



Mobile Money for the Unbanked

The case for interoperability: Assessing the value that the interconnection of mobile money services would create for customers and operators

Authors: Neil Davidson and Paul Leishman



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Introduction and summary

In just a few short years, the mobile money industry has undergone a remarkable spurt of growth: compared to 2007, when just a handful of trailblazing services had launched, it's now possible to find two or more deployments in many Sub-Saharan African and South Asian countries. Some of the services launched in recent years have achieved impressive traction with users: in a recent survey of 52 mobile money service providers, the GSMA identified 11 that have more than 1 million registered customers.

Yet the majority of these remain in an untenable sub-scale position. One theory is that customers, particularly in fragmented mobile markets, would be more inclined to adopt and use mobile money services if mobile network operators (MNOs) interconnected their competing platforms that, today, are so-called “walled gardens”. In an interconnected environment, a customer affiliated with one operator's mobile money service would have the ability to send money electronically to the wallet of a customer affiliated with another operator's service.

Arguments in favour of domestic mobile money interconnection are typically supported with analogies to other industries where interconnection is purported to have been a catalyst for growth. The success of payment card networks, like those offered by Visa and MasterCard, is often cited as evidence that interconnection must be a keystone for any successful networked industry. Ironically, mobile operators themselves are also often credited for having the foresight to interconnect their voice and SMS platforms with competitors.

Superficially, these analogies make sense: mobile money services, just like card networks and mobile telephony, are platform-mediated network businesses that are subject to network effects, meaning the value of a network to any given user depends on the number of other users with whom they can interact. So it stands to reason that by connecting consumers across different platforms, network effects would

grow stronger. But as we explore in this article, the design features and customer behaviour that characterise many mobile money services weakens the case for interconnection.

In this article, we ask whether there is a case for interconnecting mobile money services. To answer the question, we start by evaluating the extent to which customers are likely to value the ability to transact across networks. We conclude that in many markets, few customers will find the ability to transact across networks to be a feature for which they are willing to pay a premium. As such, when we make estimates about the aggregate new revenues to which implementing interconnectivity will lead, we find that they are unlikely to be significantly large to justify the investments that interconnection would require, let alone large enough to entice operators to divert their capital and attention from other critical projects.

That domestic mobile money interconnection is a feature of questionable value to consumers and expensive to implement will be of interest to regulatory authorities. In some markets the prospect of mandating interconnectivity has been raised, presumably in the context of promoting customers' interests. But in this article we suggest that it is not obvious that imposing interconnection would create welfare gains for customers. Indeed, it might have the opposite effect, if mobile operators must raise prices or curtail investment in other areas in order to implement interconnectivity.

We conclude by citing a range of other ways to allow customers to transact across network boundaries that, while less costly and complex than interconnection, would still create significant value for consumers. And we encourage a broader conception of interconnection—that is, with financial institutions, other payment networks, and mobile money services in different countries—and briefly discuss the benefits to consumers that these might bring.

Scope and terminology

In the context of mobile money, the interoperability taxonomy is extensive. The Consultative Group to Assist the Poor (CGAP) has proposed a framework that distinguishes between several different types of interoperability:¹

- **Platform-level interoperability**, which permits customers of one service to send money to customers of another service²
- **Agent-level interoperability**, which permits agents of one service to serve customers of another service
- **Customer-level interoperability**, which permits customers to access their account through any SIM

These three forms of interoperability entail mobile money services in one market interworking with each other. An additional proposal for interworking amongst such services is the provision of **common interfaces**, in which two or more mobile operators, in one country, each offering commercially and technically independent mobile money services, offering a single interface to third-parties (i.e. to simplify the provision of bulk payments, merchant payments, etc.).³

Of course, it is also possible for mobile money services to interwork with other platforms outside their country and industry. Such forms of interworking include:

- **International mobile money interconnection**: two mobile operators, in different countries, each offering two commercially and technically independent mobile money services, interconnecting their respective technical platforms to enable a customer affiliated with one service to send money from his mobile wallet to the mobile wallet of a customer affiliated with another service

Superficially, the case for mobile money interconnection is simple. Customers value the ability to transact with other customers. (At the extremes, customers would find mobile money rather uninteresting if they were unable to transact with anyone else, and they would find it especially interesting if they were able to transact with everyone.) Interconnection would increase the number of potential transaction partners for customers, which should make using mobile money more attractive. This should increase transaction volumes, which in turn

- **Interconnection with financial institutions**: one mobile operator, in one country, operating its own commercially and technically independent mobile money service, interconnecting its technical platform with the technical platform of a traditional financial services provider to enable interaction between the two platforms (i.e. the ability for a customer to send money from a mobile money account to a bank account, etc.)

- **Interconnection with other payment networks**: one mobile operator, in one country, operating its own commercially and technically independent mobile money service, interconnecting with a separate payment system (i.e. connecting with the Visa or MasterCard payment networks)

The focus of this article is **platform-level interoperability**, which we will call **domestic mobile money interconnection**. By this we mean two or more mobile money service providers, in a single country, each offering commercially and technically independent mobile money services, interconnecting their respective technical platforms to enable a customer affiliated with one service to send money from his mobile wallet to the mobile wallet of a customer affiliated with another service. These providers need not be mobile network operators, but for simplicity we assume throughout this article that they are.

In this article, we'll use the term **cross-net transfer** to refer to a transfer from a customer on one mobile money network to a customer on another network, as opposed to **on-net transfers**—transfers between two customers on the same mobile money network—or **off-net transfers**—transfers from a registered mobile money customer to an unregistered one.

should improve the performance of the payments business for mobile operators—so long as the new revenues are larger than the costs associated with interconnection.

If the story were this simple, however, mobile operators would have already interconnected their payment services. At the time of writing, there are 25 countries with more than one mobile payment services; in none of these, however, has interconnection been undertaken. Why might this be the case?

1. “Interoperability and Related Issues in Branchless Banking: A Framework” (http://www.cgap.org/igm/document-1.9.56025/CGAP_interoperability_Presentation.pdf)

2. Closely related to platform-level interoperability is the notion of platform sharing, in which more than one service provider uses the same transactional processing platform. In this case, it would be easier, though not necessary, for providers to enable platform-level interoperability. This is the case in Pakistan, where MCB shares a platform with Telenor/Tameer Microfinance Bank's easypaisa, but where platform-level interoperability has not been enabled.

3. Ignacio Mas, “Networks want to Connect” (<http://mmublog.org/blog/mobile-money-interoperability-at-mwc-2011/>)

Case study: Instant messaging

In the 1990s, a proliferation of instant messaging (IM) platforms emerged to allow customers to chat with each other using clients installed on their desktops. These platforms were, like mobile money services, walled gardens; if two customers were affiliated with different IM services, they could not chat with each other. This state of affairs persisted for years. Why didn't the providers of IM platforms interconnect?

First, in instant messaging, the cost for customers of affiliating with multiple instant messaging platforms is extremely low. People didn't mind having multiple clients on their desktop because they were generally provided free and because Windows offered a perfectly acceptable way of switching between them.

Second, even if providers gave customers a way of chatting with all of their counterparts in one interface, it's not exactly clear how to monetize that. Customers didn't pay for IM. So it wasn't obvious that industry profits would increase after interconnection.

Third, there was a chance that interconnection would not just fail to generate new revenues for the industry, but that it would actually erode the profitability of the service with the largest number of users. That's because with

interconnection, the player with the largest market share loses the ability to capitalise on network effects flowing from its user base as a competitive advantage—which for an IM service can be a key competitive differentiator. So that player might reasonably question why it should take a step that would likely shrink its market share. Such a step could make sense if the overall size of the market—measured not just in users, but in profits—was going to grow significantly with interconnection. Apparently, it was never obvious that such growth would result.

The instant messaging case study illustrates that interconnection of platform-mediated businesses is not inevitable. It also hints at conditions under which interconnection is likely to occur.

The more expensive it is for customers to affiliate with more than one service, the more they are likely to value interconnection. At the other extreme, when it is very inexpensive to affiliate with multiple services, customers are likely to find interconnection to be of limited value.⁴ Of course, the degree to which customers value interconnection is a key driver of the commercial prospects for doing so, because as customers' willingness to pay increases, the ability of the industry to justify the costs of interconnection does, too.

Today, a customer of one mobile money service cannot send money from his account to an account held by someone else on another network. When customers face this problem today, what workarounds do they have at their disposal? And how much worse (in terms of expense or hassle) are these workarounds?

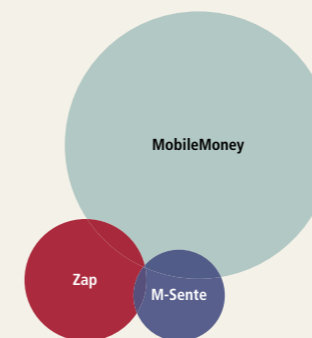
First, at low cost, customers can affiliate with multiple mobile money services.

In the developed world, most mobile accounts are post-paid, so affiliating with multiple networks implies a doubling of monthly costs. For this reason, it is uncommon for customers to affiliate with more than one mobile network at a time.

In most of the developing world, the situation is different. Since opening a new pre-paid mobile account is very inexpensive, and cost is tied directly to consumption, customers routinely maintain connections with multiple mobile operators, behaviour which is often referred to as "multi-SIMing". In this way, they can avail

themselves of promotions that different mobile operators offer, and select the account that offers them the best rates or coverage depending on their requirements for each call. (A parallel in the developed world would be the way that many customers have a wallet full of payment cards, and choose among them based on their features: loyalty rewards, interest rates, foreign exchange fees, and so on.) A June 2010 survey indicated that 43% of mobile money users in Uganda were multi-SIMing, while the proliferation of dual-, tri-, and even quad-SIM phones around the world provides anecdotal evidence for the trend.⁵

In markets with more than one mobile money service on offer, customers adopt the same strategy. The same survey of mobile money users in Uganda showed that 12% of Zain Zap users and 22% of UTL M-Sente users had also used MTN MobileMoney.⁶

Relative size and overlap of mobile money customer bases July 2010, Uganda

Source: Survey data collected for "Mobile Money Use in Uganda: A Preliminary Study" by Ali Ndiwalana, Olga Morawczynski, Oliver Popov and operator supplied data.

The ability to multi-SIM reduces the latent demand for cross-net transfers, since a customer who wants to transact with a customer of another network can affiliate with a second network cheaply and easily.

Second, many mobile money services make it possible for unregistered customers to transact with those who aren't affiliated with their network, and vice versa. Put metaphorically, the walls surrounding mobile money walled gardens have cracks.

- In many cases, operators make it possible for registered mobile money customers to send money to customers who have not registered for mobile money (indeed, in most cases, they need not even have a phone): when they initiate the transfer, they are issued a secret code which they can convey to the recipient and which can be used to collect the transfer at an agent. We call this transaction type an off-net transfer. End-to-end, off-net transfers are usually more expensive than on-net transfers
- In other cases, operators make it possible for customers who have not registered for mobile money (again, often including even customers who don't have a phone) to send money: they do so by visiting an agent, who initiates the transfer on their behalf. We call this transaction type an over-the-counter (OTC) transfer

These capabilities are important, because they mean that customers are not restricted to transacting only with customers affiliated with their own network—or indeed any network at all. They are powerful because, even in countries where mobile money has been adopted rapidly, the proportion of mobile account holders from all mobile money networks is still much smaller than the number of adults who might want to send or receive money.

In June 2010, just 2.6% of the Ugandan adult population were active MTN MobileMoney users.⁷ As such, customers with MobileMoney accounts were able to make on-net transfers to just 2.6% of their potential counterparties. Had interconnectivity been in place, that same customer would have been able to transact with 3.3% of the adult population—the proportion with any mobile money account. In relative terms this is a significant increase, but in light of the fact that MTN MobileMoney customers could already send money to 100% of the population by making an off-net transfer, it seems small by comparison. Moreover, were just one of the mobile money providers in the country to offer an OTC send capability, anyone would be able to send using mobile money, too.

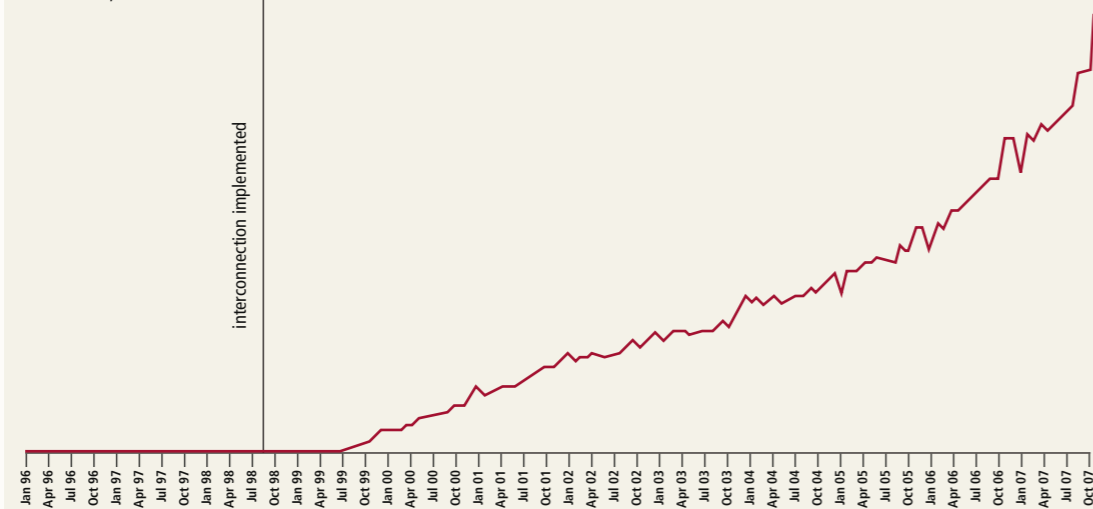
4. The cost of affiliating with multiple services can be financial and non-financial (i.e., time spent registering for a service, managing multiple accounts, etc.).

5. "Mobile Money Use in Uganda: A Preliminary Study" by Ali Ndiwalana, Olga Morawczynski, and Oliver Popov (http://mmublog.org/wp-content/files_mf/m4dmobilemoney.pdf), with additional survey data supplied by the authors.
6. Ibid.
7. Source: MTN Uganda, CIA World Factbook

Case study: the origins of SMS interconnection in the UK

When UK operators introduced SMS in the early 1990s, services functioned within their own walled gardens: Cellnet customers could SMS other Cellnet customers, but not Vodafone customers, and vice versa. This state of affairs lasted for months before interconnection agreements were struck, first bilaterally between Cellnet and Vodafone, and later with Orange and T-Mobile. The graph that accompanies this story shown below illustrates one of the mobile industry's greatest successes: in short order, SMS volumes increased exponentially.

SMS volumes, UK



Source: Mobile Data Association

What value would interconnection create for operators?

We now turn to the implications of the fact that decent workarounds to the lack of cross-net transfer functionality exist. The only scenario in which it would be commercially sensible for mobile operators to invest in interconnection is one in which they collectively have more to gain than to lose. At minimum, the new revenues that stem from introducing the ability for customers to transact across networks must be greater than the costs of interconnection.

Interconnection is not free Resourcing

First, interconnection is likely to make significant demands on the time of senior management, given the important strategic questions it raises. It will also almost certainly necessitate new hires in

Why was the interconnection of SMS platforms followed by such dramatic growth?

In part, the answer lies in the differing construct of the “walls” that enclose each service in a non-interconnected state. Without interconnection, there was no way for customers of different operators to exchange SMS messages. And there was certainly no way for customers with no mobile phone to send or receive them. But mobile money is fundamentally different. Even without interconnection, customers can often use the off-net or OTC transfer features described above. So even though mobile money services function within a walled garden environment, just like SMS initially did, in this case there are sizeable cracks that enable mobile money customers to connect across networks.

order to implement. Interconnection will require devising, negotiating, and implementing a host of business rules and service-level agreements.

Infrastructure

It is outside the scope of this article to explore the technical requirements of interconnection, although these are complex. We will also skip over the difficult question of who should own and operate the technical infrastructure that will enable cross-platform payments. But we do need to understand the scale of investment that is required.

We can assume that to enable interconnection, participating operators will need to invest in a payments switch or in setting up bilateral realtime payment instruction interfaces and settlement procedures. It has been reported that the Central Bank of Nigeria invested N500 million, or about US\$3 million, to setup a

national payments switch for its banks, although we understand that significantly less expensive implementations are possible.⁸ Still, payment switches are costly in part because of the very stringent operational requirements to which they are subject. Switches must be extremely reliable and operate in realtime, often at high volume.

In addition, each operator will need to integrate with the switch, a task that will often be carried out by the vendor of their mobile transaction processing platform, with some support from the operator's technical staff.

Foregone revenues

Finally, mobile operators may expect to experience lost revenue in their core business on account of interconnection. Mobile operators have invested in mobile money in large part because they expect mobile money users to spend more and be more loyal, and we have evidence to suggest that these effects can be substantial.⁹ In an interconnected world, however, the churn-reducing, ARPU-uplifting power of mobile money as a is likely to be diluted, since customers will find switching networks more tolerable. These lost revenues can be considered costs of interconnection.

Ultimately, customers must pay for interconnection—but which ones?

Operators will look to recoup the costs of interconnection (and earn a profit for themselves) with new revenues. Principally, they will expect net-new cross-net transfers to generate these revenues—otherwise, operators would find themselves subsidising customers who make use of interconnection with revenues from those who don't.

We specify that these transactions must be net-new, because if the outcome of interconnection is simply a conversion of on-net transfers to cross-net transfers, or off-net transfers to cross-net transfers, no growth will actually have occurred—indeed, value will have been destroyed since implementation of interoperability is costly.

Below we consider two segments to assess the likelihood that customers will begin making large numbers of net-new transfers. In our analysis, we assume that the end-to-end cost of sending money cross-net will be greater than the cost of sending money on-net but less than the cost of sending money off-net.¹⁰

Segment 1: Existing customers of mobile money services

With the advent of interconnection, existing customers may start making cross-net transfers. This has the potential to occur when a sender and his counterparty have both previously registered for mobile money, but with different mobile money service providers. If affiliations with payment networks were random, we might expect this situation to arise frequently. But there are two forces which drive customers to affiliate with the same network as their transactional counterparties.

1. First, mobile operators create significant financial incentives in the core business for people who want to call each other frequently to affiliate on the same network; it is usually cheaper to call on-network than off-network.¹¹ Since customers have a smoother path to registration for a mobile money service offered by Operator A if they already use Operator A for core mobile services, and if we assume that there is some correlation between the people a customer wants to talk to frequently and the people a customer would want to transact with, customers will find themselves to some extent naturally grouped on the same mobile network with those they want to transact with—even before mobile money is launched.

2. A reinforcing dynamic applies in mobile money. Mobile operators intentionally create significant financial incentives for the senders and recipients of transfers to affiliate with the same mobile money network. As an example, for an average-size transfer, MTN Uganda charges \$1.44 for an off-net transfer and \$0.31 for an on-net transfer.¹² Transactional partners with any degree of price sensitivity who transact more than once will find it most economical to pay the upfront cost of registering for a new SIM and wallet (cost: less than \$2) in order to take advantage of lower per-transaction costs.

Customers who don't bother to align on the same network are likely to transact rarely.¹³

Finally, recall that we are seeking to identify sources of net-new transactions; simply replacing an off-net transfer with a cross-net transfer does not count. As such, these pairs of customers must, in the world without interconnection, either be foregoing making transfers altogether or using another mechanism to do so. This implies that their willingness to pay for a mobile money transfer must fall between the cost of a cross-net transfer and the cost of an off-net transfer.

8. “E-Payment: Banks, Others Shun N500M Central Switch,” Nigerian Best Forum, 10 March 2011 (<http://www.nigerianbestforum.com/generaltopics/?p=95560>).

9. “Is there Really any Money in Mobile Money?” by Paul Leishman (http://mmublog.org/wp-content/files_mf/moneyinmobilemoneyfinal.pdf).

10. We assume that operators will have to make cross-net transfers cheaper than off-net transfers in order to drive adoption of cross-net transfers. And we assume that they will make cross-net transfers more expensive than on-net transfers to (1) generate revenues that can be used to pay for the costs of interconnection and (2) create an incentive for customers to affiliate on their own network.

11. The cost structure for off-net calls is almost always higher than the cost-structure for on-net calls.

12. It's common for operators to impose a higher fee for off-net than on-net transfers. First, this creates an incentive for recipients to affiliate with the sender's network.

Second, the sender's network is subject to additional costs for providing off-net transfers (i.e. SMS termination rate of recipient network). Source of tariff: MTN. 13. An alternative explanation for this behaviour would be low price sensitivity—probably found most frequently at the upper end of the income distribution.

Segment 2: New customers to mobile money

New customers may sign up for mobile money because cross-net transfers are now available to them. What would their profile be? A customer who only occasionally sends to others and whose counterparties are affiliated with more than one network might be compelled to register for mobile money in an interconnected world. (Customers who regularly send to others will presumably have taken the step of registering for mobile money already; customers who meet this description but need only to send to affiliates of one network will find their decision unaffected by the introduction of interconnectivity, since they might today sign up for the same mobile money service that their transaction partners already use.)

Interconnection's P&L

To recap, here are the profiles of customers who are likely to begin availing themselves of the cross-net transfer functionality that interconnection would make possible:

- Pairs of customers who have each affiliated with a mobile money service, but who, because they need to transact only very occasionally with each other, have not taken the step of affiliating with the same network, and who today, rather than using the off-net transfer functionality, opt to forgo making a transfer or use a non-mobile-money mechanism to do so
- Customers who occasionally want to send or receive money to or from affiliates of more than one mobile money service, but who today, rather than using the off-net transfer functionality, opt to forgo making a transfer or use a non-mobile-money mechanism to do so

How large are these segments of customers for any given market? It's impossible to know without undertaking a nationally-representative quantitative survey. Even harder to answer definitively is the question of how many new transactions they are likely to make with the introduction of interconnection. But intuitively, the prospects are underwhelming. By definition, these segments are composed of customers who need to transfer only very occasionally. They are also customers who consider off-net transfers too expensive, but who would be willing to absorb the cost of signing up for a new service in order to make occasional cross-net transfers.

Do these forecasts justify interconnection? That is, will the gross profit from processing cross-net transfers be larger than interconnection's cost? And will it be so much larger that operators will be confidently able to deem interconnection a priority—above all other prospective initiatives they might otherwise undertake to bolster growth of their mobile money service?

Foregoing interconnection, even when it is offered

At best, it is unclear whether interconnection of mobile money services stands to create as much value for customers as it would cost to implement. Customers can already affiliate with multiple mobile money services, allowing them to send money inexpensively to customers of any mobile money network. In fact, in countries where a mobile money service provider allows customers to send off-net transfers to unregistered users, or allows customers unaffiliated with their network to make transfers over-the-counter, substantially more customers can transact with each other already than interconnection would permit.

For this reason, it would be risky to confidently forecast that the volume of cross-net transfers will be large. Even in an interconnected world, price-sensitive customers who send or receive money with any regularity are likely to continue to multi-home in order to gain access to the best value money transfer they can arrange based on the affiliation(s) of the recipient.

For a clue to how customers will react to the introduction of interconnectivity in mobile payments, we need look no further than the core mobile business. As discussed previously, in emerging markets where prepaid accounts are most common, customers are likely to carry more than one SIM card. Often, it is much cheaper to make on-net calls as compared to off-net calls, so customers collect SIM cards so they can do as much of their calling on-net as possible. In other words, price-sensitive customers in many markets eschew interconnection regularly—even when it is in place.

Some ways forward

The commercial case for interconnection is not clear cut, because it is not obvious that enough customers want interconnection badly enough to justify investing in it. What other next steps make sense?

Encourage uncomplicated ways for customers to transact across network boundaries

Implementing interconnection between mobile money systems will be very complicated. But as we have seen, simple solutions can give customers many of the benefits that interconnection would.

- In some markets, onerous SIM- and mobile money registration requirements make it more difficult for customers to multi-SIM, which in turn makes it more difficult for them to transact with customers not already on their network. Telecommunications and financial regulatory authorities should bear this consequence in mind when developing guidelines for registration.
- In some markets, mobile money service providers are prohibited from allowing customers to send money to unregistered customers or allowing unregistered customer to send money over the counter in an effort to deter money laundering and/or terrorist financing. Financial regulators should consider customer due-diligence procedures that can be applied to unregistered customers when they transact.
- In some markets, operators have not considered the benefits of allowing customers to send money to unregistered customers or allowing unregistered customers to send money over the counter. It is not obvious that offering this functionality is always desirable—for one thing, the knock-on effects of mobile money adoption on core mobile usage are probably diluted when these options are provided to customers—but they are worth evaluating.

Consider interconnection more broadly

There are a range of tangible benefits that can be unlocked for customers when mobile operators interconnect with other platforms:

- Introducing the ability to move money between a mobile money account and an account offered by a bank that is already connected to the broader financial system would unlock a host of transactional features that are not currently available to mobile money customers. It could also provide account holders with an opportunity to earn interest on their balance in countries where regulators forbid paying interest on mobile money accounts.

- Connecting mobile money platforms with other payment networks, like the ones operated by Visa and MasterCard, would allow mobile money account holders to buy goods and services at merchants affiliated with those networks—and offer the payment networks a new source of transactional growth.

- Connecting mobile money platforms from different countries could unlock net-new transaction volume for each in cases where a significant remittance corridor exists.

Refrain from ex-ante imposition of interconnection

Financial regulators from countries in which mobile money services have been launched may be tempted to impose interconnectivity among mobile money services. It is already widely understood that doing so has the potential to deter investment in mobile money. This is principally because interconnection will dilute the potential of mobile money to reduce churn and increase usage of mobile services, which as we have discussed previously is a key driver of investment in mobile money by mobile operators. Given the positive network effects that accrue to successful mobile money platforms by virtue of the large size of their network of users, mandating interconnectivity could, perversely, deter the very mobile operators which have the appetite to make major investments in their mobile money services in order to reach scale.

This paper raises another consideration. Mandating interconnectivity would presumably be undertaken to promote customers' interests. Our research suggests the importance of clarifying whether the lack of interconnection does in fact manifest itself as a pain point for a significantly large group of customers. Given that the "walls" in the walled gardens of mobile money are, as we have seen, porous, it is not obvious that imposing interconnection would create significant welfare gains for customers. Indeed, it might have the opposite effect, if mobile operators must raise prices or curtail investment in other areas in order to implement interconnectivity.



For further information please contact
mmu@gsm.org
GSMA London Office
T +44 (0) 20 7356 0600

