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Mobile Financial Services: Extending the Reach of Financial Services Through Mobile Payment Systems

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Nai Sema means "to connect" in the Fijian language. Through this occasional paper series, FDC aims to promote an exchange of ideas amongst those working in international development and cooperation and to generate discussion on the topics presented within.

Foreword

Over the last two decades FDC has done a great deal of project work focused on expanding financial services for the poor as well as undertaking various ICT4D initiatives. Throughout this period FDC has sought to explore ways that new technologies can increase financial inclusion as well as to maximise transfers of knowledge on these issues internationally. Recently, as we have sought to better understand the emerging opportunities relating to mobile phone banking, we discovered very little information which summarises what is actually occurring and where. Accordingly, we decided to pull together what we learnt into this first edition of *FDC Nai Sema*. I hope the ideas and findings included in this paper about international mobile financial services will be helpful to practitioners in telecommunication and information technology firms, microfinance institutions, central banks, and remittance service providers, as well as to researchers and social investors.

Craig Wilson
Executive Director

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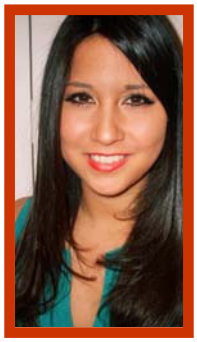

As part of FDC's work with the Asia Pacific Economic Cooperation's Business Advisory Council on Financial Sector Capacity Building, it became clear that there was limited summary information about the actual status of various mobile financial service initiatives around the world. Accordingly, FDC moved to compile an overview of the current literature on mobile financial services, with the intention of evaluating how effective mobile phones may be in providing financial services to the unbanked population in developing countries. This edition of *FDC Nai Sema* highlights what the mobile financial services industry entails, including the benefits and challenges facing the industry, while also providing case studies to evaluate its effectiveness. I would like to acknowledge my FDC colleagues Craig Wilson, Vladimir Pacheco, Melanie Aube, and Sherry Chen for all the support and assistance they provided in the preparation of this paper and during my time at FDC. Further, I would like to acknowledge the very useful feedback and comments I received from Marina Solin of the World GSM Association and Sarah Rotman from the Consultative Group to Assist the Poor (CGAP) who reviewed the paper.

Alaina McMurray

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Executive Summary

This edition of FDC Nai Sema investigates the current literature on mobile financial services and evaluates the effectiveness of these systems in providing financial services to unbanked populations.

Firstly, the accessibility of mobile phones has the potential to provide an enormous contribution toward poverty reduction for the unbanked. For instance, in developing countries people are more likely to own a mobile phone than a bank account and mobile phone networks are more widespread than ATM networks and bank branches. Thus, high mobile phone concentration offers a way to cheaply and rapidly provide financial services to the many unbanked customers who demand them. Furthermore, mobile financial services offer a physical proximity that other systems simply cannot provide. Customers do not have to walk miles in order to find a bank branch as they are essentially carrying the bank in their pocket. Mobile financial services also have the potential to play a significant role in the transfer of remittances. Mobile subscribers in donor countries can transfer cash directly from their mobile phone, across international borders, to the mobile wallet of family and friends, wherever they may be.

While mobile financial services are becoming an increasingly viable option in providing financial services to the unbanked, there are still many hurdles that the industry must overcome. For instance, customer illiteracy poses a potential challenge as difficulties may arise for first-time users who have never used mobile phones before. In addition, as most models of mobile financial services are quite recent, there is a low awareness of the industry, and its positive impacts have yet to be fully demonstrated.

The lack of regulatory frameworks also poses a challenge as investors require certainty to mitigate risks while still allowing for innovation. Banking regulation typically recognises various categories of risk that bank regulators and supervisors seek to mitigate when dealing with mobile financial systems. These include: credit, legal and liquidity risks and consumer protection. This report explores these risks, in addition to highlighting the overall benefits and challenges faced by the emergence of mobile financial services.

Currently, there are several successful cases of mobile financial services in developing countries, suggesting that mobile financial services have great potential for the unbanked populations. The uptake of these services has been particularly strong in the Philippines, where three million customers use the systems offered by Globe Telecom; in South Africa, where 450,000 people use WIZZIT; and in Kenya, where Safaricoms' M-PESA has 6.5 million accounts. This report will examine these models of financial services, and will also look at three additional mobile financial services that have been recently launched, including: WING in Cambodia, Absa Cellphone Banking in South Africa, and Bualuang iBanking in Thailand.

In order to present a comparison with mobile financial services, the report also provides an overview of additional technologies expanding the reach of financial services. These include Personal Digital Assistants, Smart Cards, and Automated Teller Machines.

Introduction

Providing financial services to people in the lower income strata of society is considered vital towards alleviating poverty. In many developing countries, however, most people do not have access to even the most basic financial services. People living in poorer areas are often considered unattractive customers by formal financial institutions, as their transactions are generally small and many live in remote areas beyond the reach of banks or their networks (Coyle 2007: 2). Providing financial services to this group of customers is often difficult and expensive.

Thus, governments, NGOs and the private sector have explored novel ways of providing financial services to the poor. One such way is through mobile communications. Mobile communications have had a significant positive impact on economic growth in the developing world. Numerous studies have demonstrated that mobile technology accelerates information flows, increasing productivity, foreign direct investment and facilitating access to markets, the development of social networks and the creation of social capital. Currently, mobile networks cover more than 80% of the world's population, and nearly three billion people worldwide are estimated to have a mobile phone (Bueno 2008: 3). Of particular relevance to us is the rise of the mobile financial service industry. Mobile financial services are becoming increasingly common, replacing typical bank branches, and mobile money has become one of the hottest topics in the wireless world (Virki 2009).

While the use of mobile phones to conduct payments and banking transactions is still at an early stage, we believe that the next few years will be pivotal for mobile financial services as it turns from a niche to a mainstream channel for consumer banking. Estimates show that mobile banking usage will grow from 10 million active users in 2009 to over 53 million active users in 2013, representing a compound annual growth rate of 51.8 percent (Payments 2009). Mobile financial services are set to achieve the fastest rate of mass-market penetration in recent history, even outpacing items such as credit cards, online banking, or ATMs (Payments 2009).

The proliferation of mobile devices and their potential to be deployed rapidly and affordably to populations living in poor or remote areas in other regions of the world creates an unprecedented opportunity to extend the benefits of financial services.

What is Mobile Financial Service?

Mobile financial service is a variation of branchless banking. The World Bank's Consultative Group to Assist the Poor (CGAP) Technology program defines branchless banking as 'the delivery of financial services outside conventional bank branches using information and communications technologies and non-bank retail agents' (CGAP 2007).

Before analysing mobile financial services, it is important to define e-money and point-of-sale (POS) agents. E-money is defined as a "monetary value as represented by a claim on the issuer which is: 1) stored on an electronic device; 2) issued on receipt of funds of an amount not less in value than the monetary value issued; and 3) requires that the electronic store of value is on a device that is in the customer's possession" (Bueno 2008: 3). Another important concept of mobile financial services is the POS agent. These banking agents vary and include retail, lottery, and postal outlets that work on behalf of a financial institution. POS agents allow clients to deposit, withdraw, or transfer funds or pay bills, among other services. The agents can process transactions with card readers, mobile phones, or barcode scanners. In some cases, depending upon the regulation, these agents can even open bank accounts for new clients and fill in credit applications (Bueno 2008: 4).

Benefits of Mobile Financial Services

For many reasons, mobile financial services have emerged as the ideal partner for offering financial services to populations without access to banks ('the unbanked population'). Benefits of this type of service include the following:

Accessibility of mobile phones

Because of the lack of access to basic financial services in the developing world, the accessibility of mobile phones has the potential to provide an enormous contribution towards poverty reduction for the unbanked. In low income and developing countries, few people have bank accounts, and bank branches and ATM networks are sparse (Coyle 2007: 2; Wishart 2006: 5). This lack of access to even the most basic banking services (such as a current or cheque account) has serious economic consequences. For instance, people lacking banking services are typically forced to rely on cash, which is much less secure than using the banking system (Kumar and Mas 2008; Cracknell 2004: 10). Furthermore, they are often unable to save reliably, and are therefore more vulnerable to financial uncertainty.

However, because of its low cost, access to mobile phones in developing countries is very high (Bueno 2008:5). Thus, high mobile concentration offers a way to cheaply and rapidly provide financial services to the many unbanked customers who demand them. In 2006, the mobile phone industry celebrated the connection of its second billionth customer; surprisingly, more than 80% of these two billion customers lived in developing countries (Bueno 2008:5). Furthermore, the World GSM Association reported that from 2003 to 2006, more than 800 million mobile phones were sold in developing countries (Mathison 2007: 2). More recently, in February 2009, the World GSM Association announced that according to Wireless Intelligence, the GSMA's market intelligence unit, the mobile world had celebrated its four billionth connection (GSMA 2009). This milestone underscores the continued growth of the mobile industry and puts the global market on the path to reach a staggering six billion connections by 2013 (GSMA 2009).

In many instances, people have mobile phones, yet they do not have bank accounts. CGAP reports that there are approximately one billion people in emerging markets who are in this position (Virki 2009). For instance, in a study conducted by the Financial Sector Deepening Trust in Kenya, it was reported that 54.4% of the adult population in Kenya owned mobile phones, while only 18.9% had access to formal financial services, and 7.5% more were served through microfinance institutions and savings and credit cooperatives only. This means that 26.4 % of the adult population had financial accounts (Bueno 2008: 4). Hence, the accessibility of mobile phones makes them a viable means of providing financial services to those in developing countries. Mobile phones are now becoming the preferred means of communication and, in many cases, are the only option in accessing financial services. For this reason, most industry observers are optimistic and expect that more than a billion people in emerging markets will start using mobile money within a few years (Virki 2009).

Physical Proximity of Mobile Phones

Mobile financial systems offer services that can be provided at very low costs while still delivering effective results (DFID 2006: 6). For instance, mobile financial services using channels such as text messaging can be carried at a cost of less than US 1¢ per message (Infotech 2008: 1). The low cost of using existing infrastructure makes using such channels more feasible for low income users. This is in stark contrast to the costs of opening a bank account with an institution. In a study conducted by the World Bank, it was reported that an individual must have the equivalent of at least 50% of per capita GDP to open

up a bank account, which was the case in ten percent of the countries it surveyed (Beck, Demirquc-Kunt, and Peria 2008). For example, it costs over $US 700 to open a checking account in Cameroon (Beck, Demirquc-Kunt, and Peria 2008). As a result, only 20% of families in Cameroon have a bank account (Beck, Demirquc-Kunt, and Peria 2008). Mobile financial services are therefore an appealing option.

Indirect Impacts and Benefits: Increased Quality of Life

Mobile financial services also provide many beneficial, indirect impacts which can improve the quality of the user's lives. The active use of mobile financial services may bring about improved household financial management and changes to family dynamics concerning savings and sharing, which could lead to increased family saving rates and resilience in financial shocks (Coyle 2007: 2). Furthermore, it may also reduce losses of cash to petty theft, thereby increasing people's sense of security in their communities (Coyle 2007: 2). This comes as a huge advantage to the poor, as many people are forced to hold their cash due to their lack of access to institutional banking services. The elimination or minimalisation of cash clearly offers distinct advantages.

Another indirect impact of mobile financial services is that it allows consumers the opportunity to free themselves of various time-consuming and costly activities associated with institutional banking systems (Williams and Torma 2007: 15). Anecdotal evidence related to this is powerful. The case of African farmers is used to illustrate this point. If farm workers in parts of South Africa want to top up their phones, they must walk for at least 30 minutes along a sand road to get to the main road. They must then wait for a taxi, which in itself is an unpredictable process, to take them into the nearest town. The entire journey typically takes two and a half hours and costs at least 20 Rand, half a day's wages (Williams and Torma 2007: 15). In contrast, a mobile transaction can provide the same service for less than 1 Rand and can eliminate all travel time. The same time and money savings apply when most South Africans pay for their electricity, which is done by topping up electricity meters. Typically, the queuing time at the top-up shops in the region is two and a half hours, which many people cannot afford, especially the elderly or the infirm (Williams and Torma 2007: 15). Thus, mobile transaction systems can eliminate the travel and time involved in buying electricity top-up cards. From this perspective, mobile financial services have a huge potential to improve the quality of life for the unbanked.

The Importance of Remittances

The increasing popularity of remittance services creates a unique potential for mobile phones to provide financial services to the unbanked or under-banked segment. Mobile subscribers in donor countries can transfer cash directly from their mobile phone, across international borders, to the mobile wallet of family and friends in the recipient country (Macalla 2008:1). It is a secure, fast, and convenient method, which is also cheaper than remitting cash by using traditional means (Coyle 2007: 3). The money received can be withdrawn at an ATM or transferred from an individual's or agent's mobile wallet for cash.

Mobile financial services have the potential to play a significant role in the transfer of remittances. Over 175 million migrants currently use remittance services, sending money to over 800 million recipients at an estimated average transaction value of US$200 (Macalla 2008: 1). A spokesman for GSMA at the Mobile Money Congress seminar in Barcelona in February 2008 stated that, "the remittances market will grow from the current $230m to $1 trillion over the next 5 years - a growth rate of almost 35% per

annum and the reduction in fees anticipated by the widespread adoption of mobile technology, giving rise to a 70% boost in revenues for those serving this market" (Macalla 2008: 1).

A case study using ethnographic data collected in the Kenyan slum of Kibera, is presented to illustrate the potential uses of mobile financial services to facilitate remittance transactions. Kibera, located on the outskirts of Nairobi, is one of the most impoverished areas in the country. The unemployment rates are among the highest in Kenya, with only 17% of the adult population being reported as permanently employed (Morawczynski 2008: 7). Furthermore, there are no formal financial institutions within Kibera, so residents must travel into town to transact money transfers. Infrastructure within the slum is very poor, with a complete lack of all-weather roads and the majority of the dwellers do not have electricity. However, many of the residents in Kibera do posses mobile phones. The mobile financial service, M-PESA, was launched in 2007, and Olga Morawczynski (2008) implemented her ethnographic study on the system from September to December 2007. Her results found that the M-PESA service provided an alternative method to existing remittance transfers, radically changing the way residents in Kibera remitted money back to their rural villages.

Several respondents cited that they began using M-PESA as they became increasingly frustrated with the other remittance channels available, such as sending money via friends and family, post offices, bus companies, and commercial banks. Sending remittances to rural areas via friends and family had traditionally been the most popular method for remittances among Kenyans, and according to Finaccess (2007), 58% used this channel because it was the cheapest method. However, sending remittances this way was also the most complained about, as it is very risky. Accordingly, several respondents found that money often failed to reach the final destination, as those entrusted with the transfer could claim that money was stolen by 'highway robbers' or that they had incurred 'unexpected expenses' along the way' (Morawczynski 2008: 6). Respondents commented that with mobile financial services, they could send money directly to the recipient in rural areas, eliminating the need to rely on corrupt, informal channels, or transmissions via capital cities. Respondents also claimed that they preferred M-PESA over the bus and courier companies because the transfer time was much shorter. They no longer needed to wait for the money to be transported physically, nor did they have to go into town, where most of the bus and courier services are located.

Challenges Facing Mobile Financial Services

There are high hopes that mobile financial services will expand the access of financial services to large numbers of the poor who do not currently have bank accounts. While mobile financial services open up a new and potentially successful delivery channel for financial services, key questions and issues relating to the implementation of these services must be taken into consideration.

Conceptualising Electronic Money/ Customer Illiteracy

While mobile financial services are very simple and easy to use, there is the possibility that difficulties will arise for first-time users who have never used mobile phones before. Customers coming to banking for the first time through mobile financial services may not understand abstract concepts about virtual (in a sense, 'invisible') money (Donner and Tellez 2008: 6).

Customer illiteracy poses a potential challenge when implementing mobile financial services. In terms of technological illiteracy, prospective customers who might be an excellent match for the product may feel the technology is too complex for them (Bueno 2008: 7). Problems may also arise with customer illiteracy, as the majority of poor clients cannot read or write, and thus solely trust what sales agents or voice services say and provide. Non-Latin language users are also placed at a disadvantage, as mobile phone software and hardware is based on the Latin alphabet (Bueno 2008: 7). Financial illiteracy is also a concern, as target customers may be unaware of the terms and conditions underlying the financial agreements to which they agree with the financial service provider (Bueno 2008: 7). These illiteracy issues could enable firms or agents to take advantage of unwitting customers. The solution to the problem may come about by encouraging financial service providers to teach their customers financial and technological literacy and provide an efficient customer service department (Donner and Tellez 2008: 6). Another solution is to enforce stringent regulation on mobile financial service providers.

Lack of Regulatory Guidance

The most important problem facing mobile financial services is the general lack of regulatory guidance and oversight of activities (Bueno 2008: 7; DFID 2006: 6). For instance, it is not always clear who is responsible if something goes wrong. What is required is a better understanding of the new mobile financial services and their inherent risks in order to create regulations which are effective and proportionate. According to CGAP, the solution to this problem is to develop updated regulations including new reporting rules, minimum capital and liquidity requirements, and restrictions on how e-money proceeds may be held (Bueno 2008: 7). Generally, CGAP suggests that all new regulations fulfill the following pre-conditions; 1) Setting objective and transparent standards regarding the permitted use of agents, thereby increasing the number of service points; 2) facilitating account opening while maintaining adequate standards for customer decision-making; and 3) permitting a range of players to provide payment services and to issue e-money, thereby enabling innovation from multiple sources (Bueno 2008: 7). Moreover, CGAP suggests that the risks associated with non-banking agents issuing e-money can be minimised by stipulating specific regulatory requirements such as per-customer transaction limits and maximum e-money balances (Bueno 2008: 7). In addition, to minimise the risk of losing customers' funds, operators can be subject to minimum security standards, be required to put e-money proceeds in a segregated bank account held in trust for the benefit of the customers, and be required to hold a sufficient proportion of funds in liquid form to mitigate liquidity risk (Bueno 2008:7).

Low Awareness

As most models of mobile financial services are quite recent, their positive impact has yet to be fully disseminated (DFID 2006: 11). Because of this low awareness, mobile financial service customers tend to be more financially and technologically sophisticated than non-customers. It is likely that mobile financial services will have to address potential customers' lack of knowledge by increasing their marketing expenses. Financial institutions will have to pay for specific marketing activity in the agents' community or incentivise their selling agents based on performance.

Agent-related Risks

Agent-related risks arise from the outsourcing of customer contact to retail agents. Entrusting retail agents may seem riskier than if the same functions were in the hands of bank tellers in conventional bank branches (Donner and Tellez 2008: 9). These retail agents may operate in hard-to-reach or dangerous areas and may lack physical security systems and specially trained personnel. The lack of expert training may be a particular problem if retail agents' functions range beyond the cash-in/cash-out transactions of typical bank tellers to include a role in credit decisions (Lyman, Ivatury, and Staschen 2006:7). Banking regulation typically recognises multiple categories of risk that bank regulators and supervisors seek to mitigate. These include; credit risk, operational risk, legal risk, liquidity risk, consumer protection, and anti-money laundering and/or combating financing of terrorism.

1. Credit Risk

Credit risk is the risk that one party of a financial transaction will not receive the money that he/she is owed when it is due (Lyman, Ivatury, and Staschen 2006:8). For instance, when a customer makes a deposit at a bank branch, she receives a deposit receipt and can be fairly certain that the funds will be credited to her account and that she will be able to withdraw the cash when desired. In contrast, when a customer makes a deposit into her bank account through a retail agent, there remains a risk that the transaction will not be communicated to the bank and the account may not be credited. In addition, when the retail agent processes a cash withdrawal for a customer, the retail agent also takes a credit risk, in that the bank may not reimburse the cash that she disbursed. Furthermore, institutions also face credit risks with agent-assisted branchless banks whenever they collect customer deposits or payments from their retail agents (Lyman, Ivatury, and Staschen 2006:8).

2. Operational Risk

Operational risk refers to potential losses resulting from "inadequate or failed internal processes, people and systems or from external events" (Lyman, Ivatury, and Staschen 2006:8). A variety of prospective operational risks may arise for banks and non-banks that use retail agents and rely on electronic communications to settle transactions. For instance, there is the possibility that customers or retail agents may commit fraud, or a bank's property and equipment may be stolen from a retail agent's premises. Data loss caused by hacker attacks, inadequate physical or electronic security, or poor backup systems could also cause financial losses for both banks and non-banks. For example, anecdotal evidence from Brazil has revealed how operational risk is a significant issue within their agent-assisted branchless banking systems. Banks in Brazil have reported losses due to retail agent fraud and robberies, which reportedly occur with great predictability when word gets around that a particular agent is handling an increased volume of cash (Lyman, Ivatury, and Staschen 2006:8).

3. Legal Risk

Financial service providers will invest in a new banking model if they can predict and manage how laws, regulations, and legal agreements will be applied and enforced. However, because regulators have had little experience with agent-assisted branchless banking

and are still currently adjusting existing rules to address them, there remains a level of legal and regulatory uncertainty and ambiguity (Lyman, Ivatury, and Staschen 2006:8).

4. Liquidity Risk

Retail agents (especially those that are small, unsophisticated, or remote), might not have enough cash to meet customers' requests for deposits or withdrawals. They might also lack the experience in the more complex liquidity management required for offering financial services. To effectively manage liquidity, retail agents must balance several variables, including turnover of cash, ease of access to the retail agent's bank account, and processing time of transactions, among others (Lyman, Ivatury, and Staschen 2006:8).

5. Consumer Protection

Any of the previous categories of risk can trigger consumer protection if the resulting loss falls upon the customer. The use of retail agents may also increase the risk that customers will be unable to understand their rights or be unable to press claims when distressed (Lyman, Ivatury, and Staschen 2006:8). It may not always be clear to poor customers living in remote areas how they will be protected if fraud occurs, and who is liable in such a situation.

6. Anti-money Laundering and Combating Financing of Terrorism (AML/CFT)

Banks bear the risk that customers may be identified improperly or that customers may use the retail agent to launder money or channel funding to terrorists. Outsourcing account opening and transaction processing to unsophisticated retail agents may also make it hard for the bank to observe and report suspicious transactions (Lyman, Ivatury, and Staschen 2006:8). For these reasons, AML/CFT regulations generally require agents to conduct some aspect of customer due diligence and suspicious transaction reporting when opening a new account or outsourcing transaction processing.

Case Studies

The uptake of mobile financial services has been particularly strong in the Philippines, where three million customers use systems offered by mobile operator Globe Telecom; in South Africa, where 450,000 people use WIZZIT; and in Kenya, where 6.5 million customers (or one in six Kenyans) are registered with the Safaricom M-PESA system (Bueno 2008:3; Virki 2009). Three additional services are also examined, including; WING in Cambodia, Absa Cellphone Banking in South Africa, and Bualuang iBanking in Thailand. The cases described below illustrate the effectiveness of mobile financial services.

WIZZIT in South Africa

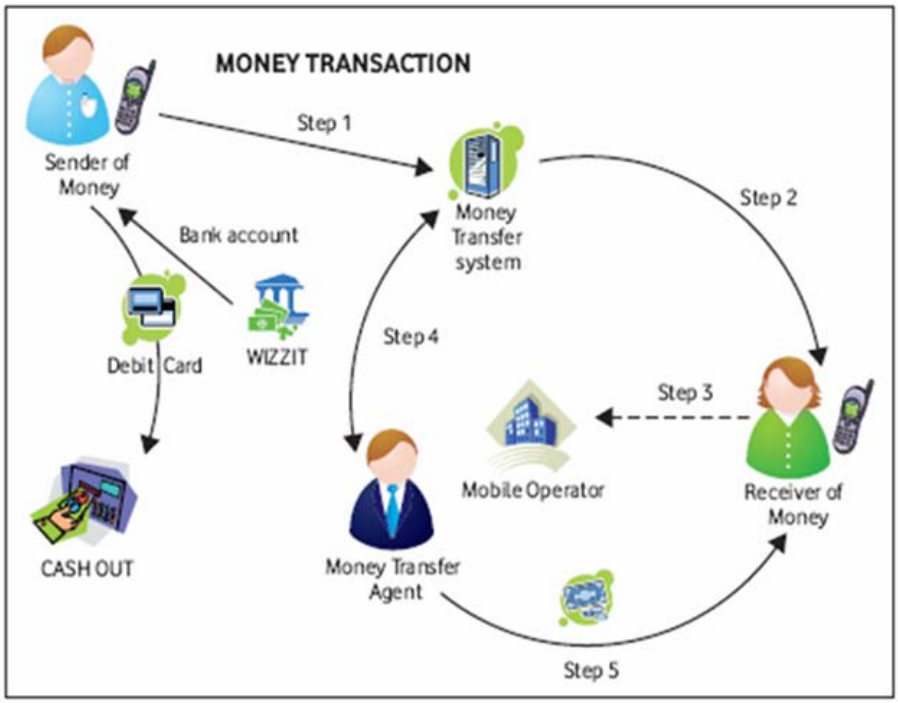
WIZZIT was introduced in South Africa in November 2004 through a partnership with the South African Bank of Athens. WIZZIT has positioned itself as a virtual bank and has no branches of its own. Mobile phone customers can use their phone to make person-to-person payments, transfer money, purchase prepaid electricity, and buy airtime for a prepaid mobile phone (Kramer and Paul 2006: 12). With their WIZZIT bank account, customers also receive a Maestro branded debit card that enables them to make purchases, get cash-back at retail outlets, and withdraw money at any South African or Maestro-labelled ATM anywhere in the world (Kramer and Paul 2006: 12). WIZZIT does not have a minimum balance requirement and does not charge fixed monthly fees. Customers are charged US$5.26 to sign up, and use a pay-as-you-go pricing model, with charges ranging from US$ 0.15 to $0.78 per transaction, depending on the type (Williams and Torma 2007: 13). Evidence suggests that total expenditure on banking charges by WIZZIT customers is lower than it is for conventional bank customers; average expenditure in fees was typically about 20 percent less for WIZZIT customers than for traditional banking customers on a like-for like basis (Williams and Torma 2007: 13).

To open a WIZZIT bank account, a WIZZIT agent is sent to the applicant's home or workplace. The administrative processes surrounding account opening are handled by "Wizz Kids", who are often young people who have been previously unemployed (Williams and Torma 2007: 14). This unconventional marketing is perhaps why the service has proven to be so successful. The company employs over 2,000 of these "Wizz Kids" to promote the product in townships and rural communities and to help customers open accounts (Williams and Torma 2007: 14). Figure 1 describes the WIZZIT transaction system.

A study of the WIZZIT system conducted by CGAP, the United Nations Foundations (UNF) and the Vodafone Group Foundation (VGF), found encouraging results, pointing to both opportunities and challenges for those seeking to increase the adoption of mobile financial services. The survey polled 515 low income South Africans (300 of whom did not use mobile financial services and 215 of whom were customers of WIZZIT). The low income WIZZIT customers valued the service for its affordability, its ease of use, and its security. Respondents indicated that they used WIZZIT because it was cheaper" (70%), "safe" (69%), "convenient" (68%) and "fast" (68%), in contrast to bank branches and ATM's, which had higher fees, longer queues, and poor customer service (Ivatury and Pickens 2006: 2). Furthermore, WIZZIT's customers conducted more banking transactions per month using the service (9.3 per month) than non-users conducted at all other channels combined, perhaps, because they perceived it to be cheaper, more convenient, and more secure (Ivatury and Pickens 2006: 2). WIZZIT customers also preferred to use their mobile phone over other channels to pay for prepaid electricity, transfer money, buy pre-paid airtime, check account balances and pay store accounts.

Results of the study also revealed challenges that the WIZZIT system faces in South Africa. For instance, although users (97%) and non-users (81%) stated that they were open to using new technology, results suggested that users and non-users alike still have difficulty with the technology, and may prefer human interaction (Ivatury and Pickens 2006: 3). Fifty-one percent of non-users and 49% of users agreed with the statement that "you would rather deal face to face with a person rather than an electronic device, even if the device is faster (Ivatury and Pickens 2006: 3). Another challenge faced by WIZZIT is the low awareness of mobile financial services in South Africa. Sixty–five percent of non-users surveyed were not familiar with the term "cell phone banking." South Africans' attitudes towards banking pose yet another challenge (Ivatury and Pickens 2006: 2). Eighty-four percent of the unbanked non-users cited that they would like to open up a bank account, but they seemed to believe that their income and employment status rendered them ineligible to have banking services (Ivatury and Pickens 2006: 2). While this study suggests that mobile financial service providers must build greater awareness of their services and change perceptions about banking to segments of the low-income market, overall, it reveals that mobile financial services are valued by poor populations in South Africa and may be more affordable than traditional banking. Thus, CGAP, UNF, and VGF see the tremendous potential in the power of network operators, banks, and new entrants to deliver financial services to the poor.

Figure 1. WIZZIT's mobile banking system

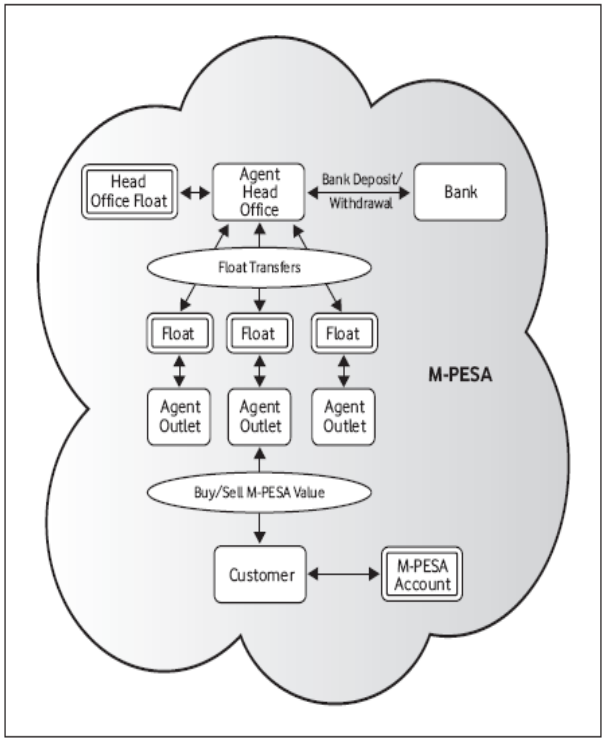


Source: Williams and Torma 2007: 14

M-PESA in Kenya

In 2007, Safaricom and Vodafone launched M-PESA, a mobile-based payment service targeting the unbanked, pre-pay mobile subscribers in Kenya (Kramer and Paul 2006: 12). At the core of M-PESA is a central float within which customers have a unique account and which holds their balances (Williams and Torma 2007: 14). This account is entirely separate to their pre-pay airtime credit. While the entire M-PESA float is banked with the Commercial Bank of Africa, the banking contract for the float is between a newly created entity, Trust Co., formed by Vodafone (Williams and Torma 2007: 14). It is through this Trust Co. and service level agreements with Safaricom that the account relationships are managed (rather than being between the bank and individual M-PESA customers). Figure 2 illustrates the transaction system of M-PESA.

Figure 2. The M-PESA system



Source: Williams and Torma 2007: 14

To open an M-PESA account, an individual needs a Kenyan national identity card. Safaricom provides the new account holder with a SIM card which enables transactions. Once registered, customers can send funds to any other phone number on any network. The receiver gets a text message that can be taken to a retail agent, which is typically a small store owner who has enough cash on hand to complete the transaction (Kramer and Paul 2006: 12). Furthermore, customers can use their M-PESA account balance to buy goods and services, in addition to carrying out any other mobile transactions and mobile payments (Williams and Torma 2007: 14). M-PESA comes with a full transaction tracking and reporting system, including customer care support and anti-money laundering measures. Currently it is being developed to allow international use for remittances, allowing Kenyans overseas to send money home quickly and more cost effectively than most alternative means. Figure 3 provides a visual example of the process an M-PESA customer would go through when using the mobile-payment system.

A recent household survey conducted by Caroline Pulver (2009) on the performance and impact of M-PESA in Kenya produced encouraging results. The survey was conducted over 3,000 randomly selected households in Kenya between August and October of 2008. Results indicated that before M-PESA was introduced, people typically sent money within Kenya through various means, including; by hand (58%), by bus (27%), through the post office (24%), by direct deposit (11%), and through other methods (16%). After registering with M-PESA, customers were more pleased with the service in comparison to alternative methods. For instance, 98% of customers found that M-PESA money transfers were quicker than alternative methods; 98% found it safer; 96% found the service more convenient; and finally, 96% of the M-PESA customers found it

cheaper than alternative methods (Pulver 2009:9). Eighty-one percent of the customers found M-PESA easy to understand and use, and additionally, Pulver (2009) found that remittances within Kenya became more common through M-PESA use; 52% of users received money in 2009 compared to the 16.5% in 2006. Customers of M-PESA predominately used the system in order to send money to family members on a monthly basis (86%).

While Pulver found that M-PESA usage confirmed several benefits to users, problems with the system were also apparent. Twenty percent of users could not withdraw money from an M-PESA agent, as nearly 70% of the agents lacked sufficient funds (Pulver 2009: 23). Furthermore, users experienced problems retrieving money: while over half of the customers retrieved their money within a few days, 4.3% of users reported that their money was sent via M-PESA to the wrong person, and one-third of users reported that they were never able to retrieve their money. In general, however, the initial experiences of M-PESA have been found to be encouraging in terms of rapid adoption rates and success in meeting the basic financial needs of customers.

Figure 3. Example of what a customer sees on her phone in a cash withdrawal: The case of M-PESA in Kenya

Source: Williams and Torma 2007: 15

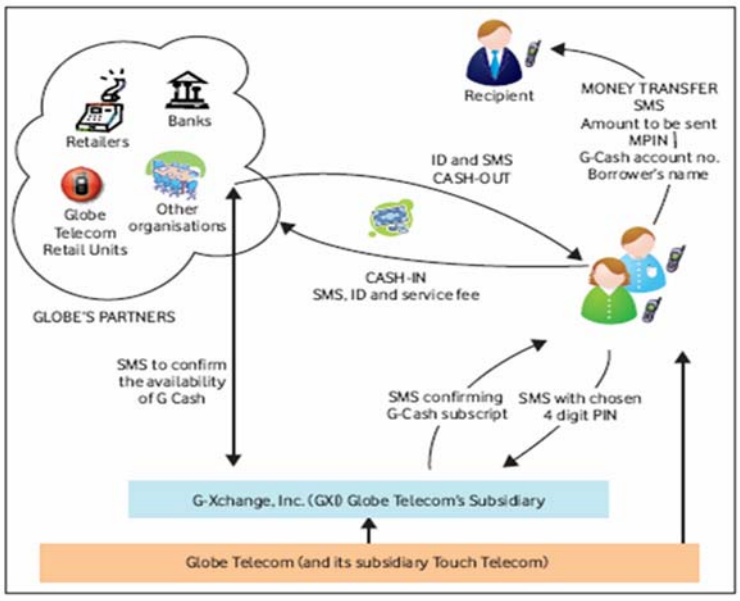
Globe Telecom, the Philippines

Globe Telecom's mobile financial transactions system is called G-Cash. Globe Telecom promotes G-Cash as a mobile wallet service enabling cashless and cardless financial micro-transactions (Kramer and Paul 2006: 15). Globe Telecom formed a subsidiary, G-Xchange Inc. (GXI), to manage G-Cash operations. GXI delivers G-Cash services with partners that include banks, utility companies, retailers, governmental bodies, and non-profit organisations (Williams and Torma 2007: 15). G-Cash supports a wide range of services, such as enabling the purchase of goods and services, microfinance and micropayment applications, tax payments and bill payments, and domestic and international remittances (Williams and Torma 2007: 15). Globe also has G-Cash outlets at their retail units. In 2006, Globe had 3,500 partners, including 27 international partners in 15 countries (Williams and Torma 2007: 15).

Registration for G-Cash services is a one-off process which involves the exchange of SMS messages between the Globe Telecom and its subsidiary Touch Mobile subscribers. To register, a subscriber must send an SMS to 2882, along with: a self-nominated 4-digit PIN, their mother's maiden name, their first and last name, and their address and telephone number (Williams and Torma 2007: 15). These details are verified against the customer's ID when withdrawing cash. All transactions and remittances with G-Cash are SMS text driven. The customer does not need a special SIM card to use the service. Figure 4 below describes the money transfer and cash-in and out services of G-Cash.

Globe's reach has rapidly expanded through its wide network of partners. As of March 2006, there were approximately 1.3 million G-Cash registered users transferring about USD$100 million per day (Kramer and Paul 2006: 13). Furthermore, Globe boasts a vast distribution network of 700,000 airtime loading retailers throughout the country (Kramer and Paul 2006: 13). With an estimated 68 million unbanked Filipinos, almost half of whom are mobile phone users, Globe Telecom is now entering a potentially huge untapped market and source of revenue (Kramer and Paul 2006: 12).

Figure 4. Money transfer and cash-in and -out services of G-Cash



Source: Williams and Torma 2007: 15

WING in Cambodia

WING is a business that has been established by ANZ (one of the top 40 global banks), to create a mobile payments capability in emerging markets. Operating in Cambodia since February 2008, WING is a provider of mobile phone payment services. WING's services allow customers to transfer, store and cash-out their money using a mobile phone. WING currently has more than 150 points of representation in Cambodia, and is represented in 16 of the nation's 24 provinces (Payments b 2009). The WING customer base is primarily the under and un-banked portions of Cambodia's population. WING has focused on providing a service to garment workers and other rural customers who have traveled to Phnom Penh and other urban centres for work. The WING product provides them with a safe, affordable, and fast way to transfer money to their relatives who rely on remittances for education, housing, and other staples.

Cambodia has great potential to benefit from the mobile financial service industry. The country has and continues to face many challenges. Approximately 80% of the Cambodian population live in rural areas, and 35% live beneath the world poverty line (Payments b. 2009). While mobile telephony has thrived in Cambodia, there are still only approximately 3 million phone users in a country of 14 million people. The number of bank accounts is considerably less, with an estimate of only 500,000 accounts in the country. Unlike other countries, there is no widespread electronic banking network, and there are only about 200 ATMs in the entire country. Cambodia has had ATMs only since 2005, and ANZ was the first bank to introduce them (Payments 2009).

Since its establishment, WING has noted particular challenges it has faced in implementing a mobile payments business in Cambodia. There are few mobile handsets which have the Khmer Unicode character capability. This has meant that WING has had to design support materials to aid those with low English literacy to use the product. Furthermore, like many other markets, there has been an absence of regulations for the mobile payments in Cambodia. WING works with progressive regulators in the National Bank of Cambodia, who are able to monitor the development of the payment system. Challenges aside, WING is very optimistic about the transformational effects their mobile payments service can have on a country like Cambodia. They have already heard anecdotal evidence of the benefits of the product from different customers, be it the tuk tuk driver who cashes in his takings from the previous day each morning, or the garment worker who now sends money without having to travel home on a monthly basis. WING realises that, like any new technology, it will take time to build scale and educate customers on the benefits of the service, yet they are very pleased with the positive signs they are seeing at their early stage of development (Payments 2009).

WING estimates its project will reach approximately 8 million Cambodians, aged 15-55, who do not currently have access to traditional banking services (AusAID 2009). The anticipated benefits of their project include: savings of approximately US$16.8 million per year for 560,000 rural receivers; improved financial literacy in rural areas; the generation of an additional 750 merchants/small businesses operating in rural areas to service customers; and finally, improved access to low cost financial services that will facilitate micro business activities and provide women, in particular, with increased security in their financial transactions (AusAID 2009).

Bualuang iBanking in Thailand

As of 2009, Fiserv, Inc., the leading global provider of financial services technology solutions, is now providing its innovative Mobile Money service to Bangkok Bank. This bank is one of the only banks in Thaliand that uses an international mobile banking solution. Clients can now access Bankgok Bank's internet banking platform, *Bualuang iBanking*, on their mobile phone, allowing them to view account information, pay bills, transfer funds, and top-up their mobile phone account. Furthermore, the application is available in both English and Thai languages. According to a Fiserv press release, Thailand's mobile penetration rate is greater than 80 percent, making it among the highest in the Asia Pacific region (Conz 2009). Karen Campbell, executive VP of Bangkok Bank, posits, "The uptake of this banking technology demonstrates a significant shift in how banks across the world connect with their customers..... Customers in Asia need the portable banking tools to complement their busy, highly mobile lifestyle. We recently observed a group of late teens in a focus group talking about how going to an ATM was too much effort for them - they expressed a need for total mobility" (Payments 2009).

Absa Cellphone Banking in South Africa

Absa introduced its mobile-banking services in South Africa in 2000. Over the last few years, a huge surge in uptake has occurred, and up to 5,000 new clients register each and everyday. Furthermore, Absa has become the first South African bank to register its one millionth mobile banking client. To put this into perspective, this is more than twenty-five percent of Absa's customer base. It is also two times more than customers accessing their banking from the internet. This means that mobile banking is the only electronic channel for a few hundred thousand Absa customers. Amazingly, the growth to this number took just over three years, whereas the banking industry in South Africa took eight years to sign up a million internet banking customers (van Rensburg 2009).

Wherever they may be in South Africa or in the rest of the world, Cellphone Banking allows clients to load beneficiaries and make payments, purchase airtime, make inter-account transfers, view balances and statements, send notices of payments, and make cardless ATM payments using Absa's CashSend facility. As the managing executive of Absa Digital Channels states, "from observing the registration and usage numbers, 2009 will be the year in which 'Cellphone Banking' develops serious traction in the market such that it is poised to overtake the number of Absa internet banking clients this year" (Payments 2009).

Comparative Technologies for the Microfinance Industry

Technologies other than mobile financial services have been used in electronic banking. In comparison to these services, technologies such as Personal Digital Assistants (PDA), Smart Cards, and Automated Teller Machines (ATMs) are discussed. Overviews of each technology are provided, including; how each technology works, the technology's requirements, benefits and costs of each technology, and microfinance implementations of each technology.

Personal Digital Assistants (PDA)

PDAs are small, handheld computers that can run specialised programs to manage Microfinance Institutions (MFIs) and client data, in addition to performing financial calculations (Waterfield: 1). PDAs are beneficial to loan officers working in the field as it allows them to consult electronic lists of borrows, review clients ready to apply for loans, and refer to historical client information. Loan officers can even fill out loan application forms on the PDA and calculate the indicators for loan review and approval. Virtually all client data and client visit records are stored electronically and are immediately available in the PDA, which is small enough to fit in a shirt pocket (Waterfield: 1).

How PDAs Work

PDAs run simple database applications that must be custom-designed for an MFI to ensure compatibility with its management information system (MIS). The PDA does not replace the MIS of the institution; rather it supplements it. Users of PDA input data by either tapping on the screen with a stylus to make selections, entering data through a small keyboard, or using handwriting recognition software (Waterfield: 1). Information is transferred between an MIS and the PDA, and is shared through a 'synchronisation' process. Data entered by the loan officer is imported and merged into the main MIS, and any new, relevant information in the MIS is downloaded to the PDA. Although some MFIs are researching wireless technology to transmit data, virtually all MFIs currently use a physical 'synchronisation' process in which the PDA is connected to a personal computer (Waterfield: 1).

Requirements for PDAs include:

- A stable, well-functioning MIS
- High-speed access to MIS data from branch offices
- Strong support from top management for implementation
- Capable MIS technical support

Benefits of PDAs include:

- Standardisation of work procedures
- Increased productivity, efficiency, and accuracy of field staff
- Improved monitoring of loans
- Improved time management
- Faster and more accurate credit approval process, with the potential for automatic approval and credit scoring in the field
- Reduced volume of paper records

Costs of PDAs

Software costs for PDAs range from US$20,000-$80,000, including the development of the PDA application software, the interface between the PDA and the MIS, and adaptations to the MIS necessary to integrate the PDA technology (Waterfield: 2). In addition, hardware costs range from US$ 100-$200 per PDA, and annual software maintenance costs range from US$3,000-$10,000 per year (Waterfield: 2). Most MFIs contract an outside firm to handle the development of the software and the user interface. The duration of the development process ranges from nine months to two years.

Microfinance Implementations

The use of PDAs has spread since 1999, when Compartamos and FinComun, both in Mexico,

were the first to implement this technology. Three case studies (ADOPEM in the Dominican Republic, Compartamos in Mexico, and SKIS Microfinance in India) are provided in Appendix A.

Smart Cards

Smart Cards can be used for financial services, such as managing savings accounts, disbursing loans, or making transfers (Whelan b:1). During enrollment, all relevant client information, account balances, and individual credit or other limits are loaded onto the card through a recording device attached to a PC. Some unique form of personal identification, such as the numeric markers of the client's fingerprint, may also be stored on the card. During visits to a branch office, the Smart Card functions as an electronic passbook on which transactions can be recorded once, speeding up the process and improving accuracy (Whelan b:1).

How Smart Cards Work

A Smart Card is a wallet-sized plastic card with an embedded computer chip that can process information (microprocessor chip) or simply store data (memory chip). Smart Cards also come in the "contact" and "contactless" varieties. A contact Smart Card is inserted into a smart card reader that connects to the card's conductive micro-module (typically a gold plated area on the surface). Through this connection, software on a personal computer (PC) or ATM may transmit commands and data to the reader and the Smart Card. A contactless card can be held two to three inches away from the reader because the reader and the card are designed with antennae. Despite providing a fast card interface, the cost of these cards and readers generally restricts their use to high-volume access applications, such as automatic, no-stop highway toll plazas (Whelan b: 1).

Requirements for Smart Cards include:

•Reliable electrical power for card readers
•Dial-up facility to periodically update central processing site
•Processes, policies, and staff resources for handling lost, stolen or damaged cards and enrolling clients
•Software integration between cards, readers, and central management information systems

Benefits of Smart Cards include:

• Automated transactions
• More secure user identity and account information
• Built-in limits on credit and other accounts
• With stored data, less or no need for reader to access central server
• No repetitive form filing
• Quicker MFI administrative functions
•Improved transaction accuracy

Costs of Smart Cards

The following are indicative costs for contact cards with microprocessor chips, since these are the most commonly used Smart Cards for microfinance applications:
•US$6–$10 per card
•US$100–$300 for each card reader (Card Acceptance Device, or CAD)
• Set-up or installation fee to deploy card readers
• Monthly or annual service fee for support
•Communications charges (modemdial-up, leased lines)

Microfinance Implementations

Few microfinance institutions have adopted smart card technology but the following examples illustrate its potential. Case studies, including Prodem FFP in Bolivia and SKS Microfinance in India, are provided in Appendix A.

Automated Teller Machines (ATMs)

Automated Teller Machines (ATMs) conduct many transactions that would otherwise require staff attention; they furnish account information, accept deposits and withdrawals, draw down on pre-approved loans, and transfer funds (Whelan a: 1). The use of ATMs frees loan officers to focus on personalised services, and the machines can potentially deliver a broader range of services. ATMs are most effective for MFIs that accept savings and want to serve customers in multiple locations and/or during non-business hours (Whelan a: 1). But since a single machine can cost as much as US$35,000 and requires reliable electrical and communications connections, ATM technology may not be the first choice for all MFIs (Whelan a: 1).

How ATMs Work

Typical ATMs have two input devices (a card reader and keypad) and four output devices (display screen, cash dispenser, receipt printer, and speaker). A communications mechanism links the ATM directly to an ATM host network, which is not visible to the client. The ATM functions much like a PC; it comes with an operating system and specific application software for the user interface and communications. Whereas most ATMs use magnetic strip cards and personal identification numbers (PINs) to identify account holders, other systems may use smart cards with fingerprint validation (Whelan a: 1).

The ATM forwards information read from the client's card and the client's request to a host processor, which then routes the request to the client's financial institution (Whelan a: 1). If the cardholder is requesting cash, the host processor signals for an electronic funds transfer (EFT) from the customer's bank account to the host processor's account. Once the funds have been transferred, the ATM receives an approval code authorising it to dispense the cash. This communication, verification, and authorisation can be delivered several ways. Leased line, dial-up, or wireless data links may be used to connect to the host system, depending on the cost and reliability of infrastructure. The host systems can reside at the client's institution or be part of an EFT network. The EFT network may support debit card transactions using PINs, or credit card transactions using a signature (Whelan a: 1).

Requirements for ATMs include:

- Reliable electrical power and communications infrastructure
- Affordable dial-up or leased line rates for the ATM to send and receive data
- A central database where client data must be stored for balance verification
- Reliable after-sales servicing and support from the vendor or third-party
- Solid operational procedures and resources to distribute cards and control PINs
- Supply of correctly denominated currency
- Systems to securely transfer cash to ATMs
- Adaptations for effective usage, such as building-in verbal instructions to guide illiterate users

Benefits of ATMs include:

- Flexible account access allows clients to access their accounts at their convenience
- MFI personnel are not required to be present for transactions and have more time to serve clients
- Increased hours of operation fit client schedules
- More clients can be reached beyond the branch network, such as in smaller population centers
- More low-cost funds are available because ATMs make it easier for clients to deposit savings

Costs of ATMs:

- Up-front equipment acquisition cost or network participation fee
- Set-up fee to install and network the ATMs

• Usage fee, either per transaction or on a monthly basis
• Monthly or annual service fee for support
• Communications charges for dial-up, leased lines, or wireless data links

Initial costs are high, particularly if the institution is establishing a self-supported network. Individual ATM purchase prices are US$20,000–$35,000 (Whelan a: 2). Magnetic cards cost US$0.25 to US$0.50 each, and smart cards usually run between US$6–$10 each (Whelan a: 2). ATMs that use smart cards do not require a real-time internet connection, since the ATM can obtain some client financial data from the microchip on the smart card. The microchip or wireless internet service may be required where communications systems are expensive or unreliable.

Microfinance Implementations

Prodem FFP in Bolivia and Banco Ademi in the Dominican Republic have each introduced ATMs in different ways to meet the needs of their unique client populations, communications infrastructures, and costs of participating in ATM networks. See Appendix A for these implementations.

The Future of Mobile Financial Services

Ten years ago, mobile financial services were not an active system (CGAP 2009). Today, the picture is very different. Branchless banking channels are now widely accepted as a means of extending the reach of the banking system. The potential of mobile financial services is often described in glowing terms, based in part on the meteoric increase in wireless coverage and penetration. Mobile financial services have the potential to do for the mobile phone what e-mail has done for the internet.

It is projected that the underlying forces driving the use of branchless channels for financial services will remain very powerful (CGAP 2009). This will be true for both the providers, reducing transaction costs while expanding into new markets, and for the clients, where increased mobility is driving the need for remote payments and increasing trust in new instruments such as the mobile phone. It is expected that the increase in the extent and use of electronic banking channels will continue well into the future. It is possible that paper instruments such as cheques will be completely phased out, and a cashless society will become a reality. Further, it is expected that a steady rise in the proportion of people using mobile financial service channels will occur globally, especially in low-income and developing countries (CGAP 2009). The recent experience of mobile financial systems, such as that of M-PESA in Kenya, is a vivid example of this potential.

In conclusion, mobile financial service is becoming an increasingly viable option in providing financial services to the poor in developing countries. Although it is in its infancy, a growing number of mobile financial services are being piloted in different parts of the world, and there are great hopes for the transformational potential of mobile transactions. Just as mobile communications present a prime case for leapfrogging traditional infrastructure, so too does the mobile financial service industry have the potential to extend the provision of financial services to people through a technology that is both familiar and widespread. There are few, yet very visible and successful experiences of mobile financial services thus far in developing countries, suggesting that mobile financial services have great potential for the unbanked population. Benefits associated with mobile financial services range from access to better, low-costing financial services, easier and safer cash handling, and peer-to-peer money transactions both locally and internationally.

While mobile financial services are experiencing rapid growth, there are still many hurdles that must be overcome in order for the services to enable the expansion of mobile transactions from its present small base. Many of these challenges have been raised in this paper. Foremost is the need for the market to clarify its regulatory regimes to ensure a stable regulatory environment that can mitigate risks, while still being conducive to innovation. Furthermore, mobile financial service firms still have a long way to go in understanding customer needs and in designing customer-friendly products. Firms will also have to

work very hard to create awareness of the full potential for mobile financial services, teaching customers how to take full advantage of the services available.

Mobile financial services clearly have great potential to revolutionise the provision of financial services to a large portion of the developing world's population that currently lacks such services. The hurdles to widespread adoption are not insignificant, but the promise of mobile financial systems suggests that this innovative approach will likely become a dominant feature of the financial landscape in much of the developing world.

Glossary

- **Automated Teller Machines (ATMs):** computerised telecommunications devices which conduct transactions that would otherwise require staff attention: they furnish account information, accept deposits, draw down on pre-approved loans, allow for withdrawals, and transfer funds.

- **Branchless Banking**: the delivery of financial services outside conventional bank branches using information and communications technologies and non-bank retail agents.

- **E-money:** monetary value as represented by a claim on the issuer which is: 1) stored on an electronic device, 2) issued on receipt of funds of an amount not less in value than the monetary value issued, and 3) requires that the electronic store of value is on a device that is in the customer's possession.

- **Mobile Financial Service:** a variation of branchless banking, in which customers can access a range of banking products, such as a variety of savings and credit instruments, via an electronic channel: their mobile phone.

- **Personal Digital Assistants (PDAs)**: small, handheld computers that can run specialised programs to manage Microfinance Institutions and client data, and also perform financial calculations.

- **Point-of-sale agents (POS)**: banking agents, which range from retail, lottery, or postal outlets, which work on behalf of a financial institution. They allow clients to deposit, withdraw, or transfer funds, and pay bills, among other services. These agents can process transactions with card readers, mobile phones, or barcode scanners.

- **Smart Cards**: wallet-sized plastic cards with an embedded computer chip that can process information or simply store data. Smart Cards can perform transactions without a link to the customer's account: in order to do this, value is stored on the chip by the customer and is periodically reloaded, over the counter, through ATM machines, or through POS agents.

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Appendix A

Comparative Technologies for the Microfinance Industry: Microfinance Implementations

Personal Digital Assistants (PDA)

ADOPEM (Dominican Republic)

ADOPEM thoroughly evaluated its PDA program and recorded dramatic improvements. Client retention improved significantly, and the number of days between application and disbursement dropped from five days to two days. Furthermore, expenses for paperwork dropped by 60 percent and data entry expenses dropped by 50 percent (Waterfield: 2). Additionally, loan officers' caseloads and other productivity measures increased by about 35 percent (Waterfield: 2).

Compartamos (Mexico)

Compartamos recently suspended its use of PDAs after deciding that it had higher priorities and acknowledged that their PDA technology had not operated smoothly. Management believes that it may have implemented PDAs too early, when the software development tools were not mature enough (Waterfield: 2). They also had difficulties with the interface between the PDAs and their MIS, a problem echoed by many of the MFIs surveyed.

SKS Microfinance (India)

SKS implemented PDAs to record transaction data during group meetings, as opposed to using it for detailed loan analysis as other MFIs surveyed had done. After saving only about five minutes per client-centre meeting (a 10–12 percent improvement), SKS discontinued its use of the PDAs (Waterfield: 3). SKS's management believes the tool had reduced the scope for error and fraud, but had not been able to quantify the impact. Electronic transfer of data improved the timeliness of information available to management, but because SKS already had a sophisticated MIS in place, the time improvements were not dramatic (Waterfield: 3).

Smart Cards

Prodem FFP (Bolivia)

Prodem FFP introduced Smart Cards to reduce the operating costs of serving rural areas in Bolivia. The Smart Card software is designed to include client identification information, including three fingerprint templates and client financial data provided by FFP's transaction processing system (Whelan b: 2). Clients are charged a US$10 enrollment fee and a US$7 annual usage fee for the card (Whelan b: 2).

Prodem FFP offers clients a quick and reliable means of conducting financial transactions, as both Smart Card and fingerprint readers are available at its 54 branches. Because the Smart Card is an electronic passbook, it eliminates paper transactions and allows customers themselves to initiate money orders, currency exchanges, cash deposits, and withdrawals directly with MFI staff who use PCs (Whelan b:2). Furthermore, all transactions are reflected immediately on the client's card, and Prodem FFP's central servers are updated twice a day, as opposed to real-time, to save the cost of a permanent Internet connection (Whelan b: 3).

Prodem FFP has reported numerous benefits since implementing Smart Cards. Waiting lines for tellers have dramatically dropped, as cardholders who need to check their balances can

now do so without teller assistance. The integration of the Smart Card, ATMs, and fingerprint identification technology has also given Prodem FFP a competitive advantage and has attracted numerous depositors who have appreciated the system for its speed and convenience.

SKS Microfinance (India)
SKS Microfinance in southern India coupled Smart Cards with personal digital assistants (PDA) in a year-long pilot project, completed in May 2002. SKS aimed for the Smart Cards to save loan-officer time at client-centre meetings, reduce error rates associated with manual record-keeping, and obtain data for management reporting and monitoring more rapidly and efficiently (Whelan b:3). SKS also hoped to create a technology infrastructure by which flexible services such as emergency loans, credit score, real-time application processing, and automated cash access could be delivered (Whelan b:3). The cost of their Smart Card is also reasonable, at US$3.40 a card.

After using the combined Smart Card and PDA combination in two client-centres for one year, SKS achieved greater accuracy in recording transactions and more efficient data delivery to the central MIS. However, the key benefit predicted from the implementation of the Smart Cards (higher loan officer productivity) was not as significant as expected. Thus, SKS decided against further implementation of the technology due to its high costs and its limited benefit for loan officers. For instance, up-front development costs had exceeded US$125,000 (Whelan b: 3). Nonetheless, SKS Microfinance's pilot illustrated that poor and illiterate clients were able to use Smart Cards, making the technology a viable infrastructure for providing additional services in the future.

Automated Teller Machines (ATMs)

Prodem FFP (Bolivia)
Prodem FFP in Bolivia serves 43,000 clients who mostly live in rural or semi-urban settings, and has installed 20 Smart Automated Teller Machines (SATMs) inside its branches (Whelan a: 2). Rather than using the typical PIN technology for client verification, these SATMs incorporate fingerprint readers. Furthermore, they use voice instructions in three languages to assist illiterate or semi-illiterate users.

After a year of deploying Smart Cards, Prodem FFP offered clients the option of conducting cash transactions through the ATM. As the micro-chip on the Smart Card contains all essential client financial information, transactions are reflected immediately on the card. Smart Cards also reduce the risk of fraud at Prodem FFP's central office, as the cards only carry the client's latest financial data. However, the primary benefit of the ATM network has been greater convenience for customers and increased deposit mobilisation. Customers have been able to use the ATMs for transactions that previously would have required staff attention, and further, they are able to conduct business in many locations. In turn, this makes it more convenient for clients to save, which increased the volume of deposit funds available to the institution (Whelan a: 3).

Banco Ademi (Dominican Republic)
Banco Ademi took a different approach and partnered with A Toda Hora (ATH: which translates from Spanish to 'At Any Time/Hour'), a service provider that operates a network of 1,000 ATMs in the Dominican Republic (Whelan a: 2). While other banks own the ATMs supported by ATH, cardholders of Banco Ademi can use any ATM in the system. Clients pay a charge of about US$0.20 per transaction, which is shared by the ATM owner and ATH (Whelan a: 2).

Banco Ademi decided to participate in a third-party network as the entry fee was reasonable and the ATM locations closely matched the institution's service area. ATH charged an initial fee of US$10,000 and an annual membership fee of US$2,400 (Whelan a: 2). Having the ATM technology has enabled Banco Ademi to provide its 28,000 clients with more convenience, as it provided 24-hour access to funds via a wide network of locations. Furthermore, instead of handling deposit-taking and balance checking, the institution's staff was free to handle personalised customer interactions.

Appendix B

Mobile Financial Services at a Glance.

India

Mobile Service Provider	Airtel
Partnering Bank/ Associate	ABN AMBRO Bank
Branchless Banking Model	Bank Led Model
Mobile Banking Feature Name	MPOWER
Services	Bank to Bank fund transfer
Security Feature	Software application
Comments	Other service providers include Hutch, BPL and Spice.

Kenya

Mobile Service Provider	Safaricom (60:Vodafone, 40:Telkom)
Technology/Solution Provider	Vodafone Group
Partnering Bank/ Associate	Commercial Bank of Africa
	Faulu Kenya (MFI)
Branchless Banking Model	Non-Bank Led Model
Mobile Banking Feature Name	M-Pesa
Launch Date	Mar-07
Comments	-54.4% of population has access to a mobile -18.9% of population has access to formal banking -7.5% of population is serviced by Microfinance Institutions -500 Point of Sale Agents -Average uptake in 4 Months: 150,000 Customers -To date: 6.5 million customers

Malaysia

Mobile Service Provider	All Networks within Malaysia
Partnering Bank/ Associate	OCBC Bank
Branchless Banking Model	Bank-Led Model
Mobile Banking Feature Name	OCBC Mobile Banking

Philippines

Mobile Service Providers	Globe Telecom	SMART Communications
Partnering Bank/Associate	Clearing house: records and arranges settlement between retailers and G-Cash customer	Banco de Oro (BDO)
Branchless Banking Feature Name	Non-Bank Led Model	n/a
Mobile Banking Feature Name	G-Cash G-Xchange	SMART Money
Launch Date	Oct-04	Dec-00
Services	-Cash deposit -Cash withdrawal -Top up and transfer mobile credit (GLOBE *Share a Load* and *Ask a Load*) -Inward international remittances from Overseas Filipino Workers -Transfer of cash to and from other users -Cashless purchasing at participating outlets (Min of P10 =$0.19 -Bill payments -Payment of income tax and annual business registration fees -Payment via the internet for games, tickets, and online stores -Donations to charity -Transfer from bank accounts to G-cash via ATMs(Partnering bank only for this service: BANCnet	-Cash deposit -Cash withdrawal -SMART Load-top up and transfer mobile credit -SMART Padala- Inward international remittances from Overseas Filipino Workers -Transfer of cash to and from other users -Cashless purchasing at SMART and MasterCard outlets -Bill payments
Security Feature	-Two factor authentication: phone and PIN per transaction -ID must be shown by law; no credit history needed -SIM based encryption is optional	-n/a -ID must be shown by law; no credit history needed -SIM based encryption
Comments	-Some companies have pay salaries, commissions, and bonuses -No saving or lending services yet -100 participating Universities and Tertiary institutions for tuition payments -G-Cash is available in 15 countries via 27 international partners with 200 outlets -6000 Points of Sale Agents -As of 2006: 1 Million Customers	-No credit offered -Optional service is coupled with debit card at a cost of P220 per annum -No minimum balance required; a maximum of P50,000 (%950) -Estimated $50 million overseas remittance per month -700,000 Points of Sale Agents -As of 2006: 2.5 million customers -20,000 SMART Padala Agents

South Africa

Mobile Service Provider	Wizzit	MTN
Technology/Solution Provider	Cointel-Simplus	Fundamo
Partnering Bank/Associate	Absa Bank Postbank Bank of Athens	Standard Bank
Branchless Banking Model	Non-Bank Led Model	Non-Led Bank Model
Mobile Banking Feature Name	n/a	MobileMoney
Launch Date	Dec-04	Aug-05
Services	-Person to person transfers -Transfer money -Buy airtime -Bill payments -Maestro Debit Card for optional retail and ATM transactions	-n/a
Security Feature	-SIM encryption -PIN code	-SIM Encryption -PIN code -Voice Recognition
Applications	-WAP -SSMS	-n/a
Comments	-No minimum balance required or monthly fix costs -2000 Point of Sale Agents -To date: 450,000 customers	-Also has Capitec Bank as partner

South Korea

Mobile Service Provider	SK Telecom	Korea Telecom Freetel (KTF)	LG Telecom
Partnering Bank/Associate	Woori Shinhan Chohung Hana Kyangnam Kwangju Jeonbuk Jenu	Kookmin KorAm Pusan	Korea Exchange Korea First Kookmin Industrial Bank of Korea
Branchless Banking Model	Non-Bank Led Model	Non-Bank Led Model	Non- Bank Led Model
Mobile Banking Feature Name	M-Bank	K-Bank	Bank On
Launch Date	Mar-04	Nov-06	Aug-03
Comments	-Each mobile chip is tailored to one bank only in Korea -200,000 customers	-Each mobile chip is tailored to one bank only in Korea -700,000 customers	-Each mobile chip is tailored to one bank only in Korea -700,000 customers

Tanzania

Mobile Service Provider	Zantel (Etisalat)
Technology/Solution Provider	Mobipawa
Mobile Banking Feature Name	Z-Pesa

Zambia

Mobile Service Provider	Celtel (Celpay Holdings)
Technology/Solution Provider	Fundamo
Partnering Bank/ Associate	South Africa First Rand Banking Group
Branchless Banking Model	Non-Bank Led Model
Launch Date	2002
Services	-Account Balance -Cash Deposit -Cash Transfers -Bill Payments

Appendix C

Mobile Technology Providers and their Customers

Solution Provider	Country of Origin	Banking Customers
M-Com	Australia/ N-Z	ANZ Bank
Giesecke & Devrient (G&D)	Australia/ N-Z	Commonwealth Bank of Australia
CASI Software	USA	Hancock Bank BancorpSouth
ClairMail	USA	Bank of Stockton BB&T
CPNI	Canada	n/a
Firethorn	USA	BancorpSouth Synovus Wachovia SunTrust RegionsBank
Fronde Anywhere	New Zealand	Kiwibank Bank of New Zealand ASB Bank Credit Agricole
IBM	USA	n/a
Jack Henry Associates	USA	Union Bank Lone Star National Bank
Metavante	USA	Harvard Employees Credit Union North Jersey Communication Bank Sutton Bank
mFoundry	USA	Citibank IBC Bank BB&T
Monitise PLC/Monitise Americas	UK/USA	HSBC First Direct Alliance & Leicester Royal Bank of Scotland Natwest Ulster Bank
Mshift	USA	Cardinal Bank Digital Federal Credit Union Flagstar Bank Patelco Credit Union Salem Five Bank

Solution Provider	Country of Origin	Banking Customers
Mshift	USA	Cardinal Bank Digital Federal Credit Union Flagstar Bank Patelco Credit Union Salem Five Bank
Obopay Inc	USA	Citigroup
Paybox	Germany	Mobilcom/A1 Bank MasterCard One Austria Vodafone Egypt Maxis Malaysia Commonwealth Business Council Uganda Lari Exchange UAE
Pyxis Mobile	USA	n/a
Research in Motion	USA	Bank of America
S1	USA	n/a
Sprint	USA	n/a
Sybase 365	USA	United Bank of India Citibank Compass Bank
Telrock	UK	Royal Bank of Scotland Natwest Mint
Tyfone Inc	USA	West Coast Bank Bank of Oswego
Yodlee	USA	n/a