



Mobile Financial Services Working Group (MFSWG)

Mobile Financial Services Accessing Levels of Interoperability

This guideline note is to provide members of the AFI Network with a framework to assess the degree of interoperability in their respective markets and prioritize appropriate policy responses. The note provides a common framework for benchmarking interoperability across different use cases. This framework will help to clarify a complex issue and establish a shared understanding and vocabulary that enables peer learning.

Contents

Introduction and Focus	1
Definitional Framework	1
A Framework for Measurement and Self-Assessment	2
The importance of identifying use cases that will drive financial inclusion	2
Conducting the Self-Assessment	4
Defining the Scope of Measurement	5
Applying the Framework to the Case of Pakistan	5
Annex A: Member Survey	7

Policymakers can use the framework to prioritize the use cases requiring intervention or support to improve usage of formal retail payment services. Identifying these use cases will also enable more effective dialogue with providers.

Introduction and Focus

The Mobile Financial Services Working Group (MFSWG) has agreed on a framework that will enable a common understanding of the principles of interconnection and interoperability of retail payment systems. Many markets represented by the MFSWG have determined that, in order to achieve pervasive financial inclusion, the retail payment system must be integrated across service platforms. As markets develop and service providers continue to innovate, policymakers are grappling with how to encourage investment in payments system infrastructure while still ensuring customers have a variety of suitable services with which to transact across networks.

Although many countries are on similar paths and face similar challenges, they also have markedly different market realities, due to differences in size, scale or complexity. Without a baseline of shared terms, concepts and assumptions, these differences can make peer learning difficult. This guideline note provides a framework for this baseline to be developed, enabling policymakers to conduct high-level self-assessment and engage in constructive dialogue with their peers. The framework is based on research conducted by the Consultative Group to Assist the Poor (CGAP),¹ which has been working closely with the MFSWG to establish a shared understanding of interoperability and interconnection, and to learn from global practices.

Definitional Framework

First, it is important to distinguish *interoperability* and *interconnection*, both critical aspects of the environment in which customers transact across networks. The MFSWG's "Basic Terminology"² guideline note provides the following definitions:

Interoperability is ultimately a question of technical capacity, or the extent to which information can be formally exchanged between two (or more) systems. For example, mobile phone networks are interoperable inasmuch as a customer of one carrier can place calls to a customer of another carrier. Similarly, we see interoperability when a customer of one bank is able to withdraw funds from his account at the ATM of another bank.

Interconnection, in contrast, occurs when interoperable systems are actually connected and reach a particular level of technical capacity. For example, when a mobile phone user pays one rate to place calls to a subscriber on her network, but four times that rate to place a call to a subscriber on another network. Complete technical interoperability and suboptimal interconnection can therefore coexist. Similarly, it may be possible for a customer of one bank to withdraw money from the ATM of another bank, but high costs or service restrictions may make it less likely, and thereby limit practical interconnection. Interconnection in these situations is often affected by varying pricing rules.

South Africa: Moving Toward Greater Interconnection

South Africa provides a good example of the distinction between interoperability and interconnection. The bankcard market achieved a significant degree of interoperability early in its development. This was achieved through the use of a single national switch for all domestic switching. The industry owns the infrastructure, but it was driven by direct policy intervention.

However, after measuring³ the use of bankcards after some years on the market, the government became concerned about what appeared to be significant transaction fees for "not-on-us" transactions. Further study revealed transaction costs and interchange fees were discouraging customers from conducting payment transactions on another payment institution's channel.

Even though systems were interoperable and capable of facilitating transactions across networks and channels, the nature of the pricing did not encourage usage of those channels, therefore limiting the degree of interconnection for bankcards.

Meanwhile, in Pakistan...

Despite relatively high levels of customer usage, there is very little ATM network growth in Pakistan. This suggests that, in South Africa, controlling interchange fees⁴ between payment providers would not necessarily have solved the issue.

One likely culprit behind ATM stagnation in Pakistan is price caps, which have dampened the commercial incentive to expand ATM networks. This points to the balancing act policymakers must manage when moving toward greater interconnection.

¹ CGAP, June 18, 2012, "Interoperability and the Pathways Towards Inclusive Retail Payments In Pakistan." Available at: <http://www.cgap.org/publications/interoperability-and-pathways-towards-inclusive-retail-payments-pakistan>

² MFSWG, 2012, "Mobile Financial Services: Basic Terminology." Available at: www.afi-global.org/sites/default/files/publications/MFSWG%20Guideline%20Note%20on%20Terminology.pdf

³ Commission of Enquiry into Banking Charges, 2008.

⁴ Fee paid between banks or payment providers to accept card-based transactions.

Interoperability is a necessary, but insufficient condition for interconnection. A fully developed payment system is both interoperable and interconnected.

For the purpose of brevity, the remainder of the guideline note will use “interoperability” as a generic term in the broad context of payment system development, which will include both interoperability and interconnection as previously defined. When it is relevant, the distinction between the two will be made clear.

A Framework for Measurement and Self-Assessment

The CGAP study on interoperability in Pakistan presents a three-step process for policymakers to more effectively assess the degree of interoperability in their respective payment environment. Taken in sequence, each step helps to clarify the range of issues impacting the interoperation of retail payment systems.

The importance of identifying use cases that will drive financial inclusion

The first step is to identify use cases relevant to the service the market is demanding (namely customers, and more importantly, the competitive and business dynamics of private sector players). When identifying use cases, the issues to be taken into account can be organized by the nature and needs of the market participants themselves.

The complexity of the relationships between private sector players will likely dictate the pricing and availability of services. Similarly, the forces of competition in the market (for example, first movers gaining significant market share) will also influence the service options offered to customers. From the viewpoint of customers, use cases would be driven by their needs and most likely related to other services, financial or otherwise, that rely on payments across networks. For example, agricultural value chains operating on a seasonal basis will drive payment volumes in areas that may or may not have sufficient digital payment infrastructure to support efficient payments across networks and platforms.

The level of interoperability will vary depending on which factors influence the use cases.

CGAP identifies the following variables to take into account:

- Accounts to and from which payments may be made (e.g. all bank accounts, card-linked accounts, basic accounts and mobile-enabled electronic money accounts);
- Payment instruments (and associated transaction type) used to affect a given use case (e.g. cash withdrawal as a specific use case in the category of the card payment instrument); and
- Channels used (e.g. ATM or agent).

There are many ways for a retail payment to be completed, using different infrastructure, instruments and payment types. The variables for each payment will most likely include the type of account (e.g. bank accounts versus electronic money accounts), payment instrument and channel used (e.g. ATM or agent). Two use cases commonly discussed in the context of MFS are account-to-account transfers using electronic money (e-money) and cash withdrawal at agents.

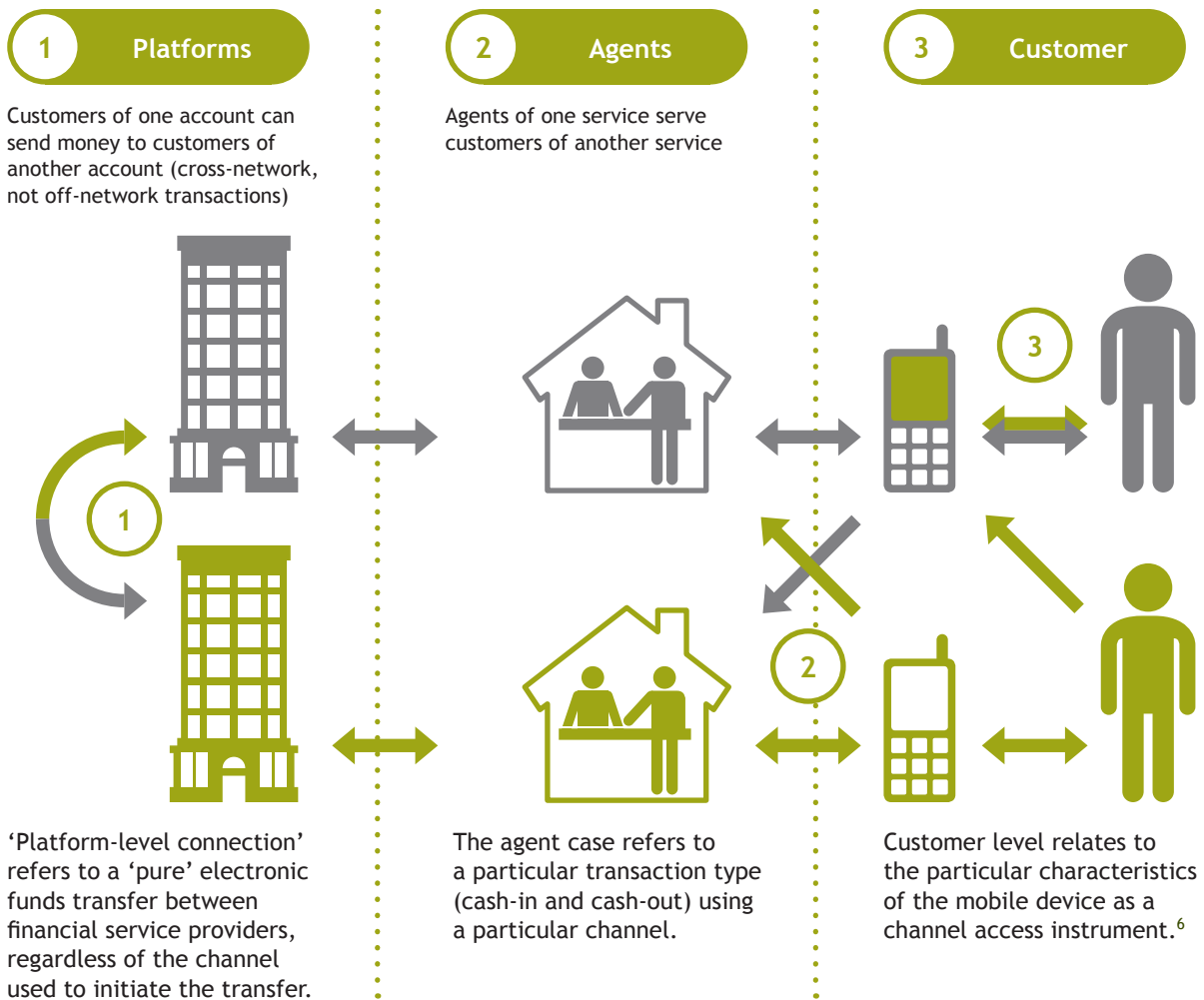
Various use cases will require different interoperability requirements at the technical level. Communication between different payment platforms must be conducted consistently to serve the customer well. Different use cases may also likely involve a variety of providers, and therefore different incentives, particularly when one provider seeks to leverage another provider’s payment infrastructure.

To accurately determine what actions are needed to address the technical and real-world business constraints keeping payments from being transacted across networks, it is important to identify and prioritize the use cases where change is needed. While there are numerous use cases that would benefit from improved interoperability or interconnection, not all would necessarily drive financial inclusion. For example, bank account-to-bank account transfers over the Internet, or use of an ATM to deposit cash into one’s bank account may not be priority use cases in a market with low penetration of bank accounts or limited Internet connectivity.

CGAP provides another example of the different contexts in which the use case for retail payments can arise. Figure 1 illustrates three use cases relevant to MFS.⁵

⁵ Kabir Kumar and Michael Tarazi, January 9, 2012, “Interoperability and Branchless Banking in Mobile Money,” CGAP Blog. Available at: <http://www.cgap.org/blog/interoperability-branchless-banking-and-mobile-money-0>

Figure 1: CGAP Interoperability Framework



Tanzania: Interconnection at the Agent Level

Tanzania’s remarkable growth of cash-in/cash-out (CICO)-based mobile-enabled e-money services poses a particular challenge for both interoperability and interconnection, particularly at the agent level. The growth of mobile-based CICO in the country can be attributed to a highly competitive market in which four mobile network providers have actively invested in developing an infrastructure for servicing customers at agents. The result is that each provider has a sufficient number of clients to drive demand for transacting across networks.

Tanzania already enjoys relatively low transaction fees due to its competitive market. The Bank of Tanzania sees the ability to transact across networks as key to maintaining healthy competition and keeping prices low. However, implementation at the agent level has significant challenges. For example, all service providers must determine the value associated with allowing their competitors to transact on their infrastructure and then price products accordingly. As in the South Africa and Pakistan examples, pricing of “not-on-us” transactions can impact the usage of interoperable systems. Customers are likely to be sensitive to such pricing changes, particularly in a market where prices are already low.

Additionally, where providers can use their competitor’s infrastructure, in this case agents, they have less incentive to build or invest in their own agent network. Although Tanzania has good penetration of agents, there is still some way to go. Achieving interconnection of CICO services at the agent level highlights these trade-offs, many of which are business solutions that may or may not require policy intervention to achieve the desired outcome.

⁶ An example of customer-level interoperability is MTN Mobile Money in South Africa, which allows Vodacom customers to open MTN Mobile Money accounts on Vodacom SIM cards (i.e. regardless of the SIM card or the phone).

Conducting the Self-Assessment

Once a relevant use case has been identified, the degree of interoperability, and ultimately interconnection, can be assessed. This assessment can be done systematically to enable more effective comparison between use cases that share certain characteristics (e.g. similar infrastructure), and

to facilitate dialogue among peers in other markets. The table below defines five different levels of interoperability, with each level depicting a specific state of development, beginning with basic system functionality (theoretically interoperable) and ending with a fully developed payment use case (effectively interconnected).

Table 1: Defining the Five Levels of Interoperability of a Defined Payment Instrument

Level	Name	Definition	Requirements
1	Theoretically interoperable	System of one participant is capable of connecting to another.	Typically, the issuer must have a core electronic banking system.
2	Technically interoperable	Standardized interfaces exist for trustworthy message exchange between parties.	Standardized interfaces must be physically in place for exchange.
3	Functionally interoperable	Interfaces and systems function to required level of robustness.	Systems must be able to connect based on agreed standards and specifications (uptime, response time, etc.).
4	Interconnected	Business rules enable exchange of value between participants.	Agreements must be in place defining fees, rules and risks of the exchange.
5	Effectively interconnected	Interconnection achieves intended objectives (e.g. is not impeded by high fees or technical issues).	Effective interconnection requires that systems are not only interconnected, but are being used by customers. For example, low-income clients are not discouraged from using the service by higher costs or technical glitches.

Nigeria: A Tale of Two Use Cases

Nigeria provides some additional insights into the degree of interoperability versus interconnection across different use cases. From a policy perspective, the Central Bank of Nigeria (CBN) has mandated interoperability at the technical level for all card- and mobile-based payment channels. Although there are several independent switches in the market, all electronic retail payment transactions must connect via the central national switch, the Nigerian Inter-Bank Settlement System (NIBSS).

For mobile-to-mobile payment transactions, the most common use case is mobile-enabled e-money accounts, with which account holders can use their phone to conduct transactions. From a technical perspective, each provider with a mobile e-money product is connected to NIBSS and can facilitate transactions accordingly. However, for the customer navigating the mobile menu to make a payment across networks, interfaces are inconsistent. Menu options often do not appear or the process does not allow payment instructions to be completed.⁷ Given these conditions, the mobile-to-mobile payment use case could only be considered “Interconnected.”

In contrast, the EFT use case for bank-based account-to-account transfers is more fully interconnected. Bank account holders with access to the web platform⁸ offered by InterSwitch (an independent payment service provider and switch) can make payments to account holders at other banks and make a variety of bill payments. While the volume of payments across this platform is relatively low (because of the low number of account holders with Internet access in Nigeria) those customers can enjoy relatively convenient access and affordable electronic retail payment services. Given these conditions, the EFT account-to-account-over-Internet use case in Nigeria is likely to be considered “Effectively interconnected.”

⁷ Notably, pricing is not an immediate issue in Nigeria since the CBN sets the interchange fee.

⁸ www.quickteller.com

These levels are useful because they allow policymakers to improve the degree of interoperability of a particular use case (moving from one level to the next) by focusing on considerations specific to the needs of the stakeholders in question. Some of these considerations include provider incentives, customer pricing sensitivities, payment behaviors, informal alternatives and infrastructure reliability. The levels are additive since they depend on the previous one being in place, with each level likely requiring a different degree of focus on the considerations mentioned above. Therefore, improving the interoperability of the use case in question is an incremental process, exemplified by the evolution of global retail payment use cases that are effectively interconnected.

Defining the Scope of Measurement

The final step of the framework is to define the scope of the measurement, or the degree of interoperability “relative to what?” This allows policymakers to specify the target group intended to be impacted by improvements in interoperability and monitor market developments to identify whether changes occur. Without this measurement approach, policy or market interventions will either lack focus or will be difficult to attribute to specific outcomes, should they emerge. CGAP presents the following three ways in which the scope can be measured in Table 2.

Table 2: Scope of Measurement

1) Adult population:	2) Total number of accounts at authorized financial institutions:	3) Number of accounts qualifying for the particular instrument:
The proportion of interoperable accounts is relative to the absolute maximum number of adults in a given country. This method provides the broadest scope and will assess financial exclusion in a country where most adults do not have accounts (provided the instrument is meant to be used universally).	The proportion of interoperable accounts is defined in relation to existing accounts. This method separates the assessment of financial exclusion from the assessment of interoperability by considering only the number of accounts currently open at authorized financial institutions. ⁹	This provides a narrow measure of interoperability across platforms that offer the same instrument. This method assesses interoperability without reference to either financial exclusion or the pervasiveness of a given instrument. For example, when measuring card interoperability, only accounts with linked cards would be counted when determining the denominator. ¹⁰

Applying the Framework to the Case of Pakistan

The three steps discussed previously help to both clarify the context in which interoperability exists in a market and to develop a baseline from which interventions can be measured. The tables below apply this approach to Pakistan with respect to

three use cases prioritized by the State Bank of Pakistan.¹¹ This example can be examined to understand how various use cases compare across different aspects of the payment system. Table 3 describes the unique characteristics of the three use cases in question, while Table 4 applies an assessment of the level at which each use case is interoperable.

⁹ In practice, this measure would help shed light on whether interoperability is limited by the characteristics of the accounts themselves. For example, despite being tallied as an account, a bank account without a linked ATM card is inaccessible at an ATM; therefore, it is not interoperable in the cash-out at ATM use case.

¹⁰ Although this is the most direct measure, it may overstate the situation; if only 10% of population or one-third of bank accounts have associated cards, it may be less meaningful to state that the accounts of this tiny minority are interoperable.

¹¹ These findings were taken from research conducted in 2012. Note that use cases 2 and 3 essentially correspond with more defined versions of the agent-level and platform-level interoperability in the CGAP framework discussed earlier. It is our understanding that these findings are still relevant.

Table 3: Interoperability Use Cases Considered

		1. ATM withdrawals	2. Cash-in and out at agent	3. Electronic Funds Transfer (EFT)
A	Store of value (from accounts)	Card-linked bank accounts	Mobile e-money accounts	Any bank account
B1	Payment instrument category (how value is transferred)	Payment card	Credit transfer	Credit transfer
B2	Transaction type (application of discrete rules to instrument)	Cash withdrawal	Cash-in/out	Real-time electronic transfer
C	Channels used (to access instrument)	ATM	Agent	Mobile, PC, ATM

Table 4: Measuring Interoperability for Three Use Cases in Pakistan¹²

Layer	Name	Definition	% of accounts qualifying at each layer	
		ATM withdrawals	Cash-in and out at agent	EFT
1	Theoretically interoperable	100%	100%	All accounts at online branches only
2	Technically interoperable	100%	0%	46%
3	Functionally interoperable	100%	0%	46%
4	Interconnected	100%	0%	Accounts at the 20 1LINK banks that have signed IBFT agreement
5	Effectively interconnected	100%	0%	Same as 4, provided pricing is appropriate and not an impediment to service usage
	Total eligible accounts for instrument (Denominator definition 3 from Section C)	15,327,626	929,184	Mobile, PC, ATM

With the system of assessing and organizing payment use cases outlined in Tables 3 and 4, we can more easily determine where to focus policy interventions (assuming policy can effect the change in question). The Pakistan example (among others) shows that interoperability of retail payment systems is a complex endeavor, particularly for new services such as mobile financial services, which bring a new set of stakeholders to the table (i.e. mobile network

operators). Policymakers may find themselves in a balancing act, trying to drive market growth without constraining business incentives. This is a difficult process requiring a clear set of priorities to help assess the various trade-offs involved. The framework and language discussed in this guideline note are tools that can help policymakers and regulators discuss market context, prioritize objectives and engage the industry effectively.

¹² Final measurements require accurate data reporting by banks, which would have to be collated by the state bank. Consequently, in order to arrive at the initial indications, CGAP et al. used available data and made assumptions shown in Annex C of the published report. In part, this exercise illustrates the value of collecting the required data and conducting measurements over time.

Annex A: Member Survey

The survey below enables working group members to assess their respective markets, benchmark one another and ultimately engage in more in-depth discussions about possible solutions to shared challenges. The cells in green should be completed by following the instructions in each section.

Section 1: Market Readiness		Instructions: Read the statement below and rate its validity on a scale of 1 to 4. (1= Yes, 2= Somewhat, 3= Unlikely, 4= No)		
	Name	Rating		
1	There is a common understanding among key players in the financial sector of what interoperability means			
2	The central bank has played an important role in promoting interoperability in the past.			
3	Electronic payments are already highly interconnected in my market.			
4	Full interoperability creates challenges for the business models of some providers.			
5	For greatest efficiency and lowest possible pricing, my market ultimately needs one national switch.			
6	Achieving full interoperability of financial instruments is inevitable although it takes time.			
Section 2: Use Case Prioritization		Instructions: Label the following use cases 1, 2 or 3, based on your national priorities. (1= most important, 3= least important)		
	Name	Priority		
1	ATM withdrawal (card-based)			
2	Cash-in and cash-out at agent			
3	Account-to-account electronic ¹³ fund transfers (EFTs)			
Section 3: Level of Interoperability		Instructions: What level of interoperability are the three use cases in your market? (Yes, No, Unsure)		
	Name	ATM withdrawals	Cash-in and out at agent	EFTs
1	Theoretically interoperable			
2	Technically interoperable			
3	Functionally interoperable			
4	Interconnected			
5	Effectively interconnected			
Section 4: Intervention Needed		Instructions: Consider the questions below and indicate what intervention is required to further develop each of the respective use cases.		
	Name	ATM withdrawals	Cash-in and out at agent	EFTs
1	Policy intervention required	Yes/No	Yes/No	Yes/No
2	Business solution required (not policy relevant)	Yes/No	Yes/No	Yes/No
3	Both policy and business intervention required	Yes/No	Yes/No	Yes/No
4	No intervention required	Yes/No	Yes/No	Yes/No

¹³ Account-to-account transfers could be bank-to-bank, e-money wallet-to-wallet transfers, wallet-to-bank and bank-to-wallet.

About AFI Mobile Financial Services Working Group Guideline Notes

The AFI Mobile Financial Services Working Group guideline notes are based on the experience of group members and attempt to provide guidance on the definition of common standards, approaches, and practices for MFS regulation and supervision within AFI member institutions. The notes are not summaries of best practices nor do they propose new principles or revisions to existing core principles. Instead, they highlight key MFS policy and regulatory issues and identify challenges to be addressed. The definitions here are intended to complement rather than replace similar MFS definitions drafted by International Standard Setting Bodies (SSBs).



About AFI

The Alliance for Financial Inclusion (AFI) is a global network of financial inclusion policymaking bodies, including central banks, in developing countries. AFI provides its members with the tools and resources to share, develop and implement their knowledge of financial inclusion policies. We connect policymakers through online and face-to-face channels, supported by grants and links to strategic partners, so that policymakers can share their insights and implement the most appropriate financial inclusion policies for their countries' individual circumstances.

Learn more: www.afi-global.org

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