoming dormant. For example where access codes are known only to the owner of the phone and money stored in the e-wallet is no longer available in a bank account, this could be lost forever should the main owner pass away. Our colleagues in Kenya have reported such instances. In banking and insurance there are usually clear regulations, policies and practices on how to address the issue of dormant assets. In mobile payments this needs to be resolved so that the consumers' assets always belong to them and there is a clear, simple accessible mechanism for recovering them. The first step is to determine who has control over dormant assets in the various mobile payment mechanisms and what is happening to those assets now.

8. **Digital certificates.** In African countries particularly, the mobile phone market is flooded with "generic" phones from China, i.e. millions of mobile phones with the same (cloned) or no identification numbers such as the International Mobile Equipment Identity (IMEI) number, which is in theory unique and used to identify each mobile phone from 3G onwards. They are used by GSM networks to identify valid devices and block stolen phones. However, the 'generic' phones described above are virtually untraceable and if stolen, cannot be blocked remotely. This increases the risk of fraud perpetrated against the consumer and it is argued by some of our members that by allowing the import of such phones, without measures being taken to protect stolen and cloned phones, government authorities in those countries are failing to protect

¹⁹ *Financial inclusion and integration through mobile payments and transfer.* African Development Bank & Yes Bank. A detailed discussion of bank-led and non-bank-led models in Africa and India. 2012.

consumers against products that are harmful to them. Equally, there is a need to enable the consumer to restore service requiring service standards for rapid restoration of mobile payments on a new phone.

9. **Excessive prices of transfers (remittances)**, with some providers charging a fee as high as 40% of the amount that is sent. The potential for competition from new technologies does not guarantee that prices will fall – it is a prerequisite for that to happen. CI have agitated for competition policy to be applied in the money transfer market and we see development of mobile transfer technology as helping in that area providing security guarantees are put in place.
10. **Accessibility**. Despite the rise in the use of mobile payments, access to these services is still limited and countries like Kenya and India that have very high levels of penetration are still exceptions rather than the norm.

The OECD point out that payment protection rights vary, within and across countries, depending on: *i)* the payment methods being used (*e.g.* credit/debit card, pre-paid, mobile phone bill); *ii)* the nature of a problem (*e.g.* unauthorised charges, fraud, delivery and/or conformity); *iii)* the nature of a product purchased (*e.g.* goods and services may be treated differently, as could tangible and intangible products); and *iv)* the payment providers that are involved (alternative payments providers, such as mobile network operators and other non-financial institutions, may fall outside the scope of some regulatory frameworks, given their non-bank status in some jurisdictions)²⁰.

What is CI doing to improve consumer protection in this domain?

The above list of issues requires a careful choice of forum for them to be addressed. As it happens, we are currently working in parallel with three different organisations: OECD, ISO (International Standards Organisation) and UNCTAD.

OECD: The OECD Committee on Consumer Policy on which CI sits is currently preparing policy guidance in the area of mobile and online payments. The CCP includes consumer protection agencies from all the OECD countries and CI sits *ex-officio* alongside other non-national delegations including the Business & Industry Advisory Committee and the Trade Union Advisory Committee. The preparation of policy guidance on mobile payments is on the verge of completion and CI has pressed for stronger provisions on data protection, protection of minors, redress mechanisms and provisions for limited liability for consumers in the event of security breaches, and other measures for consumer protection. At the time of writing we seem to have been successful in those regards, although the guidance has yet to be finally 'signed off'.

ISO: In ISO, the task has proved to be more fundamental. The ISO Financial Services Committee TC 68 has set up Working Group 10 on mobile banking/payments which aims to develop an international standard on mobile payments. The early emphasis of the WG was on interoperability and other technical matters, but, correctly in our view, the secretariat appealed for input on consumer protection, which we have provided. There are five papers covering issues of security, person to person payments, consumer to business payments, and CP regarding the purchase and installation of Apps. The WG is very industry-dominated in the sense that most members work for financial institutions including banks, card manufacturers, merchant acquirers. However, we have found them open to suggestions and we have reached draft agreement on issues such as data protection, redress, financial inclusion and the crucial issue of the establishment of a liability regime for events of security

²⁰ OECD Report on consumer protection in online & mobile payments. August 2012.

breaches. Perhaps the most fundamental improvement was simply to insert matters of basic CP into the standard whereas previously they were entirely lacking.

At the time of writing there is still some way to go. For example, we have signalled the issue of access to dormant assets (sometimes referred to as 'abandoned funds') in the event of theft, death or number termination / lapse of mobile phone account. The second draft of the standard is currently being redrafted before going to consultation and vote as a draft international standard. But, as with OECD there is scope for optimism that CI's amendments will be incorporated.

United Nations: CI have lobbied for financial services to be integrated into the UN Guidelines for Consumer Protection which were drafted in 1985, (clearly, long before the present technology emerged), revised in 1999 and are currently being revised again under the auspices of UNCTAD. In that context we have argued for insertion of the following amendments²¹:

"consumers should be provided with easy-to-use, secure payment mechanisms and information on the level of security such mechanisms afford"

and:

"Governments and businesses should ensure effective consumer control of personal data. Collection of personal data (including internet usage information and IP addresses) should be made through free, informed and positive consent (opt-in), and only when strictly necessary, in an open and transparent way and wherever practicable and lawful. Confidential personal data should be protected against unauthorized use, and in any event, its use should be minimised. Those affected by any personal data breach must be promptly notified of the details of the breach and of the available means of redress."

Throughout these parallel processes we have been in contact with expert members and have agreed positions in advance of the meetings. Most of the negotiation has taken place in writing or in teleconference. There have been two face to face meetings, in Paris and in Boston and at the latter We have sometimes been able to secure the attendance of colleagues from our member organisations at crucial face to face meetings, for example at the ISO meeting in Boston a representative from Kenya, a country which, as can be gleaned from the above, is of great importance in this field.

World Consumer Rights Day 2014: Such processes are both labour intensive and intellectually demanding, as they are technical in both engineering and legal terms and require fairly specialised skills in drafting of international documents. This work has then represented a major investment of time and resources for CI and we are the only organisation to be involved in all three. The campaign will continue as a result of the adoption of mobile telephony and consumer rights as the theme of World Consumer Rights Day on 15 March 2014. This will involve participation by members all over the world and we hope will result in a rich crop of evidence which will be useful to us in future work on this vital subject. Previous recent WCD themes have been 'your money your rights'²² (2010), CI's proposals to the G20 proposals for consumer protection in financial services²³ (2011) and a global member survey of consumer protection throughout the world²⁴ (2013). Our continuous activities in the field of financial services since 2008 indicate that our commitment is for the 'long haul'.

Further information on CI's Fix our Phone Rights Campaign 2014 can be found here: <http://www.consumersinternational.org/our-work/wcrd/wcrd-2014/>

²¹ CI *CI proposals for amendments to the UN Guidelines on Consumer Protection*. Submitted to UNCTAD Geneva 2013.

²² CI *Our money our rights: how the global consumer movement is fighting for fair financial services*. World Consumer Rights Day 2010.

²³ CI *Safe, fair and competitive markets in financial services; recommendations for the G20 on the enhancement of consumer protection in financial services*. Submitted to OECD Task Force April 2011.

²⁴ CI *The state of consumer protection around the world*. World Consumer Rights day 2013.

Annex A

What are 'mobile payments'? Sources: ISO, OECD, CI.

Mobile payments can be hard to define due to the variety of transaction models carried out through mobile phones as well as the availability of both telecoms and the internet on many mobile phones. Central to the development of mobile FS is interoperability.

Interoperability: According to [ISO/IEC 2382-01](#), *Information Technology Vocabulary, Fundamental Terms*, interoperability is defined as follows: "*The capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units*".

Mobile payments: Payments for which payment data and instruction are made *via* mobile phones or other mobile devices, such as tablets, iPods etc using a payment instrument and associated infrastructures. Such payments would include Internet payments using a mobile device, as well as payments made through mobile network operators (MNOs). The location of the payer and supporting infrastructure is not important: the payer may be on the move or at a point of sale.

Mobile card payment: A payment transaction initiated by a mobile device using a card credential and a card infrastructure (authorization, settlement)

Mobile device: A personal device with mobile communication capabilities i.e. able to be connected to a mobile network (SMS, mobile Internet, Wi-Fi). An example of mobile device is a mobile phone.

Mobile device present, or proximity, payment: A mobile device initiated payment where the payer and payee (and/or his/her equipment) are in the same location. Mobile device present payments include mobile contactless payments and are thus distinct from mobile remote payments.

Mobile remote payment: A payment initiated by a mobile device whereby the transaction is conducted over a mobile telecommunication network (e.g. GSM, mobile Internet, ...) and which can be made independently from the payee's location (and/or his/her equipment).

Mobile wallets and electronic purses: A mobile wallet is a digital container accessed by the mobile device and allowing customers to store applications and credentials being used for mobile financial and non financial services. This container may reside on a mobile device owned by the consumer (i.e. the holder of the wallet) or may be remotely hosted on a secured server (or a combination thereof) or on a merchant website. Typically, the mobile wallet provider provides the wallet functionalities but the usage of the mobile wallet is under the control of the consumer.

A mobile wallet is not to be confused with an electronic purse which is only one of the applications that could be contained in a mobile wallet. Essentially it contains a store of electronic money and is therefore analogous to a physical purse containing just cash without credit cards etc. The electronic purse can be replenished by redemption of mobile coupons held in the wallet. Instead of paper, an electronic code on the mobile device is exchanged as a discount certificate for a credit at a cash register.

Near field communication: Contactless communication at close proximity operating through smart phones using radio frequencies.

An important distinction to bear in mind regarding all the above is that between *M-Commerce* and *E-Commerce*. Mobile banking for instance refers to a bank transaction carried out using a mobile phone

(M-commerce), while Internet banking (E-commerce) describes a bank transaction carried out using an ordinary computer or computer networks. The difference is very subtle and both types of transactions may overlap, mainly with regard to the technologies used.

Annex B

Simplified Conceptual Model of Mobile payments

(Relationship between the major participants in a mobile-payment)

Sources: Xen Technologies, OECD, CI.

Through their mobile devices, consumers can purchase products in two principal ways:

- Mobile, point of sale, contactless payments: Such payments involve goods which are purchased when buyer and seller are both present; the payment is made using contactless radio technologies.
- Mobile remote payments: These payments are initiated using mobile devices; transactions are carried out over telecommunication networks such as the global system for mobile communications (GSM) or Internet. Such payments, which are not location-sensitive, may be made through SMS or Wireless application protocol (WAP). With WAP, the consumer uses displayed web pages or additional applications are downloaded and installed on the mobile phone to make a payment. This is similar to 'traditional' online purchases.

Mobile payments can be processed as follows:

- They may be charged to a consumer's mobile phone bill.
- They may be made through debit or credit cards.
- They may be made through a wired or wireless integrated chip (IC) card (pre-paid payments).

Application Flow

The Mobile Payment Application Service Provider (MPASP) (E.g. Ericsson) provides the necessary technical infrastructure (hardware and software), to facilitate mobile-payments, and acts as an intermediary between the financial institutions (banks, etc.) and mobile network operators.

Registration

The users (customers and merchants) have to be registered with the MPASP prior to using the M-payment service. At the time of registration the MPASP collects the bank account details (or credit card details) of the customer and merchant as well as their valid digital certificates. The mobile phone numbers of the customer and the merchant are linked to their respective bank accounts and this link is maintained by the MPASP. The users are provided with a client m-payment application (mobile wallet) that is either resident on their phones or else in the SIM card. This application may be provided over the air to the users. The mobile wallet will normally interact with the MPASP server.

Authentication

A mobile phone user communicates with a merchant and makes an economic transaction (e.g., buying a ticket from an airline company over the phone). The merchant obtains the phone number of the customer and initiates the m-payment transaction request. The customer confirms the request and authorizes payment. The MPASP receives the authorization and verifies the authenticity of the customer.

Transaction

The MPASP then debits the customer account and credits the merchant account by interacting with the bank. Once the electronic funds transfer is successful a confirmation message is sent to the customer and the merchant advising them of the debit and credit respectively. The Certifying Authority supplies digital certificates for the users in the system to provide security.

This model can be extended to handle the interaction between the MPASP and the financial system taking into account inter-bank payments and settlement.

Mobile Network Operator business models

MNOs are also playing a growing leading role in mobile payments in a number of countries. They do so under a range of business models, which can be categorised as follows:

- *Mobile centric model*: The mobile operator acts independently to deploy mobile payment applications to NFC-enabled mobile devices.
- *Bank centric model*: Under this model, banks develop a mass-market payment mechanism independently, without involving mobile operators or mobile phone manufacturers.
- *Partial integration model*: This involves a mobile operator creating a bank subsidiary to handle mobile payments, and the subsidiary offers a payment mechanism for vending machines.
- *Full collaboration model*: Under this model a joint venture is formed between mobile operators, banks, and other payment providers;