Mobile Money

Choosing a technical model for A2A interoperability: Lessons from Tanzania and Pakistan

DECEMBER 2015

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Authors' Note

We would like to thank all the parties involved in the implementation of these projects for their valuable contribution. We would like to underscore the complexity of these multilateral projects in Tanzania and Pakistan. At the time of publication, six out of seven providers in Pakistan have connected to a national switch, the service is technically live and their customers can transfer funds to customers of other providers and banks. In Tanzania, bilateral integrations are only partially complete. Only one provider out of four is bilaterally connected to two other providers, and one provider is not connected to any of the providers yet.

We would also like to point out that interoperability is a new topic and the technical models these providers selected for A2A interoperability are not necessarily permanent. They are aware that different models can be used as the market evolves.

CONTENTS

Executive Summary

In 2014, the GSMA engaged with mobile money service providers (MMSPs) in eight markets to foster collaboration and establish domestic account-to-account (A2A) interoperability. In this paper we are going to focus on Tanzania and Pakistan - two of the three markets - where account to account interoperability was implemented in 2014. With very different regulatory environments and commercial models, providers in each country chose a technical model best suited to their own market context and aspirations.

Ultimately, two different technical models were selected:

- **Bilateral integration** – MMSPs in Tanzania were already connected to banks, so adding a few more bilateral integrations was seen as the most straight forward solution. Bilateral integration also gave the MMSPs more control over the service and implementation costs.

- **Switch** – MMSPs in Pakistan are bank-led,[1] so they were already familiar with an inter-bank switch. Connecting to a commercial switch seemed to be the most efficient and cost-effective option. Providers were willing to accept the rules set by a third- party and relinquish control in favour of ease of implementation and access to a wider traditional banking and mobile financial ecosystem.

It is important to note that interoperability was not mandated by either of the central banks in these markets. The decision to interoperate was reached purely on market situation. The providers had time to reflect on their choice of technical model, and select the best model based on their business needs. However, despite careful consideration on both sides, the MMSPs faced major implementation issues. The biggest one was aligning the schedules and internal priorities of the participating MMSPs and third parties. The providers also had to communicate with each other on a regular basis and with the third party (as in Pakistan). Finally, some implementation activities, such as developing operational rules from scratch (as in Tanzania), have taken longer than expected and may require assistance from a neutral party for the MMSPs to reach a consensus.

This case study explores:

- How the market context in each country influenced the rationale for A2A interoperability

- How the MMSPs decided on their particular technical model.

- How the technical models and implementation processes work

- The lessons providers learned from implementation.

Together, this should provide useful insights for MMSPs planning to introduce A2A interoperability in their own markets.

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1. See Appendix 1

Introduction

The GSMA provided on-the-ground assistance to mobile money service providers (MMSPs) to connect their services and launch account-to-account (A2A) interoperability in their markets.[2]

What is A2A interoperability?

Domestic account-to-account interoperability allows mobile money customers to:

- Transfer money directly and in real-time between accounts from different mobile money schemes in the same market; and

- Transfer money directly and in real-time between mobile money accounts and bank accounts in the same market.

Domestic account-to-account interoperability allows mobile money service providers (MMSPs) to:

- Settle funds for transactions across mobile money schemes and between schemes and banks in the same market; and

- Implement common risk management practices that preserve the integrity of the individual mobile money schemes.

Mobile money A2A interoperability was launched in Tanzania in 2014, and in Pakistan in 2015. However, long before these launches, MMSPs in Tanzania and Pakistan had to consider a range of technical choices to implement A2A interoperability in their markets. The reasons for choosing a technical model can range from cost and accessibility to the capacity of a country's financial infrastructure.[3] Ultimately, providers in these markets opted for two different technical models: bilateral integration in Tanzania and, in Pakistan, a commercial switch.

Why did providers consider these the most appropriate technical models for their markets? What factors contributed to their decisions? And what can MMSPs in other markets learn from their experiences implementing these technical solutions? This publication will answer these questions and will provide useful insights for MMSPs planning to introduce A2A interoperability in their own markets.

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2. In Tanzania, the IFC has played a crucial role as an independent facilitator of this industry-based initiative.

3. For more details on assessing different technical models for A2A interoperability, see GSMA (2014) "A2A Interoperability: Making Mobile Money Schemes Interoperate", http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/03/A2A-interoperability_Online.pdf

TEXT BOX 1

Expected benefits of A2A interoperability

By giving customers the ability to transact with customers of other mobile money schemes, mobile money service providers can provide a real-time, affordable, low-risk, and accessible way to send and receive money between accounts. A2A interoperability can:

1. Strengthen the relevance of accounts to consumers, ensure their loyalty, and drive network effects

2. Contribute to the digitization of cash in the ecosystem and to the modernization and to the efficiency of payment systems

3. Improve financial inclusion by bridging the gap between the banked and the unbanked

Market context: The rationale for interoperability

With all four of the country's mobile network operators providing mobile money services, Tanzania has become one of the most successful mobile money markets in the world. More than 25% of the population are active mobile money users (with almost 11 million in December 2013),[4] and they conducted an estimated USD 2 billion in transactions per month in 2014. Most money is sent person-to-person (P2P) and represents 40% of all transaction volumes.[5]

Unlike Tanzania, branchless banking has scaled differently in Pakistan — only 7.5 million people, or 3.9% of the population, are registered mobile money users.[6] However, over-the-counter (OTC) transactions[7] are quite popular and account for 88% of all transactions performed,[8] which in 2014 were worth about USD 1.1 billion per month.[9]

The reach of the traditional banking sector is quite limited in both countries — only 10% of the population in Tanzania[10] and 7.4% in Pakistan[11] have a bank account — and this encouraged providers to look for different ways to extend the reach of mobile money and increase the size of their addressable market. Interoperability seemed to be the next logical step and,

for Pakistan's providers in particular, interoperability was seen as an important opportunity to promote the use of mobile accounts and reach scale.

While mobile money services are telco-led in Tanzania, in Pakistan they are bank-led. According to the branchless banking regulations of the State Bank of Pakistan, the banks hold the license, own the technical platform, and are liable for fulfilling all regulatory requirements.[12] Three of the five telecom operators in the market have acquired either majority or 100% shares in microfinance banks to have more control over mobile money products and services.[13] As a result, of the seven branchless banking service providers in Pakistan in 2014, five are telco-bank partnerships and two are bank-only schemes.[14] Despite these different relationships with banks, MMSPs in both markets recognised the benefits of A2A interoperability that commercial banks have already realised.

The mobile services market is relatively well balanced in both countries, with an almost equally large number of GSM operations. This relative parity in market share between the key negotiating partners meant consensus was needed on how to move implementation forward.

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4. Bank of Tanzania, National Payment System Directorate Statistics: http://www.bot-tz.org/PaymentSystem/statistics.asp
5. According to the 2014 GSMA Global Mobile Money Adoption Survey and GSMA Mobile Money Intelligence estimates.
6. According to a Q1 2015 report by the State Bank of Pakistan, http://www.sbp.org.pk/publications/acd/BranchlessBanking-Jan-Mar-2015.pdf
7. See Appendix 2 for more information about the service models employed by mobile money providers worldwide.
8. According to a Q1 2015 report by the State Bank of Pakistan, http://www.sbp.org.pk/publications/acd/BranchlessBanking-Jan-Mar-2015.pdf
9. State Bank of Pakistan, quarterly branchless banking newsletter Oct-Dec 2014, http://www.sbp.org.pk/publications/acd/BranchlessBanking-Oct-Dec-2014.pdf
10. InterMedia, "Financial Inclusion Insights: Tanzania", http://finclusion.org/country-pages/tanzania-country-page/
11. InterMedia, "Financial Inclusion Insights: Pakistan", http://finclusion.org/country-pages/pakistan-country-page/
12. State Bank of Pakistan Branchless Banking Regulations: http://www.sbp.org.pk/bprd/2011/C9-Enclosure-2.pdf
13. There are two main types of banking licenses — one for commercial banks and one for microfinance banks — and the difference lies in the scope of their services and paid-up capital.
14. See Appendix 1 for more information about the commercial models employed by mobile money providers worldwide.

Finally, both markets have a supportive regulatory environment. The consensus of stakeholders involved in the interoperability process in Tanzania and Pakistan was that central banks were enabling agencies, rather than entities which dictated how markets should organise themselves. This allowed industry players to discuss and agree on a technical model that suited all stakeholders.[15]

TABLE 1

At a glance: The market context in Tanzania and Pakistan

Key characteristics	Tanzania		Pakistan		
	Mobile money services (by launch date)	**Operator (GSM market share by Q1 2015)**	**Mobile money services (by launch date)**	**MMSP-telco (GSM market share by Q1 2015)**	**MMSP-bank**
Mobile money services and ownership	M-Pesa (2008)	Vodacom (~36.7%)	EasyPaisa (2009)	Telenor (26.6%)	Tameer Bank
	EzyPesa (2009)	Zantel (~5.3%)	Omni (2010)	N/A	UBL (bank only)
	Tigo Pesa (2010)	Tigo (~26.3%)	Mobicash (2012)	Mobilink (27.8%)	Waseela Bank
	Airtel Money (2011)	Airtel (~29.3%)	TimePey (2012)[16]	Zong (20.0%)	
			UPaisa (2013)	Ufone / PTCL (16.5%)	Ubank
			HBLExpress (2013)	N/A	HBL (bank only)
			MobilePaisa (2014)	Warid (8.15%)	Bank Alfalah
Commercial mobile money model	Telco-led		Bank-led		
Predominant mobile money service model	P2P transactions performed through mobile money account		P2P transactions performed over-the-counter (OTC)		
Market size	USD 2 billion monthly transactions in 2014 >11m users (~25% of population)		USD 1.1 billion monthly transactions in 2014 > 5.4m users (~2.7% of population)		
Regulation on interoperability	Enabling, open to market-led solution		Enabling, open to market-led solution		

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15. Please see GSMA (forthcoming), "Mobile money account-to-account (A2A) interoperability: Considerations for policy engagements," by Simone di Castri and Crystal Kaschula.

16. TimePey has since disbanded and Zong is working on other banking arrangements.

Choosing a technical model: The main considerations

Once MMSPs in Pakistan and Tanzania had decided to implement A2A interoperability, they faced a new challenge: identifying the most suitable technical model for their markets and commercial goals.

The assessment criteria outlined below include the main considerations providers take into account when deciding which model to implement.[17] When these criteria are applied to Tanzania and Pakistan, it becomes clear why MMSPs in these markets made different decisions. In Tanzania, MMSPs entered into bilateral arrangements, while providers in Pakistan decided to integrate with a local switch, 1Link.[18]

1. Risk management

Fraud and risk management are two of the biggest concerns for any financial system. MMSPs in both Tanzania and Pakistan wanted to ensure they could address and properly mitigate any new systematic risks and fraud arising from their interoperability arrangement.[19]

In Pakistan, as per the branchless banking regulations, branchless banking accounts are technically hosted by partner banks, which are familiar with banking switches and understand the role of a switch for minimising risks. 1Link is an established switch in the market with reliable reconciliation and settlement processes in place. 1Link settles through the central bank, the State Bank of Pakistan, on a daily basis, and over the years has developed rules on fraud management and dispute resolution that are accepted by local banks and approved by the State Bank of Pakistan. 1Link also has irrevocable debit authority over settlement accounts.

In Tanzania, providers worked with IFC initially. They were confident they would be able to manage the additional risks arising from bilateral integration

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17. For more details on assessing different technical models for A2A interoperability, see GSMA (2014) "A2A Interoperability: Making Mobile Money Schemes Interoperate", http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/03/A2A-interoperability_Online.pdf The sequence of the criteria presented here is consistent with the report mentioned above and is not reflect the importance of the criteria for MMSPs in Tanzania and Pakistan.

18. 1Link Guarantee Limited is the largest banking switch in Pakistan and has been in operation since 2001. 1Link is jointly owned by 11 commercial banks in Pakistan and all 37 commercial banks and some MFBs are members. It offers services such as ATM access, Inter-Bank Fund Transfers, and bill payment. Once new regulations on payment service providers came into effect in October 2014, 1Link became regulated by the State Bank of Pakistan. 1Link has a daily settlement process.

19. For more details on fraud and risk when implementing A2A interoperability, see GSMA (2015), "Operational guidelines for interoperability: A customer-centric approach" and GSMA's revised fraud and risk management toolkit (2014).

by designing robust operational rules for MMSPs. They agreed that existing and new risk assessment procedures would be sufficient to handle fraud, risks or

disputes, and they would also be able to develop new rules as the service grew and new risks, disputes, or cases of fraud arose.

> "Bank of Tanzania endorsed IFC as a facilitator and convener of expertise in a process owned by Tanzania's MFS industry. For Bank of Tanzania, IFC's role as an independent facilitator served not only to arbitrate among industry competitors, but also relieved the central bank of the risk of having to choose sides among opposing industry views if it were to facilitate discussions itself."
>
> Source: International Finance Corporation

2. The complexity of implementation

The complexity and associated costs of implementing A2A interoperability can be the biggest barriers to deployment, and providers need to find an efficient solution that matches their commercial goals.

The service providers in Pakistan and Tanzania were motivated by different interests. In Pakistan, MMSPs wanted a solution that would not only give them access to other mobile money services, but also to a broader mobile financial ecosystem. In Tanzania, on the other hand, providers were already independently connected to banks through bilateral arrangements or aggregators, ATM networks and merchants, so they

were primarily interested in connecting to each other to conduct cross-net P2P transactions. The number of bilateral interconnections required in each market — and the related implementation and management costs — were therefore clearly different.

In Pakistan, it was less complex and more beneficial to connect to the existing switch and integrate with a broader financial ecosystem. Tanzanian providers, however, would reap greater benefits from integrating bilaterally and offering cross-net P2P, rather than building and connecting to a switch — an expensive option in the early stages of this project.[20]

3. Transaction costs

Since mobile money is a high-volume, low-value business, MMSPs need to minimize transaction costs to have a viable business. Affordability is key, so they also have to avoid passing these costs on to customers. Thus, keeping fees for interoperable transactions similar to those for on-net P2P transactions would

encourage customers to adopt the service and guarantee uptake of A2A interoperability.[21]

Providers in Tanzania decided that a bilateral arrangement would be the most cost-effective solution. By not incurring the additional operational

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20. Tanzanian providers could have made use of existing switches, however, they wanted to avoid incurring additional costs (sharing revenues with third parties) and increasing transaction costs for customers.

21. Please note that even though this criteria refers to transaction costs, providers also considered other types of operational costs and staffing needs. In Tanzania, providers did not expect to have to add staff or incur meaningful operational costs given the expected growth of transaction volumes from launching A2A interoperability. In Pakistan, integrating with a switch incurs a one-time membership fee, however, some of the MMSP-banks were already members of 1Link so they were not charged an additional annual fee.

costs of using a third party, MMSPs would be able to control their transaction fees and keep them comparable to on-net P2P fees.

Transaction costs were also a major concern in Pakistan, as switch fees per transaction are much higher than for on-net P2P transactions. However, as in Tanzania, providers were not willing to pass these

costs on to their customers and managed to convince 1Link to agree to a reduced fee for interoperable mobile money transactions.[22] The rationale was that the value of mobile money transactions is significantly lower than commercial banking transactions, but interoperable services could bring in higher volumes. Thus, the new fees ended up being comparable to those for on-net P2P transactions.

4. Regulatory environment

Regulations can define the requirements and constraints of A2A interoperability, and might influence which technical model MMSPs are able to put in place. Familiarity with the regulatory environment and understanding potential regulatory challenges are a prerequisite for implementing A2A interoperability.[23]

In both Pakistan and Tanzania, the regulatory environments were enabling for A2A interoperability. That is, the MMSPs could freely choose the technical model that best suited their commercial interests rather than being restricted to a pre-determined or preferred model defined by regulation. However, in both markets, MMSPs were required to report to

the central banks to ensure the transactions and associated risks were transparent.

In markets where regulation may not be enabling because the technical model is imposed by the regulator, providers should assess how this model would affect the sustainability of their business. In some cases, MMSPs have completely shut down operations because they did not see a business case.

In Pakistan and Tanzania, the central banks are both supportive of each market's specific technical solution and are actively involved in overseeing reconciliation processes and settlement.

5. Agreement framework

Maintaining control over the agreement framework gives MMSPs the ability to define, influence, and control the operating rules and technical specifications for the services they provide. This is important because it allows MMSPs to adapt A2A interoperability rules to their own market. An agreement framework includes the minimum service-level agreement (SLAs), the commercial agreement to be put in place, and how to deal with disputes, define and customize user interfaces, define settlement cycles, and other issues.

For providers in Tanzania, it was important to have control over the agreement framework. The MMSPs

wanted the flexibility to define their own rules and choose an agreement that would guarantee A2A interoperability and be commercially viable. Their preferred choice was the Receiver Pays Model,[24] through which the receiving provider compensates the sending providers for receiving money from their accounts on a transaction basis. This ensures end-to-end profitability for the full transaction cycle and motivates both parties to send or receive value.

In Pakistan, the MMSPs were drawn to an agreement framework based on standard practices in the country's banking industry. They were comfortable with the

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22. The contract for this agreement was under review at the time of publication.

23. Please see GSMA (forthcoming), "Mobile money account-to-account (A2A) interoperability: Considerations for policy engagements", by Simone di Castri and Crystal Kaschula.

24. For more details on the receiver pays model, see Appendix 6.

switch taking the lead on the terms and conditions for the service, since this would ensure they automatically complied with banking industry practices.[25] However, during this process, MMSPs realised that 1Link's systems and legacies from banking operations would not support

the Receiver Pays Model, which was also the preferred commercial model in Pakistan. The MMSPs collectively requested that 1Link include this commercial model in its next system upgrade so they could use it for mobile money transactions at launch, which it agreed to do.

6. Scalability

When selecting an interoperable solution, MMSPs must consider whether the technical model would attract other ecosystem players to the scheme and increase transaction volumes.

Since the primary goal of providers in Tanzania was to enable cross-net transactions from one mobile money service to another, and they were not expecting new mobile money players to enter the market, bilateral integration of existing providers seemed like a manageable solution that would meet their goals. The providers were also confident they would be able to manage the growth in transaction volumes, internally.

In Pakistan, 1Link was already connected to most of Pakistan's financial institutions and would be responsible for expanding its reach to new players. Providers would gain access to ATM and POS networks in 1Link's existing network, and therefore benefit from future network expansion,[26] and be able to explore other use cases as well. For example, bank account-to-mobile and mobile-to-bank account transfers. Given the size of Pakistan's market and the expected growth in transaction volumes, providers thought using a switch would put them in a better position over the long term.

7. User experience

Convenience and ease of use are key concerns for customers, and MMSPs should not compromise on user experience when selecting a technical model.

In both markets, providers realised that quick uptake would require the user experience for cross-net transactions to be similar to that for on-net transactions.[27] In Tanzania, bilateral integration allowed providers to preserve a similar user experience since they had control over the customer interface and could customise menu options and messaging with customers. For example, to prevent customer transaction errors, providers could develop a

functionality that would allow senders to see a recipient's name in the confirmation message before they entered their PIN to confirm the transaction.[28]

In Pakistan, the MMSPs were also concerned about the impact the new model would have on customer experience. However, they were confident that even though they would not have direct control over the USSD menus, they would be able to work closely with 1Link to adjust the wording, the order of the menu options, and the steps the customer would need to follow to conduct new transactions.

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25. Please note that even though MMSPs in Pakistan are technically financial institutions, they are not granted any voting rights or participation in 1Link's governance structure.

26. For more details on the products offered by the switch in Pakistan, see Appendix 3.

27. For more details on user interface when implementing A2A interoperability, see GSMA (2015) "Operational guidelines for interoperability: A customer-centric approach", http://www.gsma.com/mobilefordevelopment/operational-guidelines-for-interoperability-a-customer-centric-approach

28. For Tigo Pesa customers, at the time of publication, a confirmation message with the recipient's name was still being sent to the sender after the sender had confirmed the transaction (entered the PIN). See Appendix 7.

8. Time to market

The choice of technical model impacts time to market and, in most cases, MMSPs will decide to implement interoperability with a timeframe in mind. It is important to consider whether a technical model can be deployed within the agreed timeframe.

In Tanzania, providers considered handling the integration process themselves to avoid having to rely on a third party to negotiate commercials and set the timeline. However, they came to realise that it was actually their own priorities and willingness to implement the initiative that would determine the speed of integration. The two MMSPs initially interested in technical integration — Tigo and Airtel — preferred a bilateral model, but they decided to use an aggregator, Selcom, to intermediate the transactions.[29] They knew it was not a permanent solution, but it would help to prove that sending money cross-net could work and it would build trust amongst the providers.

After three months, more confident with the benefits of A2A interoperability, Tigo and Airtel began transitioning to a bilateral model and publicly launched it in August 2014. Tigo and Zantel integrated four months later in December 2014. Integration between

Zantel and Airtel, and between Vodafone and other providers, is expected in late 2015.

In Pakistan, the MMSPs appreciated that connecting to a central switch through an already established and standardised process would be faster, and would only require a one-time test when connecting all the players to the switch. The MMSPs would also be able to connect individually, joining the switch as and when they were ready. So, while interoperability with other mobile money services would depend on at least two MMSPs connecting to the switch, interoperability with other ecosystem players could be dictated by their own commercial priorities, resources, and technical capability and capacity.

Easypaisa was the first to connect to 1Link in July 2014, followed by Upaisa in October 2014, Mobicash in December 2014, and MobilePaisa in February 2015. The other services, UBL Omni and HBL Express, were already connected to 1Link. Therefore, with the exception of Zong, cross-net mobile money transactions are already possible amongst MMSPs in Pakistan.

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29. Aggregators play a key role in connecting MMSPs to third parties in Tanzania, including major bill payers and POS networks. Thus, the value proposition of a switch is relatively low (as mentioned under the "complexity of implementation" criteria above).

TABLE 2

Assessment of each Technical Model in Context of Tanzanian and Pakistani Markets

| Assessment criteria	Tanzania Pros and cons of bilateral integration	Pakistan Pros and cons of connecting through a switch
Risk management	It was realised that new risks to the system would be introduced and proper mitigation was planned by designing robust operational practices.	It was realised that the service providers would benefit by joining established operational processes around risks, fraud and disputes.
The complexity of implementation	The service providers were in a better position to set up bilateral agreements due to their previous familiarity with such arrangements and their limited focus on cross-net P2P transfer.	The service providers had greater familiarity with switch integration and they were interested in providing access to other use cases (ATMs, banks, etc.) for their customers.
Transaction costs	The service providers realised that bilateral arrangements would give them better control over transaction fees and help keep cross-net P2P fees the same as existing on-net P2P fees	The service providers realised that the fee is higher for their business model, however they were also able to convince the switch to reduce the fee for mobile money transactions.
Regulatory environment	The regulator did not create any barrier to interoperability in Tanzania and was open to approve any solution decided by the industry	The regulator did not create any barrier to interoperability in Pakistan and was open to approve any solution decided by the industry
Agreement framework	Bilateral agreements provided an ability to maintain control over interoperability rules and commercial terms	The service providers preferred to work with standardised agreement, and were also able to incorporate mobile money nuances
Scalability	Bilateral model was considered sufficient to fulfill cross-net P2P requirement of the providers.	Connectivity with the switch was considered because it provided an opportunity to connect to a larger payment ecosystem.
User experience	The providers realised that bilateral connectivity provides an ability to customize messages and customer interfaces	The providers realised that they will have limited ability to control customer experience and to mitigate this, they may have to incorporate some changes themselves.
Time to market	Bilateral connections were considered faster provided the providers prioritise interoperability over other projects. In the absence of a switch in the market setting up a switch would take more time.	Connectivity with the switch was preferred because it was considered an independent approach where the providers would implement based on their timelines and priorities.

How the two technical models work

Understanding how each of the technical models work reveals the complexity of implementation and can help MMSPs that are considering interoperability to visualise the challenges.

In the bilateral technical model used in Tanzania, mobile money providers had to integrate their platforms on a one-to-one basis (see Figure 1), whereas with the switch model used in Pakistan, each provider must integrate with the central switch (commercial processor) in order to connect with each other (see Figure 2).[30]

FIGURE 1

Bilateral Arrangement

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MMSP A

MMSP B

MMSP C

BANKS
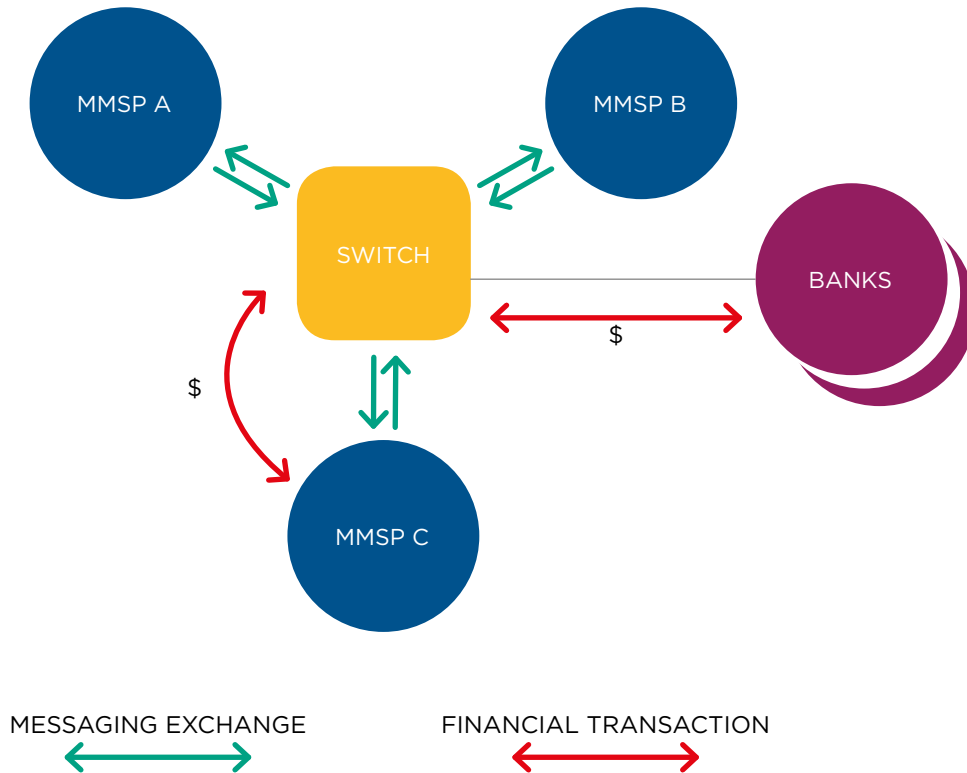
MESSAGING EXCHANGE

FINANCIAL TRANSACTION

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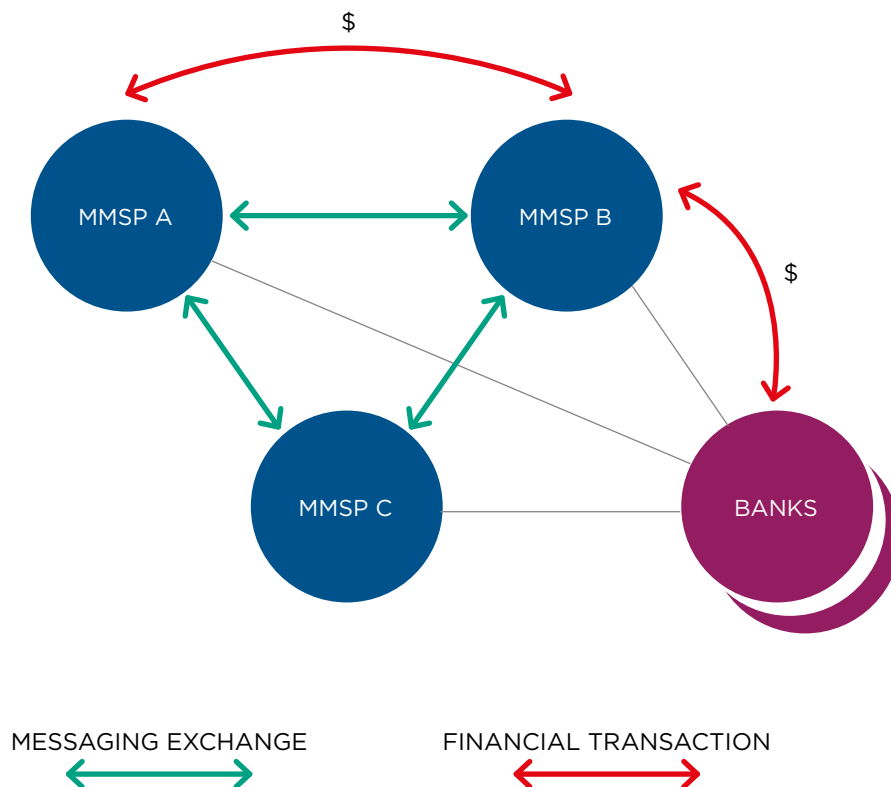
30. For more details on other technical models for A2A interoperability, see GSMA (2014), "A2A interoperability: Making mobile money schemes interoperate", http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/03/A2A-interoperability_Online.pdf

FIGURE 2

Switch Arrangement

In both arrangements, customers expect their funds to be transferred either in real-time or near-real-time. However, the settlement of funds between providers depends on the rules of the particular scheme. In a bilateral arrangement, the provider, together with the regulator decide when and how often to settle, whereas in a switch arrangement, it is typically the switch that determines the settlement rules.[31]

Bilateral arrangement in Tanzania

With this technical model, a provider 'pre-funds' customer transactions by transferring funds to the other provider's corporate account (see Appendix 4). A corresponding disbursement account of e-money is created on the provider's platform, so the total balance on the platform remains 1:1 with its own trust account. In addition to the disbursement account, each provider opens a collection account on its own platform to capture the e-money being sent to the receiving provider. When a customer sends a cross-net transaction to a different mobile money scheme, the collection account of the sending MMSP is credited with corresponding e-value on its platform. On the receiving MMSP's platform, the disbursement account (created by the sending MMSP) is debited, with e-value sent to the recipient customer (see

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31. For more details on implementing A2A interoperability, see GSMA (2015), "Operational guidelines for interoperability: A customer-centric approach",
    http://www.gsma.com/mobilefordevelopment/operational-guidelines-for-interoperability-a-customer-centric-approach

Appendix 4). This process ensures that the trust accounts for every MMSP remain balanced whenever a cross-net transaction is performed.

Over time, the e-value in a disbursement account diminishes and needs to be rebalanced to prevent transfers from being interrupted. At the same time, the collection account increases in value and the stored e-value can be 'redistributed' and moved to the corporate account to pre-fund the other provider's platform. This prevents prevents the disbursement account from running out of e-value.

Switch arrangement in Pakistan

Since branchless banking in Pakistan is bank-led and run jointly by a MNO and a bank, connecting to the switch required partner banks to integrate their systems with the switch. However, the two bank-owned MMSPs (UBL Omni and HBL Express) which were already connected to 1Link simply had to connect their mobile money platforms to the switch.

In this type of technical arrangement, the switch takes care of transaction messaging and the settlement process (see Appendix 5). In Pakistan, each of the participating branchless banking providers had to open a settlement account with the switch, which is funded by the provider. The switch then settles the respective provider's bank accounts by crediting and debiting each settlement account based on the transactions completed that day. Although a customer receives their funds almost immediately, the banks are settled on a net-basis at day's end.

TABLE 3

Bilateral and switch arrangements: A comparison of the main features

Feature	Bilateral arrangement in Tanzania	Switch arrangement in Pakistan
Regulatory approval of technical model	Yes	Yes
Control over service design	MMSPs	1Link and MMSPs
Use cases allowed	Focused on cross-net P2P	Cross-net P2P and integration with other financial institutions and players (e.g. banks, ATMs, merchants, etc.)
Control over timelines, including launch	MMSPs	1Link and MMSPs
Settlement responsibility	MMSPs	1Link
Settlement institution	MMSPs and their trust account banks	Central bank
Settlement frequency	Manually, when needed to re-balance	Automated, daily
Dispute, fraud, and risk management	MMSPs	1Link
Cost	Same as on-net	At least the switch fee plus on-net

TEXT BOX 2

Interoperability of a shared mobile money platform in Sri Lanka

In Sri Lanka, there is an interesting but uncommon interoperability scenario. In 2013, the largest MMSP in the country, Dialog, opened its eZ Cash mobile money platform to other MMSPs that wanted to offer mobile money services to their customers. Etisalat and Hutch have joined this platform and launched services also called eZ Cash. Customers of all three providers use the same platform and the same agent network, so they can send money to recipients on any of the three schemes. In essence, Dialog provides managed services to the other two providers, and customers of one provider can seamlessly transfer money to customers of the others.

Key lessons learned

Providers in both Tanzania and Pakistan were prepared to adopt A2A interoperability and have implemented their respective technical models quite successfully.

Based on the implementation so far, we have identified lessons which can help other MMSPs implement and launch A2A interoperability in their markets. However, we are confident these lessons are not exhaustive.

As the commercial launch of A2A interoperability approaches in Pakistan and new integrations happen in Tanzania, more lessons will emerge.

Clear communication and a common vision is critical

One of the reasons it took longer than expected for interoperability to go live in Tanzania was that the MMSPs had different priorities. Other product launches and organisational priorities competed for internal resources, and this extended the time to launch. In order to set realistic expectations, maintain trust between all parties, and keep the initiative on track, it is crucial for providers to be transparent about their priorities.

Closely aligned priorities and proper communication are equally important when working with third parties, such

as a switch. Early in the project, providers in Pakistan sent change requests to 1Link (to lower transaction fees and use a receiver pays model, among others), but at the time of delivery, some of the features did not quite meet the providers' requirements because 1Link had not understood the requests clearly. A special meeting had to be held to realign priorities, clarify 1Link's deliverable, and discuss the impacts of the changes on the MMSPs' business. In hindsight, if communication channels had remained open throughout the process, misunderstandings would have been saved.

Creating or changing operational rules is not easy

While providers in Tanzania recognised that one of the benefits of a bilateral arrangement was more control over the commercial model, they initially underestimated the complexity of writing operational

rules from scratch. In order to align the business and legal requirements for interoperability and develop the rules, MMSPs relied on external facilitators, such as the International Finance Corporation (IFC),[32] and the

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32. For more details on IFC support for Tanzania's providers , see the IFC case study, "Achieving interoperability in mobile financial services – Tanzania case study",
http://www.ifc.org/wps/wcm/connect/8d518d004799ebf1bb8fff299ede9589/IFC+Tanzania+Case+study+10_03_2015.pdf?MOD=AJPERES

support of the GSMA. Once approved, these rules are owned and updated by the implementing providers as needed. This flexibility allowed Tanzanian providers to develop rules based on their own market practices, rather than implementing rules by third parties that could be rigid and difficult to adapt to.

In Pakistan, the switch owns the scheme rules, and the MMSPs had to invest some effort in helping 1Link understand the business case for mobile money.

Generally, a switch business case is based on high-value, low-volume bank transactions, whereas the mobile money business case is based on low-value, high-volume transactions. The scheme rules required some changes, and once the providers had successfully differentiated the business cases, 1Link implemented the changes. It was then easier to convince the switch that the Receiver Pays Model would allow providers to create network effect.

Service design is key to customer adoption

In both Pakistan and Tanzania, providers recognised that careful service design would drive customer acceptance and adoption. They paid special attention to improving the usability of the service, which would reduce the risk of errors and maintain an affordable price point for the target segment.

For example, after the service was launched in Tanzania, Tigo realised the importance of menu design and the position of menu options. It had created a new menu option, "Transfer to Airtel Money", to differentiate the new interoperable transaction from the existing on-net P2P option. However, when the option was moved up in the menu, the number of transactions to Airtel Money increased by about 20 percent.[33] The providers now want to simplify and improve the customer experience even more by making the back-end system recognise the transaction automatically. This way, customers would not have to know which mobile money service they are sending money to and would only have to enter the MSISDN.

In Pakistan, the MMSPs initially mirrored the transaction steps[34] that commonly appear on a bank's website on its own USSD menu. However, this made the menu too long, and transactions were timing out before customers could complete the steps. Realising this early on and taking steps to simplify the menu were key to improving the customer experience. Another service design challenge came when 1Link included the names of the partner banks in the USSD menu instead of the name of the branchless banking service. This was a major issue, as customers were not familiar with the names of MMSP-banks, so providers replaced them with the names of the mobile money services instead. The USSD menu was also pulling in a long list of services (37 options) from 1Link. To simplify this, providers created an additional step where customers first select an option to 'Send money to a bank' or 'Send money to a mobile money service'. Then, based on this selection, the mobile money services appear in a simpler, shorter list.

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33. See the example of a user interface in Appendix 7.
34. See the example of a user interface in Appendix 8.

A pilot phase is necessary

Testing the reliability of systems before commercial launch is a crucial step. A pilot phase should be planned well in advance to stress test all possible situations and ensure providers are prepared to handle them when the service scales. By starting slowly, it is possible to identify technical and operational bottlenecks and eliminate them before transaction volumes grow.

A pilot phase was a must for MMSPs in Pakistan and Tanzania. It was during the pilot phase that the technical system (e.g. delays, errors, and outages) and other operational disruptions (e.g. dispute resolutions) were tested, allowing providers to put processes in practice to deal with them early on.

Some organic growth can be expected

In markets where consumers are already familiar with mobile money, some organic growth can be expected without much investment in marketing campaigns.

In Pakistan, organic growth occurred simply by virtue of connecting to the national switch, and providers benefiting from bank-to-wallet and wallet-to-bank usage. The number of transactions has grown exponentially, even without any above-the-line marketing activity, and have become a major source of revenue for providers. According to the State Bank of Pakistan, there were 281,841 transactions in the first quarter of 2015 with a value of over USD 66 million.

After interoperability between Tigo and Airtel was launched in Tanzania, both providers saw growth in cross-net transactions even though the only marketing was a radio campaign by Airtel. However, MMSPs in Pakistan and Tanzania recognise the benefit of marketing campaigns and are planning to invest more in these.

Moving forward

While these two markets are still in the early stages of A2A interoperability, we hope other MMSPs can benefit from the experiences of providers in Tanzania and Pakistan when choosing and implementing their own technical solution.

Strategic considerations such as risk management, the complexity of implementation, the regulatory environment and others, are critical for MMSPs planning to launch A2A interoperability, and should be assessed when identifying the most appropriate technical model. Furthermore, maintaining open communication, designing a user-friendly service and then piloting it, were important lessons for MMSPs in Tanzania and Pakistan, and are relevant to the wider industry as well.

We would like to reiterate that lessons from these and other markets will continue to be shared as A2A interoperability evolves and the GSMA follows the progress of the industry.

Some of the A2A interoperability issues the GSMA will continue to explore are:

- Funding mechanisms amongst providers, and efficiency gains from automating the reconciliation process and implementing net settlement after reconciliation;

- Improved user interfaces with simpler menus and which do not require customers to know a recipient's mobile money service in order to transfer money;

- Risks arising from technical integrations and the management processes required to mitigate them; and

- Impact of interoperability on scaling mobile money services and the development of the payment ecosystem.

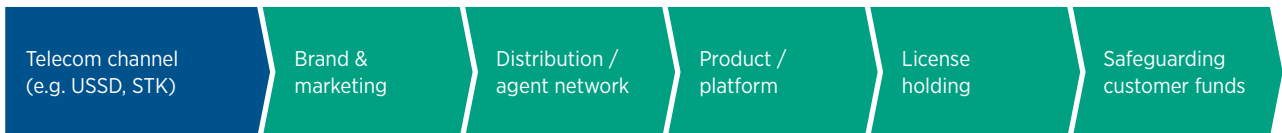# Appendix 1: Sample of mobile money commercial models

1 MOBILE OPERATOR-DRIVEN:
MOBILE OPERATOR ASSUMES MOST FUNCTIONS OF THE MOBILE MONEY VALUE CHAIN

Telecom channel (e.g. USSD, STK) › Brand & marketing › Distribution / agent network › Product / platform › License holding › Safeguarding customer funds

2 PAYMENTS COMPANY-DRIVEN:
DEDICATED PAYMENTS COMPANY MANAGES CORE SERVICE OFFERING

Telecom channel (e.g. USSD, STK) › Brand & marketing › Distribution / agent network › Product / platform › License holding › Safeguarding customer funds

3 BANK-DRIVEN:
BANK ASSUMES MOST FUNCTIONS OF THE MOBILE MONEY VALUE CHAIN

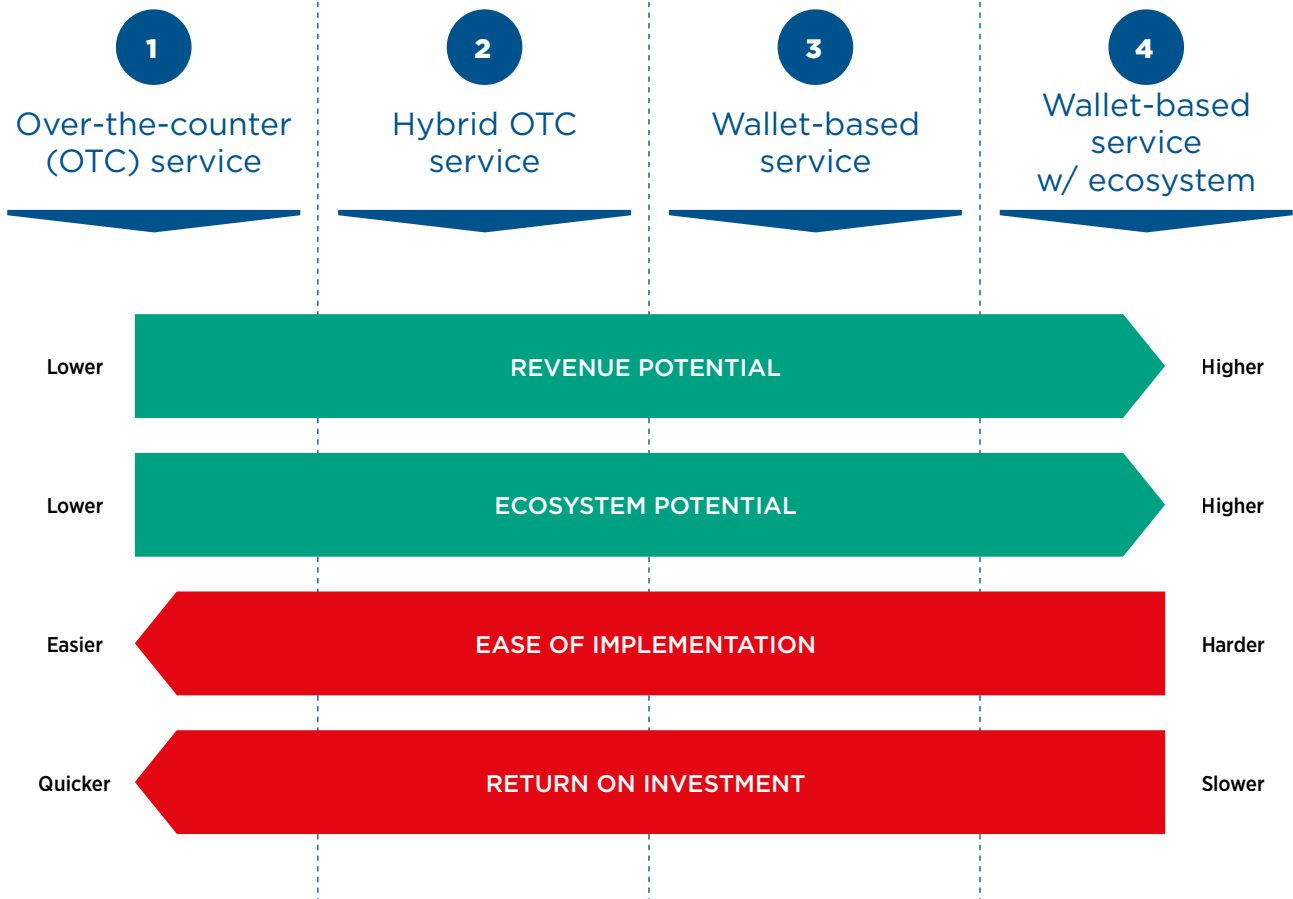Telecom channel (e.g. USSD, STK) › Brand & marketing › Distribution / agent network › Product / platform › License holding › Safeguarding customer funds

MOBILE OPERATOR ACTIVITIES   BANK ACTIVITIES   PAYMENTS COMPANY ACTIVITIES

Appendix 2: Mobile money service models

1	**2**	**3**	**4**
Over-the-counter (OTC) service	Hybrid OTC service	Wallet-based service	Wallet-based service w/ ecosystem

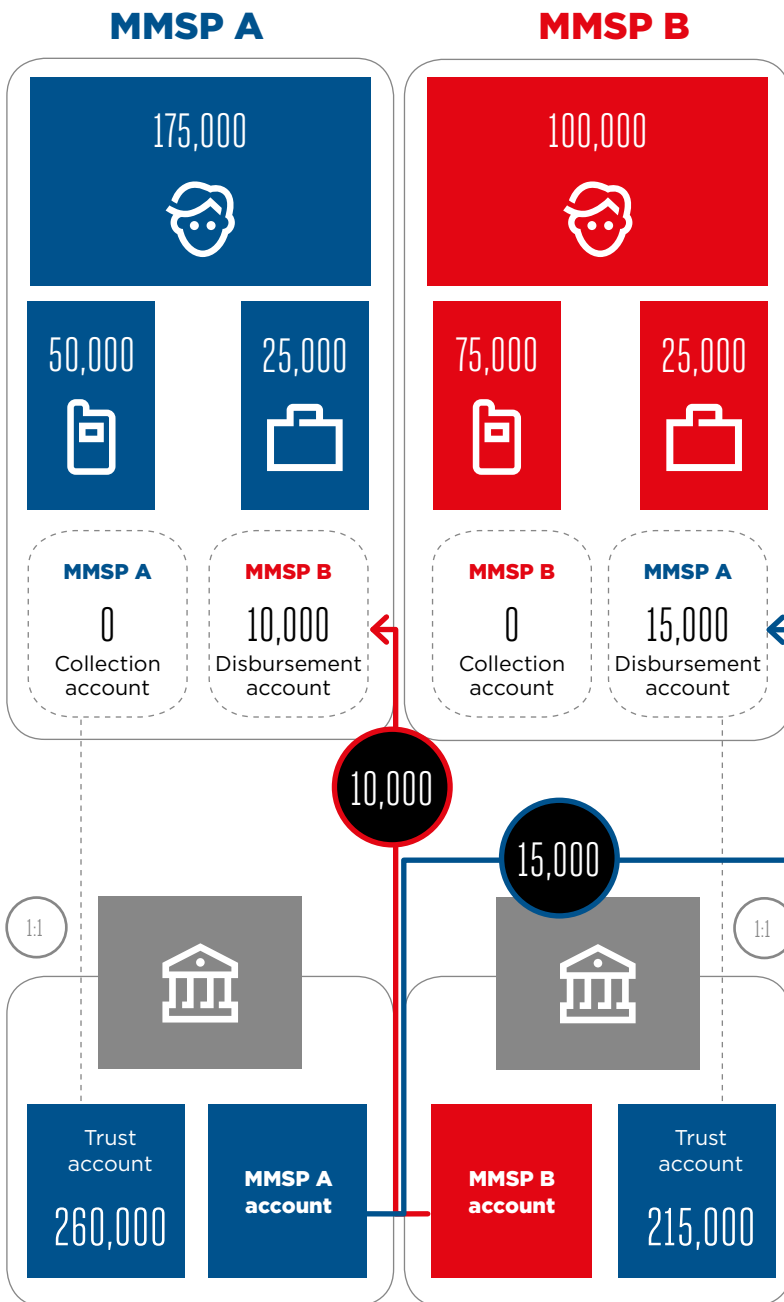| Lower	**REVENUE POTENTIAL**	Higher
Lower	**ECOSYSTEM POTENTIAL**	Higher
Easier	**EASE OF IMPLEMENTATION**	Harder
Quicker	**RETURN ON INVESTMENT**	Slower

Appendix 3: Products and services offered by the switch in Pakistan

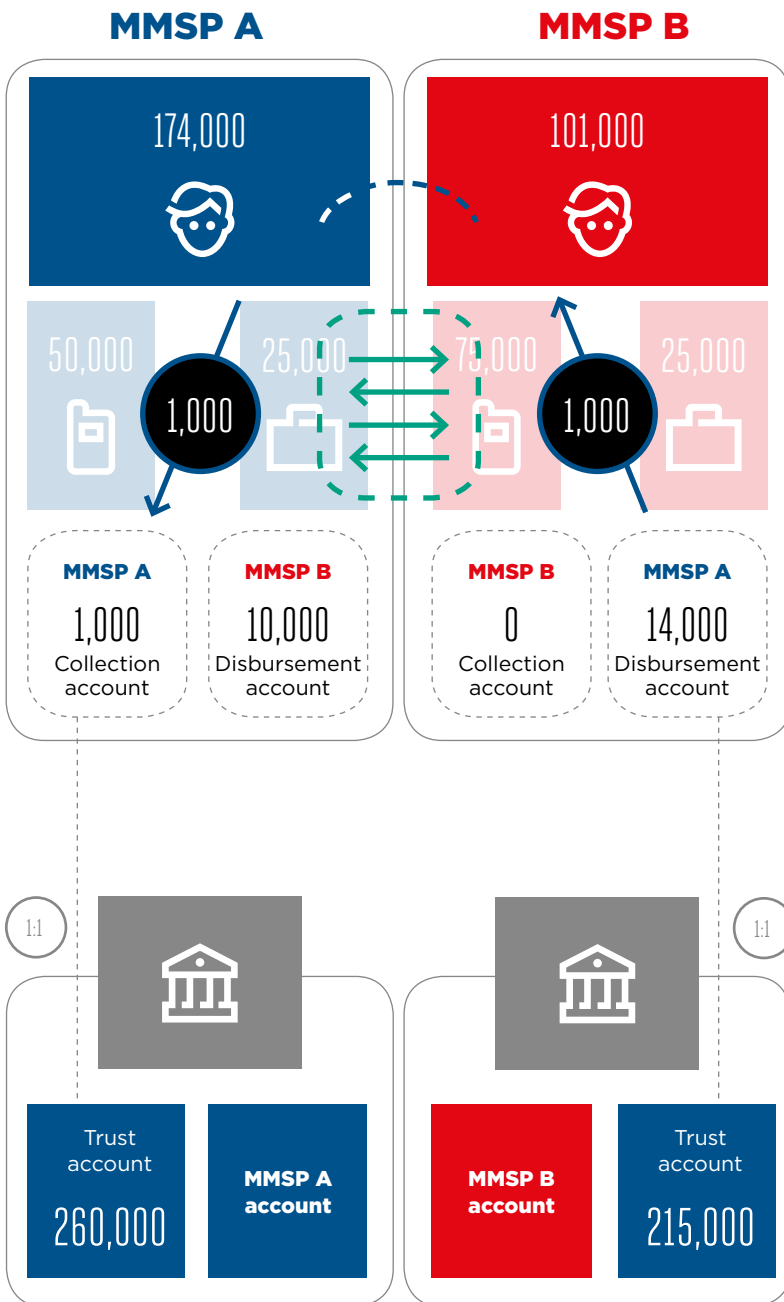| PRODUCTS OFFERED	TECHNICAL SET-UP	SERVICES OFFERED
• Mobile airtime top-up • P2P: mobile money to mobile money • P2P: mobile money to bank account • P2P: bank account to mobile money • Bill payment • B2C, G2C disbursements • Merchant POS • ATMs • Merchant acquisition	• Technology provided by TPS Pakistan, Oracle and IBM • Messaging formats: ISO & Proprietory (PHX 8583) • Provides clearing and settlement	• Settlement • Clearing • Dispute resolution and reimbursement

Appendix 4: Pre-funding and transaction flows in a bilateral arrangement

Operational model
Pre-funding

MMSP A

175,000

50,000

25,000

MMSP A
0
Collection account

MMSP B
10,000
Disbursement account

MMSP B

100,000

75,000

25,000

MMSP B
0
Collection account

MMSP A
15,000
Disbursement account

10,000

15,000

1:1

1:1

Trust account
260,000

MMSP A account

MMSP B account

Trust account
215,000

» Each MMSP has
  ⊘ Customers
  ▣ Agents
  ⬚ Corporate partners

» The total balances on the platform is represented 1:1 in the trust account(s)

» Each MMSP opens its collection in its own platform and a disbursement account for the other MMSP

» From the bank account, each provider pre-funds the other provider'sdisbursement account with its own funds

» MMSP B prefunds 10,000 at MMSP A and has its disbursement account credited with the same value

» MMSP A prefunds 15,000 at MMSP B and has its disbursement account credited with the same value

» Trust accounts are credited with corresponding amounts

Operational model
Transaction flows

MMSP A

174,000

50,000   25,000

1,000

MMSP A	MMSP B
1,000	10,000
Collection account	Disbursement account

MMSP B

101,000

75,000   25,000

1,000

MMSP B	MMSP A
0	14,000
Collection account	Disbursement account

1:1

1:1

Trust account	MMSP A account
260,000	

MMSP B account	Trust account
	215,000

» Customer from MMSP A sends 1,000 to customer in MMSP B

» Platforms communicate securely to check MSISDN, account status, account name, transaction limits and confirmations, error codes for failures, exceptions, responses etc. If all pass then:

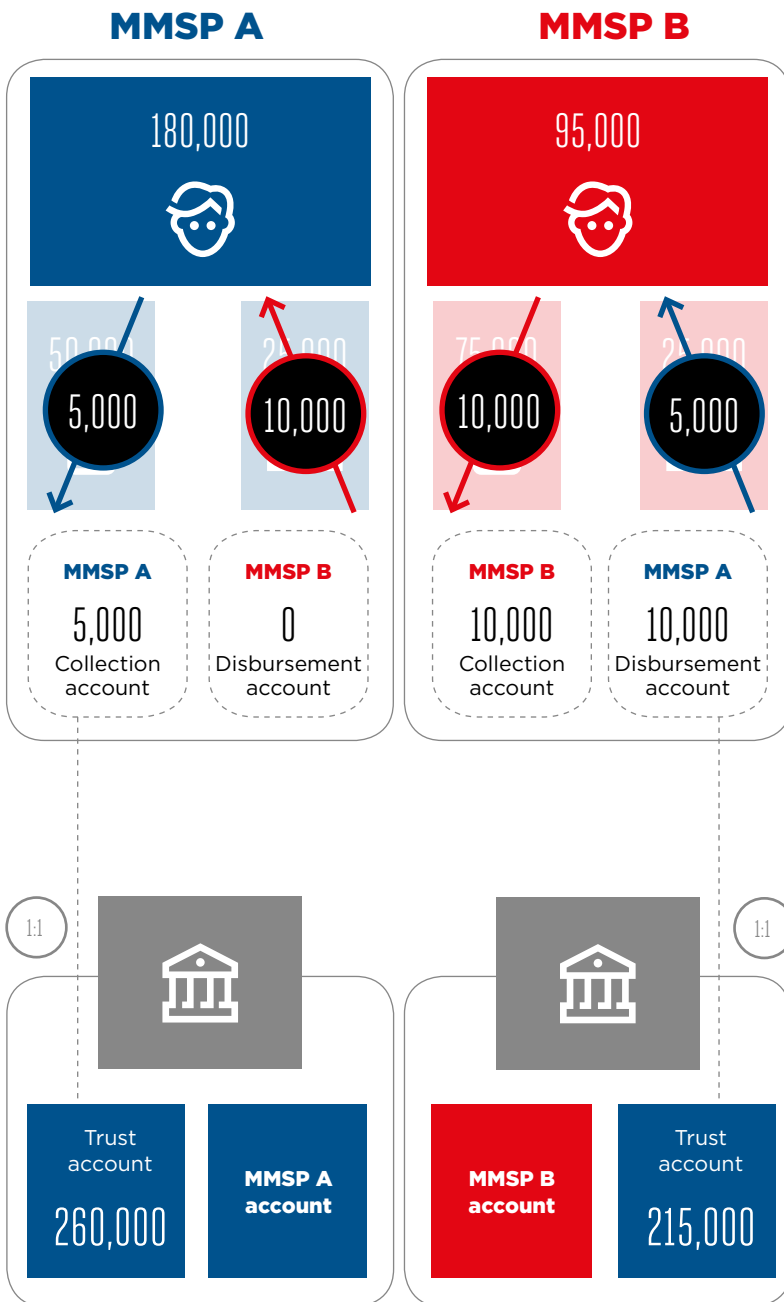1,000 debited from MMSP A customer wallet

MMSP A's collection account is credited with 1,000

MMSP A's disbursement account is debited with 1,000

MMSP B customer wallet is credited with 1,000

» Trust account balances remain constant whenever a transaction between MMSP A customers and MMSP B customers is performed

Operational model
Transaction flows over time

MMSP A

180,000

5,000

10,000

MMSP A	MMSP B
5,000	0
Collection account	Disbursement account

MMSP B

95,000

10,000

5,000

MMSP B	MMSP A
10,000	10,000
Collection account	Disbursement account

1:1

Trust account

260,000

MMSP A account

1:1

MMSP B account

Trust account

215,000

» Collection accounts on each platform are credited as their costumers send money cross-net

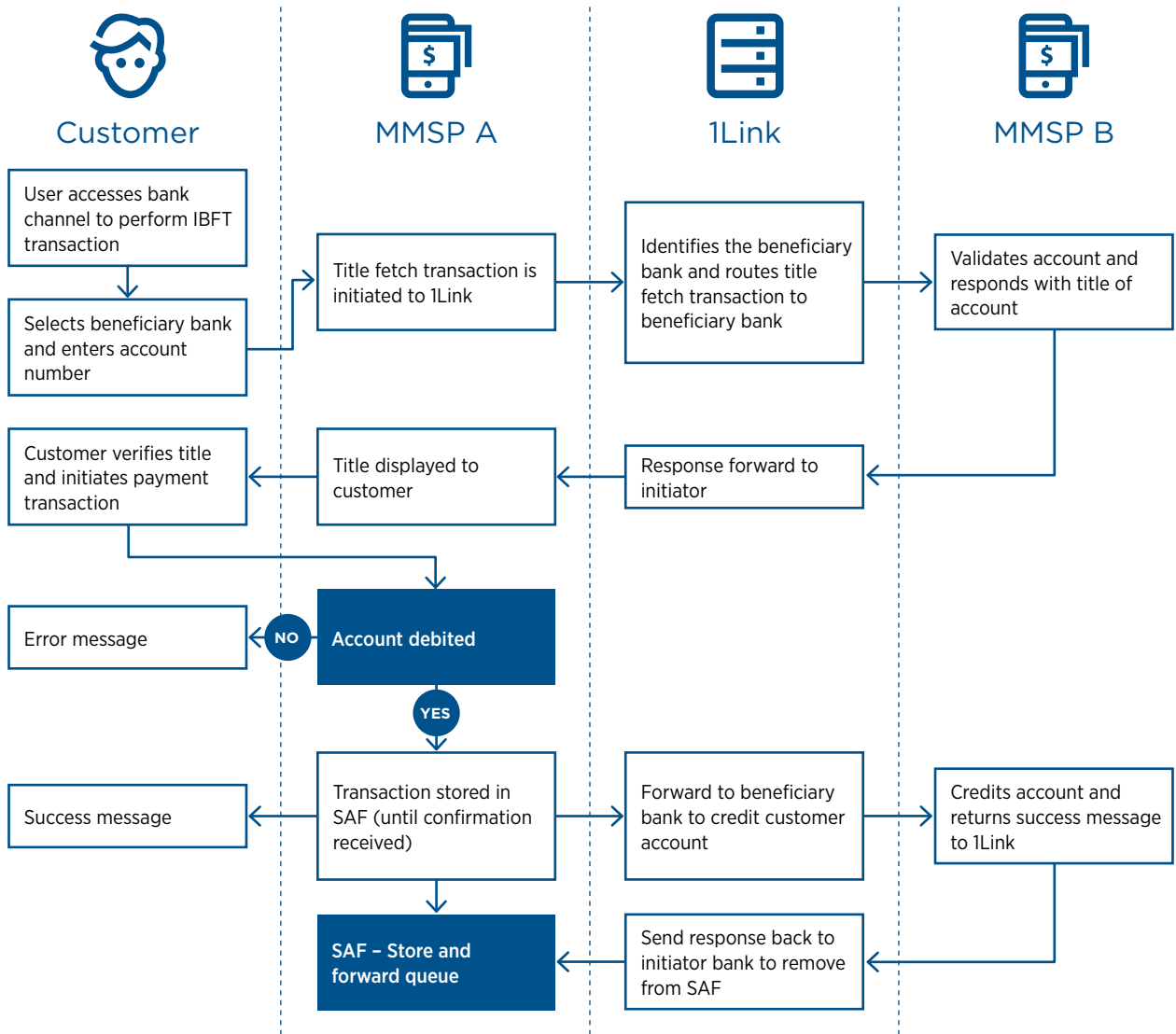» Disbursement accounts on the other provider's platform is debited

» In this example, over time:

5,000 was sent from MMSP A to MMSP B. MMSP A's net customer balance: **175,000** - 5,000 + 10,000 = 180,000

10,000 was sent from MMSP B to MMSP A. MMSP B's net customer balance over time: **100.000** + 5,000 - 10,000 = 95,000
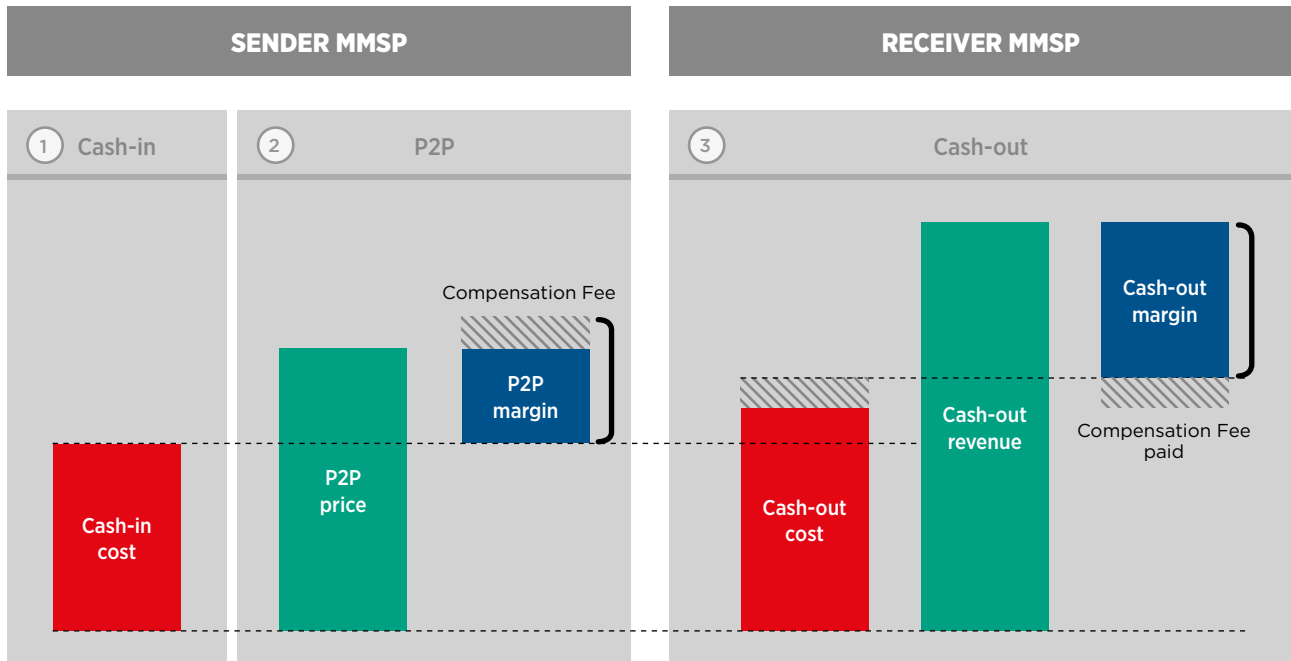
» MMSPs' collection accounts need to be rebalanced to carry on prefunding customer transactions and guarantee the liquidity of their platforms

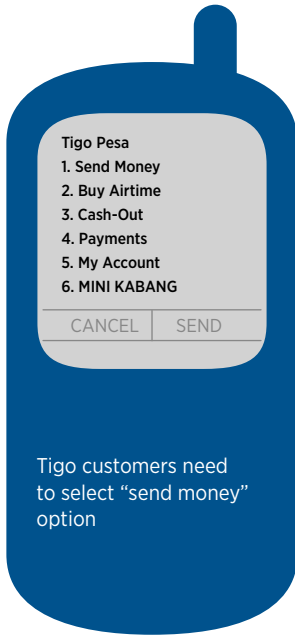# Appendix 5: Transaction flows in a switch arrangement

Customer

MMSP A

1Link

MMSP B

User accesses bank channel to perform IBFT transaction

Selects beneficiary bank and enters account number

Title fetch transaction is initiated to 1Link

Identifies the beneficiary bank and routes title fetch transaction to beneficiary bank

Validates account and responds with title of account

Customer verifies title and initiates payment transaction

Title displayed to customer

Response forward to initiator

Error message

NO Account debited

YES

Success message

Transaction stored in SAF (until confirmation received)

Forward to beneficiary bank to credit customer account

Credits account and returns success message to 1Link

SAF – Store and forward queue

Send response back to initiator bank to remove from SAF

Source: 1Link

Appendix 6: Cross-net model - Receiver pays

SENDER MMSP		RECEIVER MMSP	

① Cash-in   ② P2P   ③ Cash-out

Compensation Fee

P2P margin

P2P price

Cash-in cost

Cash-out margin

Cash-out revenue

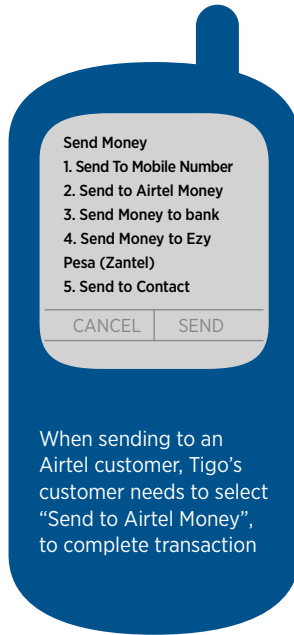Compensation Fee paid

Cash-out cost

Receiver MMSP agrees to pay an interchange fee to sender MMSP, its margin diminishes while sender MMSP's margin increases
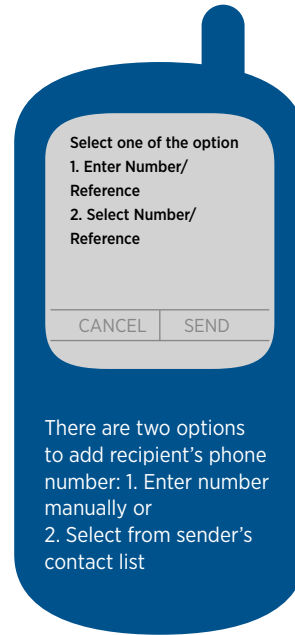
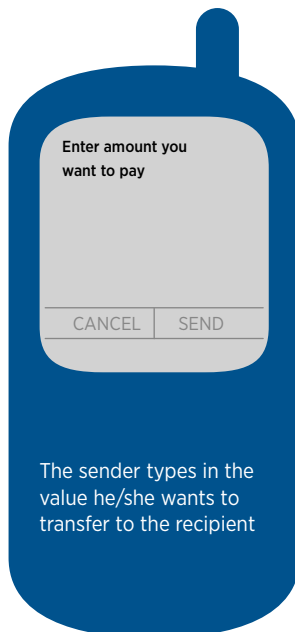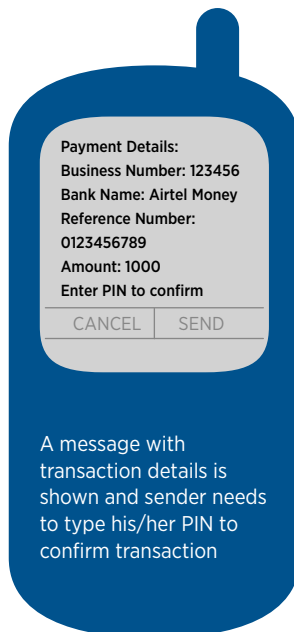# Appendix 7: Example of user interface in Tanzania

SCREEN 1

Tigo Pesa
1. Send Money
2. Buy Airtime
3. Cash-Out
4. Payments
5. My Account
6. MINI KABANG

CANCEL   SEND

Tigo customers need to select "send money" option

SCREEN 2

Send Money
1. Send To Mobile Number
2. Send to Airtel Money
3. Send Money to bank
4. Send Money to Ezy Pesa (Zantel)
5. Send to Contact

CANCEL   SEND

When sending to an Airtel customer, Tigo's customer needs to select "Send to Airtel Money", to complete transaction

SCREEN 3

Select one of the option
1. Enter Number/ Reference
2. Select Number/ Reference

CANCEL   SEND

There are two options to add recipient's phone number: 1. Enter number manually or 2. Select from sender's contact list

SCREEN 4

Enter amount you want to pay

CANCEL   SEND

The sender types in the value he/she wants to transfer to the recipient

SCREEN 5

Payment Details:
Business Number: 123456
Bank Name: Airtel Money
Reference Number:
0123456789
Amount: 1000
Enter PIN to confirm

CANCEL   SEND

A message with transaction details is shown and sender needs to type his/her PIN to confirm transaction

SCREEN 6

You have sent 1000,00 Tshs to
0123456789 (John)
{message}
,Txn ID:C111111.111.C11111

OK

A confirmation message is shown with transaction details, which now also includes the name of the recipient and the transaction ID for future reference
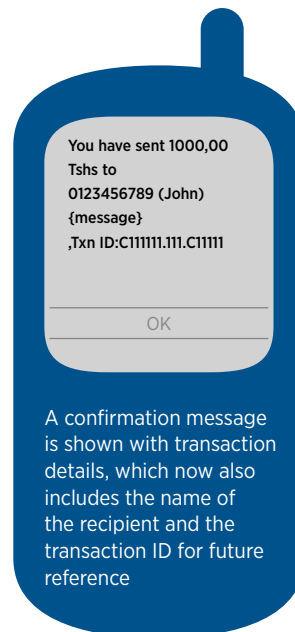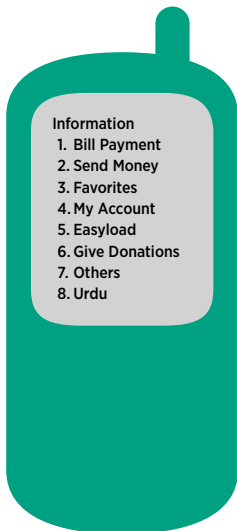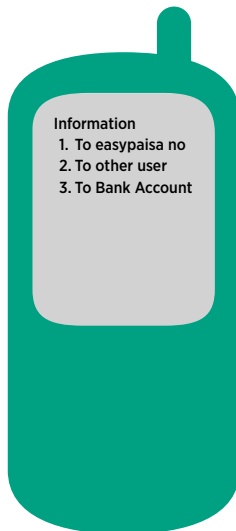
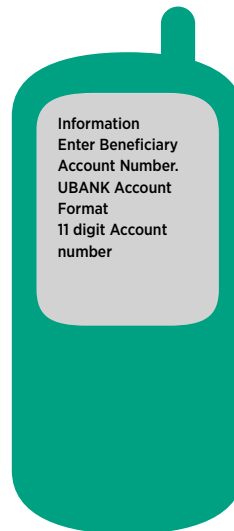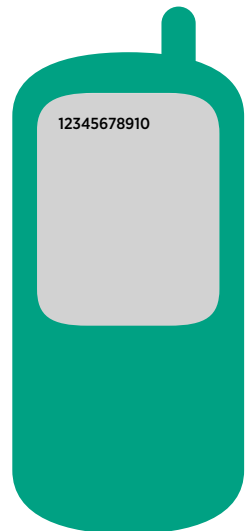# Appendix 8: Example of user interface in Pakistan

SCREEN 1

Information
1. Bill Payment
2. Send Money
3. Favorites
4. My Account
5. Easyload
6. Give Donations
7. Others
8. Urdu

SCREEN 2

Information
1. To easypaisa no
2. To other user
3. To Bank Account

SCREEN 3

Information
Select Bank
1. UBANK
2. UBL

SCREEN 4

Information
Enter Beneficiary
Account Number.
UBANK Account
Format
11 digit Account
number

SCREEN 5

12345678910

SCREEN 6

Information
Enter Amount

SCREEN 7

100

SCREEN 8

Please verify
Account Details:
Title: Sender's
Name
Account Number
12345678910
Bank: UBANK
Reply with 1 to
confirm

SCREEN 9

Enter PIN

SCREEN 10

You have paid Rs
100 Successfully to
account number
12345678910

For further information, please visit the website at www.gsma.com/mobilemoney