

# The Transformational Potential of M-Transactions



# Foreword

We hope you enjoy this sixth Policy Paper in the Vodafone series in which we are delighted to be joined by Nokia and Nokia Siemens Networks in this collaboration on mobile transactions. This partnership is particularly apt since mobile transactions is a prime example of an issue that requires effective cross-industry cooperation.

Our aim in these papers is to provide a platform for leading experts to write on issues in public policy that are important to our industry. These are the people that we listen to, even if we do not always agree with them. These are their views, not ours. We think that they have important things to say that should be of interest to anybody concerned with good public policy.

**Arun Sarin**

Chief Executive, Vodafone Group



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This paper can be seen online at [www.vodafone.com/m-transactions](http://www.vodafone.com/m-transactions)

Nick Hughes



Head of International Mobile Payment Services, Vodafone

## Introduction

### Summary

It is always exciting to see and be involved with new business development. Unfortunately, people developing mobile payment schemes were saying exactly the same thing ten years ago. We have had a series of false dawns, witnessed many pilot schemes and heard a lot of talk about potential, but (with a few exceptions) we have seen little development and certainly no transformational change. The harsh reality is that despite the availability of the technology to make mobile transactions work, customers didn't want them. Why would they? In a market where incumbent players offer a range of services that work, the customer already has a choice of proven alternatives, so why change to something new?

However, my sense is that we are at the start of a new phase of development, and the most exciting thing now is that the action is taking place in the developing world.

The remarkable growth in access to mobile telephony in developing markets has created the possibility of delivering new financial services by leveraging secure, low-cost mobile networks and platforms. Commercial entities and policy makers are starting to embrace the vision of a transformational change, but how and in what form will this change come?

The subject is a broad one. For sure, contemporary financial service models can be unbundled to allow delivery of simple service propositions, enabled through a mobile phone and targeted directly at what customers need. This could be referred to broadly as 'm-transactions'. This term is accommodating as a description as it can encompass m-banking services (e.g. deposit taking and account management), m-transfers (e.g. distribution of state benefits, or person-to-person remittances), and m-payments (e.g. settlement of bills and payments for goods and services).

Our aim with this report is to contribute to thinking about potential social and economic impact of m-transactions, addressing some of the drivers of current activity and looking at various related policy aspects, both now and in the future.

In some quarters, the transformational impact can appear to be taken for granted (rightly or wrongly) and the policy debate has even moved on to consider the potential problems arising from these nascent services. There will indeed be issues that require attention as two culturally different sectors converge; the relatively fast-moving, high volume/low value transactional

world of telecoms and the more conservative, low volume/high value world of banking. Opportunities will come from the speed, reach, data richness and economic efficiencies of mobile networks. Challenges will come from managing issues such as customer registration, fraud, money laundering and finding viable, scaleable commercial models that work where the customers' disposable income is low. Our expectation is that progress and success will come through experimentation. Different business models, partnerships, pricing strategies and distribution channels will be tested and assessed. From this diversity of approach will come the solutions to the challenges of creating and coping with exponential growth.

The exponential growth in the mobile communications industry owes much to the power of network effects. As more people become connected to the network, the value to each individual of acquiring a mobile phone increases, as there are more people who can be called. A similar effect is to be expected in terms of m-transactions and if so, it is at the point where network effects are triggered that we will see truly transformational impacts.

Before any such point is reached, the role of financial and telecoms regulators will be key. A government policy goal that is common in many emerging economies is to increase access to financial services. This will require a risk-based regulatory regime with a 'lighter touch' intervention to reflect simple services, typically involving much lower capital/or financial values than we experience in mature economies. Regulators will also need to see evidence that the 'data-richness' of mobile services can serve to protect consumers and mitigate fraud or mis-use. Will lower cost, transparent services also encourage the transfer of capital away from the murky economy and into the formal sector? Before any of this can happen at scale, such services need to be allowed to develop under appropriate control.

This report touches on some big issues to which there are no simple answers, but these studies are a contribution to the debate. I am certainly not alone in hoping that in another ten years time, stakeholders will be able to look back and acclaim the economic benefits that emerging economies will have gained by leap-frogging to a world in which m-transactions pervade.

We hope that you will find the studies to be both interesting and useful.

Diane Coyle



Enlightenment Economics

## Overview

### Introduction

In the space of a decade, mobile networks have become a significant part of the infrastructure in many developing countries. The policy interest in mobile transactions is driven by three characteristics shared by many low- and middle-income countries. One is widespread access to mobiles, at least relative to many other types of infrastructure or household asset. A second is the stark lack of access to financial services. A third characteristic, which has aroused particular interest in the aid community, is the rapid growth in inflows of remittances from overseas. It is natural to ask whether the reach of mobiles can be used to deliver a range of other services, access to financial transactions amongst them.

There have been several pilot schemes testing different models of m-transactions services. The aim of this report is to contribute to the debate amongst national and international policymakers by assessing the potential for mobile transactions to have, as many people hope, a transformational effect on access to financial services in low and middle income markets. There are now a number of these where mobile penetration has grown to such an extent that it makes sense to think of mobiles as serving a mass market.

### Context

#### The lack of access to basic financial services in the developing world

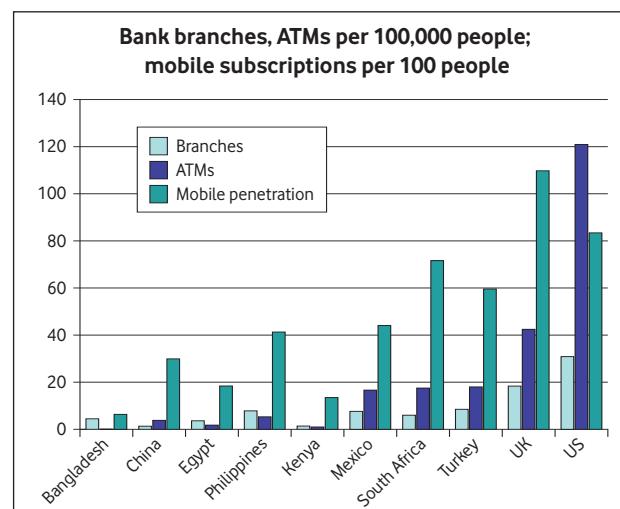
In low income, developing countries very few poor people have bank accounts, and bank branches and ATM networks are sparse anyway. As Figure 1 shows, even the most banked developing countries have much smaller financial networks than a typical developed economy such as the UK.

This lack of access to even the most basic banking service – a current or checking account – has serious economic consequences. Poor people have to rely on cash, which is much less secure than using the banking system. They are unable to save reliably, and so are more vulnerable to financial uncertainty.

The consequences go beyond the adverse effects on individuals' financial security. A predominantly cash economy is likely to have a large informal sector, with many people employed casually. In many emerging and developing economies, the shadow economy represents an important proportion of overall economic activity. For example, recent estimates suggest that it represents about 40% of official GDP in most African countries, but can be as high as 60%. People working informally are less likely to acquire skills and progress up the jobs ladder. The tax base is also lower than it would otherwise be, undermining the ability of governments to raise money for public services.

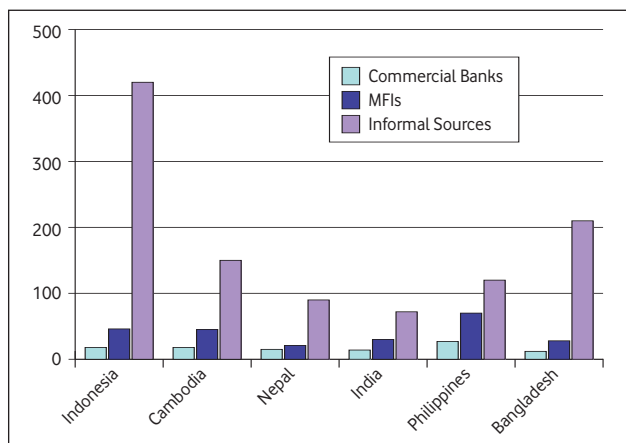
Access to financial services is also fundamental to entrepreneurship. Case studies suggest that a high proportion of small businesses in developing countries have to borrow informally. One indicator of the extent to which credit markets are constrained is provided by the gap between interest rates on formal bank loans, micro-credit loans (which overcome some of the information shortfall which makes conventional bank loans to the poor seem too risky), and informal loans. In many developing countries, the cost of borrowing informally is extremely high. Figure 2 gives some examples.

**Figure 1. Number of bank branches and ATMs per 100 people, selected developing countries.**



Source: World Bank

**Figure 2. Interest rates on loans, selected developing countries, %.**



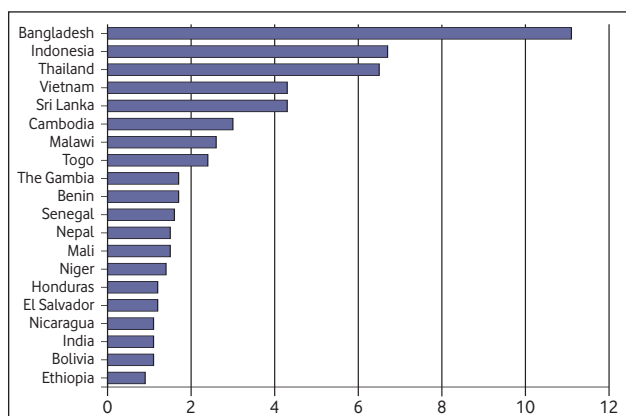
Source: World Bank

For all these reasons, financial services are a vital foundation for economic development, and inclusive financial services for the unbanked are seen as essential for poverty reduction. This is why hopes for the transformational potential of mobile transactions are so high.

**The growth of microfinance**

The importance of access to financial services for growth has likewise led to high hopes for microfinance institutions. As Figure 3 shows, these have spread quite widely in some countries, an achievement for which Grameen Bank founder Mohammed Yunus was awarded the 2006 Nobel Peace Prize. Most microfinance takes the form of small loans (typically less than £100) for village-based enterprises. Microfinance institutions do not offer an array of banking services, and in particular do not provide basic transactions services (such as cash deposits and withdrawals or the ability to pay utility bills). The vast majority of the MFIs are themselves small, with fewer than 2,500 borrowers. The small scale explains the very high repayment rates (95-98%) claimed for microcredit loans, as the social pressure amongst small groups of borrowers is given as the explanation for the rarity of defaults. The success of microfinance in terms of reach amongst low-income households testifies to their appetite for financial services. And certainly, technological innovation offers the hope of reducing the cost of serving poor customers.

**Figure 3. Microfinance clients as a % of population, selected countries.**



Source: UN

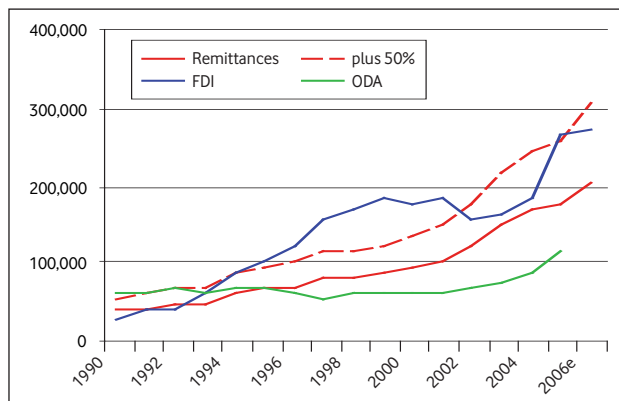
**The importance of remittances**

A final aspect of the market context, also indicating the potentially high demand for m-transactions amongst poor households is the strong growth in remittances from overseas, shown in Figure 4. The solid (red) line shows the officially-recorded figures, but money sent home through informal channels is estimated to add a further 50% to the flow, giving a grand total shown by the dashed (red) line. Cross-border remittances are either subject to high transactions costs (in the range 8-17% commission for bank transfers or transactions through money transfer companies), or are unregulated and potentially insecure if sent through informal channels.

Remittances dwarf official aid flows for certain recipient countries and are now of the same order of magnitude as foreign direct investment for developing countries as a whole. The main remittance 'corridors' mirror large flows of migration, such as India-UK or Mexico-US, and make a significant contribution to the resources available to the recipient economy in some cases. For example, overseas worker remittances to Mexico were estimated as equivalent to 124% of inward foreign direct investment and 2.2% of GDP in 2003 (World Bank, Hernandez-Coss). A key aspect of remittances is that they will be directed by recipients towards the most productive uses for the household, and are therefore more likely than other types of external finance to be directed towards spending on activities such as housing, education, or financing entrepreneurship.

Remittances are typically relatively small payments by the standards of developed country banking systems. The average size of a remittance payment from the US to Mexico in 2003 was just over \$220. The average cost of sending \$300 was then \$15, down from about \$30 in 1999. Along the main corridors, competition has helped reduce charges paid by customers, but costs elsewhere remain high. It's possible that m-transactions would introduce the scope for significant cost reductions on typically quite small transactions.

**Figure 4. Financial flows to developing countries 1990-2006, \$000.**



Source: World Bank/IMF

## Issues

There are high hopes that mobile transactions have a transformational potential in terms of extending access to financial services to large numbers of very poor people who do not currently have bank accounts. The key questions this report addresses are the scope for transformational impact, which groups of the population could be affected, and what key attributes would be necessary to realise the transformational potential? These questions raise some important issues.

### Customer needs

Customer needs lie at the heart of the potential for mobile transactions. In particular, if mobile is to prove transformational in delivering access to financial services, the specific needs of very low income customers must be understood. The extent and nature of their demand for financial services is unknown.

All customers focus above all on security and convenience, which are central aspects to any scheme. Beyond that, the needs of different types of customers clearly differ: people with no other access to financial services place an emphasis on person-to-person transactions and cash-in and -out mechanisms. Customers who are already banked and regard mobile as an alternative means of access to existing services will have a wider range of requirements. Will mobiles extend access to financial services or will they merely improve ease of access for those who are already banked? This is the central question addressed in the paper by Howard Williams and Maili Torma. A clear message from the experience of M-PESA, Vodafone and Safaricom's m-transactions scheme in Kenya, and other schemes, is that developing countries will remain cash-based economies for the foreseeable future, so the mechanism for making cash deposits and withdrawals is central to the potential of m-transactions schemes. Therefore it is both the widespread adoption of mobile, and also the extensive distribution networks of the mobile operators, that create the foundation for the transformational potential.

The broader impact of mobile transactions must also be considered. Extending the scope of formal sector financial services can expose people in the informal economy to both perceived and real costs, such as regulation, taxes or, in corrupt economies, exploitation by local officials who see banking activity as a signal of wealth that can be tapped.

A final issue regarding customer needs is the importance of social factors. To give one example, there is a summary in this report of a survey by Forum for the Future of users of Vodafone Egypt's airtime transfer scheme, which makes possible person-to-person transactions. One inhibiting factor is the perception in Egypt that use of an airtime transfer simply implies that the sender is short of money and therefore involves a loss of face. This type of factor will vary from country to country, and does not seem to apply in Kenya or Uganda for example. Even so, the cultural reactions to such fundamental economic innovations as means of payment are important and will influence the pace of adoption in some societies.

### Commercial innovation and regulation

The mobile transactions value chain is a complex one incorporating wholesale arrangements between mobile operators and financial service providers on one side and the retail distribution network which serves customers on the other. The scope for commercial innovation is demonstrated by the range of variants already seen in operation. It will be important for operators to be able to try a range of approaches in order to ascertain the nature of demand and develop pricing packages which drive forward network effects. This is exactly what drove the rapid expansion of mobile originally, where for example commercial experimentation demonstrated the success of calling party pays in driving demand and network effects.

Policy makers' potential concerns about the commercial choices and business models could prompt regulatory interventions, while at the same time the commercial models will inevitably be shaped by the scope and nature of the regulation.

Commercial innovation which creates network effects will be extremely important for the long-term effects of m-transactions, and raises commercial issues concerning optimal pricing and interoperability. The paper by Marc Ivaldi and his colleagues from the University of Toulouse looks at the first of these issues, and George Houpis and James Bellis of Frontier Economics address the second. It is important that policy makers recognise that commercial innovation and experimentation will be key to developing viable business models. Regulation should not seek to impose specific outcomes at this stage of market development.

A further specific and important issue for m-transactions schemes in developing markets is the impact of know-your-customer and anti-money laundering rules, particularly in the context of very low income customers with limited documentation and lack of access to facilities such as photocopiers.

As Ivan Mortimer-Schutts sets out in his paper on regulation, mobile transactions inherit two regulatory environments, telecommunications and banking. It is clear that there will need to be a continuing dialogue between the two sets of regulators, if the potential of mobile transactions is to be realised. Three key areas of regulation which appear to form hurdles to innovation are restrictions on deposit-taking, restrictions on distribution, and consumer protection regulation. At present regulators can turn a blind eye to m-transactions on the grounds that they are not material in scale, or alternatively to introduce limits on transaction size to mitigate any risks. However, these options are unlikely to be sustainable, or worse still could constrain the business models for m-transactions to operate at an inefficiently small scale. The paper suggests the need to consider the basic principles of regulation in each area in order to assess whether the forms of intervention which have grown around the banking industry are appropriate for m-transactions. It suggests a detailed policy agenda for both banking and telecommunications regulators in order to facilitate growth in the market and encourage new entrants and innovation.

## Conclusions

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There are, rightly, great hopes for the transformational potential of mobile transactions. This report is intended to contribute to the policy debate by analysing the potential hurdles to the extension of mobile transactions from the present small base, and thereby suggesting possible actions to lower the barriers to transformational m-transactions.

The fundamental point is that the fact that mobile telephony has spread so rapidly does not automatically mean transactions services spread by mobile can penetrate low income markets just as fast. A number of obstacles need to be overcome, perhaps the most important the development of suitable cash-in and –out mechanisms.

There should be no presumption that m-transactions automatically transform the nature of or the scope for access to financial services. However, there is sufficient evidence of the potential to suggest that policy makers should ensure there is an appropriate regulatory environment so that innovation with respect to business models and partnerships can occur.



**Pauline Vaughan**

Head of M-PESA, Safaricom Ltd

# Early lessons from the deployment of M-PESA, Vodafone’s own mobile transactions service

Safaricom and Vodafone launched M-PESA, a mobile-based payment service targeting the un-banked, pre-pay mobile subscribers in Kenya on a pilot basis in October 2005. M-PESA started as a public/private sector initiative. Vodafone was successful in winning funds from the Financial Deepening Challenge Fund competition established by the UK Government’s Department for International Development to encourage private sector companies to engage in innovative projects to deepen the provision of financial services in emerging economies. The full commercial launch was initiated in March 2007.

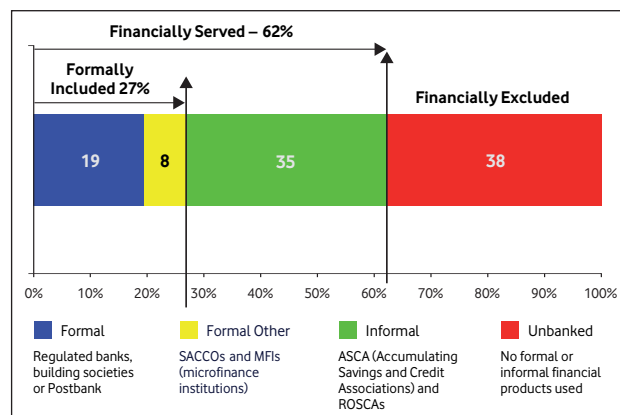
The service comprises a simple registration process to set-up a customer’s new M-PESA account into which they can upload (deposit) and download (withdraw) cash at a large number of Safaricom’s re-seller airtime distribution agents. Making a deposit is a similar process to topping up their airtime pre-pay balance: the account identifier is the mobile phone number and the customer goes to the very same place that they would go to buy airtime. There the similarity ends; the M-PESA account is entirely separate to the pre-pay airtime credit. Once registered, the customer can send funds to any other phone number, on any network. The receiver gets a text message that can be taken to a re-seller agent and ‘cashed in’, enabling person-to-person money transfer instantly over large distances. A customer can also use their M-PESA account balance to buy goods and services (including airtime credit for any other Safaricom pre-pay phone). It comes with a full transaction tracking and reporting system, customer care support and anti money laundering measures, and is being developed to allow international use for remittances, allowing Kenyans overseas to send money home quickly and much more cost effectively than most alternative means.

## The Market Opportunity

Kenya has a total population of 36 million (2007 estimate) of which 42% are estimated to be under the age of 15. GDP per capita (PPP basis) is approximately \$1,200 (2006).

According to a recent comprehensive survey conducted by Finaccess and the Financial Sector Deepening (FSD) Trust<sup>1</sup> the formal banking sector is underdeveloped in Kenya with only about 450 bank branches in the country. The survey indicates that only 27% of the adult (18+ years old) population participates in the formal banking system (see figure 1) but this disguises some very significant and important regional differences (see figures 2 and 3). The survey reveals that the banked population was predominantly male (61%), well educated (72% with secondary education) and likely to own a mobile phone (69%).

Figure 1. Access to Formal Banking

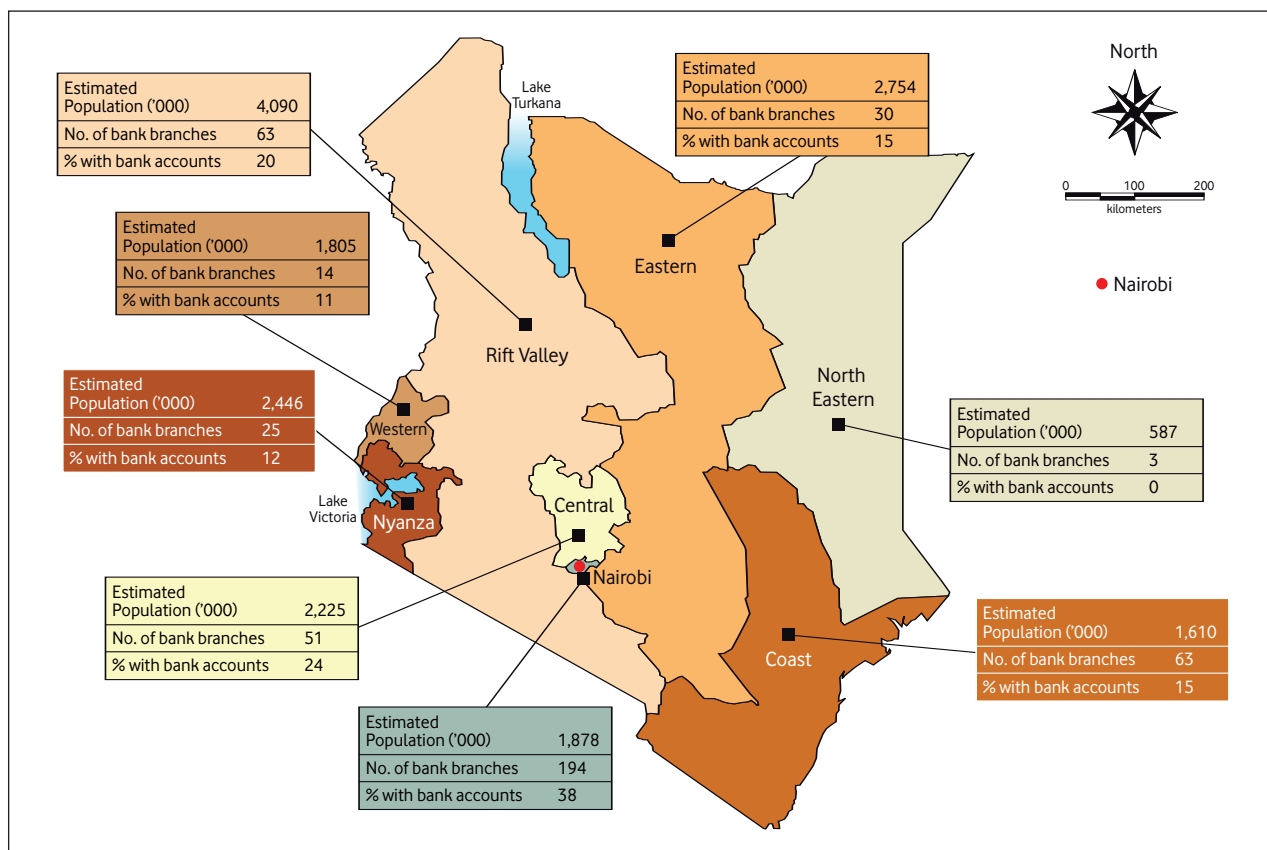


Source: FinAccess Survey 2006

1 FinAccess Survey 2006, www.fsdkenya.org/finaccess

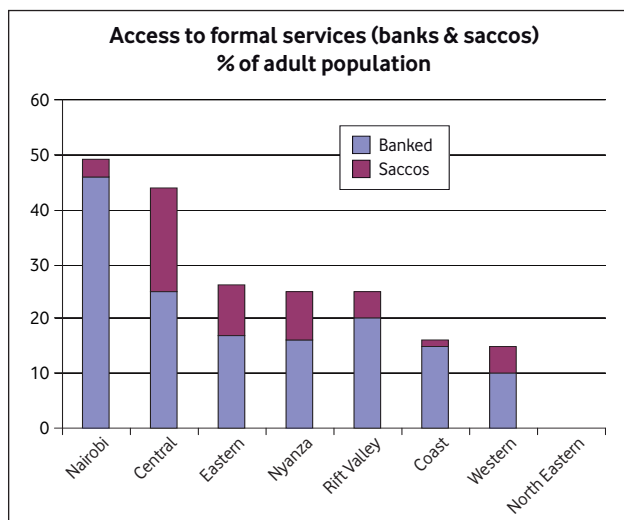


**Figure 2. Bank Account Usage by Province**



Source: FinAccess Survey 2006

**Figure 3.**



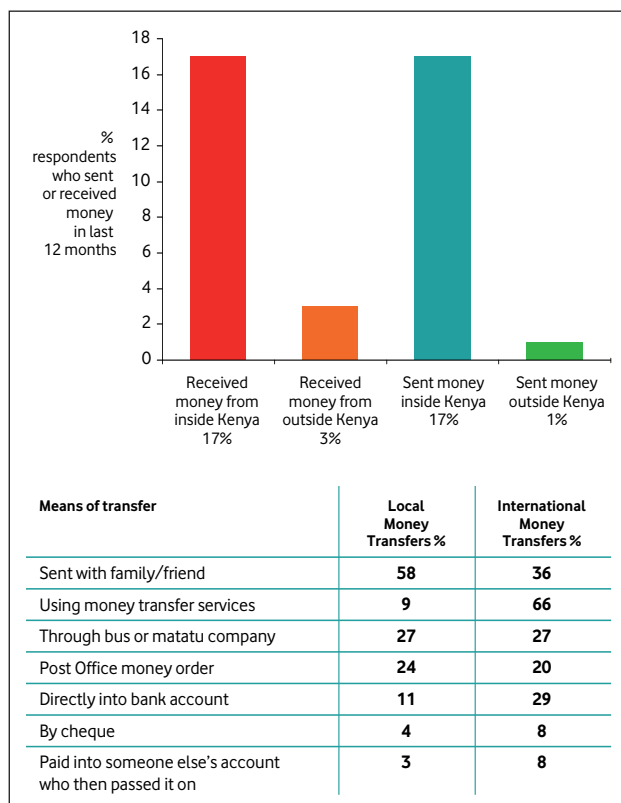
Source: FinAccess Survey 2006

Informal groups which form for social reasons are very important in Kenya in a financial context. They differ widely in their financial arrangements but typically include rotating savings and credit associations (ROSCAs or chamas). 58% of the users of informal groups were women, the survey reported. While the access to the formal banking system is higher in the urban areas, the informal credit associations are much more prevalent in the rural areas. Consequently, the proportion of the adult population that is actually "unbanked" or "financially excluded", which is 38% nationally, is in fact moderately higher in urban areas (42%) than rural areas (38%).

The informal sector is very important and while many groups have quite well developed governance processes (78% of users said their group held regular meetings, 53% elected officials through voting and 51% had a constitution), problems did arise. The most frequently cited problems were members pulling out (41%), members not paying contributions (35%), death of members (21%), non-cooperation among members (19%) and cash not being immediately available (12%). None of these problems arise within the formal banked sector or indeed the M-PESA system.

Money transfers are an important feature of the Kenya economic system and a critical financial need for many people (see figure 4). 17% of respondents had sent and received transfers from within Kenya. Of those who have received transfers, 28% listed transfers from family or friends as their main source of livelihood. The most popular means of transferring money within Kenya are via family member or friend or via a bus company or "matutu". International money transfers predominantly use formal channels.

Figure 4. Usage of Money Transfer Services



Source: FinAccess Survey 2006

Of the unbanked proportion (38% of the total), most of the reasons cited for not having an account related to the lack of a regular income or savings. The lack of access to a bank was only mentioned by 5% of the respondents.

### Mobile Phone Access

The survey indicates that current mobile phone usage is heavily concentrated within the group of formally banked respondents (see figure 5).

Figure 5.

Survey results		Banked	Financially included but no formal service	Unbanked
Mobile Phone Access	Own a phone	69%	19%	16%
	Via family/friend	15%	33%	28%
	No access	16%	48%	56%

Source: FinAccess Survey 2006

The transformational potential of M-PESA will depend upon whether the benefits of having access to more reliable and dependable money transfer services can persuade individuals who are either currently unbanked or using informal services to acquire a mobile phone. Currently, fewer than 1 in 5 of the people in these groups owns a mobile phone. However, it is worth noting that the survey was conducted in August/September 2006, and mobile penetration is still increasingly rapidly in Kenya.

## The M-PESA Experience

### Registration

The rate of early adoption of M-PESA has been very encouraging. Within the first 3 months (March 2007-June 2007) there were 111,000 registrations and 450 active agent outlets. The current registration rate (June 2007) is running at 12,000 per week.

The number of agent outlets is important as this determines the essential reach of the M-PESA network. The 450 M-PESA agent outlets already secured should be seen in the context of about 600 ATMs and the 350 Western Union agents that currently exist across the whole of Kenya.

### Transfers – Usage Characteristics

In the first three months, we have seen a very encouraging degree of usage. The value of transfers from person to person has totaled nearly \$6 million with an average transaction size of approximately \$45. This seems a surprisingly high average and may be indicative of the type of transfers being executed. As the network effects increase and familiarity with the system increases, it will be interesting to see whether the average transaction size reduces.

Anecdotal feedback suggests that M-PESA is being utilized for a wide variety of commercial transactions, which may explain the high initial average transfers. Some specific examples include:

- Paying field sales staff their allowances and expenses – particularly to manage replenishments for long distance truck drivers. In one case, a truck driver needed money to buy some spare parts for the lorry which had broken down on the Ugandan border. He called his head office in Nairobi, which sent him \$100 to cover the spare parts and the repairs.
- Salary payments for casual workers. Safaricom itself uses M-PESA for payment of our casual workers, who no longer need to travel to the head office in Nairobi to collect their payments.

There is also clear evidence of customers using the M-PESA system as a store of value for the purposes of personal safety and security. Some specific examples include:

- One of our customers traveling from Nairobi to Kisumu deposited money with M-PESA and withdrew it at his destination instead of carrying cash – this is to combat the insecurity and theft on public transport. This behaviour was also seen during the M-PESA pilot.
- A taxi driver requests his customers pay by M-PESA as it is safer for him, since he does not want to carry cash around due to the risk of theft.

There are examples of M-PESA being used for convenience – a more efficient, lower cost and reliable way of transferring funds for regular payments. These include:

- Customers using M-PESA for rent payments.
- A customer in Meru (300kms from Nairobi) used M-PESA to purchase specific drugs from a chemist shop in Nairobi and had them couriered to his home.

- Many M-PESA users are using the system to buy airtime conveniently. It provides an emergency top-up facility out of hours or late at night.

There are also frequent instances where M-PESA is used in circumstances of emergencies. For example:

- A child fell ill while the father was in another town. He sent money to his wife via M-PESA so that the child could get medical care.
- A customer working in Mombasa had a son who had been sent away to school in Kakamega [about 700Km away] and who needed to settle an outstanding fee balance. He sent the money to one of the teachers in the school who cashed the voucher and used the money to clear the balance. School fees are a regular example of M-PESA usage, with money being sent to relatives nearby.
- A customer's brother was arrested and they needed money to bail him out. He sent money to his wife so that she could go personally to pay the bail fee.

These various transactions are representative of the types of situations in emerging markets where cash transfers are required to settle debts, make payments or resolve problems remotely. While the level of usage per registered customer is still quite low – an average 3.5 transactions per month per registered customer – the value to individuals who are able to execute these transfers is likely to be considerable.

## Conclusion

There are many examples of mobile payment initiatives that have reached pilot stage and then fizzled out due to lack of uptake by customers. The initial experience of M-PESA is encouraging in terms of the rapid adoption and the basic financial needs of customers that are being met through M-PESA. Keeping things simple, focusing on what the customer wants, and getting early visibility and adoption is critical. In terms of building from this promising start into a scaleable business, it is going to be critical to get the right support from regulatory stakeholders. As discussed elsewhere in this report, how they react to growth and influence of a new type of financial payments system is going to be crucial.

**m-PESA** Send pesa by phone

M-PESA is the new, easy and affordable way to send money home.  
 \* Please see following advertisement for a list of Authorised M-PESA Agents.

Register **FREE** at any Authorised M-PESA Agent\*

Safaricom  
 www.safaricom.co.ke  
 Terms & Conditions Apply

**Howard Williams<sup>1</sup>**Professor,  
University of Strathclyde**Maija Torma**Researcher,  
University of Strathclyde

# Trust and Fidelity: from 'under the mattress' to the mobile phone

## Introduction

Banks impoverish: "they eat your money" is a common expression in South Africa, highlighting the perception that many have of the inadequacy of the traditional banking services available to low income households. It is a view which is not unique to South Africa. This inadequacy and the relatively high costs of the services disenfranchises the poor. Across the developing world most individuals do not have bank accounts. In South Africa for example there are 16 m people without bank accounts (out of an adult population of 47.7m).<sup>2</sup> The inadequacy of traditional banking services coupled with their limited geographical footprint means that low income households rely overwhelmingly on informal means to save their money; often in cash in their homes, or colloquially, "under the mattress".

*Access to Finance (A2F)* has therefore become a focal point of many development strategies, access to finance for both the productive sector (MSME<sup>3</sup>) and low income households. It has long been recognised that low income households have a significant demand for financial services, yet are typically least able to access them and pay proportionately higher costs for those services they consume. In recent years much attention has been paid to providing credit to low income households through microfinance initiatives; but increasingly attention has turned to the need to provide a wider range of banking services, with an increased focus on savings.

Providing a range of services to allow individuals to climb the banking ladder is an integral part of enhancing their participation in the formal economy and the processes of economic development. Climbing the ladder involves steps from the first rung of easy and low cost access to transactional services through to increasingly sophisticated services involving a wide variety of both debt and savings instruments.

For small scale entrepreneurial firms or sole practitioners, access to finance can transform the ability of their enterprises to grow and leverage their existing resources and cash-flow to invest in new services, products and/or markets. It is well understood that entrepreneurial activity and new firm entry

facilitates economic development by fostering innovation and the reallocation of resources. Yet one of the key determinants of new firm formation is access to finance (Klapper, Laeven and Rajan, 2004). Newcomers need to have access to the necessary financial services, including external financing, not only to invest in new productive capacity but to develop new products and enter new geographic markets. As observed by Rajan and Zingales (2003), access to finance for large numbers of people is important to expand economic opportunities beyond the rich and well-connected, and thus crucial for a thriving democracy and market economy.

However, although the benefits of increased access to finance are well understood, the existing banking paradigms and business models of service delivery are structurally unable to address the needs for the poor – in terms of the products and services on offer, their cost, and the geographical reach of the bank branch infrastructure. An important consequence of these structural constraints is a lack of market-based information on the demand for services by low income households and the MSME sector. 'This lack of information, in turn, exacerbates the perceptions of credit risk and the inherent uncertainty in investing in 'bottom of the pyramid' markets.

This paper seeks to explore the ways in which innovative mobile technology and services can make a contribution to providing high quality and low cost access to the 'banking ladder'. The key question is whether mobiles offer significant new opportunities to address the needs of low income households and their participation in economic development; or do they, instead, simply offer another channel for some consumers to access existing banking services and products.

## Outreach of Financial Services

A vicious cycle driven by perceived low levels of demand, low levels of bank income, high bank fees, inappropriate products and extremely limited geographical reach, ensure that only a small percentage of people in developing countries use banking services. Conventional banking business models are essentially driven by income derived from the fees for services

and the margin earned between interest paid on deposits and interest receivable on loans. The branch infrastructure is a substantial fixed cost for traditional banks; it is both expensive to maintain and expensive to increase its geographical spread. Any reductions in the essential fixed costs of a bank have the potential to increase profitability and the competitiveness of the bank. Hence the conventional banking business models tend to concentrate on relatively dense urban areas and relatively affluent areas.

In the context of these traditional banking business models, the geographical extension of a banking network is hampered by the high cost of rolling out a physical network of bank branches, by the small average size of customer deposits, by relatively low population densities, and by a lack of documented credit histories (necessary for AML/KYC requirements and also to leverage additional bank income from a loan portfolio).<sup>5</sup> As observed by UNCDF:

Building comprehensive, secure banking networks accessible to the underbanked and unbanked segments of population, dealing with very modest sums of money, can prove to be prohibitively expensive to banks. Building network of bank branches and ATMs in remote locations can be unsafe, while providing electronic banking is impossible due to the lack of either fixed telecommunication infrastructure (poor telecom service penetration rates) or lack of end-user devices.<sup>6</sup>

To combat the prohibitive costs associated with roll-out of banking networks, alternative access channels can be considered, all of which have a downside if the basic telecoms infrastructure in a country is inadequate.<sup>7</sup> It is possible to install fully automatic ATMs, for example, but these depend on a widely available telecommunications network and the ability to ensure regular cash replenishment. The promotion of e-banking is contingent on the widespread availability of internet access as well as advanced telecommunications infrastructure.

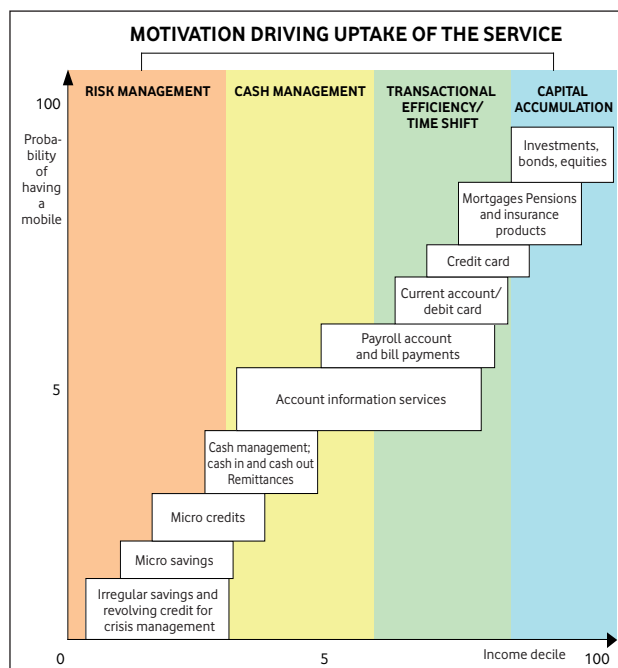
In countries with a poor fixed telecommunications infrastructure but high mobile penetration and growth rates, mobile telecommunications networks are being considered as alternatives to the more traditional banking channels. Evidence of this is provided by a recent CGAP survey: 62 financial institutions in 32 countries report using new technology-based channels to handle transactions for poor people (including ATMs, POS devices, and mobile phones). Nearly 75% of the respondents (46) were banks that operate in *both* large markets (e.g., India, Brazil, and South Africa) and small markets (e.g., Malawi, Namibia, and Guatemala).<sup>8</sup>

## The Banking Ladder

Assessing the demand for financial services among low income households is complex and there is only limited data available. However, it is well known that there is a demand for financial services across all income groups and in many cases, especially for low income households, these demands are met through informal and unregulated service providers.<sup>9</sup> At their best such informal service providers, such as saving clubs and

credit unions, provide timely and low-cost access to borrowing and saving schemes. At their worst, informal schemes, such as money lending, can lead to penury.

Figure 1. Banking ladder



The concept of the banking ladder (see Figure 1) is a stylised way of capturing the nature of demand for financial services by individuals and households across the whole population, charting the progression the way in which an individual may use them. The banking ladder implicitly defines the conditions under which services need to be offered to the market. The ladder also postulates a relationship between the level of income and the adoption of mobile telephones. Exploring the relationship between the demand for financial services and the adoption of mobile phones is fundamental to defining the market in which mobile transaction platforms could play a transformational role in the provision of financial services to all.

The main impact of banking on low income households is two-fold. On the first steps of the banking ladder, the benefits of access to finance are exclusively improvements in the quality of people's lives, such as saving time (for example avoiding long queues to pay bills), reducing the threat of crime, and making transactions (such as intra country remittances) easier. The subsequent rungs of the ladder introduce additional benefits which flow from establishing financial track records. In terms of *debt*, these higher rungs on the ladder allow for formal acquisition of property rights (through mortgages for instance), the smoothing of income against unpredictable expenditures and the ability to support family-owned entrepreneurial activity. In terms of *savings*, better access to financial services can lead eventually to access to longer term products such as pension schemes and the acquisition of investment products. Climbing the banking ladder allows individuals to benefit from the broader processes of economic development.<sup>10</sup>

The existing evidence suggests that low income households appear to be willing to pay relatively high prices, accept onerous conditions on loans, carry substantial risk over the security of their savings and be relatively price insensitive. For some commentators these features of demand translate into a large and potentially lucrative addressable market. For others, however, the willingness to pay and price insensitivity is simply a reflection of the exploitation of market power and the extraction of economic rents from consumers with no alternative. Clearly the willingness to pay in a competitive market will be a key determinant of the way in which access to the banking ladder is defined in many markets.

For the SME community a similar banking ladder exists but with important differences. A greater emphasis is likely to exist for transactional and informational services, such as paying invoices, accounts receivables and payroll, and less on cash based activities. Moreover, it is likely that debt financing will hold greater significance for the SME sector at all levels of business than for individuals.

## Mobile Transactions

What role can mobile telecommunications play in providing banking services? One view is that mobile technology is just another, although highly innovative, access channel; an alternative is that mobile telecommunications networks are becoming the 'front office' for financial services leaving the existing banks as providers of back office functions. But there is also another view which seeks to define the competitive advantages of the banking and mobile finance business models and then explore the ways in which these could give rise to new market structures within which the existing portfolio of financial services (savings, credits and transactions) can be unbundled.

There are a number of mobile transaction initiatives in the developed and developing world. Most are bank-led and largely provide an information and transaction channel which complements existing bank access channels such as branches, telephone banking and online services.

There are, however, significant examples of innovative mobile transaction schemes that hint at a radical transformation of the financial market landscape in that the business model addresses those without existing bank accounts. Examples which are often cited include Wizzit in South Africa, Globe in the Philippines and M-PESA in Kenya. In addition there are mobile financial transaction models which make innovative use of existing widely-diffused financial service platforms, such as Visa, in order to deliver transaction services to under-served market segments. Interestingly, the most innovative of these mobile banking models, and those with the greatest potential to bring significant benefits to consumers, are those addressing the needs of developing markets, which hitherto have been the most complex in which to increase access to finance.

In both types of approach – mobile transactions as a brand new access channel and as an innovative alternative banking system – the rapidly-growing mobile communications infrastructure and its associated support services

(for example, air time agents) provide the possibility of outreach vastly beyond traditional banking networks and at significantly lower costs.

In order to explore the nature of mobile financial transaction systems in more detail, three examples are described below. Each attempts to provide a system that allows a customer to put cash in and take it out, and also make money transfers to other individuals and entities. Each system, however, is 'optimized' for particular purposes and thus there are significant practical differences between the systems and the user experience.

At their core, each of the schemes described offers four basic services. How these services are offered and charged to the consumer varies. The four core services are:

- *Information* – for example account balance retrieval, transactional history of deposits and withdrawals;
- *Transactions* – for example, transfer of funds between accounts;
- *Cash-in and cash-out services* – the deposit and withdrawal of cash;
- *Payments* – a variety of mobile payment applications, such as air-time top-ups, electricity meter top-ups and in some markets broader services such as m-payments at vending machines.

The differences between the schemes can also be described in terms of the broader system characteristics which may be less transparent to consumers. The systems vary in terms of: their technical platform; who manages the money float and settlement mechanisms; who manages the interaction with a customer and how; and whose brand is used to market the product. These broader characteristics fall into the following categories:

- *Open or closed system* – the extent to which a specific mobile scheme allows transactions and/or payments to any account in any other network. The ability to effectively interconnect with the existing bank clearing systems and money transfer networks (such as Visa), and the terms and conditions of this interconnection regime, is a critical aspect of the design and operation of a mobile banking scheme. In effect this interconnection regime defines the nature and extent of the network externalities, and their distribution.
- *Interoperability* – the technological design of the system and its functionality. The key issue is whether or not the mobile scheme is essentially a proprietary system embedded in the network, equipment and operations of an existing mobile operator or instead stands free of any particular network. Is the service tied to one mobile network operator or is it network-independent?
- *Identity of the deposit holder* – are deposits made by customers held in individual deposits at a licensed deposit taking institutions (a traditional bank) or are they instead held as nominated elements of a pooled account (which itself might or might not be directly held at a licensed deposit taking institution)?

- *Mechanisms for deposit making, transfers and cash withdrawal* – the effectiveness of these operations is vital in turning a mobile payment system into a transformational mobile system. Without a convenient way to deposit and withdraw cash, any mobile system is bound to fail in mostly cash-based societies. This makes ensuring the trustworthiness of collection agents pivotal in establishing the integrity of the mobile banking product. The integrity and the efficacy of agents in managing the deposit taking process, transfers and cash distribution is critical to managing some of the range of risks inherent in a mobile banking product, including reputational risk.
- *Regulatory compliance* – there is a variety of ways to comply with both know your customer (KYC) and anti-money laundering (AML) regulations. For example AML tools might be applied only when transactions exceed specific limits in terms of both frequency and amount. The migration from mobile customer to mobile bank customer offers significant potential to reduce the costly information asymmetries between customer and bank, as mobile operators of payments schemes hold useful information about customers’ usage patterns.
- *Tariff structures for consumers* – are customers charged account fees or fees per transaction?

The user experience of the various mobile systems depends on how well specific products correspond to customer needs in different countries. The demand for banking services in developing countries, especially by the ‘unbanked’, is relatively poorly understood. However, there is considerable case study evidence that supports the following categorisation of customer needs:<sup>11</sup>

- *Savings* – The ability to make small and infrequent payments into savings accounts;
- *Security* – to be able to keep the little money that can be saved somewhere safe;
- *Ability to make person-to-person transfers* – this is especially important in countries where many people do not have a regular income and depend on domestic or international remittances;
- *Accessibility* – ease and low cost (both in terms of time and money) of financial services;
- *Convenient and easily understood procedures* – for sending money, making payments and making deposits and withdrawing cash.
- *Low, transparent prices* – in many countries poorer people are put off using bank accounts because the amounts they deposit are usually too small to pay the transaction fees levied by traditional banks.

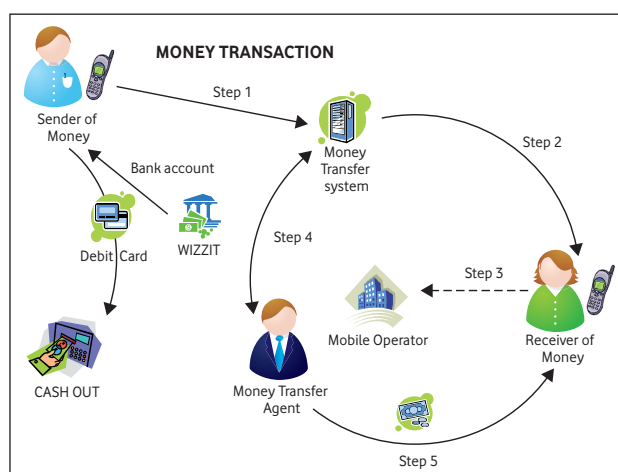
## Three mobile transactions schemes

### 1. WIZZIT – South-Africa

Wizzit has positioned itself as a virtual bank and has no branches of its own. Mobile phone subscription customers can use their phone to make person-to-person payments, transfer money, purchase prepaid electricity, and buy airtime for a prepaid mobile phone. With their Wizzit bank account the 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.<sup>12</sup> Wizzit does not have a minimum balance requirement and does not charge fixed monthly fees. It uses a pay-as-you-go pricing model, with charges ranging from USD 0.13 to USD 0.66 per transaction depending on the type. Customers are charged USD 5.26 to sign up. Evidence suggests that total expenditure on banking charges by Wizzit customers is lower than for conventional bank customers; average expenditure in fees was typically about 20% less for Wizzit customers than for traditional banking customers on a like-for-like basis.

Providing consumers with competitive transaction-based fees is an integral element of the Wizzit business model. The fee structure of the main retail bank in South Africa requires that a minimum deposit of between 50 and 100 Rand be kept in the account (and 100 Rand could easily be more than the typical family weekly food bill and transport costs). There are also monthly standing fees and transactional fees – on small deposits these costs can result in the loss of 20% of savings in any one year. ATM fees are 3.25 Rand per 100 Rand plus a 0.65c surcharge. In contrast, Wizzit only charges a maximum transaction fee of 4.99 Rand and most transaction fees are under 3 Rand (for real time transactions). The mobile operators take a 20c fee for every 20 seconds of air time use.

Figure 2. Wizzit's mobile banking system.



Source: Brian Richardson, WIZZIT, presentation, 4 June 2006

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 one of these WizzKids, very often young black people who had previously been unemployed.

For most Wizzit customers derogation from certain aspects of the AML and KYC requirements (the so-called exemption 17) facilitates the relative ease of opening a bank account. Exemption 17 means that the AML and KYC requirements are not implemented so long as the maximum balance (25,000 Rand) and maximum transaction limits (5,000 Rand) are not exceeded. In cases where these limits are exceeded the Wizzit account is suspended until the full AML and KYC compliant procedures are completed. Under 10% of Wizzit's customers have ever exceeded the maximum thresholds set out in exemption 17.

One of the main advantages of WIZZIT is that the mobile transactional technology works on any handset, and SIM card and across all the networks.

In principle one of the strengths of Wizzit is that the account can be used to send money in real time to any WIZZIT account holder in South-Africa, and overnight to any other bank account holder. To transfer money Wizzit uses the well developed South African inter-bank clearing house system. It accesses the clearing system as an autonomous division of the South African Bank of Athens Ltd. This 'any-to-any' feature is seen as a significant advantage in giving Wizzit account the ability to transact with any mobile user regardless of the identity of their network operator or their bank.

**2. M-PESA – Kenya**

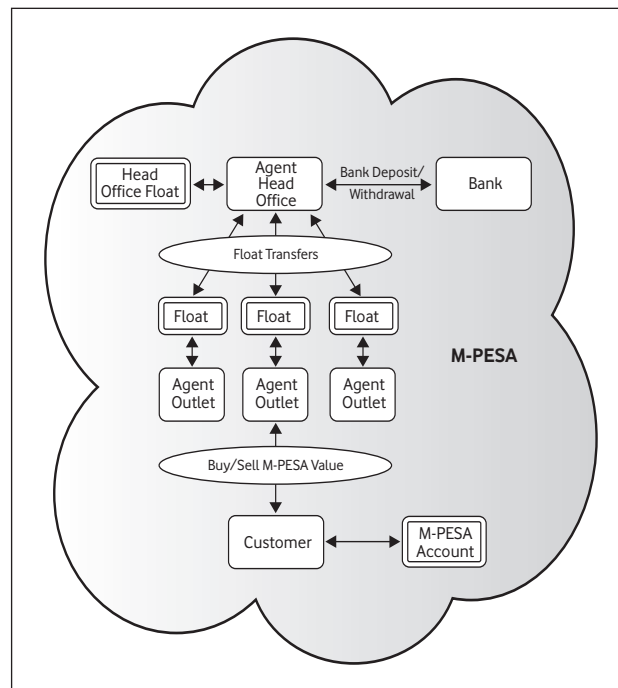
M-PESA is a new service which was trialled in 2006 and launched in 2007 in Kenya. The pilot funding for M-PESA came from DFID and Vodafone and Safaricom. Unlike mobile transaction schemes which add a new channel to existing banking services, M-PESA is an alternative solution – it is described and understood by the Kenyan regulators as a mobile payments system. At the core of M-PESA is a central float within which customers have a unique account and hold their balances and is entirely separate to the pre-pay airtime credit. The whole M-PESA float is then banked with the Commercial Bank of Africa (CBA); the banking contract for the M-PESA float is between a newly created entity, a Trust Co, formed by Vodafone. It is through the Trust Co and service level agreements with Safaricom that the account relationships are managed, and not between the bank and individual M-PESA customers.

To open an M-PESA account, a person needs a Kenyan national identity card. The mobile operator, Safaricom, provides the new account holder with a SIM card that enables transactions using an application running in the SIM Tool Kit (STK) environment.

Through specific M-PESA agents,<sup>13</sup> the customers can carry out m-transactions and m-payments, and also pay cash in and make cash withdrawals. At present (early 2007), M-PESA's services are available only to M-PESA account holders and certified agents; it is not linked to the clearing system.

The diagram below, from the M-PESA Standard Agent's Brochure, describes the transaction system.

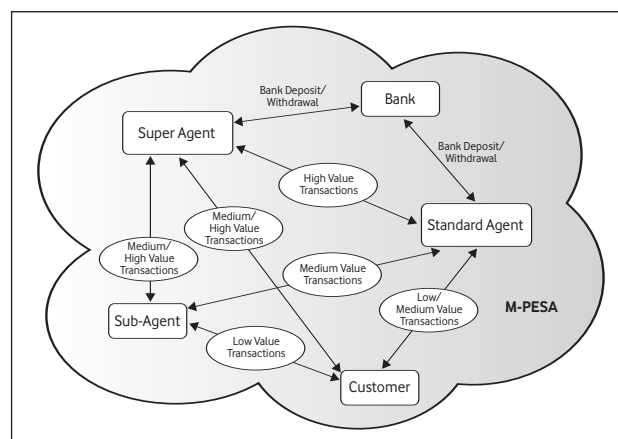
**Figure 3. The M-PESA system**



Source: Standard Agent's Brochure, 6 September 2006

M-PESA uses a network of agents. Agents operate a float of M-PESA value plus a cash float at each outlet. The relationship between various agents in the M-PESA system is shown in figure 4 below.

**Figure 4. The role of M-PESA agents**



Source: Standard Agent's Brochure, 6 September 2006

Limiting the transaction network to M-PESA account holders and agents allows M-PESA to avoid using the clearing system. At this early stage the potential advantages and disadvantages of the relatively closed nature of M-PESA are not yet clear.



### 3. Globe Telecom – Philippines

Globe’s mobile financial transactions system is called G-Cash. Globe Telecom promotes G-Cash first and foremost as a mobile wallet service enabling cashless and cardless financial micro-transactions.<sup>14</sup> The Globe sees itself as an open platform enabling mobile financial services. The Globe Telecom formed a subsidiary G-Xchange Inc. (GXI) to manage G-Cash operations. GXI delivers G-Cash services with partners which include banks,<sup>15</sup> utility companies,<sup>16</sup> retailers, governmental bodies and non-profit organisations.<sup>17</sup> Globe also has G-Cash outlets at their retail units. In 2006 Globe had 3,500 partners, including 27 international partners in 15 countries.<sup>18</sup> In addition the customers can use Globe’s retail units to deposit and withdraw cash. The balance with local partners is usually settled at the end of each day.

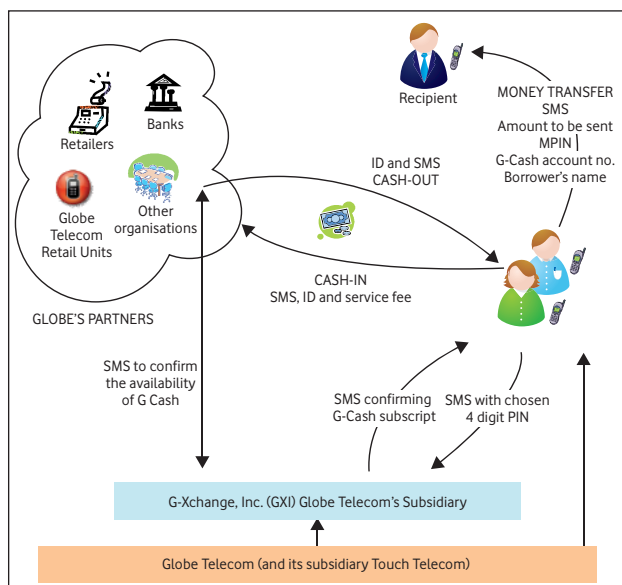
To become a partner of Globe a company has to present all the company registration documents and any potential partners will also be verified against OFAClist, credit review and investigation and finally bank verification.<sup>19</sup> After that main and retailer wallet is defined and depository/settlement bank will be assigned. These documents are sufficient to make the Globe service compliant with regulator’s requirements.

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 just has to send an SMS to 2882, with self-nominated 4-digit PIN, mother’s maiden name, first and last name, address and telephone number. 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 also does not need a special SIM card to use the service.

G-Cash supports a wide range of services enabling the purchase of goods and services, micro-finance and micro-payment applications, tax payments and bill payments, and domestic and international remittances. Figure 5 below describes the money transfer and cash-in and -out services of G-Cash.

**Figure 5. Money transfer and cash-in and -out service of G-Cash**



G-Cash users can load prepaid airtime credits on to their mobile phones and transfer both cash and airtime credits between customers of Globe Telecom and its subsidiary Touch Mobile. In Philippines the value of pre-paid cards is relatively low and this is reflected in the relatively small level of transactions possible with G-Cash. Typical top-ups of USD 0.47 to 0.57 are allowed by the networks (equivalent to around four to five minutes of calls) while transfers between customers of both cash and airtime credits are permitted as low as USD 0.04.

The customer can use cash-in and cash-out services which are accessed through the partners. These services are managed through SMS transactions but the customer must present a valid ID card. To comply with AML requirements, the customer has to fill in a form (in a SMS format) for both cash-in and cash-out and there are also set limits for money transfers. Current transaction limits are set at 10,000Php (approx. USD 200) per transaction, 40,000 Php (approx. USD800) per day and 100,000 Php (USD2,000) per month.<sup>20</sup> The fee for cash-in/cash-out transactions below 1,000Php will be a flat 10.00Php while for transactions 1,000Php and above, the fee will be 1% of the amount being cashed-in/out.

To comply with AML requirements, Globe applies monitoring. SIM cards are checked for multiple registrations to the service by same phone number, the same name or the SIM card. Also, continuous near-breaches of wallet limits are checked. This monitoring allows the operator to check if any of the accounts are used for money laundering.

Globe is also looking into delivering microfinance services. In April 2005 Globe Telecom piloted a project together with GXI, Rural Bankers Association of the Philippines (RBAP) and Microenterprise Access to Banking Services (MABS) (a USAID-funded programme) to deliver microfinance to the rural population. The pilot was launched in four rural banks located in Luzon and Mindanao islands. G-Cash offered a loan collection service through G-Cash with loan disbursements to follow if the pilot is successful. The planned loan amount is 5,000Php –150,000Php with loan repayment periods of 3 to 12 months.<sup>21</sup> In May 2006, G-Cash launched a marketing campaign in co-operation with rural banks promoting mobile payments for micro and small business in rural areas.

## Summary

The summary tables compare the three cases in terms of the functions and characteristics and categories of consumer experience described earlier.

Function			
	WIZZIT	M-PESA	Globe
Information	Yes	Yes	Yes
Transaction	Yes	Yes	Yes
Payment	No	Yes	Yes

Underlying characteristics			
	WIZZIT	M-PESA	Globe
Open or closed system	Open	Closed	Open
Interoperability	Yes	No	Yes
Who is holding the customer's deposit?	Bank	M-PESA float	Bank
Cash in and out mechanism	Bank card – ATMs, WIZZIT agents	Authorised agents	Authorised agents
Transaction limits (AML/KYC)	Yes	Yes	Yes
Cost of usage for customer	Per transaction	Per transaction	Per transaction

Consumer experience			
	WIZZIT	M-PESA	Globe
Security	Yes	Yes	Yes
Ability to make person-to-person payments	To any bank account holder and WIZZIT account holders	Only to people who hold M-PESA account.	To any bank account holders and Globe account holders
Convenience of use	Bank cards can be used as well as mobile for cash deposit and withdrawal and payments	Only M-PESA enabled phones can be used for cash deposit and sending funds. Funds can be received on any phone/network.	Bank cards can be used as well as mobile for cash deposit and withdrawal and payments
Transaction based prices?	Yes	Yes	Yes

There are not yet any systematic and comparative studies of mobile schemes, but much of the existing evidence including case studies coheres around a number of key themes.

### i Banking is Banking

Mobile schemes unbundle traditional banking services, in particular separating out information and transactional services from cash services, deposit taking and savings and credit products. Hence one of the key issues is the articulation between information-based financial service products and those that necessarily involve (national or international) banking payments.

One of the intrinsic competitive advantages of mobile-based financial services is their ability to handle information at very low cost through SMS, combined with the extensive geographic and socio-economic diffusion of mobile services. Furthermore the intrinsic ability to interconnect between individual mobile networks within and between countries ensures that the benefits of substantial network externalities can be distributed to consumers and, on the supply side, to innovative financial services providers.

Intrinsic to the utility of any banking service are the underlying inter-bank relationships and clearing systems, so for any mobile scheme the nature of access to clearing systems is of great importance. The cost of the service to consumers and the business model depend on the cost, availability and quality of access to bank clearing systems. In effect, there is a parallel between the role of interconnection to bank clearing systems and the interconnection issues in telecommunications.

Several models of access to clearing exist in the schemes, all of which can be seen as solutions to the fact that mobile schemes do not have rights of access to clearing systems. In the case of Wizzit, interconnection to the clearing system has been arranged through operating the company in partnership with an established bank. In the case of M-PESA, all transactions are contained within M-PESA, which removes the issue of access to clearing but denies M-PESA customers the broader network externalities derived from an 'interconnection' agreement with the banking system.

### ii Reducing Information asymmetries

Various conceptual frameworks can be used to explore the benefits to low income households of broader access to financial services. World Bank research has noted that financial market imperfections such as informational asymmetries, transactions costs and contract enforcement costs are particularly binding on poor or small entrepreneurs who lack collateral, credit histories, and social connections.<sup>22</sup> Without broad access to finance, such credit constraints make it difficult for poor households or small entrepreneurs to finance high-return investment projects, reducing the efficiency of resource allocation and having adverse implications for growth and poverty alleviation. Hence, for example, considerable work has been done by the IFC/IDA to facilitate the supply of competitive credit products to SMEs in Sub Saharan Africa.

For many individuals existing banking services are inaccessible because of the relatively high transaction costs involved – costs which partially reflect the information asymmetries between the banks and the potential or existing customers. Furthermore, the tightening of KYC and AML regulations have all exacerbated these information asymmetries. The costs of reducing the information gaps are large, especially in countries

where the reliable documentation issue, the nature of demand for financial services and the geography of existing bank networks coalesce to drive up the cost. Anecdotal evidence indicates that in developing countries it can cost up to USD 50 to open a bank account.

In effect these information asymmetries are a substantial barrier to access for consumers. Moreover, the interpretation of the regulations (for example the processes for verifying original documents) has added to the barriers to entry faced by new financial service providers.

New entrants could take one of two approaches to the issue. The first is to structure the banking products in such a way that temporary derogation from the KYC and AML rules can apply. The other is to link the network information about a mobile customer (such as frequency of top ups, calling patterns) as a 'key' to access financial services. At present the evidence shows that the derogation from regulations given certain constraints (such as volume, frequency and size of transactions and deposits) has been the preferred approach. Yet the alternative indicates that mobile transactions have the potential to reduce these information asymmetries substantially. The use of customer specific network data, subject to data privacy laws, could be a highly effective way of removing a major barrier to the diffusion of banking services in low income countries. Such an approach would clearly create collaborative opportunities for both mobile operators and financial service providers.

### iii. Quality of life impacts

Mobile financial products allow consumers the opportunity to free themselves of many time consuming and costly activities. However, it is the interplay between mobile based financial products (such as salary payment) and the ability to withdraw cash for the system which determines the net benefit to consumers.

For individuals, climbing the banking ladder is fundamental to greater participation in economic development. Simply reducing the risk of crime by removing the need to carry around cash is significant. Reducing the time taken to use existing services and removing some of the associated costs can also fundamentally transform people's lives.

Whilst there is little systematic data on the use of mobile transactions, the anecdotal evidence is powerful. Here are some typical examples. Farm workers in South-Africa, to top up their phones, had to walk for at least 30 minutes along a sand road to get to the main road. They then had to wait for a taxi, an unpredictable process, to take them into the nearest town at a cost of at least 10 Rand. The whole journey typically took 2.5 hours and cost at least 20 Rand – half a day's wages. A mobile transaction can provide the same service for less than 1 Rand and eliminate all the travel time.

The same time and money savings apply to the top up of electricity meters – the means by which most black South Africans pay for their electricity. Typically the queuing time at the top-up shops is in the region of 2.5 hours – the cost of this to the elderly and the infirm is substantial and there is anecdotal evidence of elderly people sitting in the cold

without power because of their inability to cope with buying the top-up cards. Mobile transactional systems eliminate the travel and time involved in buying electricity top-up cards.

### iv. Cash is cash: the Achilles heel of mobile solutions?

Cash remains central in most developing economies and so the ability of mobile schemes to handle cash is fundamental to their success. There are two important aspects. The first is the ability of individual account holders to deposit and withdraw cash in a secure and reliable manner. The second is the ability to convert information and transaction-based financial products (such as salary payments) into cash.

In terms of individual account holders' cash deposits and withdrawals, a number of potentially complex issues arise. In a traditional banking environment, the bank branch is the focal point of this activity and is subject to many regulations which ensure, albeit in cumbersome way, security and reliability. These regulations can cover not only the physical properties of the building but also the soft infrastructure, such as levels of cash holdings and security procedures or the criteria applied to the recruitment and training of staff. In the case of mobile transactions, the primary focus of cash-based activities will be agents who are likely to be widely scattered and whose primary business is not providing banking services. So there is inevitably a trade-off between using a geographically extensive network of related businesses (such as airtime sellers) to provide cash services and a conventional network of bank branches and ATM machines with their smaller geographic footprint.

Again, there are already competing models. Wizzit interfaces with ATM machines and uses a debit card to allow for cash-based activities whilst M-PESA essentially relies on its own agents. In order to protect its closed system from a heavy withdrawal of cash, each agent within the M-PESA service has to provide a float which is additional to their own banking needs.

The ability to move cash in and out of accounts is important for consumers. In the M-PESA trial, there was evidence that many people used their M-PESA account to deposit money whilst they made a journey into Nairobi and then to withdraw the money as required when in the capital. The intention was clearly to reduce risks and increase personal security.

The management of cash reserves at the agent is an emerging issue. There are significant reputational risks as well as real financial risks for all involved. Localised 'runs on cash' could destabilise the system around a particular agent and there are questions about the liability for the cash once a deposit has been made by a customer.

Turning to the conversion of informational products into cash, an increase in the number of banked people will help governments and employers to distribute benefits like pensions or other welfare payments and salaries. Using mobile schemes can ensure such transactions are timely, relatively low cost, relatively free of risk, and auditable. However, the recipient will need to convert the payments into cash. In effect, the costs and risk involved in handling cash are shifted from the employer to the employee. Botswana is an

interesting illustration. Here, the government's decision to pay public sector wages directly into bank accounts has increased the number of people who are banked, despite no changes in the reach of banking services (for example as measured by number of actual bank branches and ATMs). However, it has also resulted in very long queues at ATMs on payday as staff seek to withdraw cash.

However, there is some evidence that mobile transactions are transforming some traditional cash-based activities into information-based transactions. For example, there is evidence from M-PESA that delivery organisations are exploiting the SMS-based capabilities of the scheme. Instead of a truck returning to the depot with loaded with cash, all the deliveries have been paid for by M-PESA transactions. Not only does this increase security but the additional information about payments (such as time of transaction) can be used to enhance the productivity of the delivery process.

## Conclusions and recommendations

Mobile transactions can simultaneously enhance the outreach of financial services, reduce information asymmetries and provide relatively low cost informational and transactional financial products. It therefore has the potential to transform the access to finance for very many people. It brings closer to reality the aspiration to provide mass access to finance to all countries and income groups.

However, it is clear that the enormous success of mobile telephony in terms of penetration rates and access across countries and income groups is not sufficient in itself to deliver the broad transformational potential of mobile financial systems. The competitive and regulatory environment is also fundamental to ensuring the successful diffusion and adoption of innovative mobile banking products.

A number of issues emerge as components of a new policy dialogue which must span the telecommunications and banking sector. These are the nature of universal service obligations; the reduction of information asymmetries; and interconnection issues.

### Reducing Information Asymmetries

The information asymmetries between consumers and traditional banking institutions are large and sufficiently costly to address that the incentives to open a bank account can be substantially reduced or entirely removed. For banks, addressing these information asymmetries drives up costs in markets where revenues are already perceived to be relatively low.

Where the entry route to financial services is through mobile networks, there is already a consumer track record in payment and creditworthiness. Importantly, the use of such data (with the consent of consumers), and, perhaps linked to network data, provides a new route both to tackle the information asymmetries and to address regulatory concerns such as KYC.

A dialogue on this issue between banking and telecommunications regulators could result in significant reductions in information costs and the removal of a major factor inhibiting the uptake of financial services.

### Access to clearing systems

The capture and distribution of externalities to consumers is an important driver of demand for network-based services. In banking markets access to clearing systems is of fundamental importance and for any new entrant such access is fundamental to defining a viable business plan. Different forms of access to clearing manifest themselves in highly differentiated business models, as the case studies here demonstrate.

A joint policy dialogue could seek to establish the delivery of competitive and low cost access to clearing systems within national markets. In some countries a cost-based interconnection regime would result in investment in and procurement of local resources, while in other cases it would allow international capital and services to stimulate local economic activity.

### Partnerships

Enhanced access to finance has become a clarion call in many quarters and mobile banking is seen by many as the main conduit to realising this goal. Yet it is clear that there are some big hurdles on the path towards widespread mobile transactions. The combination of the risks associated with increasing outreach, providing a wide range of financial services and absorbing the financial risks of the portfolio and the underlying investment militates against individual mobile schemes making significant headway. However, a policy dialogue between the financial service community, the telecommunications sector and the international development agencies could mitigate each of these risks, which will be essential if mobile financial systems are to become transformational.

## Notes

- 1 Howard Williams acted as a Senior ICT Policy advisor and consultant at the World Bank from 2002 to 2007. He is also an Associate at the Oxford Internet Institute.
- 2 There are various estimates of the unbanked in South Africa, the range is commonly accepted as being between 14 and 16 million people are unbanked.
- 3 Micro, small and medium sized enterprises.
- 4 Interestingly this lack of data on the demand for banking services by low income households has been exacerbated in recent years by the focus on the International Finance Institutions (IFIs) and others on providing microfinance credit through informal channels rather than understanding and encouraging the demand for a broad range of financial services.
- 5 See for example, Ivatury, Gautam (2006). Using technology to build inclusive financial systems. CGAP Focus Notes.
- 6 UNCDF (2005). Shaping the "Blue Book" on Building Inclusive Financial Sectors for Development. An Issues Paper for the Global Meeting, ILO Headquarters, Geneva, 4-5 May 2005.
- 7 In the United States, the costs associated with opening a new bank branch are about \$2 million, and costs can be as high as several hundred thousand dollars in developing countries. M-banking services which use channels such as text messaging/ SMS can be carried at a cost of less than US\$ 1 cent per message. The low cost of using existing mobile communications infrastructure makes such channels more amenable to use by low income customers.
- 8 CGAP Focus Notes No. 32, January 2006.
- 9 There is evidence that in some low income households consumer goods are purchased as a means of savings; these are consumer goods with relatively high resale prices which can be easily sold in a period of economic stress.
- 10 These benefits are well-documented and some of the conceptual foundations can be found in, for example, De Soto, *The Mystery of Capital* (2001). It should be noted that the banking ladder does not imply that there is a linear and unidirectional path describing access to financial services.

- 11 See for example: Financial Diaries, Porteous/DFID (2005). The Access Frontier as an Approach and Tool in Making Financial Markets Work for Poor, 26 May 2005. Or Coleman, E.B. Wynn-Williams. J. (2006) Rural Finance in the Lao People's Democratic Republic: Demand, Supply and Sustainability. Asian Development Bank.
- 12 Ivatury, Gautam. Pickens, Mark (2006) Mobile phone banking and low-income customers; evidence from South-Africa. CGAP, November 2006.
- 13 M-PESA has commercial agreements with entities and this commercial agreement is the basis of an entity acting as an M-PESA agent.
- 14 Globe Telecom presentation at the CGAP annual meeting in 2005 "Globe G-Cash – A Breakthrough in Mobile Commerce being a truly mobile solution – cashless and cardless"  
[http://www.microfinancegateway.org/files/30783\\_file\\_Gcash\\_presentation.pdf?PHPSESSID=](http://www.microfinancegateway.org/files/30783_file_Gcash_presentation.pdf?PHPSESSID=)
- 15 Equitable-PCI Bank, Standard Chartered Bank, TA Bank, Development Bank of Singapore and Bank of the Philippine Islands
- 16 Power, water and telephone companies
- 17 UNICEF as well as local non-profit organisation Kythe Foundation or Children's Hour).
- 18 Australia, Bahrain, Brunei, Canada, Germany, Hawaii, USA, Hong Kong, Israel, Italy, Malaysia, Saudi-Arabia, Singapore, Taiwan, United Arab Emirates, United Kingdom.
- 19 Office of Foreign Assets Control in Philippines.
- 20 Globe Telecom presentation at the CGAP annual meeting in 2005 "Globe G-Cash – A Breakthrough in Mobile Commerce being a truly mobile solution – cashless and cardless.
- 21 Globe Telecom presentation at the CGAP annual meeting in 2005 "Globe G-Cash – A Breakthrough in Mobile Commerce being a truly mobile solution – cashless and cardless.
- 22 Demirgüç-Kunt, Asli. Beck, Thorsten. Martinez Peria, Maria Soledad. Reaching out: Access to and use of banking services across countries. The World Bank. April 2005.

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# The regulatory implications of mobile and financial services convergence

## i. Introduction

The long predicted integration of mobile telephone and banking services is beginning to make an appearance – in emerging and developing markets. It has the potential to generate significant economic benefits, extending access to financial services and perhaps stimulating more fundamental changes and increased competition in the sector. Where the costs of traditional retail banking have been too high, or where their distribution arrangements are inappropriate to serve low income clients, mobiles are enabling innovations that could extend access to financial services in these markets. Regulatory reform may also enable mobile banks as a group to foster the rise of new, more efficient international retail settlement networks of particular relevance to the growing population of immigrants and their demand for cross-border banking services.

But these transformations may be constrained by financial and other regulatory frameworks. There are many formal barriers to the provision of payment and transaction services by non-banks. In the short term, current regulatory frameworks may also favour the inappropriate use of pre-paid accounts as substitutes for deposit accounts that provide consumers with greater protection. Added to these complications are formal and informal trade barriers that apply to cross-border services. Without adjustments to regulation at the domestic and international level, valuable legal, operational and organisational innovations important for the success of mobile banking will be impossible or too risky to implement.

Where financial service innovations are emerging outside of the traditional scope of responsibility of financial market regulators, it is at a higher level of domestic and international governance that policy makers will need to conduct a fresh, sober review of how financial regulation objectives can most effectively be achieved in ways that also facilitate valuable innovations in services and market structure.

There is a degree of urgency in this regulatory agenda. The network structure emerging from convergence between payments, retail banking and telecommunications will be

difficult to alter once established. Hence it is all the more important that regulatory and institutional frameworks set the right incentives early on in the process of innovation to capture the full benefits that may be generated through the development of m-banking and payments.

The rest of this paper is structured as follows. The next section provides relevant background on the key components of retail payment and related financial services. This clarifies some of the business model choices that mobile providers will face. Then follows the main discussion of the regulatory implications of mobile transactions. The last section concludes with policy recommendations.

## ii. The building blocks of retail payments

The starting point for our discussion is the definition of retail payments. A payment is the *transfer of ownership of assets*, generally, but not necessarily, *money*, to be accepted as a form of settlement of a claim.

*Money* is a particular kind of asset that has the important features of being, in many but not all countries, (1) a stable store of value and (2) a unit of account that (3) is widely accepted as a means to settle claims. In most economies, money is *currency* issued by a government mandated authority, such as the central bank, and has no intrinsic value itself, but acts as a placeholder for value and is by law defined as a valid asset in which to settle claims. But it is possible to have other instruments (and issuers) that are sufficiently stable and widely accepted to act as money. There are many instances of private institutions issuing claims accepted for payment in limited contexts: corporations issue stocks and bonds, retailers issue gift certificates, airlines issue air-miles, etc.

*Currency* often takes the form of physical notes and coins. But it is increasingly held as a claim on a commercial bank (or script) at which clients hold accounts and from which they can effect payments. These claims on banks are generally backed up by deposit insurance and currency reserves held by the deposit taking institution with the central bank.

The solvency of such banks is important for ensuring that deposits held with them remain a good store of value and can be exchanged for other assets.

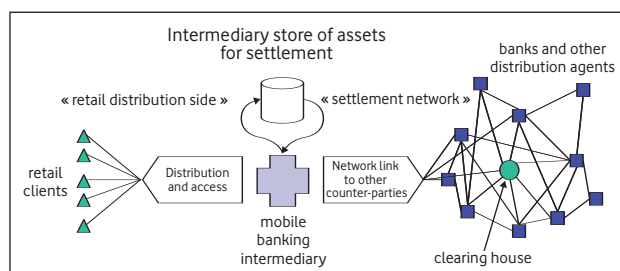
Currency, like other assets, is of little use without the ability to unambiguously attribute *ownership* of it. Banknotes and coins are 'bearer instruments': ownership is generally based simply on possession. But the ownership of value held with banks is established by a complex set of rules, contracts and conventions as well as mechanisms to ensure compliance with them.

Lastly, having ownership of an asset (or a claim thereto) is of little use if owners do not have the means to exchange it for other assets, goods or services. Beyond the simple physical process of exchanging notes and coins, institutions have developed a wide variety of accepted *processes for transferring assets* in the form of money. Most prominent is a bank-to-bank transfer of units from one account to another, often held with a separate banking institution. This can often be achieved using payments instruments or media (e.g. cheques, debit or credit cards, chips embedded in mobiles) issued by a depositors bank. In some cases, private issuers have experimented with true digital, encrypted cash (or e-money) that can be stored on a smart card and transferred to other cards with the help of specialised card readers<sup>2</sup>. The specific process by which transfers are conducted include a whole variety of checks and balances, confirming amounts, accounts, availability of funds, the identities of the counter-parties, dates for transfer and the units of account being used as well as the possibility of conversion from one unit of account to another (e.g. foreign exchange).

Payment providers are intermediaries which settle financial claims between certain types and scope of transaction counter-parties. Secondary characteristics of payment services include the kinds of transactions they support, the ease of use of their payment instruments and the costs, risks and speed associated with settlement arrangements. The value of the payment service depends on the way a provider combines these features.

Mobile based innovations only apply directly to some of these functions of payments. They have the potential in principle to generate improvements in efficiency. But in practice businesses may be unable to reap their full benefits without making adjustments to complementary processes, systems and market structures.<sup>3</sup> The most important business strategy and regulatory issues mobile payments operators have to confront will arise precisely from attempts to make adjustments to these kinds of complementary processes and structures in order to enhance the overall value of mobiles in payment and retail financial services.

Figure 1. The primary components of retail payments



The most pertinent features of retail payments are illustrated in figure 1. These are 1) *Distribution*: retail payments require a punctual or on-going relationship with individual users of the service. 2) *The role of deposit taking*: the way in which a payment intermediary facilitates transactions depends on the kinds of assets in which it supports transactions and the rights it has to act as a *custodian of clients' assets* for settlement or other purposes. 3) *Settlement networks*: an intermediary needs to establish arrangements for settling claims (on behalf of clients) with other counter-parties.

ii.1. Distribution: acquiring and serving customers

The first essential component of payment services encompasses the client relationship: This includes the ability to cost-effectively contact, profile and acquire clients and thereafter to equip them with the means to initiate (or receive) regular payments or conduct other banking operations. This is the area of payments in which the role of mobiles and mobile operators are (for the casual observer) most prominent: in several countries, customers are already using mobiles to transmit and receive payment instructions<sup>4</sup>.

Three specific elements of distribution are of particular importance in terms of business and regulatory challenges facing aspiring mobile transaction operators: client acquisition, access to payment facilities, and information exchange.

Mobile operators may be able to build on existing client bases to acquire retail clients at lower cost than many other potential 'de novo' banks or payment providers. This is key to any new service. Given their broad penetration, relative to banking services, mobile phone operators in developing countries have the potential to acquire banking clients at a relatively low cost. The lower the costs are, the further down the income scale payment providers and banks will be able to profitably extend their services. But some physical presence may be necessary in order to fulfil business and regulatory requirements.

Secondly, once a client has been 'acquired', they must be provided with easy and preferably low-cost means for on-going use of the payment service. In particular, mobile banks will need to complete their payment services with other means to facilitate cash deposits and withdrawals. The potential to bring down total distribution costs therefore depends critically on how mobile operators arrange for cash in and out. Non-bank retailers such as airtime resellers will play an important role in this. This aspect of mobile banking models therefore raises the prospect of operational risks with which regulators and most banks are unfamiliar.

**Box 1. Examples of non face-to-face account opening procedures**

*PostIdent process (Germany):* To open accounts at remote institutions, applicants can complete a form and have their identity validated by personnel at the Post Office. The applicant must present him or herself at the Post Office with the application and a valid form of identification and to sign the application in the presence of the postal worker who forwards the forms to the financial institution.

*Electoral roll (United Kingdom):* For the opening of internet based accounts, operators in the UK have been permitted to validate an applicant's identity by checking the data submitted to them (name, address) against information available electronically on the electoral roll.

*Wizzit (South Africa):* is a mobile based bank that has introduced the use of 'Wizzkids' to complete the necessary identification process. These generally young employees are sent out to check the identity of applicants and collect photocopies of relevant identity papers.

Lastly, mobile payments providers will have to design efficient means to gather information about their (prospective) clients and target products and sales strategies to their individual profiles. Information about consumers is important in order to optimise business models by informing commercial decisions, helping to estimate credit risks and shedding light on customer demands.

**ii.2. Deposit-taking**

Payments service providers need to process monies that clients want to hold. Providers may try to issue their own money, but must in that case ensure some form of conversion with more widely accepted assets. More generally payment providers will choose to subscribe to existing currency systems. National currencies are likely to be a first choice. These have the advantage, both by convention and law<sup>5</sup>, of being widely accepted as a means of settling claims. But they also come with constraints. In particular this means working within established rules and institutional structures that support them. Sources of liquidity – critical for settlement providers – will be limited by the issuer (i.e. the central bank) to a select number of banking institutions. And for each currency, settlement networks and providers will be limited. Mobile payments providers may have little choice between different exchange venues. Processing currencies in a dematerialised form requires the intervention of institutions authorised to take deposits. In this form of commercial bank script,<sup>6</sup> currency has the advantages of being both immaterial and an instrument for which legal and operational frameworks for the transfer of ownership are well established and accepted. By participating in these networks a new payment provider can quickly achieve the scope necessary to settle claims for its clients. But to take advantage of these features, a payment provider needs either to seek authorisation to take deposits itself or to work with an institution that is already authorised.

**ii.3. Settlement Networks**

The last step in the payments chain requires direct or indirect links to settle claims with a relevant set of transaction counter-parties. The value of the service expands more than proportionately with the scope of this network: the more persons with which transactions can be completed the greater the benefit of the payment service<sup>7</sup>. Together, mobile transaction providers could have the potential to introduce significant innovations to settlement networks of great benefit to consumers and the un-banked. But their actual scope and incentives to do so are currently constrained by hurdles to deposit taking and by the dominance of existing settlement and inter-bank networks and the regulatory structures that support them. Existing settlement networks are useful for gaining quick access to counter-parties, and therefore achieving sufficient scope, but could constrain their potential to innovate in future. In developing markets, existing domestic retail clearing systems may actually provide very poor scope and efficiency.

**Box 2. Remittances and the international stepping stone for non-banks**

International remittance services are an important area for the application of mobile led payment and banking services and a potential spring-board to wider development. The remittance market is poorly served by existing banking services and settlement structures. But as a growing market it offers increasing revenue potential for new entrants. It also provides a bridge from developed economies into emerging and less advanced economies that could enhance access to finance.

But as an international financial service, remittance and related banking services inevitably confront a more complex regulatory and policy framework than purely domestic services. Mobile operators may face operational constraints due to (a) restrictions on cross border trade in retail financial services, (b) currency convertibility and (c) differences between national legislative and regulatory frameworks that erode opportunities for economies of scale to be achieved in a cross-border environment. Moreover it is in this cross-border context that authorities are most concerned to stem money laundering and terrorist financing and hence most strictly apply customer due diligence rules.

**iii. Regulation of Retail Payments**

This section explores the policy issues which arise from the entry of mobile providers into retail payments. The overall aim of financial regulation is to foster financial stability and correct market failures.

The table in Box 3 sets out the important dimensions of financial regulation in order to explore the implications in the context of mobile transactions. Three particular issues are discussed in this section:

- 1 Entry restrictions on deposit taking and consequences for settlement networks.
- 2 Regulatory constraints on distribution channels
- 3 Consumer protection



**Box 3. Relevant elements of banking system regulation**

Banking and payment services are subject to a wide range of regulatory and supervisory practices. This table provides a brief overview of objectives and instruments relevant to the development of mobile banking.

Area of Regulation	Objectives	Representative Instruments
Systemic regulation	Preserve stability of the overall sector and guard against the transmission of failures throughout the system	Limits on entry and risk taking, reporting requirements, enforcement
Prudential regulation	Guard against excessive risk taking by depository institutions or fraud; small retail clients are considered to be ill placed to assess and monitor the health and good conduct of institutions, to the public sector may have a role in fulfilling this role	Authorisation requirements such as management experience, base capital, controls, operational standards; reserve requirements and risk concentration limits
Payment system supervision	Preserve the stability of payment systems, forestall contagion, ensure public confidence in retail systems	Minimum operational and technical standards for membership; financial requirements for members
Consumer protection	Protect consumers from fraud or exploitation by providers with significant market power; ensure minimum disclosure and quality standards for clients; support confidence in the financial system	Conduct of business rules, competition policy, ombudsman schemes, minimum disclosure and contracting standards, consumer education, surveillance and enforcement measures
Financial integrity	Prevent use of the financial system for the laundering of money, criminal activity and terrorist funding	Customer due diligence rules, transaction reporting requirements (e.g. suspicious transactions)

**iii.1. Deposit Taking**

Probably the single most important regulatory issue pertaining to mobile entrants into retail payments concerns deposit taking. Limitations on deposit taking are justified on the grounds that deposit holders may be poorly placed to judge the safety of their bank or to monitor its activities that may put its stability – *and their funds* – at risk. Regulation has a role to play in preventing inexperienced or potentially dishonest firms from entering the market and enforcing limits on the risks that banks take. But ideally it should aim to do so in a manner that constrains innovation and competition as little as possible.

Non-cash payments need to start from or end in an account held with a bank. New entrants in payment services, such as mobile operators, must either have the right themselves to act (within a defined scope) as custodians of depositors' funds or work with banking institutions that have authorisation. In practice, they need to find a partner bank, restrict themselves to low-value transactions only, or acquire a banking license.

In existing regulatory frameworks, a banking license is required in order to take deposits<sup>8</sup>. The process to apply for a banking license can be ill defined, lengthy, costly and uncertain. Moreover, in many jurisdictions, mobile operators may be formally prohibited by various laws from obtaining a banking license or owning a bank. Additionally, ownership of domestic banks by foreign institutions may be prohibited, strictly limited or subject to additional constraints.<sup>9</sup> Beyond these measures to vet new applicants, regulators subsequently monitor and control the risks that authorised institutions take and to which they expose depositors' funds.

In the absence of a banking license, mobile operators (and other non-banks) seeking to provide payment and banking services will be reliant on partnering banks. This deposit taking institution will in these circumstances 'own' a significant part of the client relationship and have an influence on the emergence and evolution of new payment services and providers.

Deposit taking regulation may also in the short run favour use of pre-paid accounts that both constrain mobile operators' commercial freedoms and provide less protection to consumers. By making it difficult and costly at an early stage of their development to take deposits from clients, regulation favours (1) partnerships with banks, not just as wholesale services providers but also as retail account holders, and (2) closed network payment services similar to those used by the retail industry. These restrictions are likely to reduce the number of independent mobile payments providers and, subsequently, the chances that they create efficient settlement arrangements between themselves, outside the constraints of established inter-bank settlement networks.<sup>10</sup>

Some exceptions to traditional frameworks for deposit taking are emerging. First, for limited types of purchases, mobile operators can use pre-paid (or post paid) accounts as a means to settle retail transactions. This allows them to use existing processes for payments, but provides depositors with less legal clarity and protection than with bank deposits. Informal arrangements have also allowed mobile operators engaged in low value funds transfers to take retail deposits on condition that the funds are subsequently held in highly liquid assets with regulated institutions.<sup>11</sup>

What are the potential benefits from relaxing deposit taking restrictions further?

The easing of restrictions would increase new entry and could generate scope for the emergence of new retail clearing and settlement networks. Facilitating innovation and competition in these networks is notoriously difficult. Regulatory investigations have almost invariably concluded that there is indeed a lack of competition in them.<sup>12,13</sup> But changing existing arrangements requires a degree of alignment between members' interests and capacities that can be very difficult to obtain. Once arrangements are in place, such as in existing clearing houses, new systems face an uphill battle to establish themselves. If mobile operators providing transaction services emerge in sufficient numbers, they may have better chances to introduce innovations by establishing new payment networks that compete with existing arrangements – instead of trying to work within the existing structure to achieve modifications. As new entrants seeking to develop financial services, they have incentives to develop new structures and little to lose by working around legacy systems.

There are three particular areas in which mobile entrants might be able to address deficits in current arrangements.

- 1 *International payments:* Infrastructure is not efficient for international retail (P2P) business. Although demand for cross-border retail payments remains low, international trade, migration and cross-border investment should lead it to increase. Given the foothold that mobile banks already have in the remittance markets, they may be well placed to lead the development of an international clearing house, facilitating inter-operability between mobile banks and related financial service providers.<sup>14</sup>
- 2 *Real-time P2P transfers:* Customers appear to appreciate near real time P2P transfers.<sup>15</sup> Although currently only supported within closed networks, this service feature could be a focus for mobile operators to expand. Indeed, the long delays during which funds are often unavailable to senders or receivers (using bank to bank transfers) are a frequent subject of consumer complaints.
- 3 *Domestic payment systems in developing markets.* In many of the markets which mobile providers are targeting, domestic clearing systems are limited in scope and performance. Mobile providers may face less formidable competition, in them and find new systems easier to establish. Where mobile providers and other private sector institutions can profitably extend networks to this underserved client base, they will also enhance the overall reach and quality of domestic retail payment systems.

Transaction volumes, in thousands, 2004			
	domestic <sup>1</sup> credit transfers	int'l SWIFT messages <sup>2</sup>	int'l as % of domestic
Germany	984000	77092	8%
Spain	256000	15558	6%
France	1737000	31315	2%
Sweden	313000	6573	2%
UK	2012000	51580	3%

notes:  
 1: reference domestic figures are for countries shown are based on the following clearing system: Germany: RPS; Spain: SNCE; France: SIT; Sweden: Bankgirot; UK: BACS  
 2: includes all non-domestic MT100 type messages sent to or received from indicated countries in 2004 worldwide  
 SWIFT message given an indication of bank-to-bank retail transfers via interbank networks but do not reflect total retail transfer volumes

SWIFT MT100 transfers sent to (tsd, 2004):					
	(selected countries)				
	Brazil	India	Kenya	Turkey	South Africa
Germany	112	171	18	620	128
Spain	41	50	4	225	37
France	38	17	1	22	14
Sweden	7	16	3	35	15
UK	51	483	49	455	468

The MT100 message type group largely reflects the use of the MT103

Regulatory changes that make it easier for mobile operators to enter the market without heavy reliance on an incumbent partner bank will subsequently increase the likelihood of new settlement arrangements emerging. Regulators will probably want to have better estimates of the benefits that reform could generate. And this is indeed an important next step for research. But policy makers must avoid too strong a focus on attempts to estimate concrete scenarios, as this is likely to be endless process, inevitably leading to policy paralysis. Moreover the benefits from reform will stem just as much from the enhanced scope they allow for mobile operators to experiment as from any specific innovations which could be subject to specific estimates. The benefits of change must be seen equally in terms of the reductions in unnecessary constraints on operational freedoms. Regulators should continually seek less intrusive means of pursuing their key objectives.

**iii.2. Distribution channels**

Distribution remains one of the last frontiers for outsourcing in classical retail banking. There are two distinct sets of issues. The first concerns the quality of the distribution network itself. The main regulatory concerns when it comes to distribution are:

*Reliability:* Concern may be expressed regarding the quality of procedures outsourced to agents and the robustness of controls (e.g. account opening, client identity validation); there may also be concerns about control over or trustworthiness of staff.

*Security:* As far as cash is concerned, banks and agents must ensure that funds are sufficiently protected from theft. Servicing remote agents with wholesale cash services (including the transport of banknotes) can be very risky and costly.<sup>16</sup>

*Continuity:* Where agents may go out of business or terminate distribution agreements, their customers will need to be provided with alternative means to access their funds and other services.

*Competence:* External staff will need to be monitored to ensure their level of training and competence.

These risks are likely to be of as much concern to the operators as the regulators, especially in a competitive market. So far many authorities have taken a very constructive approach to the use of agents by mobile payments providers. Equally, operators are still seeking more reliable arrangements themselves. But a lack of certainty may also be impeding further development and as the market evolves, problems may arise that regulators could act now to forestall.

Regulations that affect the retail distribution sector can therefore have important indirect effects on the emergence of mobile banking. In particular, policies in emerging and developing markets may constrain competition in the retail sector, with subsequent consequences for the variety, stability and capacities of potential agents.

In many economies, not just emerging markets, the retail trade is heavily regulated. Often there are restrictions on zoning, foreign market entry, opening hours and pricing policies<sup>17</sup>. Policies often aim to strike a balance between the benefits from large chains and the interest of diversity and small, local retailers.<sup>18</sup> But it is precisely retailers with a large yet standardised distribution network that can be attractive agents for branchless banks. Where regulation places limits on their potential for expansion there will a consequent effect on the capacity of new banks to find appropriate distribution partners.

A second set of issues has come to the fore more recently with regard to customer due diligence in the context of money laundering and terrorist finance. Anti-money laundering legislation obliges financial institutions to take care in verifying the identity of prospective clients. This is also good business practice. But where rules are too restrictive or applied with little flexibility to accommodate different means of identification, potential clients can be excluded. Moreover it is arguable that overly strict identification procedures to help stop terrorist financing and money laundering measures can drive people to use informal channels which escape the oversight of regulators altogether.

For mobile payments providers targeting in particular the poor, the un-banked or migrant communities, traditional rules in this domain can be prohibitively expensive or even impossible to implement. Many potential clients do not have access to the

kinds of documents prescribed and even if they do, it may be too costly to present them in the proper context and time frame. Moreover, suspicion of banks, illiteracy and immigrants' fears of exposing themselves to the scrutiny of host country authorities may all dissuade potential clients from even trying to open accounts.

Rules appropriate to a pro-poor financial sector development agenda should apply a risk adjusted approach to different markets and client segments. Authorities realise the importance of this. The European Commission proposal for a Regulation of money transfers (July 2005) highlighted the need to avoid "driving transactions underground", suggesting that obligations should be applied on a risk sensitive basis for lower value transfers.<sup>19</sup>

### iii.3. Consumer protection

The aim of regulation in this context arises from consumers' inability to judge the safety of their funds and the need to ensure that operators have proper incentives to respect contracts and consumer interests. But instruments of consumer protection can sometimes limit service and product innovations. Standardisation can enhance transparency, the capacity for consumers to compare offers and enforce minimum levels of quality. Caps are sometimes placed on interest rates, restrictions on product cross-subsidisation, and pricing policies may be regulated. These kinds of measures can be useful in certain circumstances. But when applied to other market environments for which they were not conceived, they can easily inhibit innovations made possible by mobile entry. Operators and regulators together need to review limitations that may pose unnecessary constraints.

Incomplete contracting standards can also be a problem for the development of new service models. For example, agents may be required to validate the authenticity of documents or signatures. The legal status of agents in this context may be ambiguous. Authorisation or validation of payments via remote mobile tools may not be recognised by existing laws. And legal frameworks applicable to mobile telephone payments may be insufficiently defined to allocate rights and obligations clearly between clients and their mobile operator/bank in the event of operational errors, incidents of theft or fraud or other unforeseen problems. Moreover, poor and remote clients are likely to be at a disadvantage if they want to identify, communicate and pursue incidents for which their mobile operator may have responsibility. The level at which laws and guidelines may need to be amended to provide a more stable legal framework will inevitably vary according to the specific legal and regulatory structure in any one jurisdiction.

It should be noted, though, that consumer protection will be a key component of any commercial strategy to build confidence in mobile payments services. This is especially the case where consumers have entrenched reservations about banks in their country. Surveys have suggested that many in developing countries have a strong distrust of banks and are likely to be sceptical at first about giving up physical bank notes for electronic based accounts. Regulators and mobile operators alike have an interest in strengthening consumer confidence.

The challenge is particularly important for early innovators. If consumer protection measures are too weak, potential first stage entrants may be dissuaded from investing in the market at all, as changing consumer habits and perceptions can be very expensive. And as the market develops, it is inevitable that there will be some dishonest entrants, with the result not only that some potential clients will become victims of fraud but that these firms' activities may damage confidence in honest firms. So it is essential that regulators and operators work together on consumer protection.

A promising avenue for developing consumer confidence may be to build on the structure of remittance services. This market provides a natural bridge between different social and economic zones, both of which can be used to promote confidence, enforce standards and educate consumers. For example, if regulators work effectively with each other across borders, recipient countries may be able to enhance local consumer protection by acting through supervisory structures in sending countries.<sup>20</sup> Migrant workers may also be one of the more effective channels for educating consumers of financial services back home. In both cases, national regulators will need to enhance cooperation with other authorities at different levels of government – local and international.

#### iv. A policy agenda

There should be little disagreement in principle that the advent of mobile financial and transaction services have the potential to generate economic and social benefits, extending access and fostering growth in liquidity. Governments and regulators, in advanced as well as less developed economies, should therefore be seeking to facilitate the entry of these new providers. The focus should be on encouraging innovation, while developing more efficient ways to continue to pursue the fundamental aims of financial regulation.

The challenges lie in identifying specific, pragmatic policies and instruments that can be applied effectively within existing structures and without putting at risk the stability or integrity of the market. Moreover, public authorities need to be prepared not just to introduce one-off changes in legislation or supervisory practices but to spur and accompany a longer term, dynamic transformation that mobile businesses may trigger, both at home and in coordination with authorities abroad.

This section summarises by setting out proposals which would encourage new entry into mobile financial transactions, innovation by operators and demand by consumers for these services.

##### Deposit Taking

###### *Lower barriers to deposit taking*

Regulators should review and seek to reduce the up-front fixed cost barriers to deposit taking for institutions that aim to act as payment or transaction banks. To mitigate against a subsequent increase in risk, clear and strict rules should be imposed on the use of these funds (the types of assets in which they could be stored) and compliance with them monitored.

###### *Carefully select the asset classes in which transaction banks can place depositors' funds*

The rules limiting the use of clients' funds by mobile banks will be very important as means to limit risk taking by these more lightly regulated institutions. More broadly, the choice of eligible assets will indirectly channel financing to 'favoured' recipients. Although there may be a temptation to limit the permitted assets to local government bonds this would create an unwarranted subsidy to governments and waste an opportunity to enhance market liquidity and asset diversity. Equally, authorities should resist calls to coerce savers to fund domestic 'development projects'.<sup>21</sup> Low risk corporate assets or international bonds could provide significant risk diversification opportunities.

###### *Ensure new entrants have access to central payment infrastructure*

New payments providers must be able to gain cost-effective access to inter-bank settlement structures, such as domestic clearing houses, in order to provide main stream transaction services. But such clearing houses are often owned by incumbents in the retail banking industry with incentives to limit the growth potential of new competitors such as mobile providers. Competition authorities and regulators need to review relevant clearing house membership rules, technology and fees.

##### Cross Border Remittances

###### *Create international regulatory structures that facilitate cross-border services*

International cooperation between regulatory authorities is necessary to facilitate mobile banking in remittance markets. New or existing regional or international authorities may be able to introduce a degree of regulatory competition or peer review mechanisms to promote greater opportunities for trade and guard against intransigence or even abuse of power by national regulators.

###### *Facilitate the development of economies of scale across borders*

International payments are perhaps the least well developed segment of financial markets, both for consumer and business transactions. It may therefore be an area of market demand, such as for remittances, in which mobile banks find greatest potential for initial, profitable commercial developments. But as an intrinsically dispersed international market, achieving economies of scale will require cross-border activities that may conflict with formal and informal restrictions on financial services trade (as well as on input services). Reductions in these trade barriers may be essential to deliver the scale necessary for low cost services, especially in smaller economies.

###### *Facilitate innovation via the remittance markets*

As a key market in which mobile banks are already working, remittance services should be a priority area for public policy action. By expanding opportunities in this domain for firms to develop cross-border economies of scale and more lucrative products, regulators can help to increase the incentives for mobile operators to invest and experiment. A number of steps could be taken to achieve this goal.<sup>22</sup>

- *Permit cross-border provision of retail financial services.*  
This should include the marketing of deposit accounts, credit products and transfers. Some important examples of these cross-border services have been developed.<sup>23</sup> Their potential as a conduit for lower cost financing should be investigated.
- *Facilitate off-shore accounts for remittance recipients.*  
International payments are expensive because accounts and banking structures are aligned with national and currency boundaries. Greater liberty to offer multi-currency offshore accounts could improve cross-border retail payment structures.
- *Develop mutual recognition of legal and regulatory frameworks.*  
In particular for specialised lending products in high volume corridors, regulatory coordination is important. Cross-border products are difficult to promote if they remain tied to home country legal systems.
- *Facilitate cross border participation in domestic retail clearing systems.* International access may improve competition in the market for international wholesale liquidity and payment services.

### Distribution Channels

#### *Revise outsourcing rules*

This applies in particular to guidelines for client account opening, cash deposit/withdrawal and other services provided through non-bank distribution partners (or agents). In many economies there has already been significant growth in agent based banking and in some jurisdictions regulatory frameworks are beginning to take shape. Elsewhere regulators should be reassuring new or potential entrants about their willingness to support this form of outsourcing. In those jurisdictions with initial experience, multi-stakeholder groups should be conducting reviews and drafting improved guidance.

#### *Adjust customer due diligence guidelines*

To facilitate the acquisition of clients remotely, and those without standard documentation, regulators need to devise more appropriate and proportionate KYC rules that facilitate business with these types of clients but still allow governments to combat money laundering and terrorist financing. First, authorities should be sure that alternatives to traditional identification means have been explored to minimise exclusion. Secondly, rules should be applied in ways that are proportionate to the risks posed by transaction and client types. Not all users, locations or sums represent the same risks. Mobile operators may even be able to support surveillance by contributing new data (e.g. call patterns) to statistical profiling.

### Consumer Protection

#### *Consider scope for telecoms regulators to act*

Telecoms regulators could play a role in consumer protection and licensing mobile payments providers, in an exchange of ideas with financial regulators. Telecoms regulators' existing expertise and contacts for consumer protection of mobile customers could be a useful basis for this area in particular.

#### *Devise appropriate consumer protection measures*

Existing consumer protection measures will probably need to be adjusted and new measures will need to be devised in order to support consumer confidence in the potential banking innovations. Some initiatives that regulators and mobile operators may want to investigate include:

- *Ombudsmen schemes:* An independent and respected person in the community can be a representative for receiving and acting upon client complaints. They can help to enhance real and perceived market integrity. But these persons position may also be liable to abuse or be devoid of actual influence.
- *Self regulation:* Where a sufficient number of new entrants develop the market together, there may be significant scope for regulators to place responsibilities upon them to collectively set common standards and operate their own operational controls to protect market integrity.
- *Private monitoring and certification:* Independent consumer or financial services firms may be able to play a role in assessing and monitoring the quality of mobile banks and their operations. In low income markets the costs of their operations may be too high to be sustained without some form of public subsidy.
- *Joint education programmes:* Mobile banks could, beyond the scope of self regulation, engage in programmes to enhance financial awareness and education.

### Regulatory Processes and Reviews

#### *Set review clauses on regulatory reforms, evaluate and adjust*

It is important to integrate review processes into any new reforms and possibly even establish sunset clauses. These are good practices in general and may help to ease the worries of those concerned about a permanent relaxation of licensing requirements. Some authorities already appear to have taken a fairly liberal approach to 'small' deposits being held by mobile or other institutions for purposes of making and receiving payments.<sup>24</sup> But these frameworks are inherently unstable and will require reform themselves. Greater clarity about the process of regulatory change would also aid competition at this early stage.

#### *Allow for up-market and cross market expansion*

Investments by mobile banks will depend on opportunities to expand into new products. And it would be unrealistic to expect them to ignore revenue potential from serving higher income clients. Similarly, their attention will also turn towards improving the earnings potential from customer deposits. Insofar as regulation only allows them to provide payments to the poor and the unbanked, mobile transactions may fail to reach the critical mass necessary to bring down marginal costs of banking services for the wider population. Moreover, regulations that severely limit mobile operators to serving only the unbanked may give rise to undesirable divisions between poor and advanced financial services – a sort of financial sector apartheid. There should be transparent and fair processes open to mobile providers that decide at a later stage to develop these sides of the business.

## v. Conclusion

As probably the most heavily regulated area of any economy, the financial sector is in large part a product of regulation. To seize the full benefits from the convergence of financial, payment and mobile services, this regulatory framework will also need to evolve. Simple gains may be obtained by relaxing and adapting regulations to the new possibilities that mobile communications provide for extending access and reducing costs. More important dynamic gains may also be within reach if policy makers facilitate entry enough for mobile led operators to introduce innovations and enhance competition in payment services. A well-developed policy and analytical framework for mobile transactions is required to develop and implement efficient reforms.

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## Notes

- Helpful suggestions were provided by Paul Atkinson, Diane Coyle and David Porteous. The views expressed herein do not necessarily reflect the opinions of any of the institutions with which the author is associated. All errors and omissions remain the responsibility of the author alone.
- One early example of e-money is that developed by Mondex. There are however many other instances of payment services erroneously being referred to as e-money, in the sense of stored value. The fundamental difference between remotely held deposits and e-money, as a substitute for cash, should be that e-money is a 'bearer instrument' – i.e. it embodies a claim that can be exchanged by its holder without the intervention or authorisation (visible or not) of a third party.
- This is a common feature of innovations and what determines their value: airplanes are of little value without airports, the internet would have little value without widespread use of personal computers, cash withdrawal cards are of little use without a network of ATMs, etc.
- Mobile users can send and receive SMS payment instructions, wave their phones in front of 'contactless card' reading systems and (of course) even call their bank directly to pass instructions to them verbally.
- National currencies are often declared as 'legal tender' for transactions, implying that counter-parties cannot refuse them by law as a media with which to settle claims.
- This is a term for money held with banks, denominated in national currency, but in principle a claim on the issuing commercial bank. The safety of these deposits is based on the reserves held by such banks with the central bank and issuer of national currency.
- Network scope can also be differentiated in terms of time and price that applies to groups of counterparties.
- It is worth noting that under current EU legislation, financial services institutions and under the newly approved payments directive payment institutions, are allowed to provide safekeeping of client financial instruments. This can include safekeeping of close cash substitutes, such as money market funds. But if the costs of safekeeping and frequent transfers in and out of these funds are too high, they will represent a poor substitute for traditional bank accounts. Licensing requirements, including capital requirements, for these kinds of institutions are much less arduous than for full credit institutions.

- 9 Banks may need to employ local directors, there may be restrictions on opening new branches or local shareholders / partners may be required. They must also fulfil minimum requirements regarding capital, management experience, systems and operations; all of these impose costs on start-ups. The World Bank Database on regulation provides further examples.
- 10 It is important to remember that at some level, perhaps wholesale payments, inter-operability between new mobile banking networks and existing retail banks will be necessary for long term growth.
- 11 In the Philippines, GLOBE has obtained exemptions from general licensing requirements from the public authorities, enabling them to take limited deposits from customers for transfers and retail payments. More formal arrangements have been put in place in the European Union where 'e-money' institutions are similarly allowed to receive low value deposits from the public for the purpose of settling payment, under the condition that depositors' funds are held at a regulated commercial bank or in specified assets money market funds, such as government bonds or high interest term deposits.
- 12 The challenges of achieving an integrated European retail settlement structure are well known within the industry. Progress has been painfully slow and there is still no guarantee that public sector intervention and regulation will really produce the desired results.
- 13 See for instance the much cited Cruickshank report on the UK wholesale banking market.
- 14 A recent announcement by the GSMA and Mastercard suggests that mobile operators may indeed seek to develop their own multi-lateral financial settlement arrangements.
- 15 As technology has improved it has become easier and cheaper to settle claims more rapidly, thereby reducing settlement or credit risk. What is now common practice in the wholesale world is becoming more accessible in terms of costs as technology improves.
- 16 Measures that foster a balance between deposits and withdrawals from any one agent will help to keep liquid balances low and hence minimize the risk of theft. This means it is important to encourage more than just remittance services.
- 17 For an overview of retail distribution regulation, readers may refer to cross-country comparisons by Boylaud and Nicoletti. OECD.
- 18 Regulations of this kind can have negative welfare effects on the bulk of consumers because large retailers generally have extensive, efficient sourcing and distribution networks which generate competitive advantages. Hence there is a fear that they have the power to squeeze out small competitors.
- 19 See the Regulation of the European Parliament and the Council on Information on the payer accompanying transfers of funds, 2005/0138
- 20 Remittance services providers clearly recognise that they can optimise marketing expenses and measures to build confidence in their brand by addressing both senders and recipients of funds. Senders may be better educated and familiar with modern banking tools, and hence in a better position to choose quality services and reassure family members back home about providers and how to use their products.
- 21 In particular with regards to remittances, there have been suggestions that 'money sent home' could be tapped to support local development projects. But regulatory attempts to channel foreign funds in this manner is likely to backfire, directing funds to favoured projects and probably persuading senders to remit less and save more in their host country where a greater choice of investments may be available.
- 22 Other useful proposals are included in the BIS/World Bank General Principles for remittance services.
- 23 A notable example concerns cross border mortgages supported by the Caja Madrid and Banco Solidario in Ecuador.
- 24 M-PESA, Globe and Crandy all have acquired formal or ad-hoc authorisation to take small deposits from the public for the purpose of making payments; for these small amounts, they are also subject to less strict KYC rules (that aim to limit money laundering and terrorist financing).

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# Airtime transfer services in Egypt

## Introduction

Person to person airtime transfer is one form of mobile transaction, allowing mobile subscribers to send and receive airtime for a small fee. In theory the balance transfer service (BTS)<sup>1</sup> is a mechanism for the efficient sharing of airtime within a network, making mobile services more affordable. BTS has been introduced into many developing world markets such as the Philippines, South Africa and Kenya. Although anecdotal examples of the positive social and economic impacts of BTS are emerging – such as its ability to enable airtime to be used as an informal form of electronic money – there has been little systematic research to date.

This paper summarises the findings of a study of the social and economic impacts of BTS in Egypt.<sup>2</sup> Vodafone Egypt launched BTS in September 2004 and this study is based on primary research conducted between January and July 2006.<sup>3</sup> We conducted:

- Six focus groups, each with eight BTS users, in three different locations and including both genders, and different socio-economic groups and ages;
- Six follow-up interviews with focus group participants;
- Four interviews with phone shop dealers and four interviews with airtime resellers;
- A nationally representative quantitative survey of 700 BTS users and 300 non-users.

The key findings were:

- *Balance transfer increases access to mobile services* through enabling users to obtain free or paid for airtime remotely.
- *Balance transfer improves affordability* by allowing airtime top-ups in smaller increments and access to free airtime.
- *Balance transfer creates commercial opportunities* for resellers of airtime, providing a viable and flexible business opportunity for a wide range of micro-entrepreneurs.
- *Balance transfer use supports social networks* through reinforcing existing relationships and redistributing airtime within family or friendship networks.
- *Balance transfer is not used as a proxy currency* due to significant cost and cultural barriers (as well as a lack of awareness), but has the potential to support mobile payments and mobile banking services.

Balance transfer has many potential social and economic implications. However, we have found that the social aspects are most visible at present – particularly in reinforcing existing family and friendship networks and building social capital – as the service is not yet delivering its full potential for enabling economic activity. BTS can provide economic benefits directly, through creating income earning opportunities, or indirectly, through allowing more low income individuals to access mobile services or as an enabler for improving access to financial services for underserved groups. We present some options to develop this potential at the end of this paper.

We now briefly outline how the BTS works and categorise broad user groups before examining each of our five propositions in more detail.

## The balance transfer service

Vodafone Egypt is one of two mobile operators in Egypt, a growing market with approximately 21 per cent mobile penetration in July 2006. 90 per cent of subscribers are on prepaid tariffs.<sup>4</sup> Vodafone Egypt offers different prepaid tariffs with varying pricing and usage structures but all require airtime recharge cards sold in denominations starting from 10 Egyptian Pounds (LE)/USD1.73 – without added sales tax – going up in increments to 200LE /USD34.84.<sup>5</sup> After sales tax and vendor commissions, retail prices for the cards start at 13-15LE for the 10LE card, going to 114-118LE for a 100LE card. The 10LE card has rapidly grown to be the most popular since its introduction in 2005, indicating the price sensitivity of the Egyptian mobile market.

In order to ensure revenue levels are maintained in low-income markets, many operators require prepaid users to consume airtime within a fixed time period. Prepaid subscribers in Egypt can only use their phones within 'validity' periods provided by their recharge card. A 100 LE/USD17.42 recharge card gives the buyer 90 LE worth of airtime and four months in which to use it. Lower denomination cards have shorter validity periods. The BTS service was introduced in September 2004 because the validity system did not always match a mobile user's airtime consumption, either leaving 'light' users with too much airtime at the end of their validity period or causing 'heavy' users to run out of airtime early, forcing many to ration their mobile use. BTS enables users to redistribute airtime.



The balance transfer process is described in figure 1. It uses the standard Vodafone balance enquiry interactive voice recognition costing 0.2 LE/USD 0.03 per transaction. BTS has been designed to be easy to use for the majority of Egyptians. It does not rely on literacy, ability to use text messaging or other features, but is based on a simple automated voice call with a pre-recorded message giving instructions on which button to press for fixed airtime amounts of 5, 10 or 15LE.<sup>6</sup>

### Profiling BTS users

BTS has proved to be one of the fastest growing value added services introduced into the Egyptian mobile market: 45 per cent of the Vodafone Egypt customer base had used the service between September 2004 – 05 and figures from July 2006 show 51,624 LE (USD8994) being transferred in 4400 transactions in that month.<sup>7</sup> In our qualitative research, BTS was the fourth most mentioned mobile service after calls, missed calls, and texts. The service is very important to many users. One respondent even claimed *“People would demonstrate in the streets if the BTS was withdrawn.”*

We interviewed 1000 Vodafone customers – 700 BTS users and 300 non-users – throughout Egypt between 13 and 26 July 2006.<sup>8</sup> Compared to non-users, BTS users tended to be younger, single, more likely to be students and more likely to be female. In order to investigate user profiles, we segmented BTS users into 4 broad categories, presented in Figure 2.

Figure 1. The balance transfer procedure

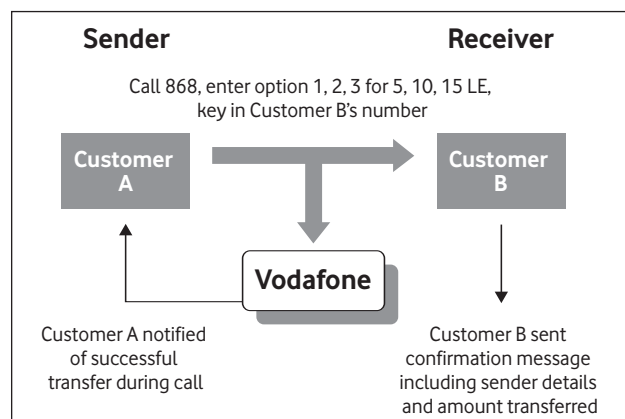


Figure 2. Characteristics of 4 broad BTS user segments

Category	'Heavy users'	'Senders'	'Receivers'	'Light users'
Percentage of total sample N=700	10per cent (68 people)	12per cent (86 people)	20per cent (139 people)	58per cent (407 people)
Times sent or received airtime (average in previous 3 months)	Sent airtime: <b>7</b> Received airtime: <b>10</b>	Sent airtime: <b>7</b> Received airtime: <b>1</b>	Sent airtime: <b>1</b> Received airtime: <b>9</b>	Sent airtime: <b>1</b> Received airtime: <b>1</b>
Gender difference	More women		More men	
Distribution across age groups	More between 13-21, fewer 45 and over	Fewer between 13-21, more 45 and over	Slightly more 13-21 and fewer over 30	More people aged over 30
Socio-economic classification	More SEC C1	More SEC A/B	More SEC D/E	Slightly more SEC C2
Occupation	More full time workers & slightly more students	Fewer students, more housewives and retirees	More part-time workers	

The findings reveal that BTS is not a very regularly used service for most users – the 'light users' category, which makes up 58 per cent of the BTS user base, only sends and receives airtime once in a three month period and even 'heavy users' only send 7 times and receive 10 times.

### Proposition One: Balance transfer increases access to mobile services.

Balance transfer users in general use their phones more than non-users, making and receiving more calls, texts and missed calls, as figure 3 below shows. Heavy users of BTS make and receive more calls and send and receive more texts than any of the other BTS user groups.

It is likely that heavier users of mobile services are attracted to balance transfer, as it allows them to maintain access to the network towards the end of validity periods. Before BTS was available, people would often run out of airtime while still in their validity period. Since cards are relatively expensive, this would mean rationing airtime until they were able to afford another card, in effect limiting the use of their mobile phone. One respondent claimed: *“In the past, I had to try to maintain my credit which I get from a LE100 card, throughout four months. So I was talking for only one or two minutes per day, but now I speak as much as I want, by paying LE10 or 15.”*

Therefore, BTS is associated with heavier mobile usage. Evidence from our survey supports this. We asked BTS users whether they thought that using BTS meant that they used their mobile phones more. The majority – 55 per cent – said that it did, with only 2 per cent disagreeing. Heavy users and receivers were more likely to agree, with 69 per cent and 73 per cent respectively saying that BTS meant they used their mobiles more.

### Balance transfer users spend more on their mobiles

It is not surprising that BTS users spend more on their mobile phones, given that they use them more. In terms of overall spend on recharge cards over the previous 3 months, BTS users (199LE/ USD34.66) spent a little more than non-users (178LE/ USD30.9). However, when the BTS user group is segmented according to our categories, we can see that heavy users (230 LE/ USD40.06) and senders (223LE/ USD38.84) spend significantly more than non-users on recharge cards

(see figure 4 below). Some of the airtime that senders purchase via recharge cards is later sent to others using BTS, in effect redistributing some of that airtime around the mobile network. Heavy users also transfer a lot of the airtime they buy, but receive substantial amounts of airtime using BTS.

#### BTS enables remote airtime top-ups

Remote transfer of airtime to friends and family is an important way of making sure that they can stay in touch. Examples include emergency situations or where a person is unable to physically get to a shop that sells recharge cards. For instance, someone who worked on a ship and couldn't buy recharge cards received airtime from friends using BTS and thus could stay in touch. We heard of many examples where BTS was used to send top-ups in an emergency.

#### Proposition Two: Balance transfer usage increases the affordability of mobiles.

##### Mobiles are a vital – but costly – tool

Although our focus group participants gave us a strong message that mobile phones were an essential tool for living, our quantitative survey showed that people do not think that they are getting more than they pay for. Mobiles are seen as a vital but costly tool.

Overall, half of our survey respondents either agreed or strongly agreed with the statement 'I spend too much money on my mobile' (50 per cent), with slightly fewer disagreeing or strongly disagreeing (31 per cent). On another measure, a small majority of respondents – 54 per cent – thought that the benefits and costs of mobile were about the same, 26 per cent said the benefits outweighed the costs and 20 per cent said the costs outweighed the benefits.

##### Making mobile use more affordable

Affordability is a major barrier to increasing the take up of mobile services in low-income markets, where the ability to pay is severely restricted beyond the top socio-economic tier of the population. Mobile operators have taken a number of steps to address this low-income market, including offering prepaid tariffs with low entry costs. One of the most crucial

issues is enabling such customers not only to purchase a handset and subscription, but also to manage airtime costs. A high value denomination card, such as the 100 LE/USD17.42 recharge card, is beyond the reach of many, and a wide variety of techniques are used by low-income users to manage airtime costs. The use of missed calls, texts and careful management of tariffs is common.

##### Balance transfer improves affordability

The ability to top up airtime in small increments enables low-income users to manage their airtime consumption in line with their restricted and unpredictable cash flow. BTS enables users to top-up airtime in smaller increments (5LE/USD 0.87) than is possible with a recharge card (10LE/USD1.73). Since BTS was introduced, customers have been able to spread the cost of their airtime by regularly topping up in small increments when their funds allow.

In our survey, users viewed BTS as an important tool to make their mobile use more affordable. 57 per cent of BTS users thought that BTS made using mobiles a little (25 per cent) or a lot (31 per cent) more affordable, with only 4 per cent thinking the opposite and 39 per cent thinking it made no difference. 80 per cent of receivers – a group that has more low-income users and relies on BTS to obtain a significant proportion of total airtime – thought BTS improves affordability, indicating that BTS plays a valuable role in enabling access to mobile services for some lower income users.

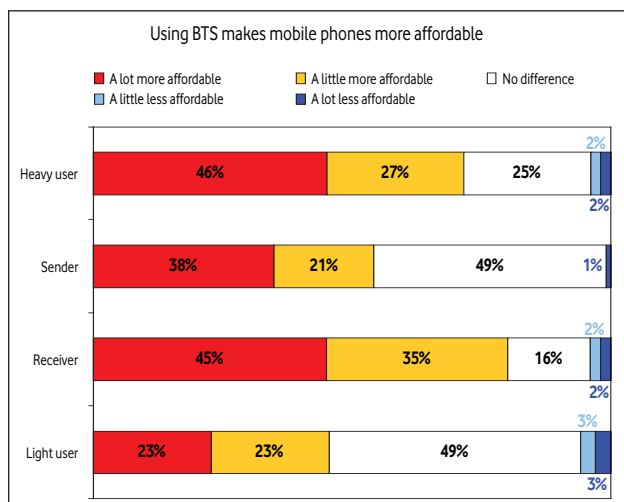
Figure 3. Mobile usage habits amongst BTS users and non-users

Average times/week	BTS user	Non-user	Heavy user	Sender	Receiver	Light user
Give a missed call	22.3	16.1	22.3	22.6	26.6	20.8
Receive a missed call	23.4	17.3	21.8	23.4	27.6	22.1
Call someone to talk	14.2	13.8	17.6	17.1	13.7	13.2
Receive a call to talk	18.8	18.5	22.7	21.1	19.4	17.4
Send a text	8.4	4.5	12.3	9.3	9.0	7.4
Receive a text	8.9	5.7	11.8	8.8	9.3	8.2

Figure 4. Average spend on airtime recharge cards and BTS sent/received in 3 months

Category	Heavy users (68)	Senders (86)	Receivers (139)	Light users (407)	Non-users (300)
Average spend on recharge cards (LE)	230	223	173	168	178
Average amount of airtime received (LE)	44	6	39	8	–
Average amount of airtime sent (LE)	33	31	9	9	–

**Figure 5. Agreement with the statement 'BTS makes using mobile phones more affordable'**



**Many users purchase airtime using balance transfer from resellers and dealers**

Although some users will purchase airtime from friends and family in exchange for cash, the main source of purchased airtime is the diffuse network of small-scale dealers and resellers that offer airtime via BTS with a small profit margin.

- 57 per cent of heavy users and 68 per cent of heavy receivers have bought airtime using BTS from a phone shop.
- Resellers<sup>9</sup> are used by fewer people (23 per cent of heavy users and 28 per cent of heavy receivers), indicating that dealers dominate the commercial BTS market.
- Low-income BTS users (SEC D/E) have done this more (51 per cent) than more affluent consumers (33 per cent of SEC A/B)

Remote top-up using BTS also took place commercially. We found many BTS users calling their local mobile phone shop or trusted reseller and asking for a transfer of airtime, promising to visit later to pay. Almost half of heavy users and receivers had done this at some point, and around a fifth of the same groups did this often or very often.

**Proposition three: Balance transfer creates commercial opportunities for users.**

In a series of in-depth interviews with dealers, BTS emerged as a useful source of revenue but was not significant compared to the main revenue-earners – recharge cards, lines and handsets. However, it helped drive footfall and attract customers into the shop.

In the focus groups and through subsequent in-depth interviews, we identified several micro-entrepreneurs who have built viable businesses on BTS. These airtime resellers operate an informal service as a source of supplementary income, and transfer airtime using BTS at a small profit. The quantitative survey found a small but noteworthy number of informal resellers. People who said that they had sold airtime at a profit made up 1.4 per cent of BTS users, or 10 people. This may appear insignificant, but if extrapolated to the BTS user population as a whole, could mean approximately 40 to 50 thousand informal resellers that are actively selling airtime at profit to some degree.

There is significant variation in this category, which could include individuals who have occasionally sold airtime to acquaintances on an ad-hoc basis. However, a few individuals have started to offer BTS as a commercial service on a regular basis. The average amount of profit was LE35/ USD 6.09 in one month, amounting to either a low or very low proportion of total monthly income. The data are unreliable, especially since many were reluctant to reveal figures for an informal grey market activity, but it is clear that some resellers have built livelihoods on BTS.

However, our in-depth interviews reveal that the reseller business model has strong potential to provide pro-poor livelihoods; it is suited to operating in 'base of the pyramid' markets due to low entry barriers, with acceptable start up costs, being easy to use and with the flexibility to integrate into different lifestyles. Potentially, anyone who has a mobile phone can become a successful reseller. Our survey identified one housewife who was making profit from selling airtime.

Resellers obtain airtime either by purchasing a recharge card at retail prices – and thus incurring administration, sales tax and other charges – or, to a lesser extent, through validity transactions.<sup>10</sup> At the moment, resellers are paying the additional costs within the recharge card system as they are essentially retail customers rather than airtime distributors. This increases their costs and undermines the pro-poor benefits of their business model as they have to charge higher mark-ups to stay profitable. Most will be forced to charge upwards of 6.50 to 7LE for 5LE of airtime.<sup>11</sup> If they were brought into the official airtime distribution network, this would significantly improve both their bottom line as well as the affordability of airtime increments to their end-customers.

**Proposition Four: Balance transfer use supports social networks.**

Egyptian mobile phone users think of their mobiles as invaluable social tools. In our survey, overall 76 per cent of BTS users and 77 per cent of non-users felt that using mobile phones strengthened their relationships with family and friends, with only 6 per cent of users and 4 per cent of non-users thinking the opposite.

**BTS strengthens relationships within existing social networks**

Although respondents in our survey were less emphatic about the social role of balance transfer than they were about mobile phones in general, they still saw the service as a tool to strengthen relationships. Overall 49 per cent of BTS users thought that using the service strengthened relationships, with another 50 per cent thinking that it made no difference. BTS also allows people to send low-value gifts, for birthdays or during festivals. Overall 29 per cent of BTS users had done this, and 4 per cent said they did it often or very often. BTS users mostly exchange airtime within their existing social networks, close friends in particular.

**Mobiles are valued by women**

Women value mobile phones for increasing freedom (52 per cent of the women surveyed said that mobiles gave them more freedom with only 5 per cent saying the opposite). There was a contrast between female BTS users (56 per cent agreeing) and non-users (33 per cent agreeing). In focus groups with younger women, we found that they are adept

at navigating traditional gender roles to obtain free airtime; asking for airtime from male friends rather than female friends, knowing that their male friends were unlikely to want anything back in return. Especially for young people, the exchange of airtime, along with exchange of missed calls and other mobile-based behaviour, has been absorbed into normal social interaction. Mobiles for much of the youth are a part of 'youth culture' and balance transfer is an essential part of that.

### **Proposition Five: Balance transfer is not used as a proxy currency.**

There are several emerging initiatives where mobiles are being used as a channel to deliver financial services.<sup>12</sup> Theoretically, a person-to-person balance transfer system offers a platform for conducting financial transactions, even if it has not been explicitly designed to do so. Airtime has the potential to become a proxy or virtual currency; it shares the same characteristics as money – medium of exchange, store of value and unit of account – and the ability to transfer it electronically makes it a viable payment mechanism.<sup>15</sup> Anecdotal evidence from other regions suggests that informal ad-hoc transactions using airtime as a form of electronic money are common in Kenya (using the Sambaza airtime transfer service) and South Africa (using the Me2U service).<sup>14</sup>

In our focus groups, we did encounter some isolated instances where participants had used airtime in exchange for goods or services. But this seemed to be taking place only in specific circumstances when the vendor wanted airtime to use: the airtime was not actually treated as a currency or as barter. We tested this in our quantitative survey, asking respondents whether they had ever bought something using airtime. Most had not, but 1 per cent of light users (four people) and 4 per cent of receivers (six people) said they had. Only one person said that they did this often or very often.

### **Cost barriers to using airtime as a proxy currency**

We had expected to find more usage of airtime for mobile payments as Egypt has many characteristics which would make such an activity valuable, particularly for longer distance transfers. There are few alternatives that can transfer cash as efficiently, safely or cheaply. However, there are barriers. The most important cost barrier is the current price structure. At present, there is a significant discount in cash compared to airtime because of administration charges, taxes and commission payments. 90LE of airtime loaded onto a phone costs 115LE after taxes and charges. If a user wants to exchange this airtime for cash, the 25LE difference in value will need to be absorbed by the user.

### **Cultural barriers to adoption**

The low usage of airtime as a proxy currency may in part be due to a perception of airtime as more of a social resource than an economic one, particularly for higher income users. Once the airtime has been bought, it can be redistributed, but normally in return for more airtime, to be received later, or as a gift. Very rarely is airtime 'cashed in'. In our survey, only 4 per cent of BTS users had ever sent airtime in return for cash (not at a profit) and only a few more (7 per cent) had ever asked someone else to send them airtime in return for cash (again, not at a profit). The concept of offering airtime instead of cash to buy something might imply that the buyer didn't

have the cash to pay, leading to a negative connotation and a 'loss of face'. This issue was raised repeatedly in our focus group discussions. There was however an appreciation of the security benefits of having virtual money that could not be stolen if protected through a PIN system.

### **Attitudes to mobile banking services**

Although it was not the primary focus of our research, we did explore the potential of using mobiles as a banking channel in our focus groups. Mobile banking met with a lukewarm response in some of the focus groups. The key issues seem to be a mistrust of including a third party in the relationship between the customer and the bank and concerns over the security of the system. However, there was positive discussion of time saving potential and increased security.

## **Options to enhance the positive socio-economic impacts of BTS.**

We now sketch out some potential ways in which the BTS could enhance the social and economic benefits of mobile phones in Egypt.

### **Using BTS to improve the affordability of mobile services.**

At the moment BTS is not officially used as an airtime distribution channel by Vodafone Egypt. All commercial sale of airtime via BTS by dealers and resellers is not within the formal distribution network, which is entirely based on printed recharge cards. However the fixed costs associated with printing and distribution, currently 0.55LE/USD 0.09 in Egypt, make it uneconomic to offer very low value top-ups through recharge cards. BTS is already operating as a person-to-person form of e-refill. Extending it to allow vendors to electronically sell airtime in very small increments to customers as an alternative to cards will improve affordability and formalise the existing dealer and reseller commercial balance transfer market. BTS can further improve affordability if smaller increments below 5 LE are allowed and validity transfers are possible.<sup>15</sup>

### **BTS is a viable means to distribute airtime but must be able to operate on a commercial scale.**

A wide range of mobile subscribers are using BTS as a form of e-top up, indicating that the Egyptian mobile market will be comfortable moving to an e-refill airtime system in the future. However, for the dealers and resellers that offer BTS, the service is too slow and cumbersome, and often fails during heavy network traffic. In order to develop BTS as a platform for building further value added services or as a significant channel for distributing airtime, it needs to offer different ways to conduct transactions, perhaps by adding a streamlined SMS based system to the existing service or a dedicated commercial service. Otherwise distributors will prefer to use recharge cards.

### **Dealers and resellers have existing trust based relationships with customers that can help introduce new value added mobile services.**

Most resellers serve specific small neighbourhood clienteles, with marketing through word of mouth and a roster of regular customers. Resellers build up trust with customers and are able to offer services like remote top-up or airtime on credit

that depend on a certain degree of trust to work. Resellers can potentially become involved in a wider network of mobile enabled services like m-payments or mobile banking.

## Enhancing commercial opportunities.

BTS offers a highly adaptable business model that is fit for operating in Base of the Pyramid conditions.

### Bring resellers into the official airtime distribution network.

Keeping resellers outside the official distribution network compromises their pro-poor potential. Resellers are unable to earn enough revenue and have to use BTS as a source of supplementary income only, while customers are paying higher prices to maintain thin reseller margins. If existing resellers, and other potential new entrants, were brought into the distribution network, they would be able to obtain and distribute airtime much more efficiently. By cutting out the retail margins, they could purchase airtime at wholesale prices and be able to distribute them for lower mark ups, improving affordability for their end customers. SMART in the Philippines follows this model for its SMS based e-refill system, with a network of over 800,000 resellers who earn a 15 per cent commission from airtime sales. Its competitor Globe Telecom's 700,000 strong distribution network will soon also earn income from acting as agents for its G-Cash e-money service.<sup>16</sup> This also significantly increases the availability of airtime in more remote areas; compare the Philippines with a population of 89 million and served by 1.5 million retailers of airtime with Egypt, which has about 10,000 official airtime retail outlets for its 72 million people.

### The pro-poor benefits of BTS can be enhanced through targeted initiatives.

Operators such as Vodafone can target specific reseller markets as a way to distribute airtime while providing pro-poor income generation opportunities. This can include providing discounted airtime to specific groups like rural women's co-operatives or unemployed youth in economically deprived areas.

## Using BTS to facilitate financial transactions and delivery of mobile banking services.

Although BTS has expanded rapidly in Egypt, we were unable to find many instances of airtime being used as a proxy currency to buy goods and services. This may be due to a lack of awareness, as the operator has not marketed airtime in this way. However cost barriers also play a strong part: the relatively low amounts of airtime that can be transferred and the significant difference in airtime face and cash value undermine its viability for regular usage, particularly for higher value transactions.

### Cultural interpretations of mobile payments, mobile banking and other value added services must be more carefully researched.

In our focus groups, the idea of introducing mobile payments and mobile banking met with a range of responses. Most crucially, there is a sense that offering to pay via airtime rather than cash gives the impression that the user is poor, and is

forced to use airtime. Although users are happy to participate in BTS transactions, perhaps even remotely, implying a significant degree of trust in both the technology as well as the distributor, there are more reservations around security when it comes to m-commerce transactions.

### There may be potential to introduce mobile banking services for microfinance clients.

Egypt has a nascent microfinance industry with large unfulfilled demand for financial services. Rough estimates indicate that the Egyptian microfinance industry could potentially have between two and three million clients, of which approximately only 220,000 are currently being served.<sup>17</sup> Mobile banking could play a role in helping Egyptian microfinance institutions increase their outreach and significantly scale up their operations.

### Remittance services from key markets may have strong potential.

Egypt has a significant remittance economy – around 3.9 per cent of Gross National Income is from overseas workers<sup>18</sup> – and there are considerable domestic remittances from urban workers to rural areas. If electronic money services were introduced onto the BTS platform, allowing international remittances might then enable cheaper, faster and more accessible cash transfers along with subsequent social and economic benefits.

## Notes

- 1 Airtime transfer is referred to as the Balance Transfer Service (BTS) by Vodafone Egypt. We use the term BTS throughout this report.
- 2 A full report that contains more data and analysis as well as a series of case studies is available at [www.forumforthefuture.org.uk](http://www.forumforthefuture.org.uk)
- 3 This study refers to tariff plans and balance transfer services that were available during this period. The BTS and Vodafone Egypt tariff plans have changed slightly since the completion of this study.
- 4 Source: Vodafone Egypt
- 5 All currency conversions used in this study are based on rates supplied through [www.XE.com](http://www.XE.com) in October 2006. The exchange rate used is 1US\$ = 5.742LE.
- 6 The features of the service have changed since the completion of this study. Users now have more flexibility in sending amounts and are charged a percentage of the transaction value as a fee.
- 7 Source: Vodafone Egypt
- 8 Respondents were selected randomly from mobile phone number lists. Users were defined as people having used BTS within the last 6 months.
- 9 A reseller is defined as an individual that sells airtime using the BTS service at a profit and who is not linked with a mobile dealer or phone shop. This excludes transfers made at face value, even if the airtime is sold.
- 10 A validity transaction entails splitting a recharge card into airtime and validity portions – a 100LE card will normally provide 90LE of airtime and 4 months of validity – and then selling only the validity while retaining the airtime. A customer will buy a 100LE card from the reseller and then transfer back most of the airtime, even all of it, and retain the validity. The customer will typically pay 30LE for the service, which covers all charges and taxes and provides 5 to 10LE profit for the reseller in addition to airtime at a lower cost than through buying recharge cards. The reseller gets airtime without incurring any extra charges.
- 11 Reseller profit margins were estimated with a range of variables. See full study for more details.
- 12 See paper by World Resources Institute in this publication for an overview of current examples.
- 13 Porteous, D (2006) "The enabling environment for mobile banking in Africa", DFID
- 14 Ibid.
- 15 The BTS service enhancements from August 2006 include flexible amounts between 1-50LE and validity transfer at 1LE per day.
- 16 See WRI paper for more details
- 17 United Nations Development Capital Fund. <http://www.uncdf.org/english/countries/egypt/index.php>
- 18 World Development Indicators 2006, World Bank

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# Competition Issues in the Development of M-Transactions Systems

## Introduction

The combination of mobile telecommunications and basic financial services is likely to mean that m-transaction systems attract the interest of a number of regulatory and government authorities, including central banks, telecoms sector regulators and competition authorities. In this paper, we assess the role of such authorities in the future development of such systems, in particular considering two issues:

- the potential for the market for m-transaction services to 'tip', with the emergence of a single dominant provider; and
- the possibility of certain types of m-transaction systems being limited or delayed due to restrictions on access to national bank clearing systems.

The first of these issues relates to the potential for m-transaction systems to exhibit 'network effects'. In the absence of interoperability between different m-transaction systems, customers of one system may not be able to complete transactions with customers of another system.<sup>2</sup> In this case, a customer is likely to join the system with the greatest number of customers (or at least the greatest number of customers with whom he or she is likely to make inter-personal transfers). This could, in the event that these network effects are sufficiently strong, lead to the emergence of a single provider with a dominant position. Further, if the m-transaction market does tip in this way to a dominant provider, this could also make it easier for that provider to leverage its market power in related markets, such as that for mobile telephony services.

The second potential competition issue is of a different nature, in that it relates to the potential for existing providers of payment/financial services to slow down the growth of certain types of m-transaction systems. Some m-transaction business models could be facilitated by access to national bank clearing systems, and in these cases, it is possible that existing financial service providers could seek to prevent or slow down the emergence of new competition from mobile platforms.

The remainder of this paper is structured as follows:

Section 2 describes briefly some of the different m-transaction systems that have been developed, focusing particularly on those used in developing countries, as described in earlier papers in this report, and highlighting some of their key characteristics;

Section 3 sets out the competition issues in relation to the development of m-transactions;

Section 4 focuses on competition concerns arising from the potential behaviour of banks in relation to access to clearing systems;

Section 5 presents possible regulatory policy options to deal with any market failures.

## 2. M-transaction systems

Whilst m-transaction systems are at an early stage of development, there is already a variety of business models introduced in different countries, including the M-PESA system in Kenya and the Wizzit system in South Africa. These schemes are described elsewhere in this report. Looking at the similarities and differences between them, the following characteristics are important in understanding the potential development of competition in the provision of m-transaction services:



- *The degree to which systems are 'open' or 'closed' to the wider financial system.* Open systems are linked to existing payment systems for transactions, whereas closed systems are not. Closed systems allow only customers of a mobile operator to set up accounts, although remittances can be sent to customers of other mobile operators. It is possible that systems could also be developed that only allow transfers between consumers if both parties use the mobile phone service of the system provider. In contrast, systems that are established with banks, such as Wizzit, are typically open, allowing customers of all mobile operators to open accounts (although it is possible that these systems could also have exclusive arrangements between a bank and a mobile operator).
- *The extent to which the development of m-transaction systems exhibit network characteristics.* A service exhibits network characteristics (or network effects exist) when the value of the service to each individual user increases with the overall number of the users of the service. This may differ between closed and open systems.<sup>3</sup>
- *The degree to which the systems are substitutes or complements to existing payment systems.* This depends on the degree of development of other payment systems in each country and the degree to which m-transaction systems work in combination with, or instead of, these existing systems.
- *The timing of introduction of such systems* – some are relatively more mature, whilst others have been introduced recently.

### 3. Competition issues in m-transactions market

#### Competition in network markets

When rival network operators offer similar services to their customers, consumers are likely to choose which network to join on the basis of the expected costs and benefits of joining each. In the absence of interconnection between networks, the existence of network benefits means that consumers prefer to be a member of the network with the largest number of customers, all else being equal.

If the network effect were sufficiently strong relative to customer switching costs,<sup>4</sup> and if product differentiation were limited, then the largest operator can grow at the expense of rivals to a position of dominance, or perhaps even monopoly (this is referred to also as a market 'tipping').<sup>5</sup> The basic reason for this is that when firms are of a similar size, each has a strong incentive to reduce its price (or increase marketing activities) in order to attract additional customers. The increase in the size of the firm's customer base increases the firm's network benefit, thus making the firm even more attractive to customers. This effect occurs whether the additional customers are new to the market, or are captured from rivals. In the latter case there is an additional effect since any rival firm that loses customers becomes less attractive in absolute terms since it now has a smaller customer base.

This dynamic means that rival firms that are not interconnected will compete strongly to establish a leading position in the market. This is sometimes referred to as competing 'for the market', and can involve below-cost 'penetration pricing' and/or high levels of marketing spend. In the longer-run, however, competition may weaken once a firm has established a leading position and is unlikely to be overtaken. Thus competition 'within the market' may be less effective in the longer term, than in the absence of network effects.

#### The impact of tipping

Were an operator to become the single dominant provider of a service, consumers could face restricted choice and higher prices than if the market was competitive, with these factors also potentially leading to lower take-up. If achieving such a dominant position could lead to leverage of such market power to an adjacent market, then this could raise additional competition concerns (we return to this below).

Once the market has tipped, the incentive for minor innovations may be reduced, as network effects limit their impact on consumer behaviour. There is, however, a potentially powerful incentive for radical innovations on the part of new entrants or smaller firms if these could attract enough customers away from the dominant firm to permit the challengers to overtake it.

In addition to a weakening of competition, network effects can also serve as a barrier to entry in the absence of interconnection. This is because a new entrant offering a similar service to existing firms is unlikely to be able to attract customers, given the low (possibly zero) level of network benefits that it can offer initially.<sup>6</sup>

#### The role of interoperability: interconnection

Interoperability between networks can reduce the impact of network effects on competition. In telecommunications, if customers of one network are able to call customers on a second network, an individual's choice of network, all other things being equal, will no longer determine the opportunities that consumer has for making or receiving calls. This will make the consumer indifferent between joining networks with different numbers of customers.

Interconnection represents a common form of interoperability,<sup>7</sup> enabling customers of one network to transact with customers of a second. Interconnection between telecommunication networks usually requires that the networks are both technically compatible, and that the network operators have agreed commercial terms for interconnection. Similar considerations would apply in the case of m-transaction systems.

Interconnection between operators will generally be value-creating due to the increase in network benefits available to customers of interconnected firms. This can be expected to expand the market by stimulating additional demand and also possibly attracting new marginal subscribers. For this reason, there is usually a strong short-term incentive for firms to interconnect voluntarily. However, when considering whether to interconnect, firms can be expected to compare their long-term profits with and without interconnection.

A firm that is confident that it will be the winner and will eventually establish a dominant position can be expected to oppose interconnection absent any compensating payment (provided the gain in profits from dominance outweighs the short term impact of lack of interconnection on profits). A firm might take this attitude because it has established a leading market share, or because it has a superior product or reputation, or a cost advantage relative to rivals. In contrast, a firm that is not confident that it will be the winner can be expected to prefer interconnection in both the short and long-term. This is because interconnection has a “levelling effect” on competition between firms. More generally, when networks are interconnected, competition is likely to resemble that in standard markets, and the tendency to tip described above is expected to be absent. Interconnection can occur without regulatory intervention in a number of cases:

- a start-up market: if networks are small and not interconnected, customers may be reluctant to choose between rival operators as they fear being isolated having made the “wrong choice”. This can prevent the market from growing to its full potential. Customers may be particularly wary where there is no way of predicting which firm is likely to be most successful, especially where they must incur significant firm-specific sunk costs (e.g. for equipment that is not interoperable) that may be less valuable if their chosen supplier does not succeed in establishing a large customer base. In this situation, competing firms have a strong incentive to interconnect to stimulate market growth.
- a market with similar firms: in a symmetric market where no firm has (or expects to have) a clear advantage there is generally an incentive to interconnect to increase the network benefits, whilst avoiding the cost of intense competition ‘for the market’.
- a market with asymmetric firms: in such cases there is typically a threshold market share for the large firm above which it will refuse to interconnect, and below which it will agree to interconnect. The threshold market share depends upon both the relationship between network benefits and network size and on the magnitude of customer switching costs. When demand is growing, firms with relatively low customer acquisition costs (due to a superior reputation or a strong position in the supply of a complementary good) may be able to overcome a relative size disadvantage. Where this is the case the early leader may prefer to interconnect. Allowing firms to negotiate compensating payments as part of the decision to interconnect can also be expected to make it more likely that firms will volunteer to do so.

Where firms are asymmetric therefore, although they may initially refuse to interconnect whilst they develop a customer base, interconnection could emerge over time. In this context, a temporary refusal to interconnect is of strategic value when a firm believes that it can develop a large customer base, as this will enable it to subsequently negotiate more favourable interconnection terms with smaller firms.

In circumstances where firms may be able to decide to interconnect unilaterally, that is without the agreement of other firms, then a firm can be expected to interconnect with a rival provided the benefit of obtaining access to a larger customer base outweighs the cost.<sup>8</sup>

In summary, interoperability may emerge without intervention, because it avoids intense competition for the market, and can help maximise the benefits for all consumers of the service.

#### M-transactions and interoperability

The development of m-transaction systems can be expected to exhibit network effects. Customers looking to sign up to an m-transaction provider are likely to consider the range of possible transactions that they would be able to make using a given system. Customers are likely to prefer to join the network that gives them the greatest range of options, particularly for person to person transfers. If a customer is only able to transfer money to/from other customers of the same system, he or she is likely to join the system with the greatest number of customers (or at least the greatest number of customers with whom he or she is likely to make inter-personal transfers).<sup>9</sup>

In the absence of interoperability enabling inter-network transfers, competition might therefore tip towards the largest provider in the market. Even if two (or more) mobile operators developed alternative m-transaction platforms (i.e. ‘inter-system’ competition), they may not interconnect. In the absence of such interconnection, the customers of the two (or more) operators would face a restricted set of transaction options, as they will not be able to undertake m-transactions with customers of other mobile operators, and/or, may not be able to undertake m-transactions with retailers/merchants not ‘authorised’ by or customers of their own mobile operator. Such a situation could inhibit the take-up of m-transactions and hence the associated benefits to consumers. This could be the case for example if the existence of two systems delayed consumer take-up until the ‘best’ system emerged, even if the existence of the two systems led to stronger competition for customers.

Such a lack of interoperability may arise either at:

- a technical level, where interconnection between the mobile operators is not possible because the platforms are incompatible; or
- a commercial level, where interconnection between mobile operators is not possible because of the absence of a commercial agreement to provide such interconnection, even though it is technically feasible.

The same could apply to open systems, if these were developed in an exclusive way between a mobile operator and a bank.

As explained in the previous section, the commercial incentives for interoperability involve a trade-off of potential costs and benefits:

- with nascent services, such as m-transactions, the benefits from providing access to a larger customer base can outweigh any potential profits from seeking to gain a dominant position by competing for the market;



- the technical requirements to provide unilateral interconnection may not be significant – this would reduce the likelihood of an m-transaction services provider being able to gain a dominant position;
- where operators are asymmetric, it is possible that voluntary interoperability-interconnection may not be established at first, but this may change over time. Even at the outset voluntary interoperability-interconnection is more likely where providers can negotiate side payments; and
- even if voluntary interoperability-interconnection is not offered, it is not necessarily the case that this denotes a market failure – if operators are strongly competing ‘for the market’, this could imply benefits for consumers.

In summary, there should therefore be no automatic presumption of market failure in relation to interoperability in the development of m-transaction systems.

#### Leverage of market power

As this discussion highlights, the main competition concern in markets with network effects is the possibility of a market tipping, with the emergence of a dominant provider. If this were to occur, then there could be concerns about abuse of dominance, including anti-competitive foreclosure of a related market. Operators might try to use bundling or tying strategies to leverage their power in one market into a related market for a complementary good, for example from m-transaction to mobile services. This leveraging can occur when a firm that has market power in one market uses it to try to eliminate or weaken competition or deter entry in the related market.

However, supposing that a mobile operator has market power in m-transaction services, anti-competitive leveraging is expected to be a profit maximising strategy in specific circumstances. Such concerns would therefore need to be evaluated on a case by case basis.

## 4. M-transactions and access to clearing systems

The previous section addressed potential competition concerns related to the network effects that are likely to be present in the provision of m-transaction services.

In this section we examine a concern of a different nature, namely the potential of existing market power in payment systems being used to limit or delay the development of m-transactions. The degree of this will depend on:

- the extent to which m-transaction systems rely on access to bank clearing systems;
- the pre-existing market power of banks; and
- the banks’ incentive to ‘foreclose’ the market, which will in turn depend on whether m-transaction systems are (or are seen to be) a substitute for or complement to traditional banking services.

If an m-transaction system is initially developed as a ‘closed’ system, it may later require access to an existing conventional payment system, such as the national bank clearing system or credit card networks, in order to facilitate transfers or for transactions to take place between customers of the m-transaction system and customers of the existing banking

system. As national bank clearing systems are typically run by banks, it is possible that banks could seek to restrict access to an operator of such an m-transaction system, operated by a non-bank.

The key question is whether and under what conditions a bank, or group of banks, would have an incentive to do so. This depends on the expected benefits and costs from providing such access:

- If the deposits of the m-transaction system are re-invested in the domestic financial system, then the overall availability of domestic capital might be expected to increase, if the m-transaction system raises the level of deposits made by people with no existing bank account; or to remain unchanged if m-transactions services substitute for other means of savings. In other words, the growth of m-payments should not be expected to reduce the potentially available capital/liquidity to be used by the banking system, and could increase it.
- However, if the deposits are not re-invested in the domestic financial system, then this could potentially reduce the capital/liquidity available to banks.
- The facilitation of transfers/payments between m-transaction customers and ‘traditional’ banking customers could also be expected to increase the value for traditional banking customers from participating in the banking system, to the extent that m-transaction customers were previously unbanked, thanks to the extension of network effects in financial services.
- On the other hand, to the extent that m-transactions substitute for payments to merchants using credit/debit cards, this could reduce the expected profitability from such transactions for existing banks.
- If the m-transaction provider intends to engage in the provision of other revenue-generating banking services (such as lending or the provision of additional financial services) on the basis of the initial deposit-taking and transactions services, or is expected to engage in such activities by the banks, then this could be seen as a threat to either actual or future potential banking revenues. The greater the opportunity for generating additional deposits, and the larger the mobile operators relative to the banks, the greater the perceived threat to banking revenues.

To the extent that access to the clearing system would facilitate the expansion and take-up of m-transactions, banks could seek to restrict access to clearing strategically to minimise the potentially negative effect of the growth of m-transactions on their own profits. In the event that the m-transaction systems are more efficient than traditional payment mechanisms (which seems likely in regions of developing countries where the conventional banking infrastructure is poor), this could result in productive inefficiencies, especially for certain types of transactions such as micro transactions. Such an outcome, could therefore lead to some consumers continuing to have to use higher cost services, or having a more restricted ability to execute transactions.

## 5. Regulatory/policy options

### Policy objectives of the regulatory regime

In general, public policy and regulation should seek to maximise economic efficiency. Economic efficiency has three dimensions:

- allocative efficiency,
- productive efficiency, and
- dynamic efficiency.

Allocative efficiency occurs when all an economy's resources are used in such a way that it is not possible to reallocate resources and improve the overall welfare of society.

Productive efficiency is a pre-condition for achieving allocative efficiency: it refers to the situation where a given level of output is produced using the most cost-effective means.

Both productive and allocative efficiency are point in time, static concepts. By contrast, dynamic efficiency requires that firms have appropriate incentives to develop new products and services.

When considering appropriate regulatory policy towards the development of a nascent service such as m-transactions, the concept of dynamic efficiency is critical. That is, regulators and policy makers should look to ensure that their intervention (or lack of it) will provide firms with the appropriate incentives to invest in and develop new products and services. Focusing on the establishment of highly competitive markets at a very early stage could undermine incentives to innovate if it discourages firms from this investment.

### Policy options

Before intervening in a market, a regulatory authority should therefore assure itself that left on its own, the market would not generate an efficient outcome, and that the benefits of intervention will outweigh any costs associated with it. Regulatory intervention to deal with competition concerns in the telecommunications sector can be broadly classified as either *ex ante* regulation, or *ex post* regulation.

*Ex ante* regulation refers to a situation where, a regulatory (or other relevant) authority establishes that, absent such *ex ante* intervention, the abuse of a dominant position (or other market failure) will occur. As a general principle therefore, *ex ante* regulation should be imposed only if there is an expected market failure that can be avoided or mitigated more effectively by pre-emptive regulatory intervention than by *ex post* intervention, if and when a market failure has occurred. In the case of *ex post* intervention, regulatory remedies are imposed only following an investigation and establishment of a market failure as a result of anti-competitive behaviour by market participants. This type of intervention typically relies on the principles of general competition legislation, applicable to any sector of the economy, rather than sector-specific regulation.

In telecommunications markets (and other network industries), *ex ante* intervention has been typically deployed during a period of transition from what has been traditionally a monopolistic market structure, to a competitive one.<sup>10</sup> The trend in the liberalisation of telecommunications

markets has been to move progressively away from *ex ante* regulation, relying instead on *ex post* regulation based on competition principles.

In the case of the introduction of a new system or service, *ex ante* regulation may be appropriate to ensure that rival systems are interoperable. There are a number of approaches that an authority could take to furthering this aim, ranging from:

- relatively interventionist strategies, such as requiring operators, through *ex ante* regulation, to ensure the technical interoperability/interconnection of their respective systems; to
- a light-touch approach, such as requiring the creation of a standards body (co-ordinating and approving standards for m-transaction systems).

In view of the network characteristics of telecommunications markets, regulators have also considered measures that could facilitate the emergence of stronger competition – typically measures related to the ease of switching between alternative service providers, such as number portability. The framework used in the assessment of the need to introduce such measures varies from country to country, but they have been typically considered and introduced as a way of facilitating pre-established competition.

In what follows, we consider the role of regulation in relation to the different potential competition concerns that could be raised in the development of m-transaction systems.

### Regulation and interoperability

The challenge for regulators is to determine how and when to intervene to secure interoperability, recognising that intervention can have both costs and benefits. Given the uncertainty about the development of the m-transactions market, there should be no general presumption that the regulatory imposition of interoperability will improve economic efficiency. It is possible that mandated interoperability could hamper market development, for example if the regulator inadvertently dampens competition and innovation in the development of potentially market-leading propositions, by imposing interoperability prematurely.

Given this, *ex ante* regulation should focus on ensuring that interoperability remains feasible at low cost but should not be used to mandate interoperability at the outset. The key advantage of this approach is that, correctly specified, it can allow maximum scope for market development to be guided by competition between networks, whilst reserving a credible option for *ex post* regulatory intervention to secure interoperability, should this become necessary at some point in the future in the light of market developments.

For example, *ex post* intervention could conceivably be required to ensure network interoperability if the market does not provide this and the loss of network benefits outweighs any increase in competition. An approach indicating such possible intervention could also, to some degree, reduce the incentives for operators to compete and innovate in the development of “winning” propositions. Any regulatory rule that specifies the potential for such innovation should

therefore be carefully designed to minimise this effect, with for example the operator of the “winning system” able to retain some of its economic rent.

Under this approach, *ex ante* regulation should focus on ensuring that firms do not take actions that increase the barriers to achieving interoperability. The details of this will be country- and system- specific.

In relation to concerns that could arise if an m-transaction system provider were to become dominant, and seek to gain an advantage in the mobile communications market through anti-competitive tying and/or bundling, the earlier review of the development of m-transaction systems suggests that:

- it is not clear that such position of dominance in the m-transaction market will be achieved,
- a number of m-transaction systems are at an early stage of development, and
- it is not clear that even if an operator were able to gain a dominant position in a distinct m-transactions market, that it would be in its interests to leverage this into the mobile services market.

In light of the discussion above, we expect that *ex post* intervention, following an investigation of specific conduct and its impact, should be sufficient in most cases to safeguard for the potential negative effects of anti-competitive tying and/or bundling.

#### Regulation and clearing

The earlier analysis of the potential for foreclosure from access to a national bank clearing (or similar) system, suggests that the traditional banking system may, in some circumstances benefit from the introduction and expansion of m-transaction systems, if these result for example in the expansion of banking services to the unbanked. This is of particular relevance in countries with a relatively large share of unbanked populations and where mobile platforms create access and distribution networks that have significantly greater coverage than conventional banking services. There are also other potential costs, and benefits, that banks will be expected to evaluate.

Policy makers should be concerned with ensuring that access to a national bank clearing system does not increase unduly the risk for the system as a whole, or other individual participants. To the extent that the access seeker is not going to engage in revenue generating banking activities, then the requirements for access to the system should be no more stringent than necessary to meet the objective of ensuring no increase in risk from such access. Requesting an m-transactions provider to obtain a full banking licence in order to have access, could be too onerous a requirement, in the absence of such provider offering banking services. Were such provider to seek to offer banking services in the future, and compete with existing/traditional bank services providers, the requirement to obtain a banking licence would apply then. This should reduce concerns of the provision of access to a national bank clearing system without a full banking licence, leading to ‘unfair competition’ from operators of m-transaction systems.

## 6. Conclusions

We have examined in this paper potential competition concerns that could be raised from the introduction and development of m-transaction systems, focusing in particular on the network characteristics of such systems and the fact they are introduced by mobile operators in bundles with mobile services.

If, in the market for m-transactions, network effects are strong, then competition may not be sustainable in the long-run without interoperability. An immediate implication is that competition between rival network operators seeking to develop a leading position in the market may be very intense as each seeks to establish a winning proposition. In addition, individual operators could face a high degree of risk associated with the possibility of failing to establish a leading position in the market and ending up as a fringe player facing a large rival.

The challenge for regulators therefore is to determine if, how and when to intervene to secure interoperability, recognising that intervention has both costs and benefits:

- On the benefit side, interoperability can increase network benefits (such as the possible transaction set of customers), sustain long-run competition in markets with network effects and reduce barriers to customer switching.
- On the cost side, interoperability may reduce the intensity of competition in nascent markets (i.e., competition to develop a leading proposition for the market) and also has a negative effect on innovation.

In nascent markets such as that for m-transactions, operators are more likely to all support interoperability to the extent that this promotes customer take-up and stimulates market growth. This is because there may be uncertainty about market developments and this may cause consumers to be reluctant to subscribe to services that are not interoperable, due to the risk of being “stranded” *ex post* and having to incur costs to switch supplier. As such, interoperability may serve to promote the development of the market and hence be supported by all operators.

Mandated interoperability may well have an adverse impact on economic efficiency by reducing competition for subscribers early on and, potentially, the incentives to create a superior system. The role of *ex ante* regulation should therefore be limited to ensuring that no unnecessary barriers to interoperability develop over time, either as a result of a lack of market coordination (for example in standard setting), or more likely in the case of m-transactions, through the strategic behaviour of firms. If any intervention is potentially foreseen at a later date, the rules of that intervention should be clear to all parties and carefully designed to minimise the potential costs of intervention on innovation and competition to develop a leading proposition for the market.

We also examined in this paper another potential competition concern, which could in fact delay or prevent the development of m-transaction systems. To the extent that access to a bank clearing system would facilitate the expansion and take-up of an m-transaction system, restricting access to a clearing

system could be used strategically to reduce any potential threat to retail banks from such expansion. Were access to existing bank clearing systems to be 'restricted' for strategic reasons, this would warrant an examination of the current regulations for access to national bank clearing systems, to consider the extent of any required modification.

## Notes

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- 1 We would like to thank Diane Coyle, Ivan Mortimer-Shutts, Howard Williams, Neil Pratt, David Porteous and Sir Derek Morris for their useful comments on an earlier draft of this paper. The views expressed in this paper represent only those of the authors.
- 2 This relates to the case of similar firms in the same industry seeking access to one another's customers.
- 3 We use the term 'open' to denote the link of an m-transaction service with existing payment systems. The significance of the network effects will depend on the existence of such link, and the extent of exclusivity of an open system. Within closed systems, network effects will also depend on the ability of an m-transaction system customer to engage in transfers with customers of other mobile operators' m-transaction systems.
- 4 Network effects will exist when the value of a service to a user of it increases with the overall number of users of the service.
- 5 In the context of competing technological standards, rather than competing service providers, this outcome is referred to as de facto standardisation.
- 6 Another possible issue is the establishment of an inferior system, if a firm wins a 'system war' not through technological superiority but because it had developed an early lead in the market by other means – for example, by heavy marketing expenditure. Conversely, if firms decide to maintain incompatible proprietary technologies, the market may remain fragmented, and customers will be deprived of the full potential of the possible network benefits.
- 7 We use these terms interchangeably, as m-transaction system inter-operability requires technical and commercial interconnection.
- 8 In the case of m-transactions this would for example include the costs of establishing a mechanism/system to effect money transfers to customers of other mobile networks.
- 9 Whilst this could be relevant to open m-transaction systems, in practice it is likely to be more of a potential concern for closed m-transaction systems.
- 10 There are some cases where ex ante intervention is deployed to deal with a structural characteristic of a network market, such as the case of price controls for the price of terminating voice traffic between interconnecting communications networks. Sectors of the economy that exhibit natural monopoly characteristics will also typically be subject to ex ante regulation, where the ownership structure is not expected to mitigate competition concerns.
- 11 In addition to "technical" interoperability, a further barrier to entering m-transaction markets could arise if a provider establishes a significant number of exclusive merchant relationships, especially if services become differentiated according to the scope and quality of their distribution networks. However, before intervening *ex ante* in this area, it is also important to consider the extent to which such networks are replicable, taking into account the range of potential merchants and alternative payment methods.

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# Mobile Transactions: Through the Window of the Two-Sided-Platforms Approach

## Introduction

The possibility of using mobile phones for financial services such as micropayments, electronic money or banking is one of the potential social and economic impacts of the spread of mobile networks in developing countries. While these services are a priori beneficial in terms of welfare improvements for consumers, several questions are raised with respect to the cost of accessing them. In most countries, sending money via mobile may be hard to implement at low cost. Furthermore, the volume of usage of different services may not be sufficiently high in developing countries to cover some fixed costs that mobile phone providers or banking channels may incur in setting up the payment network. This suggests that the pricing structure will have an important impact on the viability of the wireless payment service.

As these services are offered through a platform where consumers meet to conclude transactions, it seems useful to address the question of pricing via the concept of “two-sided” markets, a concept which is increasingly widely used by economists. The basic conceptual idea is that payers and payees, each on a different side of the platform, interact not directly, but through the platform, to conclude transactions. Clearly the benefit of joining and transacting on the platform is linked not only to the potential membership and transaction fees, but also to the proportion of consumers ready to join the platform on the other side. This simple observation tells us how cautious we should be when considering the pricing structure of mobile payments. The main pricing tools available

to the platform are the membership (or participation) and transaction (or usage) fees. Although these tools may appear to be straightforward substitutes from the point of view of the platform, it is not clear how the pricing choices affect the willingness of consumers to participate and use the platform.

A further important point is that, if participation in the platform is costly, consumers need to be confident enough to believe that there will be some agents subscribing on the other side. This is crucial especially when the platform has no initial reputation as a service provider. This problem is solved by making the platform attractive at least on one side. This may involve a price discrimination strategy, or even subsidies, to induce some new participants to join the platform. Other complications are linked to the presence of rival platforms offering similar services; the existing examples of mobile payments schemes involve exclusivity, making it impossible for a consumer to conclude transactions with consumers from a different network.

A simple economic model, building on the general characteristics of two-sided markets, allows us to set out some relevant issues. Particular attention should be given at the pricing stage and to the ability of the platform to reconcile the two apparently conflicting objectives, namely, on the one hand, providing welfare improving services to costumers, and on the other hand setting sufficiently high prices to recover operating costs. The general model described here can form the basis of specific empirical applications in future.

## Definition and Relevant Features of M-Transactions

The term 'm-transaction' is often used to refer to the use of a mobile phone to interact with others in order to complete a financial transaction. Many types have been developed recently in different countries. In m-commerce the mobile phone becomes a possible substitute to a debit or credit card. E-money is the storing of cash on mobiles; this service works like standard airtime and allows consumers to virtually store money on their SIM card. An extreme example is m-banking which offers to customers access to a range of financial transactions provided by a financial institution, using a wireless network.

In some developed countries, m-transactions schemes are growing more sophisticated. In Japan for example, mobiles are equipped with a contactless payment technology, allowing for massive extension of m-transaction methods. In Japan, as well as in the Nordic countries, mobile phones are linked to credit cards or bank accounts and can be used to make small payments, usually for transportation and vending machines. Here, mobile phones replace a debit or credit card that the customer must already have. M-transactions in these cases are on the way to become substitutes for traditional financial services.

However, the potential of financial services via mobile phone for poor people in developing countries is particularly interesting because many of the necessary conditions are already in place. Many already have mobile phones, and the number is growing fast. These customers are already very familiar with mobile phones, using them for voice calls and text messages, making it likely that they will need little training to be able use them for banking. Furthermore, because mobile phones are almost always connected to the network, banks can receive transaction details almost as soon as the transaction takes place, reducing uncertainty. In addition, phone operators already know how to handle cash transactions for customers (through standard airtime handling).

Even so, there is every reason to be cautious. In most countries, it is not yet possible to send money between any two mobile phones easily and at low cost. Until these restrictions are overcome, mobile transactions may not achieve the network effect that has caused mobile phones to spread as quickly as they have. Moreover, for banks, a channel dedicated only to mobile phone-based transactions may not prove profitable. So far, most mobile transactions services cover only a limited range of products. Until customers pay for a range of financial services through their phone, the channel is unlikely to make money. The pricing of m-transaction services is clearly going to be a key issue.

## The Two-sided Market Approach to M-Transactions

As in all payment systems, m-transactions involve two groups of people: the payers and the payees. Each joins the platform – one on each side of each payment – that intermediates

between them in order to provide a framework to make transactions. The transaction is thus not executed directly but is made by means of a platform: the wireless network. A payer finds it profitable to join and to use the payment service of the mobile platform only if it brings a net benefit bigger than any other means of payments. This net benefit depends on three elements:

- the transaction price (membership fee plus transaction fee) she/he bears when concluding a transaction;
- the possibility of transacting with many other people;
- her/his personal intrinsic value attached to an m-transaction (net of the outside option given by other payment methods i.e. compared with the best available alternative).

Therefore, everything else equal, the more people use m-transactions, the more each will value making an m-transaction and the more they will be willing to pay for it. The equivalent benefit holds for payees.

In this section we first provide an account of the two-sided-markets theory. Secondly, we present some general results, best practices and issues related to m-transactions which emerge from the two-sided market approach.

### A presentation of two-sided markets

The definition of two-sided market is closely related to the concept of a platform. A platform is a real or virtual place in which agents can meet other agents and interact with them. The two (or more) groups who meet through the platform are generally referred to as the two (or more) sides of the platform. The purpose of the interaction is to conclude a transaction, which can be of any kind. Thus, the concept of two-sided markets refers to situations where one or several competing platforms provide services that are used by two types of trading partners to interact and operate a transaction. Payments card systems clearly offer one of the most common examples.<sup>1</sup>

Despite their diversity, almost every platform shares a key characteristic: the value of their service depends on the total number of potential trades they can offer someone who decides to join the platform. In other words, the success of a platform is related to its ability to attract people and offer them an environment in which they can easily perform their transactions. Platforms finance their activities by charging a membership (or participation) fee to those who wish to join the platform, and a transaction (or usage) fee to people who make use of the service.

In economic terms, a two-sided market involves the presence of *cross-group externalities* whereby decisions made by members of one group affect the benefits derived by members of the other. As a consequence, the pricing structure will define how each of the two sides is charged, with different prices for each side.<sup>2</sup>

Cross-group externalities arise when the net benefit a person derives from a transaction depends not only on the (personal) value she/he attaches to it but also on factors out of his control. In two-sided markets, this is the level of participation or usage of the service by the other group. The more an agent

can interact with the members of the other group, the more she/he attaches value to the service and is willing to pay for it. In the case of debit cards, for example, the willingness of a buyer to use the card (and to pay for it) increases if the card can be used with a lot of merchants. This specific and peculiar aspect is crucial in the analysis of two-sided markets.

To understand what this characteristic implies, consider again a payment system and suppose, for instance, that the number of merchants is raised by one, with nothing else changing. Due to the cross-group externality, this directly and positively affects the cardholders. However, the increase of the number of merchants reduces the fee that has to be charged to merchants. To keep a constant quantity of transactions, the total transaction price (the sum of the merchant's fee and the cardholder's fee) should not change. This implies that cardholders can be charged more, which indirectly reduces their utility. This is a countervailing (or feedback) effect. In this example, the cross-group externality has both a direct and indirect effect. The key point is that the two sides of the market are strictly related and the pricing of one side automatically affects the pricing decision on the other side. A change in the number of people participating on one side will induce the platform to change the terms it applies to the other side.

The non-neutrality of the pricing structure is a key characteristic of two-sided markets, and is very much an implication of the cross-group externality. A further effect has to be taken into account when pricing services in two-sided markets, which can be seen from the same example. As in any market, a higher price charged to card-holders will lead to a direct reduction in the number of cardholder transactions. However, this induces a decline in the merchants' number of expected transactions, which reduces their willingness to participate. Consequently, this has an indirect negative impact in the cardholder utility. The effect of a price increase on the cardholders' side is amplified by the cross-group externality, which implies a further reduction in the number of cardholders' transactions.

The platform therefore has to consider not only the total price of a transaction, but also the pricing structure. How to share the total price of a transaction between the two sides is a crucial decision. The selection of a pricing structure affects the volume of transactions and the platform's profit.

#### A two-sided-markets interpretation of m-transactions and some results

Providers of m-transaction platforms, regulators and policy makers need to consider these aspects of two-sided markets as all the relevant two-sided markets characteristics apply to it. Overlooking these aspects, which diverge consistently from the normal understanding of markets, necessarily implies side-effects. Lack of participation is the most common platform failure. From a myopic, one-sided, perspective the platform would seek to recover costs on each side separately, with a positive profit margin on each side. Taking a two-sided view, the total price (the sum of the prices of the two sides) must be high enough to cover the total costs (the sum of the costs on two sides); *but how to allocate the price between the two sides is totally independent on the cost of each single side.*

A pricing strategy which uses the standard pricing tools may not be optimal in a two-sided context.

The following five implications, directly derived from the two-sided markets theory, would be relevant to m-transaction services.

#### Membership fee, transaction fee or both?

As already highlighted, platforms have at their disposal two types of tools: the membership (or participation) fee and the transaction (or usage) fee. Often platforms can achieve optimal pricing by using only one of them. However, there may be particular conditions under which one type of fee should be preferred to the other. A membership fee is normally preferable to a transaction fee when transaction costs are not too high, and when platforms can monitor participation but cannot monitor transactions. In the latter case, setting membership fee is the only way a platform can charge the agents.

What is not yet clear is whether membership fees and transaction fees have a different (psychological) impact in the consumers' willingness to participate and to use the platform. Therefore it is not clear whether these two fees are substitutes from the point of view of consumers. No evidence is available on the perception of agents with respect to these two different fees. Intuitively this seems to be something well worth investigating further in the process of designing charging schemes.

In the case of m-transactions, it would be easy to monitor both participation and usage. The correct mix between the membership fee and the transaction fee should be selected to ensure the lowest costs. A membership fee may imply some costs in order to set-up the subscription system and consumers' adoption procedures. On the other hand, a subscription fee would limit the number of customers who will make few transactions and would be costly to manage. A transaction fee is often used to reflect the variable and unavoidable cost of each transaction that the platform bears. In practice, many payment services use a hybrid configuration of both membership fee and transaction fee.

#### Ensuring participation

Platforms' success depends on the level of participation and in particular on customers' confidence (on both sides) in the ability of a platform to grow. The level of participation (and usage) is generally based on the agents' belief that others will participate. An issue of coordination arises when all believe that nobody would subscribe to the platform. Thus the platform has no reputation and faces zero participation. This explains the reason for platforms' aggressiveness in seeking to build a customer base in their early stages.

The attractiveness of a platform for one side of the market is directly related to its success on the other side. Each user of a platform is therefore at the same time a consumer of the service and also an input in the process. Platform's membership pricing reflects the competition to sell the services and also the competition to buy the input. This dual nature of competition may generate very aggressive strategies using cross-subsidies and prices which depart significantly from marginal costs.

An example is the so-called *divide and-conquer strategy*.<sup>3</sup> It refers to an aggressive price discrimination strategy which involves combining subsidies to convince agents to join on one side, and high margins on the opposite side to recover the subsidy, exploiting the cross-group externalities. Such strategy transfers part of the gain from increased participation to the targeted group in order to create a bandwagon effect.<sup>4</sup> This divide-and-conquer strategy is a particular instance of more general strategies that emerge when platforms can price discriminate between groups of different users. Generally, the platform buys participation by the target group in order to create value for the other group.

There are some specific features that qualify a group as the target. They should be easy to pick off with a small subsidy. They should be attractive to the other group, so that the latter are willing to pay a relatively high amount to reach them. In the case of payment systems, the question would be whether payers or payees derive less value from participation in the platform. Offering no-fee participation in m-transactions to the mobile subscriber base could be an implementation of the divide-and-conquer strategy, given that this large group might increase other potential customers' willingness to pay to join the platform. This strategy could boost the adoption for new consumers but also for consumers who already hold a mobile phone since the risk of joining the platform would be negligible. In this case, the cost of offering participation for free could be recovered from the additional customers who join the network. Another divide-and-conquer strategy would focus on boosting the level of usage. It might be possible to target only certain groups of users within the mobile network offering discounted usage fees with the sole objective to increase the volume of transactions and consequently the willingness to use it on the part of the others.

#### Tying: a way to set subsidies

As it has been described, many of the strategies adopted by platforms can involve subsidies. However, the implementation of monetary subsidies is not always feasible; the cost might be too high if a monetary subsidy induced customers who were unlikely to participate actively (and whose usage fees would therefore be low) to join the platform. To limit this, the platform can 'tie' a good or service with the membership or usage fee and give the bundle away for free or at a discounted price.<sup>5</sup> In practice there are alternative commercial strategies to provide subsidies. One option is a strategy targeted to a group for some limited period of time. Examples would be time-limited special gifts perhaps for a group such as business users with verifiable characteristics. An alternative would be a free gift or service at the time of registration.

#### Identifying the best pricing structure

As explained in the previous section, a consequence of the cross-group externality is that pricing structure matters. In other words, for a given total transaction price, the way a platform allocates the total price between the two sides will affect profits. The pricing strategy therefore has two steps. The first involves the selection of a total price, which maximizes the profits and covers the platform's total costs.

The second is the selection of the structure which allocates the total transaction price between the two sides in order to maximize the volume of transactions.<sup>6</sup>

The volume of transactions is defined as the product of the number of people on one side, the number of people on the other side, and average number of transactions for each pair agents on the different sides. For each total price, the optimal price structure is the one guaranteeing that a small variation on the prices on either of the two sides has the same impact on the transaction volume, which depends on the marginal costs of transactions.

#### Competition between platforms: multi-homing, exclusivity and interoperability

In a competitive framework, the presence of rival platforms gives rise to additional complexities in the two-sided framework. Between platforms which offer substitute services, customers face the choice of selecting only one platform (single-home) or subscribing to more (multi-home). The issue of multi-homing does not alter the relevant concepts that have been explained so far but slightly modifies the focus.<sup>7</sup> One important feature is that competition would focus more on transaction fees. With positive transaction fees, multi-homing agents concentrate their activity on the low transaction fee platform. This creates two levels of competition. Platforms compete to attract registrations and, afterwards, they compete to attract the transactions of multi-homers.

An exclusivity clause imposed by platforms is a tool to deter multi-homing by customers. When subscribing to one platform, the agent signs a contract not to join other platforms. Exclusivity usually generates a more competitive framework upfront, given that consumers need to choose between platforms. Exclusive contracts can be a way to commit to aggressive strategies where the platform implicitly bribes one side not to subscribe to rival platforms.<sup>8</sup> This allows platforms to attract more agents on the other side, which in turn reinforces the decision of the first side agents to sign up exclusively.

However the success of an exclusivity clause is very uncertain. Exclusive contracts can be perceived as a tool to leverage market power by the foreclosure of the market to rival platforms. But exclusive contracts are not efficient when platforms decide they should be inter-operable. In this case, the decision to multi-home by a consumer guarantees access to the customer base of another platform. The decision in favour of interoperability could be an answer to the need of agents to transact with other agents (otherwise they would multi-home) or a way to add value to the network by expanding the possibility of trade. Due to two-sided externalities, interoperability allows each platform to boost the volume of transactions. However, the decision has an uncertain outcome on platforms' profitability as it affects the ability to extract the value from each customer.



## Towards a Business Model of M-Transactions in Developing Countries

A formal two-sided model must be consistent with the reality of developing countries, and so we start by describing relevant characteristics of the market in Africa.

### The economic environment

There is relatively little systematic evidence on the penetration of financial services in developing countries, especially in Africa. However, it is pretty clear that this penetration rate is quite low. One of the main reasons is that the cost of accessing banks' services (including current accounts and credit or debit cards) is prohibitive. These costs encompass the account management costs, which appear high relative to both the frequency of use of the account and the purchasing power of the average consumer. The average amount spent in one transaction is so low that it is quite prohibitive to use standard payments devices such as cheques and credit or debit cards. This makes payments platforms linked with bank accounts less interesting. Even for the savings accounts that are available almost for free from the national postal service, there is still a substantial opportunity cost for people for whom the value of transactions is low. Hence cash remains the most likely choice (the best 'outside option') for a significant fraction of consumers in African countries.

### Mobile expansion

The use of mobile phones is growing rapidly in the African continent. Even if low purchasing power does not permit regular consumption of airtime, people spend enough money to at least keep the account active. One reason for the huge diffusion of mobile in Africa is the importance of communities. Community plays a crucial role in individual behaviour. Maintaining the reference social status is therefore a crucial objective for building a good reputation and for acquiring a position in the community.

### Potential for m-transactions

The benefits in adopting m-transactions include time saving and convenience, safety and security compared to handling cash. Of course, the adoption of m-transactions depends sensitively on the type of contract offered by the operator. When the issue of the best business model is approached through the perspective of two-sided markets, several questions are raised. How far should the introduction of this new service affect the pricing of the existing services? It could be offered just as a new option to existing consumers, but equally the payment service could be bundled with other existing services. Overall, the pricing strategy should trade off the cost of providing the m-transaction service with the desire to encourage the consumer to regularly use the service.

### Main results

Our formal model incorporating membership fees and transaction fees aims to show how two-sided markets work and to discuss more precisely some of the issues exposed in Section 2. The model is available at <http://www.vodafone.com/m-transactions>.<sup>9</sup>

The model assumes that the platform is monopolistic and formalises three main results. The first one illustrates the degree of substitution between the membership fee and transaction fee. The second one identifies the demands of each group and the effects of a price increase. The last one shows how to set the optimal price structure between the two groups.

The formal model confirms that when maximizing profit, the platform focuses only on the "per-transaction" price. Once identified, it is up to the platform to define how to allocate it between membership fee and transaction fee. This highlights some redundancy and suggests that the platform can use these two tools as substitutes. However, there could be some exogenous characteristics of a specific m-payment system, including aspects of consumer psychology, which makes these two tools only imperfect substitutes. This is clearly an empirical issue which requires adequate data. The model is also useful to illustrate the interdependence of demand on the two different sides of the platform. Participation on one side of the platform depends on the price charged on that side of the platform, and also on the price charged on the opposite side. Intuitively, the model suggests that the price structure is set in such a way that the platform is indifferent to a marginal increase in the price on one side associated to the same marginal decrease in the price on the opposite side. Indeed, by charging marginally more on one side (and charging marginally less on the other side), the platform marginally reduces the participation on that side (and marginally increases the participation on the other side). However the cross-group externality mitigates these changes in the volume of transactions and, in equilibrium, the effect of a marginal decrease in price on one side is compensated by the effect of the increase in price on the opposite side.

## Conclusions

This paper explores the issue of m-transactions using the framework of two-sided markets. A one-sided approach can be misleading and lead to less than optimal business model decisions.

The two-sided interpretation of the m-transactions through the definition of a rigorous model allows us to derive important properties of m-transactions markets. One risk is a lack of participation. Even if the good has a positive value for consumers, there is a possibility that the platform does not reach a sufficient number of subscribers (and a sufficient volume of transactions) to cover the costs. This is due to a coordination failure based on customers' beliefs about the likely number of participants, given a new platform's lack of reputation. Divide-and-conquer strategies might be a solution in the context of m-transactions in order to boost subscription and usage. Tying might also be another sensible strategy in order to increase participation when monetary subsidies are not implementable.

In terms of pricing, an m-transaction platform has several options for charging consumers and consequently covers its costs. Membership fees and transaction fees are two partially substitutable tools which the m-transactions platforms can use.

The price structure of m-transactions matters greatly. Once the total price that maximizes the volume of transactions has been decided, the allocation of the total price between the two sides (payee and payer) is crucial to participation and profitability. The total price covers the total cost but each single price could be optimally set below marginal cost. The price allocation is driven by other criteria than the strict costs recovery within each side.

The two-sided platform approach introduces a complete different view of competition issues. Contrary to the traditional view, pricing under marginal costs or tying products do not appear anticompetitive. The implications of the two-sided platform approach for competition policy just start to be drawn. (See Evans, 2003.)

Clearly, to build and to implement a business model along this line of analysis requires having a good knowledge of individuals' behaviours and economic conditions at stake. This calls for empirical analysis.

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## Notes

- 1 See Evans (2003) and Rochet and Tirole (2005) for further examples.
- 2 See Rochet and Tirole (2005).
- 3 See Caillaud and Jullien (2001) and Caillaud and Jullien (2003).
- 4 An example is the "marquee customer" strategy. It consists of targeting flagship stores by issuing specific cards to use at those shops. This attracts more cardholders and put pressure on other stores to accept the card so that they also could take advantage of the customer base that uses the card.
- 5 See Amelio and Jullien (2006) and Jullien (2005).
- 6 See Rochet and Tirole (2003).
- 7 Strategies like the divide-and-conquer strategy still applies. In fact, the cost of acquisition (buying the group) is smaller since individuals may join two platforms without supporting the cost of cancelling the other one.
- 8 Armstrong and Wright (2005) study the introduction of exclusive contracts. In their example, they study buyers with heterogenous taste for the platform and the sellers with homogenous taste. They show that this setting leads to an equilibrium where sellers multi-home and platforms compete aggressive to sign up buyers, charging them less than cost (perhaps nothing), and then make their profits from sellers who want to reach these buyers and who do not have a choice of which platform to join in order to reach them. They show that the introduction of exclusive contracts undermines this equilibrium. a platform can set arbitrarily high nonexclusive prices (so that sellers never choose to multi-home regardless of the rival platform's offer) and then offer a slight price cut relative to the rival platform to attract all sellers exclusively. The resulting positive network effect can then be exploited on the buyer side. When network effects are strong, this can lead to an equilibrium where all agents sign up exclusively to a single platform even though it sets high prices to both sides.
- 9 The model is also available from the authors upon request.



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