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Adoption Factors for Mobile Financial Services: Laggards and Early Adopters in Low-Income Countries

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ABSTRACT

This paper evaluated low-income countries and identified adoption factors for mobile financial services (MFS) that are not covered by TAM (Technology Acceptance Model). From the literature we identified enabler and bottleneck factors that impact MFS adoption in low-income countries. We analyzed laggard and early adaptor countries to compare the factors. In our conclusion we identified thirteen MFS adoption factors and categorized them in a 2x2 metrics using enablers and bottlenecks vs. exogenous and endogenous. Further, we used the early adopter and laggard countries to understand how the MFS adoption strategy differed between the two groups. Future direction is provided.

Keywords: mobile, financial service, TAM, low-income country, adoption,

Introduction

There are over nine million households, i.e. nearly 20-million people, in the United States [1] and an additional 2.5 billion people around the world [2] that are unbanked or under-banked. The challenges faced by unbanked and under-banked communities in both high- and low-income countries are similar including complex procedures and eligibility norms [3] as well as the need for transformative model instead of additive model [4], [5]. But these challenges/factors differ from the constructs commonly used in TAM (Technology Acceptance Model), which typically focuses on banked individuals with operational access to multiple channels [3]. This study contributes by looking at the enabler and bottleneck factors that uniquely impact the adoption of MFS in unbanked and under-banked communities.

There are over 5.3 billion mobile cellular subscriptions worldwide [6], nearly the same number of people, 5.4 billion, which have access to electricity [7]; compared to the 6.9 billion world population these numbers are 77% and 78%,

respectively. This staggering global adoption rate of mobile phones presents MFS as an attractive alternative for economic inclusion.

Mobile Financial Services (MFS) refers to a set of applications that enable people to use their mobile (cell) phones to manipulate their bank account, store value in an account linked to their handsets, transfer funds, or even access credit or insurance products [8]. The term ‘MFS’ is applied to a range of financial activities that are conducted using mobile devices, such as cellular phones or personal digital assistants [9]. For the purposes of this research MFS is defined as financial services that can be done using mobile technologies without having to be at a physical bank branch, i.e. branchless banking. Financial services include account inquiry, deposits, withdrawals, and transactions. The primary device is mobile or cell phone but other devices including hand held devices, computers, and slates are also means for accessing mobile financial services. MFSs are increasingly being promoted as the way forward for financial transactions [10] and have several advantages to help increase the efficiency and effectiveness of financial transactions and operations.

In this study “unbanked” refers to individuals that do not have any banking account and “under-banked” refers to people that have at least one bank account but with limited volume and value transaction due to lack of access to banking and financial services or due to lack of demand. Unbanked and under-banked individuals have limited (or not at all) access to savings or credit account in the traditional banking system or alternative financial institutions like microfinance, the potential of creating a “branchless banking” for these individuals avails an opportunity to leapfrog to ubiquitous financial services. Unbanked and under-banked individuals cannot afford the cost of formal banking services and infrastructure hence they benefit significantly from innovative mobile financial services like mobile banking and mobile payments [9].

Mobile adoption rate in African countries, our focus in this study, are higher than US and Europe; by 2012 sixty percent of Africa's population is expected to have mobile phones, except four countries including Guinea Bissau, Ethiopia, Mali, and Somalia [11]. While many countries have embraced MFS as a potential for financial inclusion adoption successes vary significantly; Kenya and South Africa are among the early adopters of MFS with recognizable success [12]. On the contrary MFS adoption in the laggard countries Guinea Bissau, Ethiopia, Mali, and Somalia, has not been as successful [11].

Methods

For this study we conduct literature review to identify enabler and bottleneck factors for MFS adoption and categorize them as endogenous or exogenous factors. In our analysis we look at the literature to understand how successful countries handled the adoption factors and learn from their experience. We also look at how countries lagging behind in MFS adoption handled the adoption factors. Furthermore we took a closer look at one of the countries lagging behind in MFS adoption, Ethiopia, and evaluated the specific challenges through a pilot interview with industry experts.

Our interviewee for the pilot test included five bank executives from a large government bank and a senior consultant. The interview was conducted by one of the researchers. All interviewee were male and self-identified their operational knowledge of MFS as good.

Literature review

Several scholars have applied the TAM constructs to Internet and mobile banking including security concerns, lack of awareness, trust, and mobile network quality [13]; [14], [15]; [16], and [5]. As stated before these factors are focused on operations that have adequate access to multiple channels [3]. There is a dearth of knowledge about the MFS adoption factors for unbanked and under-banked individuals. This study contributes to our understanding of factors that enable or become bottleneck for MFS adoption in the unbanked and under-banked communities. We further apply these factors by looking at two early adopters of MFS, Kenya and South Africa, as well as one laggard country in the adoption of MFS, Ethiopia.

Prior research posits several factors that impact MFS adoption. For example, the high cost of opening physical bank branch and low volume of transactions [3] lack of customer service infrastructure & informational deficiencies [17], high cost of financial transaction along with low

penetration [18], absence of MFS use policy, security, trust, presence of regulatory policy environments for telecoms and mobile finance use [19], financial limitation to acquire the technology [11], cost of telecommunication and lack of e-banking use regulatory policies [18]. These factors are summarized in Table 1 and detailed description of the factors is provided in the subsequent paragraphs.

Table 1: Mobile financial services adoption factors in unbanked and under-bank communities

	Exogenous factors	Endogenous factors
Enabler	<ul style="list-style-type: none"> - Complex procedures and eligibility norms - Cost of account maintenance - High borrowing rate - High physical branch cost 	<ul style="list-style-type: none"> - Transformational model approach - "Access to all" principle - Ubiquitous device
Bottle neck	<ul style="list-style-type: none"> - Supporting services - Absence of regulatory policy - Lack of telecom infrastructure 	<ul style="list-style-type: none"> - Lack of customer oriented services - Low transaction volume - Absence of use policy

Enabler—Exogenous: These factors are triggered by the current financial landscape, hence exogenous to MFS, but the factors motivate patrons to consider MFS as an alternative solution, hence enablers of MFS.

- *Complex procedures and eligibility norms of a traditional bank [enabler—exogenous]:* The procedures to open a traditional bank account is complex and has stringent eligibility criteria; often driven by the sensitivity of financial transactions, default liabilities, and attempt to avoid money laundering. However, the procedures and criteria should commensurate with the associated risk. For example, requiring physical presence to open an account puts too much burden on an individual furthest from a bank branch—often the unbanked and under-banked persons. MFS can alleviate these challenges by providing hand-held devices equipped with the ability to provide all necessary identifiers including picture taking and biometric features like fingerprints; this positions MFS as a flexible solution to adopt risk-based account opening [20].

- *Cost of account maintenance [enabler—exogenous]*: The minimum monthly balance an account holder has to maintain to avoid monthly account maintenance fees is as high as \$1,500.00. Many in the unbanked community do not have this level of discretionary funds; as a result their nominal deposit will dwindle due to the monthly fees, in some cases it may prompt account closure. The typical model used in MFS is transaction based; i.e. the account holder is charged a nominal fee only when making transactions.
- *High borrowing rate [enabler—exogenous]*: Unbanked individuals that use non-traditional financial services like “check cashing” or “pay-day-loan” end up paying very high interest rates; in some cases reaching an annual rate of 300%. MFS provide a low-cost and flexible model for the traditional banks, microfinance, and credit unions to reach the unbanked community, hence create an environment where these traditional institutions serve their needs avoiding the high borrowing rate.
- *High physical branch cost [enabler—exogenous]*: Opening a physical bank branch requires a significant pre-opening investment to pay for building, equipment, and personnel. To the contrary MFS that serves a rural community can be established with a purchase of a four hundred dollar (\$400.00) hand held device, a small vault, and two clerks. This low upfront investment using MFS, branchless banking has a significant cost advantage over traditional brick-and-mortar approaches in reaching the unbanked community, especially in rural areas where communities are sparsely populated.

Enabler—Endogenous: These factors are triggered within the MFS environment, hence endogenous to MFS, and the factors motivate patrons to consider MFS as an alternative solution, hence enablers of MFS.

- *Transformational vs. additive model [enabler—endogenous]*: There are two models in MFS adoption—additive model and transformative model. Additive model is providing additional services to an already existing bank account holder; transformational model on the other hand is the offering of new

services that are targeted to the unbanked [20]. MFS services currently offered by most large banks fall under the additive model including account alerts (security alerts and reminders); account balance (updates and history); customer service via mobile phones; branch or ATM location information; transaction verification; and mortgage alerts [21]. An example of transformational model is offering branchless banking through agent networks that are prevalent in unbanked communities, i.e. cash-in and cash-out features at kiosks and grocery stores. While some traditional banks are beginning to offer transactional services that go beyond static information and alerts; all these features and core banking transactions are “out-of-the-box” features for MFS that are available from day one.

- *“Access to all” design principle [enabler—endogenous]*: Many of the features offered by traditional banks are browser based, requiring internet access, and primarily designed for smart phones. While adoption of smartphones is growing steadily the dominant mobile phone devices are still feature phones, this is true even in high-income countries in US and Europe; the prediction is that both US and European smartphone market will reach 50% in third quarter 2011 [22] [23]. Given these predicaments MFS design should target “access to all” principles addressing both feature phones and smartphones; mobile apps that target only smartphones miss half the market and do so at their own peril.
- *Ubiquitous device [enabler—endogenous]*: The staggering global penetration of mobile devices with 5.3 billion subscriptions is unparalleled for technology adoption. This ubiquitous nature of the mobile device presents MFS as an ideal solution to leapfrog the 2.5 billion unbanked people to the “main stream” financial services.

Bottleneck—Endogenous: These factors are triggered within the MFS environment, hence endogenous to MFS, and the factors hinder patrons from considering MFS as an alternative solution, hence bottlenecks of MFS.

- *Lack of customer oriented services [bottleneck—endogenous]*: financial institutions that take a pro-active role in

creating a positive attitude among their populous have seen a surge in MFS adoption [12]. Governments also need to address consumer protection issues and take measures to promote anti money laundering. This is a bottleneck that should be addressed within the MFS sector.

- *Low transaction volume [bottleneck—endogenous]*: The MFS revenue model is predicated on high transaction volume. The nominal transaction fee, often charging pennies, would only rise to cover overhead and achieve breakeven if the transaction volumes are high. However, many factors including low literacy, lack of awareness, and adoption factors listed in Table 1 as well as TAM constructs result in low MFS transaction rate in many markets hence becoming a bottleneck for MFS adoption.
- *Absence of use policy [bottleneck—endogenous]*: MFS use policy are lagging in many low-income countries. Use policies on lost record, theft, settlement and service disputes, and cash-in mechanisms are needed. For example, in a credit card payment both the merchant and customer have recourse through the credit card provider if settlement or service disputes emerge. A customer with a legitimate service deficiency by a merchant may receive refunds from the credit card agency. Also a convenient mechanism for adding cash to an MFS account (cash-in) is still lacking; the customer has to make a cash transaction at an agent location or create a “debit card” like link to his/her bank account. The later requires clear use policy while the former limits the “anywhere” flexibility of MFS. Hence creating MFS use policies earlier in the process helps reduce its impact as a bottleneck.

Bottleneck—Exogenous: These factors are triggered by the current financial landscape, hence exogenous to MFS, and the factors hinder patrons from considering MFS as an alternative solution, hence bottlenecks of MFS.

- *Supporting services [bottleneck—exogenous]*: For MFS to function basic supporting services like agent networks need to be established. Lack of existing support services networks slows the adoption of MFS, hence an exogenous bottleneck.

- *Absence of regulatory policy [bottleneck—exogenous]*: Governments and the banking sector need to establish regulatory policy to handle innovative services like MFS. For example the absence of clear policies on how electronic cash (e-cash) will be governed creates a bottleneck. The absence of regulatory policy slows the adoption of MFS hence a bottleneck.

- *Lack of telecom infrastructure [bottleneck—exogenous]*: Without a robust telecom infrastructure MFS offerings cannot be relied on. Many low-income countries and even some rural communities in high-income countries are still “work in progress” when it comes to robust telecom infrastructure. Communities that do not have adequate telecom infrastructure would have to overcome this bottleneck before benefiting from MFS.

Discussion

In this section we reflect our analysis of two early adopters of MFS, Kenya and South Africa, and one laggard in the MFS adoption, Ethiopia. Our interviewees indicated MFS in Ethiopia is at “infancy stage”, and recognized Ethiopia is behind the MFS adoption curve. Nevertheless they were enthusiastic about the MFS future and its promises for Ethiopia’s large unbanked community (only 5% of Ethiopian’s have bank accounts) and its large rural community of 72-million (85%). Kenya is mentioned by all interviewees as the prime example of successful MFS adoption with M-Pesa as the prime example. And our interviewees mentioned South Africa for its exemplar MFS innovation.

Our analysis shows that both early adopters and laggards identified with several of the traditional adoption factors including security, trust, resistance to technology, resistance to change, and resistance to innovations. They also identified the benefits of MFS in encouraging savings and investment and its significant potential to generate revenue for the banking industry as well as the cellular network and service wholesalers and retailers. Our discussion of the adoption factors is grouped by the four quadrants shown in Table 1: enabler—exogenous, enabler-endogenous, bottleneck-endogenous, and bottleneck—exogenous.

[Enabler—Exogenous]: To overcome complex procedures and eligibility norms of a traditional bank South Africa instituted a legislation that allowed “lighter” control for opening accounts

with restricted limits on transaction and maximum balances. This helped promote MFS in South Africa. In contrast Ethiopia's short term strategy was to increase building traditional bank branches. South Africa has designed a framework which has helped solve issues associated with high cost of retail banking and difficulties to access for these services. Our interviewees recognized the enabler effect of MFS for exogenous factors and sited MFS as a solution to overcome the limited bank access faced by the country, one bank for every 100,000 people. They also recognized the benefits of MFS in reducing transaction and maintenance costs, improve accessibility, and save cost by targeting branchless banking rather than traditional branches.

[Enabler—Endogenous]: In addressing "Access to all" design principle South Africa favored joint ventures between technology providers and banks to design MFS system that works on smartphones and feature phones as well as across mobile service provider networks as demonstrated by two joint ventures including WIZZIT and MTN Banking [24]. South Africa's approach followed the transformational model targeting unbanked communities. In contrast Ethiopian banks focused their MFS offerings on additive model providing existing account holders mobile account information alerts. Our interviewees confirmed that the only MFS service they can currently access is account status information. They also indicated that MFS policy in Ethiopia is nonexistent and cited that electronic contracts and signatures are not supported by Ethiopian law. In addition, the interviewees recognized the opportunity created by the growing mobile phone penetration and the easy financial access MFS avails in improving financial accessibility in the country.

[Bottleneck—Endogenous]: To overcome lack of customer oriented services the central bank of Kenya adopted a fairly positive attitude regarding the introduction of mobile financial services and its assimilation in the market. In contrast there is no MFS use policy in Ethiopia. Despite the current status quo the interviewees showed promise in the aggressive Government Strategic Plan of 2011-2015 which targets to expand telecommunication infrastructure [25].

[Bottleneck—Exogenous]: To strengthen its supporting services Kenya developed an agent network which helped overcome physical constraints for MFS delivery. And South Africa developed regulatory framework and policies to facilitate easier access to MFS. Furthermore, South Africa's telecom sector provides access to traditional financial services through sound data collection and monitoring. In contrast Ethiopia's

supporting services and its telecommunication infrastructure is weak. While the country is making commendable progress in electric generation the frequency of power interruption diminishes the viability of supporting services. And internet costs are high; while the recent fee reduction for Internet access is welcome news for MFS adoption, Ethio-telecom slashed its Internet access fees by 85% after its recent management transition to a private French company, the costs are still high for the average citizen. Kenya has managed to effectively leverage a cost effective MFS solution to make it more affordable to people in its target market. For example, registration is free and small denomination money transfer using the M-Pesa platform has a cost advantage by a factor of thirty, i.e. sending \$142.00 costs \$0.80 through M-Pesa compared to \$25.00 through Western Union [24]. MFS is recognized for reducing transactional costs [26]. Our interviewees recognize the challenges of deploying MFS due to the lack of legal framework, regulatory framework, government policies, and regulations as well as the need to liberalize the telecom sector they remain hopeful about the government's growth and transformation plan to improve telecommunication infrastructure and to address the inadequate financial services [25].

Additional factors: Our interviewees identified several adoption factors that are not noted in our list of adoption factors in Table 1. We recommend further analysis and discussion prior to including these additional factors to the list of adoption factors. The additional factors include:

- *Lack of awareness.* Our interviewees have suggested a concerted awareness and promotion effort in three stakeholder groups including government officials, policy makers, and the citizenry.
- *Motivation.* A dichotomy of motivation was cited by the interviewees. On the one hand a highly motivated mobile cellular network provider and on the other hand low motivation by banks. It should be recognized the banks in Ethiopia, similar to other low-income countries, do not own their own network services. Any effort to provide MFS requires a three way partnership between the bank, the cellular network provider, and a technology (MFS) provider.
- *Low literacy level.*
- *Language.* Ethiopia is a multi-ethnic nation with at least 70 different languages. Disseminating a national solution given the language diversity is daunting; enforcing a single language is equally daunting.
- *Degree of dependence on the mobile technology.* Our interviewees posited

that the country has no other alternative channels to reach the rural masses, hence must embrace MFS.

- *Personal financial infrastructure.* Many of the unbanked and under-banked individuals pay cash for most of their services. Cash-based transactions encourage a more frugal mindset among consumers, who embrace their "pay before" spending paradigm (via prepaid mobile accounts) as opposed to the ruinous "pay after" model (with credit cards) which fueled the financial bubble that led to the current global recession [27].

Conclusions

This study used literature review to identify MFS adoption factors that are unique to unbanked and under-banked communities and analyzed the impact of these factors by analyzing early adopter and laggard countries. For successful early adopters we used Kenya and South Africa. Ethiopia was used to understand laggard country characteristics in the adoption of MFS. A literature review was conducted to understand the MFS adoption success factors in Kenya and South Africa and a pilot interview with domain experts was conducted to study Ethiopia's MFS adoption patterns.

We identified 13-MFS adoption factors and categorized them in a two-by-two matrix looking at enablers vs. bottlenecks and exogenous vs. endogenous. Further, we used the early adopter and laggard countries to understand how the MFS adoption strategy differed between the two groups.

Based on our analysis we make the following recommendations:

- *Enabler—Exogenous:* MFS adoption factors including complex procedures and eligibility norms, cost of account maintenance, high borrowing rate, and high physical branch cost are triggered by traditional financial services sector and serve as enablers for MFS adoption. MFS adoption, however, must note the negative impact these enabler-exogenous factors encumber on MFS adoptions and device strategies similar to the early adopters to succeed in the MFS adoption.
- *Enabler—Endogenous:* MFS adoption factors including transformational model approach, "access to all" principle, and ubiquitous devices are enablers inherent to MFS. Hence adopters should take advantage of these enablers and promote

their implementation to achieve MFS adoption success.

- *Bottleneck—Endogenous:* MFS adoption factors including lack of customer oriented services, low transaction volume, and absence of use policy are inherent to MFS sector but they discourage the adoption of MFS. Similar to what the early adopters did to overcome these challenges MFS adopters should follow suite to address these bottlenecks.
- *Bottleneck—Exogenous:* MFS adoption factors including supporting services, absence of regulatory policy, and lack of telecom infrastructure are triggered outside of the MFS sector, hence MFS adopters should heed the lessons learned from the early adopters and laggards to achieve success.

This research is work-in-progress. The recommendations made here are based on a very small pilot study. A full study is forthcoming to conduct further analysis; hence the recommendations may not be generalizable.

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