

Airtime to Cash: Unlocking the Potential of Africa's Mobile Phones for Banking the Unbanked

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Abstract: This paper discusses how mobile phones may be used to extend banking services to the 'unbanked'. Generally, many more people possess mobile phones than bank accounts across Africa. Mobile banking services are already offered as an addition to existing bank accounts. Instead of adding a mobile phone as a complementary channel, why not add a bank account to an existing mobile phone number? This would narrow the access gap considerably, allowing mobile phones to be used to provide financial services to those without bank accounts. Two models are discussed that may help narrow the access gap: first—airtime cash convertibility, already a defacto practice in many parts of Africa, and second—the mobile wallet, which would allow full banking services to be performed on the basis of a virtual wallet linked to a SIM card. Results from Research ICT Africa's 2007/8 e-Access & Usage household Survey are used to investigate the current usage of airtime as a means of payment as well as the potential demand for m-banking. Regulatory challenges to the adoption of m-banking as well as potential business models and possible models of cooperation between banks and mobile operators are also explored.

Keywords: Mobile banking, remittances, mobile payments, airtime, mobile wallet

1. Introduction

While the role of the informal sector in promoting economic growth in Africa is increasingly acknowledged, access to capital remains one of the biggest obstacles hindering the development and growth of the sector [1]. Africa is still struggling to provide access to formal financial services for the bulk its citizens, particularly in the informal sector.

Despite the underlying structural limitations like poverty; risk-averse bankers, unsuitable financial products and high bank charges have been rightfully blamed for this state of affairs. Poor people with irregular income and informal businesses have often no choice but to make use of informal financial services, which are many times more expensive compared to formal ones. Formal financial services are usually only extended to those with regular income or collateral [2]. Informal businesses also often lack the required accounting skills and systems to generate necessary data to convince a bank to extend loans to them. Other obstacles include bureaucratic and educational bottlenecks that prevent many Africans from having identity documents. For example, a lack of a population register makes it difficult to know the whereabouts of individuals and requires everyone to register in order to vote for elections. This also creates corruption around identity documents such as birth certificates, IDs and passports, increasing the risk for banks to deal

with new customers.

A critical issue to overcome is that of asymmetrical information. Someone without a bank account approaching a bank for a loan is likely to be rejected unless collateral is at hand. The bank has no transaction history for this person or informal business and hence does not know anything about the applicant's creditworthiness. Transaction patterns can be used to predict whether or not a customer will be able to repay a loan. Absence of a transaction history means that the ability to repay loans is unknown to banks, making it risky for banks to serve such a person unless the loan is fully collateralised. Few individuals in the informal sector have access to collateral. They either have their own informal small businesses (such as street vendors) or work for one on an ad hoc basis.

Mobile banking (m-banking) can be seen as one solution to this problem. Despite having been around for quite some time in several African countries, the existing offerings are mostly value added services—where the mobile phone is a complimentary channel to operate an existing bank account. Such services are not geared towards the inclusion of the poor and unbanked and while they are growing in popularity, they are yet to shift the access frontier in order to become “transformational” [3]. To become transformational, m-banking must progress towards bringing more informal businesses and the poor into the formal economy so that they are better able to access micro-loans and other financial services. Transacting on a mobile payment platform can also generate a transaction history that can act as a basis to evaluate creditworthiness. This would address the inadequate access to finance that restricts the entrepreneurial potential of Africa's informal sector and the poor.

This paper seeks to explore how the ubiquitous mobile platform may be leveraged to move beyond remittances and provide an alternative banking system that provides access to formal financial services to the unbanked. This can be achieved by using applications that facilitate transactions over mobiles, which go beyond the usual voice communications, and the money or airtime transfers.

2. Background

2.1 Access Gap

Within the informal sector in Africa, mobile phones play a prominent role in creating and exchanging information, allowing SMEs to communicate with clients and suppliers [4]. Mobiles also allow individuals to remain in contact and transfer money to family members. Domestic and international remittances have become indicative of the potential of mobile banking as the case of the Philippines' G-Cash from Globe Telecom and Kenya's MPESA from Safaricom demonstrate. Regional examples include Zain's Zap and MTN's Mobile Money. The RIA 2005/6 e-Access & Usage SME Survey revealed that 83.3% of the surveyed business operators owned a mobile phone while 95.6% of all business operators rated mobile phones as either important or very important for their business operations [4]

The results from the RIA 2007/8 e-Access & Usage household Survey show that mobile telephony is the most used ICT in Africa and also that there are more people with mobile phones than there are with bank accounts (with the exception of Ethiopia and Rwanda where mobile penetration is minimal). Sometimes the differences are very pronounced—for example, less than every fifth mobile phone user has a bank account in Benin, Cameroon, and Senegal as summarised in Figure 1.

When the unbanked were asked why they don't have a bank account, between 41.2% and 69.8% of the respondents gave lack of regular income as a reason, perceived as a far more significant obstacle for respondents than cost (0.2% to 20.7%) or not qualifying for a bank accounts (0.2% - 21.8%). Many felt that they did not need a bank account (12.8% - 44%). While this may be a reflection of lack of appreciation as to the benefits of having a

bank account, it may also be a sober self-reflection on the poverty of the respondents—who may receive and handle and possess such small amounts of money at one time that they are considered insignificant in comparison to the amounts that are involved in formal banking deposits, transfers and payments. Respondent responses are summarised in Table 1. In Africa, people mostly only get a bank account once an employer requires it. Another main obstacle is the distance to banking facilities or ATMs. Particularly in rural areas, it is not only transaction cost and service fees, but also the cost of transport to reach banking facilities that made people not want a bank account.

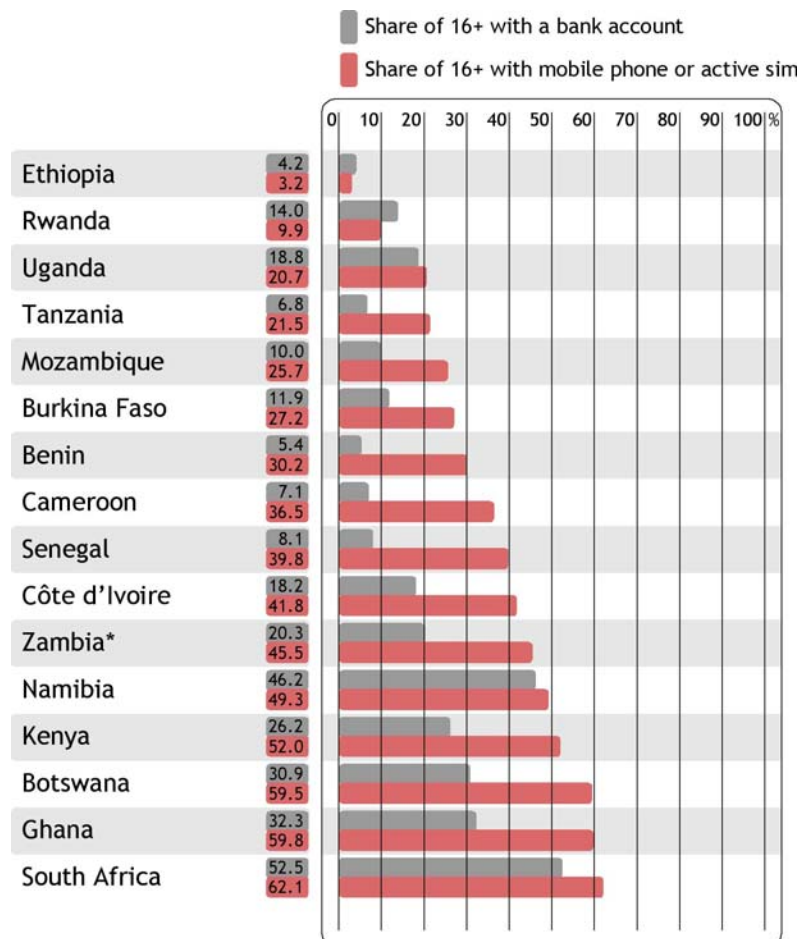


Figure 1: Share of individuals with bank account and mobile phone

* Results for Zambia are extrapolations to national level but not nationally representative.

In the developed world many children and teenagers have bank accounts as well as many unemployed people or those without regular income. Usually there is no cost involved in maintaining a savings account, depositing and withdrawing money or bank transfers. Banks in the developed world make their money from channelling savings into investment and the related interest rate spread, not from transaction fees. Conversely, in Africa banks charge high transaction fees often even for depositing money. High deposit and transaction fees ensure that banking remains the preserve of the relatively wealthy (i.e. the existing customer base) and high profit margins for banks. This is mainly possible because the banking sector is not as competitive as in the developed world.

However, even in an uncompetitive environment profitability can be increased by focusing on financial intermediation rather than transaction fees. African banks should encourage deposits since this would provide them with cheaper capital for lending than loans from the central bank or other financing options. This would provide them access to cheaper capital and increase the profit margin from lending and borrowing. With high transaction fees maintaining a bank account is too expensive for most people in Africa

compared to the benefits they would derive from one.

Table 1: Why do you not have a bank account?

	I don't need a bank account	I don't have regular income	I don't qualify to open an account	It's expensive, I can't afford one
Benin	29.3%	68.2%	20.7%	11.7%
Botswana	17.3%	62.5%	10.9%	0.2%
Burkina Faso	20.7%	54.6%	4.2%	7.2%
Cameroon	44.0%	52.8%	21.8%	7.0%
Cote d'Ivoire	30.4%	46.3%	2.9%	4.8%
Ethiopia	12.8%	47.4%	0.5%	0.0%
Ghana	25.7%	54.4%	1.5%	1.7%
Kenya	26.9%	59.1%	5.2%	0.7%
Mozambique	13.8%	66.9%	21.8%	1.8%
Namibia	20.4%	41.2%	6.9%	20.7%
Nigeria*	25.0%	51.7%	2.9%	1.4%
Rwanda	13.4%	22.6%	0.1%	15.6%
Senegal	15.6%	62.2%	19.1%	2.5%
South Africa	17.0%	54.3%	17.2%	7.1%
Tanzania	18.1%	58.5%	1.3%	1.1%
Uganda	31.3%	60.2%	5.9%	2.4%
Zambia*	21.8%	69.8%	0.2%	0.4%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

2.2 Money Transfer in Africa

The role of international remittances in developing economies is gaining increasing global recognition and economic significance to national economies. Estimated at about US\$221 billion worldwide in 2006, Sub-Saharan Africa accounted for only US\$9 billion or 4% of the total [5]. As a whole, developing countries received more than twice as much inward bound remittance than official development assistance (ODA) excluding debt. In Sub-Saharan Africa as a whole, inward bound remittances were over three times larger than ODA. On a country-by-country basis, however, it is by no means the norm for developing countries to receive more remittances than ODA. This is the situation in Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Mozambique, Namibia, Rwanda, Senegal, Tanzania, Uganda and Zambia. Nonetheless, international remittances are becoming increasingly significant to national economies as highlighted in Table 2. However, the actual size of remittances would be much higher if informal remittances are taken into account [6].

The large amounts of money that are remitted home by economic migrants each year are not sent home without cost and concerns. According to the UK Department for International Development [7, 8] the largest concern for those sending money is whether it will arrive home safely, followed by concerns over excessive charges and delays in receiving the money. Money transfer agencies in the UK have signed up to a new Customer Charter that commits them to provide transparent information on these issues. Charges for sending money internationally are dependent on whether sender and recipient have bank accounts, the speed of transfer, destination country, amount sent, exchange rates, and so on. The smaller the amount of money sent, the higher the charges (expressed as a proportion of money sent). According to DFID, the cost of sending £100 can vary from 4% to 40% [8].

According to UN IFAD, the cost of sending remittances in the developing world, depending on the method of transfer, is between 3 and 12% [9]. The cost of using an international money transfer organisation (such as Western Union or MoneyGram) is currently around the 12% mark. CGAP notes a marked improvement in remittance costs, which have come down drastically since the late 1990s [10]. It is likely that charges will decrease further with the advent of electronic payment transactions such as on-line and mobile payments.

Table 2: Remittances in US\$ million (source: World Bank, Remittances Data, and OECD Stat Extracts)

	Inward Remittances	%GDP	Outward Remittances	%GDP	ODA Excluding Debt
Benin	173	3.6	39	0.8	339
Botswana	118	1.1	118	1.1	64
Burkina Faso	50	0.8	44	0.7	828
Cameroon	103	0.6	43	0.2	398
Côte d'Ivoire	164	0.9	597	3.4	256
Ethiopia	172	1.3	14	0.1	1,823
Ghana	105	0.8	6	0.05	104
Kenya	1,128	5.3	25	0.1	893
Mozambique	80	1.1	26	0.3	1,473
Namibia	17	0.3	21	0.3	145
Nigeria	3,329	2.9	18	0.2	561
Rwanda	21	0.8	47	1.9	513
Senegal	633	7.1	77	0.9	780
South Africa	735	0.3	107	0.4	172
Tanzania	14	0.1	29	0.2	1,756
Uganda	814	8.7	322	3.5	1,497
Zambia	58	0.5	116	1.1	799
Sub-Saharan Africa	10,917	1.7	4,214	0.6	2,889
Developing countries	226,075	2	42,278	0.4	85,062

Results of research ICTAfrica's household survey reveal that remittances are quite prevalent not just internationally but also domestically, with all of the countries in the survey reporting between 8.5% and 39% of households receiving money from other households. Although it is more common to receive money from a household in another village or city, significant amounts are received from abroad (except in Burkina Faso and Ethiopia, where more households receive more money from abroad than they do from another village or city).

In most of the countries surveyed, remittances were more often received through a money transfer agency like MoneyGram or Western Union as opposed to banks. For Mozambique, Namibia, Nigeria, Tanzania, South Africa, Uganda and Zambia, remittances were more often received from a bank account, reflecting the better developed banking system and higher bank penetration in these countries or the absence of Western Union and MoneyGram services in the country. Notable however is that banks and agents such as Western Union and MoneyGram together make up only a small fraction of the transaction channels used. Bringing money in person, through a friend or family member, and other informal channels is more popular. Similar trends can be observed for households sending money to another household as summarised in Tables 3 and 4.

Table 3: Household receiving money from another household

	Share of household receiving money	From		Channel	
		Another village or city	Abroad	Bank	Western Union etc
Benin	8.5%	68%	31%	7.5%	18.3%
Botswana	20.7%	88%	10%	19.1%	4.2%
Burkina Faso	15.2%	44%	54%	3.3%	21.1%
Cameroon	23.2%	76%	22%	1.1%	24.4%
Côte d'Ivoire	17.1%	69%	23%	0.9%	20.9%
Ethiopia	5.0%	46%	46%	18.7%	27.1%
Ghana	26.5%	63%	31%	11.1%	17.3%
Kenya	11.0%	80%	17%	10.7%	19.2%
Mozambique	6.4%	52%	38%	16.2%	1.9%
Namibia	22.6%	87%	8%	39.9%	0.3%
Nigeria*	23.5%	84%	14%	33.3%	7.9%
Rwanda	4.2%	87%	7%	5.9%	3.9%
Senegal	39.0%	57%	41%	0.5%	25.1%
South Africa	16.1%	94%	3%	36.1%	1.7%
Tanzania	10.2%	71%	8%	9.3%	3.1%
Uganda	16.8%	86%	8%	16.5%	5.6%
Zambia*	19.7%	93%	6%	6.4%	6.2%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

Table 4: Household sending money to another household

	Share of households sending money%	From		Channel	
		Another village or city	Abroad	Bank	Western Union etc
Benin	36.6%	96%	4%	0.6%	0.9%
Botswana	23.8%	94%	6%	13.8%	3.0%
Burkina Faso	10.6%	91%	8%	0.7%	5.3%
Cameroon	29.9%	96%	2%	0.0%	6.6%
Côte d'Ivoire	41.5%	83%	14%	2.3%	8.5%
Ethiopia	8.0%	97%	0%	16.3%	1.0%
Ghana	29.0%	93%	1%	4.0%	0.0%
Kenya	28.2%	94%	3%	10.4%	8.1%
Mozambique	2.8%	56%	20%	33.4%	2.1%
Namibia	11.0%	94%	6%	48.6%	0.0%
Nigeria*	22.3%	88%	1%	39.1%	0.6%
Rwanda	1.9%	85%	4%	1.2%	2.4%
Senegal	19.5%	85%	10%	0.7%	5.6%
South Africa	18.6%	79%	16%	49.9%	4.9%
Tanzania	13.0%	85%	1%	15.5%	2.2%
Uganda	26.9%	96%	2%	3.3%	0.4%
Zambia*	8.3%	97%	0%	13.2%	15.1%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

This is indicative of the problems identified in the CGAP survey that people are still very concerned about security and the costs involved in remitting money [10]. There seems to be substantial demand for a service that meets the concerns of people regarding security and costs. In addition, institutions that reduce the costs of remittances can expect a higher-than-proportional increase in the value of remittances – in other words, remittances display negative cost-elasticity [11].

2.3 Airtime Transfers in Africa

In all 17 countries surveyed 7.4% to 53.9% of respondents indicated that they had transferred airtime to someone else's mobile phone. The majority of the transfers conducted are as a favour to family and friends; however there is also significant usage of airtime to pay for goods and services in a few countries. In Ghana, Nigeria, Tanzania and Zambia, 4.2% to 14% respondents indicated that the transfer was to pay for goods and services.

On the other hand, 4.8% to 68% of respondents indicated that they had received airtime from someone else before across all countries surveyed. The most prevalent type of transfers were those received from family or friends or airtime received as part of a financial transaction with someone else. In all countries except Burkina Faso and Rwanda, 0.3% to 9.9% of respondents indicated that they had received airtime before as payment for goods or services. Details are highlighted in tables 5 and 6.

Table 5: Individuals that sent airtime to someone else's mobile phone

	%	Paying for goods or services	Favour to a friend or family member
Benin	20.0%	1.9%	92.6%
Botswana	39.7%	0.4%	94.5%
Burkina Faso	12.9%	0.0%	93.4%
Cameroon	44.7%	2.6%	92.9%
Cote d Ivoire	13.2%	0.0%	84.1%
Ethiopia	7.4%	0.0%	66.1%
Ghana	24.5%	4.5%	88.1%
Kenya	53.9%	1.7%	93.0%
Mozambique	26.8%	0.0%	93.0%
Namibia	47.6%	2.7%	82.6%
Nigeria*	37.7%	4.2%	88.2%
Rwanda	15.5%	0.0%	91.7%
Senegal	23.0%	0.0%	93.9%
South Africa	8.1%	0.9%	82.2%
Tanzania	36.6%	14.0%	85.1%
Uganda	36.6%	3.0%	84.3%
Zambia*	32.6%	8.4%	97.6%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The survey indicates widespread use of airtime transfer, but not such a widespread use of airtime to pay for goods or services. For example, 88.3% of people in Kenya that had received airtime received it as a favour from a friend or family member, compared to only 1.2% who received airtime as payment for the provision of goods or services. 24.8% had bought airtime from an independent source (i.e. from someone that was not a family member or a friend, most likely an electronic airtime re-fill or top-up).

Table 6: Individuals that received airtime from someone else's mobile phone

	%	Buying airtime from someone	Being paid for goods or services	Favour from a friend or family member
Benin	42.4%	49.7%	4.3%	65.4%
Botswana	62.8%	28.6%	0.3%	85.1%
Burkina Faso	21.6%	0.4%	0.0%	77.3%
Cameroon	73.7%	57.2%	4.3%	72.7%
Cote d Ivoire	15.4%	3.7%	2.8%	74.3%
Ethiopia	4.8%	0.0%	0.0%	29.8%
Ghana	54.4%	24.9%	1.1%	72.4%
Kenya	68.0%	24.8%	1.2%	88.3%
Mozambique	55.7%	23.3%	1.2%	68.2%
Namibia	57.8%	24.7%	0.6%	79.0%
Nigeria*	46.6%	14.2%	6.7%	90.9%
Rwanda	40.1%	11.0%	0.0%	90.6%
Senegal	59.0%	58.7%	0.7%	65.0%
South Africa	12.8%	4.6%	2.1%	70.8%
Tanzania	61.7%	28.9%	9.9%	81.3%
Uganda	50.7%	15.4%	4.9%	82.1%
Zambia*	61.1%	40.4%	4.7%	91.3%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

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3. Mobile Payment System as alternative to the current banking system

In order to use the mobile phone as a strategy for the integration of the unbanked into the world of formal banking, instead of adding a mobile phone as an additional channel to an existing bank account, a more transformational option would be adding a bank account to an existing mobile phone. This should be feasible since each mobile phone number is unique and would push the access frontier considerably by turning each mobile phone number on an operator's network into a bank account number.

Currently mobile operators already maintain some kind of bank account for each of their subscribers in order to track their airtime usage. When airtime is purchased these accounts are credited and when calls are made or SMSs sent they are debited. These airtime systems could be extended to cater for add-on financial services, which extend to the unbanked and the informal economy. Such a strategy would help leapfrog some of the existing obstacles to getting a bank account and other financial services (depending of course on the national regulatory environments). It would mean establishing an alternative transaction mechanism to the expensive formal banking system, one that makes transacting electronically as convenient and cheap as dealing in cash.

Alternatively, using the conception of such an account, an individual can easily have multiple accounts associated to their mobile phone, one for airtime, one for money value and maybe another one for savings, for example. The saving sub-account would be money value as well but not immediately accessible depending on the savings account conditions.

For the case of only one account, airtime and cash would need to be convertible. This raises a couple of issues that will be discussed in the next section. Using several sub-accounts may help avoid many conceptual and regulatory issues. In the subsequent sections, we explore the implications of these two models:

- Model 1: Airtime-cash convertibility, using only one account on the mobile network servers
- Model 2: Mobile Wallets, multiple sub-accounts on the mobile network servers

In both models, transactions would need to cost very little or nothing and banks or operators would have to think about making their money in other novel ways [12].

3.1 Model 1: Airtime Cash Convertibility

Airtime is already being used in several African countries as a form of currency. In most cases it does not substitute cash but complements it. Initially developed to enable friends to share airtime across multiple prepaid SIM cards, the absence of convenient alternatives to transferring money over long distances has led this airtime exchange become a cash remittance substitute [13, 14]. In fact, remittances from family members living abroad, transferred as airtime is fast becoming an easy and a popular means of sending money. The way it works is that the person abroad purchases airtime online or at dedicated agents and this airtime is then immediately transferred to the receiver's phone. The receiver can then either use the airtime for calls and SMSs or sell it on or purchase goods with it [15].

This points to the crucial success factor for airtime being accepted as an alternative to cash—either either airtime will need to be widely accepted as an alternative currency, in that transactions can be made, and goods and services can bought with airtime; or airtime needs to be convertible backwards to cash.

If airtime could be used to pay for any product, there would be no need to convert airtime back into cash. If people could pay for day-to-day shopping with airtime they would build up a transaction history. If salaries could be paid in airtime the loop would be complete. Airtime would move in this closed loop and liquidity would be increased by new airtime being bought by mobile users and reduced by airtime being used to make calls or send SMS. The key success factor for airtime to be accepted as a means of payment is that it must resemble cash, i.e. there are no transaction costs for the end-user and it must be widely accepted. All other forms of credit (such as credit cards and cheques) have substantial charges associated with their use. For example, merchants pay banks a credit card fee up to 7.5% of the value of the product. For airtime to be a successful alternative to current payment systems, it needs to offer a competitive advantage. In the case of the unbanked, one of these advantages is no or extremely low transaction charges. This applies to those merchants or street-sellers that supply the majority of products to the very poor.

Currently, there are no formal avenues to change airtime back into cash, though a vendor might convert airtime to cash by selling it to someone else that needs airtime. Transaction histories however could be built up through airtime transfers regardless of whether it is backwards compatible to cash or not. Cash convertibility however would be much more attractive, but there are three obstacles that need to be overcome to allow for backwards convertibility:

- If airtime is convertible to cash, then selling airtime would be equivalent to accepting deposits and mobile operators would require banking licenses.
- Value added tax is charged on airtime. Some countries, like Uganda, also charge customs and excise duties.
- Value is currently lost in the distribution channels for airtime. Mobile operators pay resellers a commission for selling it. The value lost in the distribution channel can be 20%. That is, for every 10 US\$ airtime sold the operator receives only 8 US\$. If

the operator would buy the airtime back it would make a 2 US\$ loss.

3.1.1 Bank license

The first obstacle for making airtime convertible to cash could be overcome if mobile operators licensed as financial institutions. This would place them in the jurisdiction of a second regulator, the financial sector regulator. Alternatively banks could co-operate more closely with mobile operators or become virtual network operators themselves (like Virgin Mobile in South Africa—and in many other countries worldwide—where it does not own any mobile infrastructure)

3.1.2 VAT and other taxes License

The value added tax obstacle could be overcome by negotiating with the receiver of revenues to treat the VAT part of bought back airtime as input VAT. This would usually not be possible since private individuals are not registered for VAT and hence cannot issue VAT invoices. However, it should be possible to get to a special agreement for airtime given its potential for poverty alleviation. A potential VAT cycle is shown in Figure 2.

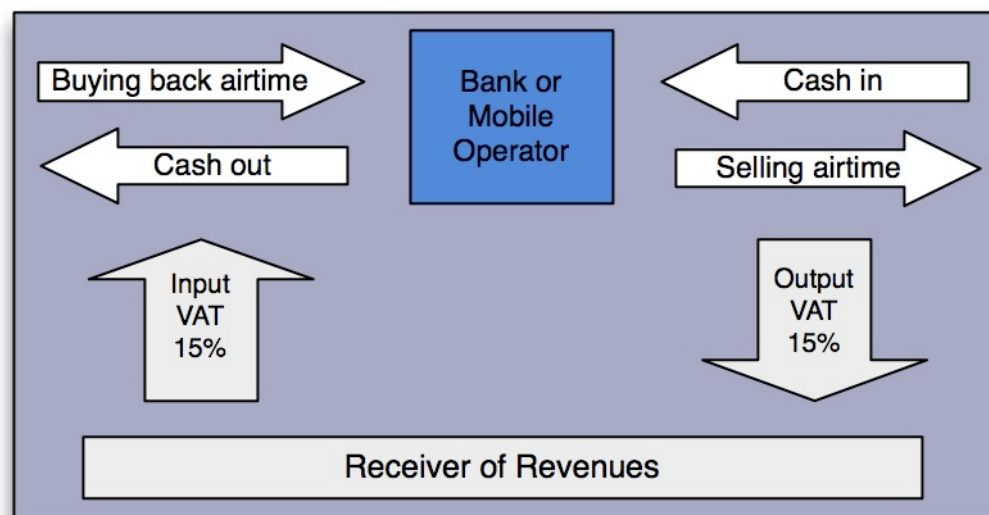


Figure 3: Potential VAT cycle supporting airtime cash convertibility

3.1.3 Value loss in the distribution channel

Currently retailers sell airtime because they get a commission. Generally two transactions need to be established that do not require commission, getting money into the system and getting it out again.

Cash out from the system: The cash-out component could easily be implemented since many businesses such as petrol stations and supermarkets are keen to get the money they take in as soon as possible into their bank accounts. Those accepting airtime in return for cash, or accepting mobile transferred cash would have their cash directly deposited safely into their bank account where it can start earning interests or being used for other purposes. Retailers across the world have already functioned as ATMs for years for that reason, providing a cash withdrawal mechanism for their clients.

Cash into the system: The cash-in aspect is of no benefit to retailers since handling cash means an expense to them, and without commission for doing it there would be no incentive for them to offer this service. Banks however have an incentive to attract money to the system. Though cash is also a cost for them, they have an incentive to attract cash

that they can lend. It would be desirable to make deposits into the system for free. Banks would not make their money by charging transaction or deposit fees but through their core value proposition, i.e., financial intermediation between those with capital and those that need it. The benefit to the banks is that they get a tool to extend their core business to a market segment they are currently unable to serve profitably as well as creating transaction histories (or customer profiles).

If retailers are to become the cash-out points and banks the cash-in points then everyone will benefit. Retailers benefit because the cash they take in is instantaneously transferred into their bank accounts. Banks benefit since they can raise capital cheaply and get an additional tool to evaluate the creditworthiness of informal businesses and the unbanked (a critical future customer base). The informal sector and the unbanked benefit from gaining access to formal financial services and being able to transfer money nation-wide and beyond to family members and business partners.

3.1.4 Acceptance of cash-airtime convertibility

The researchICTAfrica household survey asked respondents what factors would make them prefer to receive airtime rather than cash. In all countries except Botswana, the transaction costs were more of a source of concern for the respondents than its acceptance as a means of payment, reflecting both the widespread acceptance of airtime as means of payment, as well as fear of the charges involved – charges normally associated with formal banking.

Table 7: What factors would make you prefer Sending / Receiving airtime rather than cash or transferring money via banks?

	Sending		Receiving		
	zero transaction costs -	wide acceptance of airtime as a means of payment	zero transaction costs	safe transaction with feedback on transfer	wide acceptance of airtime as a means of payment
Benin	41.0%	37.8%	28.8%	0.7%	16.5%
Botswana	18.7%	22.2%	18.9%	28.6%	15.0%
Burkina Faso	13.1%	1.0%	4.5%	0.2%	0.6%
Cameroon	22.4%	1.1%	17.2%	0.3%	0.5%
Cote d Ivoire	38.6%	3.9%	19.4%	0.7%	0.4%
Ethiopia	1.3%	1.3%	2.5%	1.2%	0.2%
Ghana	64.6%	2.5%	40.8%	31.1%	3.5%
Kenya	53.1%	27.2%	48.8%	41.9%	23.5%
Mozambique	16.9%	15.5%	18.1%	36.7%	12.5%
Namibia	50.4%	33.1%	19.3%	22.1%	25.4%
Nigeria*	45.0%	33.2%	41.7%	14.9%	27.7%
Rwanda	96.7%	11.5%	68.8%	10.4%	10.4%
Senegal	23.0%	20.8%	28.4%	13.6%	9.4%
South Africa	57.4%	16.9%	45.3%	30.3%	10.3%
Tanzania	73.0%	53.1%	54.6%	12.8%	41.9%
Uganda	45.6%	21.5%	30.7%	13.8%	13.4%
Zambia*	27.5%	27.3%	28.3%	60.6%	29.7%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

The data summarised in Table 7 supports the view that the people are some way ahead of the suppliers (banks and mobile operators) in terms of accepting airtime as a payment

mechanism, but are concerned about high charges being carried over from the formal banking system to the “new” mobile payment system. The traditional model of supplying financial services to the unbanked must undergo a significant change.

3.2 Model 2: Mobile Wallets

The second model is based on the concept of several sub-accounts or wallets being associated with a particular SIM card. From a software and hardware perspective, it would be straightforward to give the user a second or third wallet that stores money electronically. Administered on a secure server, money can be transferred using the same channel and technology as for airtime transfers.

Airtime purchase could then be a transfer between the two wallets. At that point of transfer, VAT would be applicable and a reverse transfer would not be possible. This resolves the VAT problem of Model 1 and also addresses the loss of value in the distribution channel. VAT would only be charged at the transfer from the money wallet to the airtime wallet. Mobile operators benefit from this system since they can cut out the distribution channel since users can now charge their phones with airtime anytime without the involvement of third parties. In this model, airtime and cash are not the same thing, even though they use the same technology. Banks and users still benefit in the same way as they do for Model 1.

The GSM platform is already being used in Africa as a transfer mechanism for virtual currency which is convertible to cash, against transactions fees. Kenya’s MPESA, for example, is a mobile-based alternative for non-bank-account transfer mechanisms such as Western Union and MoneyGram. It is clearly cheaper as suggested by Table 8, but not yet cheap enough to function as an alternative currency. The charges are too high to pay for small items such as bread or milk. As the amount of money transferred increases, the transaction costs become more reasonable.

Table 8: Example MPESA Cost of non-bank domestic transactions (source: researchICTAfrica.net)

Amount in Khs	Send money to a registered M-PESA user		Send money to a non M-PESA user		Domestic Transfer Western Union	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
100	30	30.0%	75	75.0%	500	500.0%
500	30	6.0%	75	15.0%	500	100.0%
1,000	30	3.0%	75	7.5%	500	50.0%
5,000	30	0.6%	100	2.0%	500	10.0%
10,000	30	0.3%	175	1.8%	600	6.0%
20,000	30	0.2%	350	1.8%	700	3.5%
35,000	30	0.1%	400	1.1%	1,200	3.4%

4. Demand for Mobile Banking and Payments

In Kenya, one of the African countries with one of the most successful applications of mobile payments, banks are complaining loudly to the financial services regulator that mobile operators are unfairly competing against them. The Kenya Banking Association is arguing that “you do not allow innovation to outsmart regulation” [16]. This is precisely the point: innovation often outsmarts regulation. It is up to policy-makers to create an environment that supports innovative applications and adjust regulation to evolving innovation.

Results from RIA’s *e-Access & Usage Household Survey* indicate that there would be significant interest in some of the above mentioned options being offered as m-banking services. When asked if they would consider having their salary paid into a mobile phone

bank account, 3.5% to 49.4% of respondents indicated that they would. 1.9 to 49.7% of respondents said that they would trust mobile banking if it were backed by a mobile operator and between 1.8 to 47.7% if backed by a bank. Ethiopians are those that would trust mobile banking least. This could be explained by the low bank account and mobile penetration in Ethiopia. In Benin, Burkina Faso, Mozambique and Nigeria, respondents indicated that they would trust mobile-banking more if backed by a mobile operator. Attitudes of respondents are highlighted in Table 9.

However, individuals' attitudes to mobile banking in Botswana points to the opportunity for mobile operators and banks to cooperate. Between 19.7% and 26.3% trust mobile operators and banks respectively, but together 44.4% state that they would consider depositing their salary into a mobile bank account. A similar picture emerges in Ghana and South Africa.

Table 9: Attitudes toward mobile banking

	Mobile phone banking can be trusted if backed by a mobile phone operator	Mobile phone banking can be trusted if backed by a bank	You would consider having your salary (or your main source of income) paid into mobile phone bank account
Benin	12.4%	10.3%	10.2%
Botswana	19.7%	26.3%	44.4%
Burkina Faso	17.6%	13.0%	9.6%
Cameroon	21.0%	21.0%	12.6%
Côte d'Ivoire	10.7%	9.5%	4.5%
Ethiopia	1.9%	1.8%	3.5%
Ghana	39.3%	50.9%	45.7%
Kenya	38.1%	38.7%	38.4%
Mozambique	49.7%	47.7%	47.1%
Namibia	21.3%	20.2%	17.9%
Nigeria*	26.9%	38.0%	19.9%
Rwanda	7.9%	6.9%	4.2%
Senegal	16.0%	15.1%	36.0%
South Africa	30.1%	32.3%	49.4%
Tanzania	14.7%	13.3%	10.9%
Uganda	16.6%	14.9%	22.3%
Zambia*	22.1%	25.3%	16.5%

* Results for Zambia and Nigeria are extrapolations to national level but not nationally representative.

5. Regulating co-operation between banks and mobile operators

In many regards, the telecommunication and financial sectors are similar. Both are crucial for economic and social development, both have only a few players (oligopolies) that need to be regulated in the public interest. In future not only will banks and mobile operators be required to cooperate more closely, but the different sector regulators will have to do so as well. Who dominates this relationship between banks and mobile operators will probably be determined by the kind of business model that emerges [7, 16]. At one extreme, the mobile operator can dominate or own the whole value-chain. When this happens the resulting business model may be open to more banking institutions, but will almost certainly exclude other mobile operators. At the opposite end, when a banking institution dominates, the resulting model tends to be more open to other mobile operators, but less so for other banking institutions. M-PESA works for example only on Safaricom in Kenya, excluding subscribers from other networks from direct use of its services.

From an economic or developmental perspective the ideal would be a mobile payment system that is independent of banks and operators and allows transfers and interactions

between any bank and any operator. The formal financial system with its automatic clearing bureau is such a system but it tends to be very expensive. If banks or mobile operators are allowed to control (singly or collectively) the clearing house, their incentive is to ensure that competitors are excluded and to raise the barriers to entry. Forcing the clearing house to be an independent, not for profit, open access institution increases the likelihood of innovation in the financial services sector. In South Africa, the Competition Commission conducted hearings into the anti-competitive abuses of the banking sector and one of its conclusions was that the SA banks use the high charges of the clearing house as a mechanism to increase barriers to entry.

A mobile payment system would need to replicate this formal system but with a zero or extremely low transaction cost for the actual users. The current value being generated by both mobile operators and banks in Africa makes a partnership for such a system between banks and operators unlikely. A third party who is able to understand the dynamics of a volume based, small margin business is more likely to succeed. Finding a middle ground is critical for Africa, primarily because multiple institutions need to collaborate to make mobile payments successful via more open business models. There are entrenched positions and interests that various parties would like to protect:

- Mobile operators want more influence since they control a key piece of the infrastructure—the SIM in the user's mobile phone. In addition, the user is already a subscriber to their network.
- Banking institutions consider mobile payments their turf, so they want more control, yet on the other hand are not sure how they will deal with this new class of customers without cannibalizing their existing, lucrative customer base.
- A host of other entities with a stake in the successful implementation of mobile phone payments are eager to cash in on the promise of the mobile phone revolution—mobile phone manufacturers, SIM suppliers, software developers, value-added service providers, payment processors, digital signature issuers and verifiers, etc.

From a national development perspective the ideal would be a bank and operator independent system to allow as many people as possible to participate and to discourage the development of proprietary payment systems. This type of scalability would however be in neither the interest of mobile operators nor banks since both seek to strengthen brand loyalty and market share.

Policy-makers need to make some strategic decisions about how best to leverage the opportunity that mobile banking represents. Regulators, on the other hand, have to quickly learn to grapple with new issues that appear to extend beyond their domains of expertise with responsiveness and flexibility in order to allow innovation. From the solutions that emerge, the market can help decide what is most appropriate given the African context. There are a host of issues pertinent for policy makers and regulators in relation to mobile payments:

- Who can carry payment instructions? The goal is to prevent emerging solutions being tied only to a particular network [7].
- Who can help dispense cash? To explore how to extend beyond the limited network of established banking financial institutions [10].
- What is the limit of liability of the various institutions involved? [10]
- What types of transactions should be permitted with mobile payments?
- Who can have access to the resulting trail of a user's transactions? And what could it be used for?
- What kinds of expertise do the regulators need to put in place to be able to provide oversight while staying relevant and responsive in a rapidly changing technology landscape without stifling innovation?

- How will users of mobile payment systems be secured against system failure and fraud?
- How can a link between an individual's identity and a mobile phone (or SIM) be created without creating unnecessary bureaucratic procedures, but still protect their privacy and money?
- How can the elaborate procedures that have been developed to address Anti-Money Laundering and Combat Financing of Terrorism (AML/CFT) in the regular banking arena be applied to the mobile payment system?

6. Conclusions

The unbanked are unbanked for a reason. They will only consistently transact electronically if there are limited or no transaction costs involved and if doing so is convenient and secure. Serving the currently unbanked profitably and sustainably requires a radically different approach. Tweaking the existing banking system will not achieve a breakthrough in service provision to informal SMEs or the poor. A paradigm shift needs to occur in order to determine how the poor can be profitably brought into the banking sector. Airtime-cash convertibility or mobile wallets have the potential to provide an urgently needed breakthrough.

The RIA e-Access & Usage Household Survey provides evidence that there is general acceptance of airtime as a payment mechanism and that the mobile platform is accepted as an alternative to the banking system for payments and transfers. The potential market is enormous. The majority of current mobile phone users are unbanked. The integration between mobile phones and banking is the most promising mechanism to date to bring development and economic growth to those that need it most, the poor.

However, there are concerns about high costs and the security of such transactions. The rapid reduction in charges provides some evidence that remittances are still a high margin business and the introduction of competition should lower costs dramatically. Also, the negative cost elasticity associated with remittances means that there is potentially a massive market that is currently under-served. The challenge to policy-makers and regulators is two-fold: Firstly, to encourage banks and mobile operators to develop solutions that are not proprietary and secondly, to allow access to potential new entrants that can disrupt the lucrative business models of the banks and mobile operators. The key challenge is to do this while at the same time ensuring high levels of security and trust.

Just like convergence forced the integration of broadcasting and telecommunications, so mobile banking is forcing the convergence of the financial and telecommunications sectors. Unfortunately, the convergence of two such heavily regulated industries means that this potential is unlikely to be met unless policy-makers lay the ground rules for innovation. Recommendations could include encouraging the development of industry standards for mobile banking security based upon open access principles and changing regulatory systems to allow mobile operators to become banks or banks to operate MVNOs.

Banks need to get back to basics and focus on making money through financial intermediation rather than through transaction fees. Policy-makers and regulators need to safeguard that evolving systems serve the broader objectives of economic growth and development as well as protect consumer interests, while creating an environment that encourages and rewards innovation. The poor can participate in the formal economy if access is granted to them, in this case using micro-payments, a simple maxim demonstrated by Prahad in his classic—the “Bottom of the Pyramid” [18].

References

- [1] Stork, C. and Esselaar, S. (2006): Towards an African e-Index - SME e-Access and Usage, ISBN 100-620-37593-0.

- [2] Firpo, J. (2008): Banking the Unbanked: Issues in Designing Technology to Deliver Financial Services to the Poor, 195-206, In *New Partnerships for Innovation in Microfinance*, Springer, ISBN 978-3-540-76640-7.
- [3] Porteous, D. (2007): Just how Transformational is M-Banking, FinMark Trust, www.finmarktrust.org.za.
- [4] Esselaar, S., Stork, C., Ndiwalana, A., and Mariama Deen-Swarray, M. (2006): ICT usage and its impact on profitability of SMEs in 13 African Countries, *Proceedings of the 2006 International Conference on Information and Communication Technologies and Development*, UC Berkeley School of Information, May 25-26, 2006, Berkeley, California, USA, ISBN 1-4244-0485-1, Library of Congress 2006926701.
- [5] World Bank (2006): *Global economic prospects: Economic implications of remittances and migration*. Washington, DC: World Bank.
- [6] Gupta, S., Pattillo, C. A., and Wagh, S. (2009). Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa, *World Development*, Volume 37, Issue 1, January 2009, Pages 104-115, ISSN 0305-750X.
- [7] Porteous, D. (2006): *The Enabling Environment for Mobile Banking in Africa*. DFID,
- [8] UK Remittance Working Group. (2007): *UK remittance market: Best practices for the remittance industry in the UK*. London, DFID.
- [9] UN IFAD. (2007): *Sending Money Home: Worldwide remittance flows to developing countries*.
- [10] Lyman, T., Ivatury, G. & Staschen, S. (2006): *The Use of Agents in Branchless Distribution for the Poor: Risks, Rewards and Regulation*. CGAP.
- [11] Gibson, J. McKenzie, D.J. & Rohorua, H. (2005): *How Cost-elastic are Remittances? Estimates from Tongan Migrants in New Zealand*. World Bank.
- [12] Cracknell, D. (2004): *Electronic banking for the poor – panacea, potential and pitfalls* *Small Enterprise Development*, 15(4), 8-24.
- [13] Batchelor, S., Scott, N., & Hearn, S. (2007). *Senegal household survey: M-payment analysis*. Reading, UK: Gamos.
- [14] Chipchase, J., & Tulusan, I. (2007). *Shared phone use*. Last accessed February 25, 2009, at <http://www.janchipchase.com/sharedphoneuse>
- [15] Examples of foreign airtime remittance to Ghana, Kenya, Nigeria and Uganda using various methods include <http://www.kikwe.com> <http://www.icareug.com>, <http://www.newvision.co.ug/D/8/220/508701>, <http://www.mamamikes.com>, <https://www.mukuru.com>, <http://www.sendairtime.com>. Links last accessed on February 25, 2009.
- [16] Mbugua, J. (2008): *Kenya: Big Banks in Plot to Kill M-Pesa*. Nairobi Star. Last accessed February 25, 2009, at <http://allafrica.com/stories/200812230962.html>
- [17] Lyman, T., Ivatury, G. & Staschen, S. (2006): *The Use of Agents in Branchless Distribution for the Poor: Risks, Rewards and Regulation*. CGAP.
- [18] Prahalad C. (2006): *The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits*, Wharton School Publishing Paperbacks.