

Cash Replacement through Mobile Money in Emerging Markets: The FISA Approach

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The rapid penetration of mobile phones in emerging markets has opened a massive business opportunity for providers of retail financial services. For the first time, billions of formerly disconnected individuals have established a vibrant business relationship with their mobile network operators (MNO), and this relationship can be monetized in ways we could not anticipate five years ago.

Mobile payments has become the first successful example of customer adoption in the mobile financial services space. Interestingly, it is in emerging markets that mobile payments transactions have shown explosive growth. This could be explained by the lack of payments alternatives to cash in these markets.

According to a mobile payments report from Gartner, there will be 190 million mobile payments users in 2012 and 87% of them will be located in emerging markets.¹ If we take a look at large emerging markets like China, India, Indonesia, Brazil, and Mexico, more than 95% of all consumer initiated transactions are cash-based.² This opens a unique opportunity to monetize part of these transactions with a secure and easy-to-use mobile payments service. Unlike other emerging business opportunities, there is actual evidence of what this opportunity looks like. Today, there are six mobile payments ecosystems with more than one million active users; and in Kenya already 67% of Safaricom subscribers are frequent users of the mobile payments offering, M-Pesa.

There is nothing secret about this opportunity. Extensive coverage by the media and industry publications has resulted in over 165 pilots in emerging markets by a diverse group of organizations. Most of these have the single objective of replicating the successful experience of the six markets mentioned above. However, the majority of these experiments lack the scale and connections to the financial ecosystem required to succeed in places where the banking and telecommunications industries are fragmented.

Although the adoption of a payments service is not the same as financial inclusion, we believe payments has become a stepping stone to broader financial services such as credit, savings and insurance. Once a critical mass of low income customers is comfortable using a low cost “banking channel” for everyday commercial interactions, the probability of developing successful low income banking offerings significantly increases. At the time when this paper was written, M-Kesho, the new savings, credit and insurance products of Equity Bank and Safaricom in Kenya, was signing up clients at a rate of 240,000 per month.³

For these and several other reasons explained in this paper, we believe providers of retail financial services should acknowledge and react to this new market trend that has the potential to spread to the rest of emerging markets.

How to begin?

All the successful mobile payments ecosystems that we have studied had one common factor; beyond the technology platform used to deliver the service, there was a disciplined “service design” approach that drove the rest of the offering components and ensured customer adoption.

Clear incentives for adoption by end users are central to the product design process and were clearly communicated to the end users when promoting the service. We believe the identification of areas where cash is less efficient is key to designing attractive mobile payments offerings.

The FISA approach

How can mobile be more attractive than cash? It can be Faster, more Inexpensive, Safer, and more Accessible. These simple value propositions are what make mobile money so compelling for end users. Delivering this value, however, creates significant challenges for providers.

Value proposition	User benefit	Provider challenge
Fast	<ul style="list-style-type: none"> Instantly transfer money long distances Pay bills without waiting in line at cash centers 	<ul style="list-style-type: none"> Offer an optimized process for end users to complete transactions Ensure appropriate agent density to quickly serve customer cash in/cash out requests Guarantee network robustness for high volumes of traffic
Inexpensive	<ul style="list-style-type: none"> Remit money without the cost of existing formal payment networks and informal methods Conduct electronic payments without costly credit/debit cards 	<ul style="list-style-type: none"> Price services for the mass market while creating financial viability
Safe	<ul style="list-style-type: none"> Hold value that is safer than carrying cash 	<ul style="list-style-type: none"> Provide a secure network that does not have prohibitive end user device requirements Ensure security of mobile wallet in the event of theft Mitigate the risk of robbery of cash agents
Accessible	<ul style="list-style-type: none"> Receive mobile money in remote areas and be able to cash out Know that electronic value held is liquid (can be easily converted to cash and used to purchase goods) 	<ul style="list-style-type: none"> Create far reaching distribution networks Design agent incentives that promote sales while ensuring profitability Manage cash and electronic value float

Figure 1: FISA End user value propositions and provider challenges

The following sections detail the user benefits and provider challenges mentioned above and discuss the appropriate strategies used to marry them with technology, network and business design considerations, in order to succeed in this space.

Fast

Paying with your mobile phone can be much faster than paying in cash.

Customers can derive significant benefits from using their mobile phones for conducting transactions. The financial transaction process is initiated and completed in seconds.

The speed of a financial transaction can create real savings for people in emerging markets. They save valuable working time as they do not have to travel to urban centers to withdraw, deposit money or pay bills. Traveling can take several hours to the institution and back. People then have to wait in line at the bank or post office to conduct transactions. Waiting times of up to 2 hours are common,⁴ and the entire trip can take away over half a day's salary.

People can save time by paying electronically using their mobile device or by using banking agents in their proximity to cash-in or cash-out money. Bills can be paid with the push of a few buttons instead of traveling to an often distant office with a fistful of cash and waiting in a long queue.

Given the fact that in the near future mobile payments will enjoy rapid uptake, mobile network operators and financial institutions are challenged to provide a service that transmits payments quickly and reliably.

How do providers meet the challenge of running a fast working system?

A mobile money provider should ensure speed on three different fronts:

- End user devices – the mobile wallet application should have a simple user interface and transaction mechanism
- Back-end processing – mobile networks and back office systems should be able to handle large volumes of transactions quickly
- Agent density – there should be enough well-trained agents for cashing in and out to be a fast process

User devices

The user experience is an important but often overlooked piece of the mobile payments equation. The process for performing a transaction should be optimized to ensure a fast learning curve.

Shortening the learning curve by making the system as intuitive as possible can help overcome initial adoption barriers, particularly for users who may be skeptical or unfamiliar with the technology. For this reason, providers often enable payments over mobile technologies that their subscriber base is already familiar with. Smart and Globe in the Philippines realized that their subscriber base had a very high affinity for SMS messaging, so they leveraged that familiarity to offer mobile money over this channel. In Kenya on the other hand, Safaricom was able to create an intuitive SIM-based application that was easy enough to use and helped lead to enormous uptake of the service.

The simplicity of the transaction mechanism can have implications for speed and adoption as well. Being able to easily select a contact on the device directory and enter a simple pin to send them money is a much speedier and convenient experience than having to memorize numbers for different contacts and long processes.

Back-end processing and network infrastructure

Assuming that on average, people in developing countries conduct five transactions per month, a start-up system with only 80,000 customers still has to manage 400,000 transactions per month. This is an additional challenge for mobile networks on top of normal voice and text messaging traffic.

When an SMS-based mobile payment system is commonly used, the service providers have to ensure the scalability and reliability of the system. Usually, service providers do not separate the text messaging channel from the mobile payment channel, which heavily increases the system's traffic. Providers will have to continuously upgrade the system to meet the increasing volume of transactions.

Agent density

Speed is not only important for conducting transactions over the mobile network, but also for converting mobile money to cash and vice versa. Mobile money not only makes transactions such as remittances and bill payments much faster, but it can make cash storage and retrieval faster by bringing an agent network close to areas previously uncovered by financial services touch points (For example: branches, ATMs, and kiosks).

According to industry reports, the time to get to an agent directly impacts usage of mobile money. Customers who are 15 minutes away, use the agent once or twice a month. This increases to 10 times a month when an agent is 10 minutes away and 30 times a month when the agent is two minutes away.⁵ For this reason, successful mobile money operations have managed agent density, adding agents proportionally to customer growth to ensure fast transactions.

At this time, there are around 530 customers per agent in the M-Pesa network ⁶, 369 in the Globe G-Cash network, and 250 in the Smart Money network ⁷. The higher agent density for the Filipino providers (Smart and Globe) may reflect the higher frequency of usage by customers in that region.

Inexpensive

Mobile financial services can be cheaper than both formal and informal alternatives

Perhaps the simplest value proposition for users is that mobile money is less expensive than the alternative. This is not to say that mobile money is always cheaper than cash—in many cases, cash remains the cheapest way to make transactions, particularly the ones that are face to face. Where mobile payments provide the most value to users is as an inexpensive solution for non face-to-face transactions.

The most common example of this is the value proposition of M-Pesa. M-Pesa gained initial success through a simple value proposition: “send money home” through your phone. The majority of Kenyan households send money to friends or relatives, often in remote or hard to reach locations.⁸ Traditional methods of accomplishing this person-to-person (P2P) use case, such as through the post office or bus companies, are not only slow and potentially insecure, but are significantly more expensive.

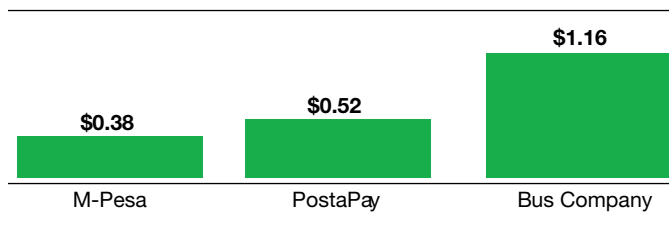


Figure 2: Sending 1000 Ksh (\$13.06) through M-Pesa is cheaper than any other service available⁹

CGAP has also found that on average, branchless banking services, such as mobile money, are 54% cheaper than informal options for money transfer.¹⁰ These informal options for the P2P use case, such as giving money to a traveling friend or bus driver, are widely used in many emerging markets and are prime targets for replacement through mobile money.

Mobile money is also less expensive for additional use cases beyond domestic P2P payments. The cost of a given use case often goes beyond explicit transaction fees. Cash use cases can be expensive from an opportunity cost perspective as well. Think of the example of paying bills in cash—this requires using productive time to travel to, and wait in line at a bill payments center, costing real money in the form of fewer working hours or hiring somebody to cover for their lost work. By bypassing the lines and travel, mobile money offers these users a much cheaper end value proposition.

What is the right price point?

While the relative inexpensiveness of mobile money may be the simplest value proposition for users, it still creates unique challenges for providers. A pricing strategy must be designed to:

- Appeal to a broad population including low income customers
- Provide incentives for rapid network growth
- Encourage customers to use mobile money instead of cash

Goals	Pricing strategy
Appeal to a broad population including low income customers	Price affordably to enroll a large customer base of people likely to send money frequently <ul style="list-style-type: none"> • Tiered pricing strategy based on transaction size with a low fee for the lowest tier (typically \$.03 - \$.15) • Competitive pricing
Provide incentives for rapid network growth	Make sending to other registered users more economical than sending to cash users in order to drive increased enrollment <ul style="list-style-type: none"> • Low transaction fees for sending to other registered users • Higher fees for sending to non-users
Encourage customers to use mobile money instead of cash	Make paying for services using mobile money more attractive than cashing out <ul style="list-style-type: none"> • Make fees for using mobile money low enough and cash out fees high enough to justify making mobile transactions instead of cash transactions. • Ensure cash out is still easily available to show that mobile money is liquid.

Figure 3: Pricing strategy goals and tactics

Appealing to a broad population requires a low entry point for using the service. Most successful implementations of mobile money have based fees on transaction size with lower fees for transactions of lower size and fees increasing either in tiers or as a percentage. This allows people to make small transfers for fees that are low on absolute terms and palatable to broad populations. In addition, the pricing structure should be simple enough for customers to understand why mobile payments are much cheaper than the alternatives. M-Pesa has shown success in both areas with its tiered pricing strategy that is prominently displayed at all M-Pesa outlets (see table on page 6).

Transaction Type		M-Pesa fee
Cash in		\$0.00
Cash out by non-user		\$0.00
Fee type	Transaction size	
Cash out by M-Pesa user	\$1.27-\$31.79	\$0.32
	\$31.80-\$63.57	\$0.57
	\$63.58-\$127.15	\$0.95
	\$127.16-\$254.29	\$1.84
	\$254.30-\$445.01	\$2.16
Transfer to user	Any	\$0.38
Transfer to non-user	\$1.27-\$31.79	\$0.95
	\$31.80-\$63.57	\$1.27
	\$63.58-\$127.15	\$2.23
	\$127.16-\$254.29	\$4.45
	\$254.30-\$445.01	\$5.09

No fee for cash-in encourages users to put money into the system

Users have an incentive to keep money in the system because of tiered cash-out fees

Low fee for transfer to register users encourages user registration (network effect)

Transfers to non-users are more expensive than transfers to users to encourage registration

Figure 4: M-Pesa pricing structure as of July 2010 (USD, 1 USD = 78.65 KES)

The pricing strategy can be more flexible as a mobile money solution matures. Added value services can be targeted to slightly above the mass market and priced higher. Once customers are comfortable using electronic money, they may be interested in services such as salary disbursement to mobile wallets.

These services can present significant revenue opportunity for banks and MNOs. (See Figure 5) Safaricom charges businesses that disburse salaries with M-Pesa around \$1 per payment, which adds up very quickly when payments are received regularly.¹¹ Receiving salaries through mobile also would likely increase the frequency with which customers cash out, generating additional benefits.

Safe

Conducting financial transactions with mobile can be safer

Across many emerging markets, security is a major barrier to financial inclusion. Conducting financial transactions can be physically dangerous for users and agents. Also, without access to formal financial accounts, people have to rely on informal providers for conducting transactions. If they want to transfer money over long distances, they have to hand it to a bus or truck driver, usually at high prices and with no guarantees.

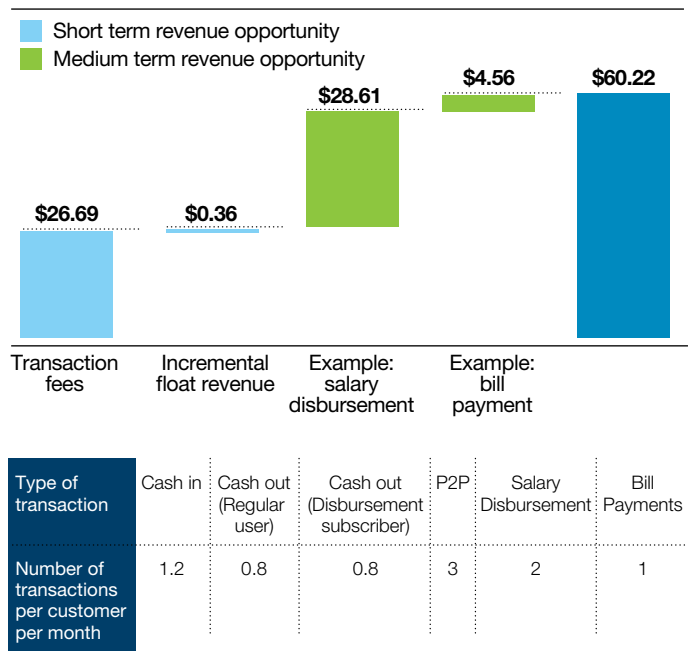


Figure 5: Full revenue potential enabled by mobile banking (IBM estimate, per account per year, assumes customer subscription to all services)

Simply carrying cash can be dangerous in many countries. The threat of robbery limits an individuals' ability to carry cash over distances to either deposit or withdraw money, pay bills, or even shop. Storing money at home can also be dangerous given the threat of break-ins or robbery from family members.

With mobile money, people do not need to carry cash around or hand it over to informal providers. A mobile wallet allows for the safe storage of money, providing a compelling alternative to storing money under the mattress or in goods such as livestock, which are risky and insecure. Mobile money can also be used to buy goods and services either formally (person-to-business) or informally (P2P) without the risk of handling cash.

Mobile technology can, therefore, dramatically change the social and economic conditions of low income individuals who do not have access to formal financial services. By depositing money in a mobile account, families can increase their net household savings and better allocate savings across family members.¹²

How do service providers guarantee security for the entire mobile money ecosystem?

In order for mobile money to be a safer alternative to cash, providers must first ensure that the network is secure from threats/hacking, that mobile wallets are secure even in the event of a lost device, and that the threat of agent robbery is managed.

Network security

The simplest and one of the most common channels for mobile banking is SMS. SMS is cheap and available on all mobile devices giving it broad applicability. However, SMS is not the most secure option. Providers will have to balance their security needs with user device requirements and network investment. Some technologies, such as USSD, are more secure but often require partnerships with owners of USSD gateways, which can be expensive. SIM-based applications in some cases require swapping a customer's SIM card with a new one enabled for mobile payments, which can be a logistical challenge. Additional options, such as html or web based applications, require that users have web enabled phones and data plans. This can alienate a large segment of customers who have basic devices.

Market focus and description	Transaction mechanism	Pros	Cons
Emerging markets: No data connection and basic devices	Short Message Service (SMS)	<ul style="list-style-type: none"> MNO-agnostic Global reach across MNOs and devices Low-income customers already familiar with the technology 	<ul style="list-style-type: none"> Low security Poor customer experience Limited to 160 characters
	Unstructured Supplementary Service Data (USSD)	<ul style="list-style-type: none"> More secure than SMS (does not store information on the phone) Available on all devices 	<ul style="list-style-type: none"> Requires MNO participation Divergent views about the billing USSD sessions Requires customers to learn "short" codes to initiate transactions
	SIM-based application (Subscriber Identity Module)	<ul style="list-style-type: none"> Simple, secure and fast mechanism for end users Deployable on all GSM devices 	<ul style="list-style-type: none"> Requires MNO participation Requires loading the menu onto the SIM card
Developed markets: Data connection and smart phones	Wireless Application Protocol (WAP) browser	<ul style="list-style-type: none"> Does not require MNO participation Browser functionality available on all smart phones As secure as online banking 	<ul style="list-style-type: none"> Requires several clicks/steps to complete a transaction Highly dependent on network speed
	Java application on the device	<ul style="list-style-type: none"> Richest customer experience Most secure of all transaction mechanisms, particularly when combined with encryption capabilities of the SIM card 	<ul style="list-style-type: none"> May require MNO or device manufacturer participation when they control content on phone Requires client to download application

Figure 6: Pros and cons of various mobile money security options

National banking regulations additionally force service providers to obey anti-money laundering (AML), know your customer (KYC) and combating the financing of terrorism (CFT) rules. Consequently, the processes and technology used for enabling mobile payments need to be designed to align with these regulations. Innovative analytics technologies can be used to detect fraud and money laundering on a network. Enabling these kinds of technologies will help demonstrate compliance.

Device level security

To prevent theft at the customer level, service providers currently make use of PINs to verify users' identity before conducting a transaction. As the links between a mobile wallet and a specific device or SIM card can be switched/terminated, users can protect funds in the event of loss or theft. Additional technologies have been developed for higher levels of security, such as Voice Biometrics, which accurately authenticates users based on their voice. This is a potentially good alternative that can be used in conjunction with PINs to improve security.

A mobile money service provider will have to weigh these decisions when choosing and working with a technology partner. Security is an important piece of technology selection that has strategy and implementation ramifications.

Agent security

Providers have to consider the security of setting up an agent network. In some countries, such as India, this has been a non-issue. However, in places like Brazil, agent robbery is a common occurrence with a significant number of agents reporting some form of theft, which only adds to the costs of maintaining an agent network. In these markets the threat of robbery is unavoidable, but providers can take steps to help mitigate the risk: developing standardized security protocols, requiring/offering robbery insurance, and sharing liability.

Accessible

Interacting with mobile money can be more convenient for users, many of whom are often in hard to reach places

Mobile money has been touted as a revolutionary tool in the fight for financial inclusion. Low financial services penetration in many emerging countries is not only a factor of price, but of accessibility. It is extremely expensive and often unprofitable for traditional banks to set up branches in remote areas.

Mobile technology has significantly bridged this gap, reaching large populations in emerging markets profitably without the need to invest in costly fixed line infrastructure. MNOs have also successfully set up low cost distribution networks for prepaid airtime in these markets, often paying commissions to agents instead of investing directly in a branch infrastructure.

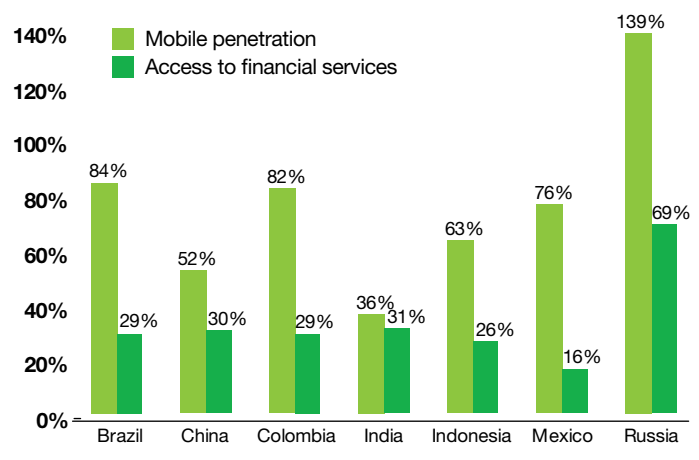


Figure 7: Access to financial services¹³ and mobile penetration¹⁴ in select countries

This business model translates naturally to a basic mobile money offering. And for this reason, MNOs have taken the lead and shown the most success in this market where regulators allow it. MNOs often start by having their airtime agent networks act as cash-in/cash-out agents, giving them instant, far-reaching distribution that is already familiar to a broad customer set. The familiarity mobile phone customers have with buying electronic currency in airtime translates well to comfort with buying electronic money.

Accessibility also helps engender trust in a mobile money offering. The breadth of a cash distribution network ensures customers that their electronic money is liquid. Liquidity is essential, especially for low income customers and those that rely on remittances for income.

How can a provider ensure liquidity, reach, and trust through an agent network?

Accessibility—encompassing liquidity, reach, trust and more, presents some of the most difficult challenges to providers of mobile money services:

- Creating a network of agents organically or through partnerships that reaches a broad population
- Designing effective incentives for agents
- Managing float in the distribution network

Creating a network and designing incentives

Addressing these challenges requires a well thought out distribution strategy. Creating an agent network is simpler for MNOs that have established networks in place, although these agents must be trained in the sales and management of mobile money. In some cases, such as M-Pesa in Kenya and Smart and G-Cash in the Philippines, this transition has gone smoothly. However, some providers have had trouble training traditional MNO agents and have decided to take a more organic approach by taking a very active role in agent selection and management, which gives them more control over the agent network.

The challenge of creating a distribution network is more difficult for banks. If a bank wants to use the mobile channel to expand beyond its traditional customer reach, it will likely need to expand its physical reach. In the past, this has prevented banks from reaching more remote areas and lower income customers since the cost to set up a branch and serve these customers through that channel can be prohibitively high. A bank will generally have to develop strategic partnerships for its agent network.

The most common approach, particularly in markets where regulators protect existing bank licenses, is to partner with one or multiple MNOs. This allows the bank to leverage the MNO's agent network, albeit with the caveat that the agents will need to be trained. Partnering with an MNO may be more costly than partnering with other agents because of the considerable bargaining power of an MNO and their vested interest in the mobile piece of a solution. When determining a strategy for partnering with MNOs, a bank must consider both regulatory protection of banking licenses and MNO concentration as shown in Figure 8.

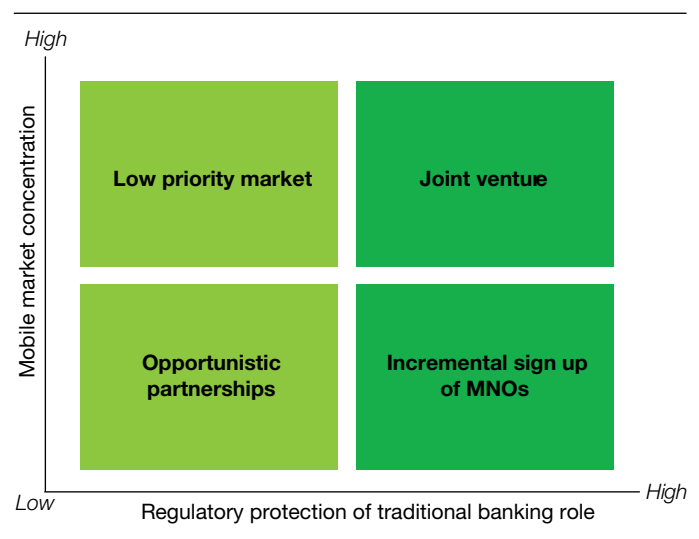


Figure 8: MNO partnership strategy for banks

Another option is to partner with large established institutions with considerable reach that could act as agents for the bank. The prime example of this is the partnership between Bank Bradesco and the Post Office in Brazil to create Banco Postal. The partnership has been very successful in terms of attracting rural populations and boosting the business of both companies. The success comes, once again, with the caveat that dealing with a large institution can be very costly. Other large institutions that could be potential agent partners include lottery operators, supermarket chains and gas stations.

The final option is to partner with smaller agent institutions such as local stores and kiosks, small retail operations or convenience stores, tobacco shops and even stand alone agents. The benefit compared to MNOs or large institutions is that the bank can negotiate much more favorable commissions, particularly because many small institutions participate with the main goal of increasing foot traffic. The challenge is that training, control and management is much more difficult for small disparate networks of organizations.

Managing float (balance of cash and electronic value)

Management of both cash and electronic value that is generated in a mobile money business is one of the most expensive and difficult hurdles a provider will face. To deliver on the promise of liquidity that is essential for creating value to users, providers must ensure that agents can handle deposits and withdrawals on-demand, balancing opportunity costs of holding capital and threats of theft.

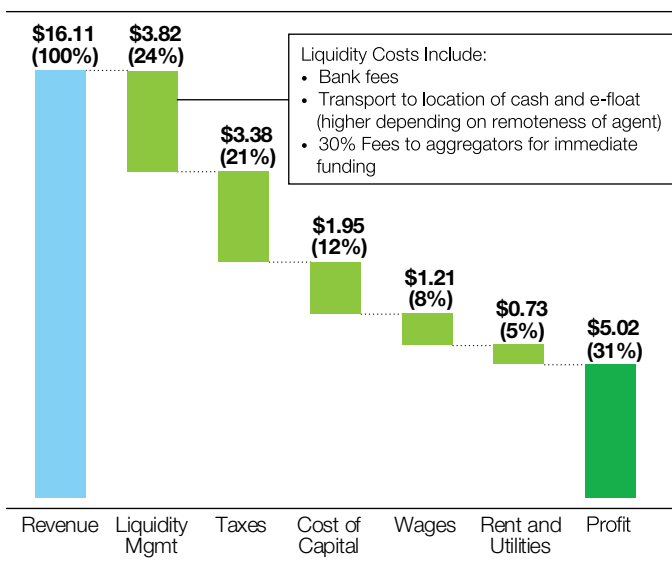


Figure 9: Daily economics of an M-Pesa agent¹⁵

Helping bring down these costs can help a provider negotiate more favorable commissions with agents. One popular way to help manage float so that an individual agent is not alone in dealing with it, is to create a “hub and spoke” system of super agents whose job is to provide liquidity on demand to agents, as well as help collect and manage cash.

Super agents, which can be a bank branch or another institution with adequate liquidity, often do not deal directly with end customers. Rather, they deal with a set of agents in their proximity, monitoring float, collecting cash, and providing cash if necessary. This helps achieve greater liquidity from scale throughout the system, minimizing issues where an agent cannot fulfill a withdrawal request.

Conclusion

In summary, through the FISA approach, providers can design a mobile money service that addresses real problems at the user level, driving, in turn, adoption for the service.

Consequently, providers of mobile financial services should focus on these business design challenges and leave the technology platform complexity to companies with experience in this space.

In response to this need, IBM has developed the Mobile Money Cloud concept to deliver an end-to-end technology and business solution that hides all platform and interconnection complexities from the provider of mobile financial services.

The Mobile Money Cloud will help a provider address all of the challenges associated with delivering value to its customers:

- Fast transactions through best-in-class transaction management systems
- Inexpensive service from the scale derived from a cloud provisioning model, the low up-front investment required, and low variable operating cost per transaction

- Safety through the security features of a trusted technology partner and interoperability with multiple user security channels
- Accessibility through scale and partnerships across the other participants in the cloud

By marrying a highly scalable, low cost back-office platform that connects the market participants with a disciplined service design, providers are in a much better position to monetize this immense business opportunity

Special thanks to Claudia Wittig and Alexander Bloch for their contributions.

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