Financial Inclusion, Interoperability and Market Development in the East African Community

By

David Cracknell

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Bringing Rigour and Evidence to Economic Policy Making in Africa

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Abbreviations and Acronyms

AFI	Alliance for Financial Inclusion
AFR	Access to Finance Rwanda
AML	Anti-Money Laundering
API	Application Programming Interface
ATM	Automated Teller Machine
BFA	Bankable Frontiers Associates
BOT	Bank of Tanzania
BOU	Bank of Uganda
CBK	Central Bank of Kenya
CFT	Combatting the Finance of Terrorism
CPSS	Committee on Payment and Settlement Systems
EAC	East African Community
EFT	Electronic Fund Transfer
EMV	Eurocard, MasterCard, Visa
FSDK	Financial Sector Deepening Kenya
FSDT	Financial Sector Deepening Tanzania
FSDU	Financial Sector Deepening Uganda
GSMA	GSM Association
IPSL	Integrated Payment Services Limited
KBA	Kenya Banker's Association
KYC	Know Your Customer
MFI	Microfinance Institution
MMO	Mobile Money Operator
MNO	Mobile Network Operator
MSC	MicroSave Consulting

MTN	Mobile Telephone Networks
MVNO	Mobile Virtual Network Operator
NBR	National Bank of Rwanda
NFC	Near Field Communication
OTC	Over the Counter
POS	Point of Sale
PSD	Payment Services Directive
P2P	Person to Person
PSP	Payment Service Provider
PWC	Price Waterhouse Coopers
QR	Quick Response
RURA	Rwanda Utilities Regulatory Authority
RTGS	Real Time Gross Settlement
SSA	Sub-Saharan Africa
SWIFT	Society for Worldwide Interbank Financial Telecommunications
TIPS	Tanzania Instant Payment System
USSD	Unstructured Supplementary Service Data

Abstract

The digital finance revolution in East Africa contributed to a rapid evolution in financial services, and especially in mobile money-based services. Today, the ability of a customer to make end-to-end transactions from one provider to any other is assumed to be critical for continued rapid financial sector development. Interoperability is believed to promote financial inclusion by promoting greater and cheaper access to a wide range of financial services. This paper contributes to questions on the benefits of interoperability from an industry perspective, the anticipated value proposition for customers, and pricing structures. It establishes how interoperability has worked in practice across East Africa. From this perspective, it determines the factors that have influenced the success or lack thereof in interoperability and considers the impact of interoperability on financial inclusion. The paper looks to the future in assessing how financial technology can enhance interoperability. It presents lessons for Sub-Saharan Africa from East African financial inclusion, market development and interoperability. The paper closes with a discussion of what the research findings mean for future interoperability. In the absence of comprehensive data, the paper has relied upon extensive secondary research followed by discussions with 30 primary respondents. Regional and international respondents were drawn from regulators, policy makers, payment specialists, donors, and financial sector specialists. The study notes the impressive results in the value and volume of payments that can be derived from an interoperable platform, citing the evolution of Safaricom's M-Pesa and Equity Bank's digital banking platforms in Kenya. However, the findings question the assumed benefits of scheme interoperability, noting the limited interoperability achieved to date across East Africa, partly resulting from the commercial and competitive positions taken by industry participants. The position of regulators and policy makers is evolving as pressure to implement nationally interoperable platforms increases and the definition of interoperability evolves to include data and payment interoperability. Financial technology, in particular shared platforms, banking as a service, and cloud-based solutions can enhance interoperability, but policy needs to evolve to support these advances.

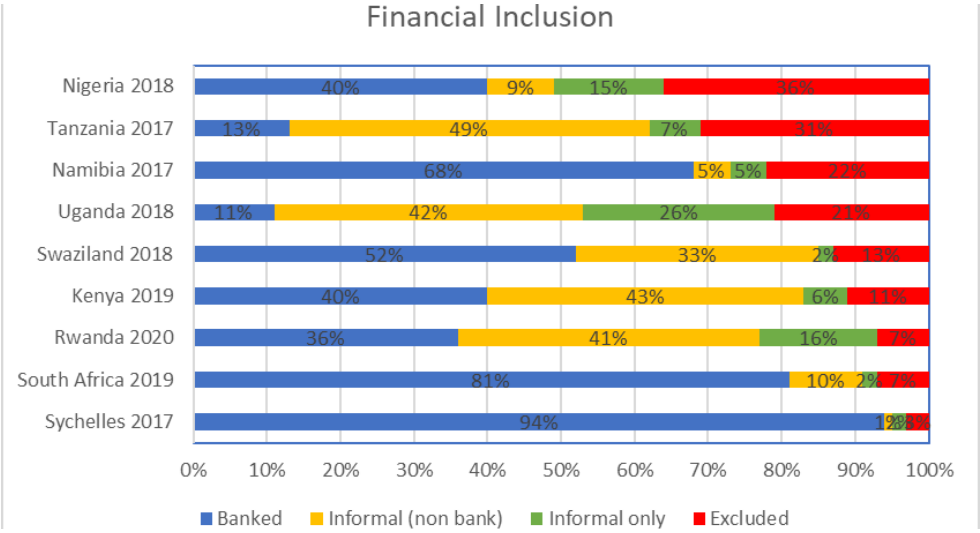
Keywords: Payment interoperability, digital interoperability, fintech ecosystem, digital finance ecosystem, payment regulation, financial inclusion, financial sector development, East African financial system.

1.0 Financial Inclusion in East Africa [1]

A generally-accepted definition of financial inclusion is that "individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way" (World Bank, 2018).[2]

Until recently, a greater focus has been on the volume and type of financial access. This has been expressed in financial access surveys as the operation of an account in either a regulated financial institution ("banked"), through mobile money, or a non-regulated institution ("informal non-banked"), or through informal mechanisms (typically savings groups, or table banking). The data in the table below is from the Finscope Rwanda survey in 2020 (AFR, 2020; 2021).

Figure 1: Financial inclusion in selected African countries



Source: Finscope data

The data shows high levels of financial access through formal channels: Kenya 83% in 2019, Rwanda 77% in 2020, Tanzania 62% in 2017, and Uganda 53% in 2018. Each of the financial inclusion studies notes the rapid growth of financial inclusion and the contribution of mobile money to financial access. As rates of financial access

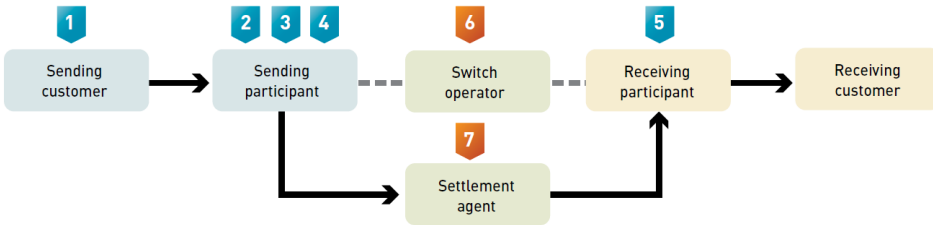
have increased, there is an increasing focus beyond access to financial services to defining and measuring financial inclusion. For example, the Global Partnership for Financial Inclusion states that "financial inclusion is measured in three dimensions: (i) access to financial services; (ii) usage of financial services; and (iii) the quality of the products and the service delivery", (G20, undated). Therefore, in considering the mobile money and digital finance revolution, there must be greater understanding of how consumers are benefiting and how the ecosystem is evolving to provide the quality services that people want to use.

The ability to move funds, from one account in the financial system to any other, whether in a wallet (a virtual account) or a bank account, is seen as a critical component in the evolution to cash-lite economies. The goal is to facilitate real time micro-transfers that are safe secure, conform to Know Your Customer / Anti Money Laundering / Combatting the Financing of Terrorism (KYC/AML/CFT)[3] norms, and are performed at a low cost. This is interoperability.

1.1 What is Interoperability?

Interoperability is defined by the global payment standard-setting body, the Committee on Payment and Settlement Systems (CPSS), as "a set of arrangements, procedures and standards that allow participants in different payment schemes to conduct and settle payments across systems while continuing to operate also in their own respective systems" (National Bank of Rwanda, 2014).

Figure 2: Digital interoperability



Source: Cook et al (2021)

NB: Describing the process of digital interoperability pictured in Figure 2: 1: A sending customer initiates a transaction; 2: The transaction is authorized when the customer confirms his/her identity; 3: The customer and account issuer authorize the transfer of funds; 4: The funds are debited from the customer; 5: The funds are credited to the recipient; 6: Payment information is transmitted by the switch; and 7: Settlement agent transfers funds between participants.

3 "KYC/AML/CFT" refers to Know Your Customer, Anti Money Laundering and Combatting the Financing of Terrorism rules that underpin the worldwide financial system.

Therefore, in the interoperable transaction, we have the customer, the customer's institution, the agent or third party accepting the transaction, a process of clearing funds, a process of settling funds, a third-party institution, and the recipient.

Consumers, however, have many ways to perform transactions across payment platforms. For consumers, how a transaction is completed matters less than cost, convenience, speed, and the security of the transaction being completed. This duality is recognized by Bankable Frontiers Associates (BFA) in their research on the success of Tanzania's mobile money interoperability, (BFA and CGAP, 2018) and by the Central Bank of Kenya in their "Payment Systems Vision and Strategy 2021-25", (CBK, 2021). It is a duality that also runs through this paper.

1.2 Why so much Focus on Interoperability?

As early as 2012, CGAP were focused on the projected benefits of interoperability. This organization stated "[a] robust environment of interoperability in payments systems benefits all participants in the payments ecosystem. End-users, including consumers, merchants, governments, and other types of enterprises, find it easier to make and accept payments" (CGAP, 2012).

The mantra has only become stronger with the digital finance revolution, though the messaging has become more nuanced with a greater focus on how interoperability is designed and implemented, guided no doubt by increased experience in implementing payment platforms (Nègre and Cook, 2021). A newer rationale has emerged for interoperability. This relates to the importance of interoperability for the developing digital ecosystems. This is the basis for open banking enshrined in the Open Banking Initiative in the UK, and the European Union's Payment Service Directive - PSD2 (European Commission, undated). It is increasingly reflected in regional policy (CBK, 2021). This paper will examine the perceived verses realized benefits of interoperability in East Africa.

1.3 Options for Interoperability

There are many ways that individuals can perform interoperable transactions. Nautiyal et al. (2020) defines seven options for interoperability, with increasing levels of formality. These are cash indirect (sending cash through a relative or driver), cash direct, multi sim, voucher, over the counter, bank transfer or directly through a mobile money platform. The study notes that for the consumer, factors that matter in deciding how to make a transaction include affordability, convenience, speed, avoidance of physical contact and security of funds. Each of these is said to have advantages and disadvantages, with the ideal solution said to direct interoperability between the platforms of mobile money providers and other financial institutions. At the level of providers, interoperability also differs depending on how the solution is structured. The connections can be bilateral or hub, settlement can be prefunded or clearing

based, governance can be full control or reduced control, the business model can be either based around processing fees, interchange fees or client surcharge, and dispute resolution can be consensus or arbitration, Nautiyal et al. (2020).

Each of these options for consumers and providers has implications. For the consumers, for providers, for the ecosystem, and for regulators and for policy makers. These implications will be explored in this paper.

1.4 Research Questions

This paper will examine research questions through primary and secondary research. The research questions being addressed include:

1. What are the benefits that industry experts anticipate from the best-case interoperability?
2. What are the expected customer value propositions for interoperability?
3. What are the price structures to the consumer and costs to the participating institution – how does this compare with alternatives?
4. How has interoperability worked in practice across East Africa – have industry benefits and customer value propositions been realized?
5. What are the factors that have influenced the success or lack of, of interoperability in East Africa?
6. What is the potential impact of interoperability on financial inclusion?
7. Can financial technology address some of the issues identified?
8. What can SSA economies learn from the East African Community (EAC) financial inclusion, market development and interoperability?
9. What do the research findings mean for future interoperability?

Primary research has been through individual interviews with industry respondents based mainly in the EAC region, drawn from digital finance, financial technology and payment industries, regulators, and policy makers. In most cases, respondents are identified by position, not name. This was done to encourage frank responses from the respondents. However, most opinions expressed in this paper have been provided by multiple respondents.

2.0 The Evolution of Payment Services in East Africa

While there is a renewed focus on interoperability to facilitate digital financial services and financial technology, interoperable payment services have a long history. At the level of the financial system, this includes a wide range of services and supporting infrastructure; for example, Automated Teller Machines (ATMs), debit cards and credit cards, electronic funds transfers, Swift[4] and Real Time Gross Settlement (RTGS) systems. The advent of mobile money and financial technology has added the ability to settle real time micro payments, and to provide additional interoperable use cases based around international and regional money transfers, merchant services, and shared agent initiatives.

Of particular interest from the perspective of ecosystem development is interoperability designed to facilitate transfers between mobile money providers (wallet-to-wallet), and between mobile money providers and financial institutions, the so called bank-to-wallet, and wallet-to-bank.

Data from East African central banks and communications authorities show the impact of mobile money, with millions of active mobile money subscribers each conducting between 10 and 15 transactions per month.

Table 1: Mobile money statistics (December 2020 unless otherwise specified)

	Kenya	Uganda	Tanzania[5]	Rwanda
Active subscribers (millions)	32.46	22.52	23.96	4.68
MM agents	264,390	235,790	560,063	131,173
Transactions per active subscriber per month (tpm)	13 tpm (Safaricom, 2021)	15 tpm (Uganda Communications Commission (2021)	10 tpm (Bank of Tanzania (2019)	12 tpm (National Bank of Rwanda (2021)

Sources: Communications Authority of Kenya, Uganda Communications Commission,

Traditional payment systems: The payment landscape across East Africa includes network of ATMs that are interoperable at country level. Not every ATM is on the national network. International interoperability is offered on some bank ATMs, those offering EuroCard, MasterCard and Visa (EMV)[6] interconnectivity. Regional banks offer

4 Transactions through the Society for Worldwide Interbank Financial Telecommunications.

Calculated from Bank of Tanzania statistics November 2019, available on https://bit.ly/3m9wWGB, accessed on 28th September 2021.

6 "EMV" is an industry shorthand for connectivity to the card associations – specifically, EuroCard, MasterCard, Visa.

ATM transactions through their regional networks. National clearing houses facilitate bank-to-bank electronic fund transfers and real time gross settlement. Merchant services are provided based around cards, and Point of Sale (POS) devices.

Mobile Money Operator interoperability: is often mandated by regulators in East Africa. Interoperability between Mobile Money Operators (MMOs) and banks, both push and pull transactions[7] is currently based on bi-lateral agreements and connections.

Systemwide interoperability: The intention of policy makers across the region is for systemwide interoperability, which facilitates end-to-end micro transactions. In Tanzania, this is the Tanzania Instant Payment System (TIPs), and in Rwanda through the Rwanda Digital Payment System. Kenya has implemented a new RTGS payment system that will handle up to one million transactions per day.

2.1 Payment Landscape across East Africa

Prior to the advent of mobile money in East Africa starting with the launch of M-Pesa in 2007, payment systems evolved gradually, and mirrored those operating in Western countries with ATMs and EMV-based card solutions. International transfers were handled through established international settlement mechanisms such as Swift. With the advent of mobile money and the digital banking revolution, the financial system is in a state of perpetual change. Change includes the diversification of the ecosystem to include mobile money operators, an array of third-party aggregators, and financial technology providers. Payment solutions, once the preserve of national clearing houses, are now being provided on a bilateral basis through payment service providers. Table 2 describes the payment landscape in East Africa.

7 A push transaction is where the payer initiates the transaction, a pull transaction is where the payee initiates the transaction.

Table 2: The payment landscape across East Africa

	Kenya	Uganda	Tanzania	Rwanda
Interoperable ATMs	Kenswitch, SACCO-link	Interswitch	Umoja	R Switch
Interoperability	Mandated (USSD)	Mandated	Mandated	Mandated (2014)
Wallet-Bank-Wallet	Bi-lateral	Bi-lateral	Bi-lateral	Bi-lateral
Bank-Bank	PesaLink, EFT, RTGS, SACCO Link	EFT, RTGS	EFT, RTGS	EFT, RTGS
Merchants	Bank and MMO	Bank and MMO	Bank and MMO	Bank and MMO
APIs[8]	M-Pesa, Airtel 5 Banks	MTN, Airtel 0 Banks	Vodacom, Airtel 0 Banks	MTN, Airtel 0 Banks
Cross border mobile money	Bank, Money Transfer, Bi-lateral MMO and fintech solutions	Bank, Money Transfer, Bi-lateral MMO and fintech solutions	Bank, Money Transfer, Bi-lateral MNO and fintech solutions	Bank, Money Transfer, Bi-lateral MMO and fintech solutions
Cross border ATM	EMV, regional bank	EMV, regional bank	EMV, regional bank	EMV, regional bank
Shared Agents	Small schemes, non-exclusivity	BAU shared agents Non-exclusivity	Non-exclusivity	Non-exclusivity

Sources: Author's observations

API Application Programming Interface, EMV EuroCard, MasterCard, Visa. EFT: Electronic funds transfer, MMO: Mobile Money Operator, RTGS: Real Time Gross Settlement. USSD Unstructured Supplementary Service Data

2.2 Interoperable Channel Usage

Most customers access services through their own financial institution or their mobile money provider's infrastructure. Table 3 provides an indication of the extent to which interoperable channels are used.

8 Based on available literature and website reviews.

Table 3: Usage of interoperable channels

	Kenya	Uganda	Tanzania	Rwanda
Interoperable ATM	Used moderately	Used infrequently	Used infrequently	Used infrequently
Wallet-Wallet	Poor take up	Poor take up	Extensively used 30% of transactions	No interoperability
Wallet-Bank	Extensive M-Pesa and partial Airtel	Relatively extensive MTN, partial Airtel.	Bi-lateral	Bi-lateral
Bank-Bank	PesaLink operating but at relatively low volume	EFT, RTGS	EFT, RTGS	EFT, RTGS
Platform	M-Pesa ecosystem. Eazzy24/7 BaaS (SACCOs)[9]	n/a	n/a	AMIR/AFR BaaS MFI platform (AFR, 2020)
# Debit Cards	10,844,565 (12/20)	n/a	9,145,240 (8/18)	471,898 (12/20)
POS devices	48,012 (12/20)	n/a	24,147 (12/18)	4,335
Merchant services	Higher usage	n/a	Growing usage	Limited use
Cross border mobile money	Bank, Money Transfer, Bi-lateral MNO and fintech solutions	Bank, money transfer, bi-lateral MNO and fintech solutions	Bank, Money Transfer, Bi-lateral MNO and fintech solutions	Bank, Money Transfer, Bi-lateral MNO and fintech solutions
Cross border ATM	EMV, regional bank	EMV, regional bank	EMV, regional bank	EMV, regional bank
Shared agents	Non-exclusivity not working at Safaricom agents	Some MNO agents operate for multiple providers Moderate use, but 'on us' systems primarily used	n/a	n/a

Source: Author's observations, and central bank websites

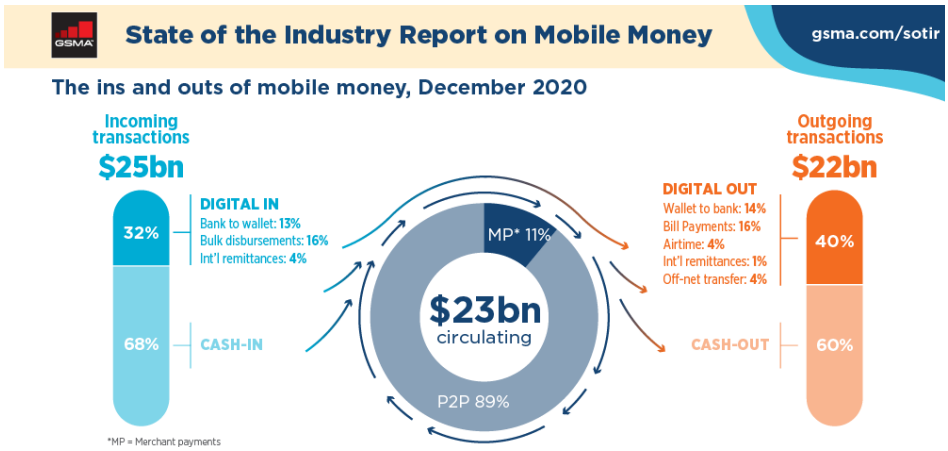
2.3 The GSMA on Mobile Money Interoperability

The GSMA State of the Industry Report 2020 (GSMA, 2021) provides an overview of the development of the global mobile money industry. Fund flows through mobile money providers are explored by GMSA. The GSMA graphic below shows incoming value of US$ 25 billion, outgoing transactions of US$ 22 billion, and a growing ecosystem with

9 As at the time of writing, SASRA is planning to introduce banking as a service platform for Kenyan SACCOs.

US$ 23 billion circulating in the system through Person to Person (P2P) transactions, and a growing base of merchant payments.

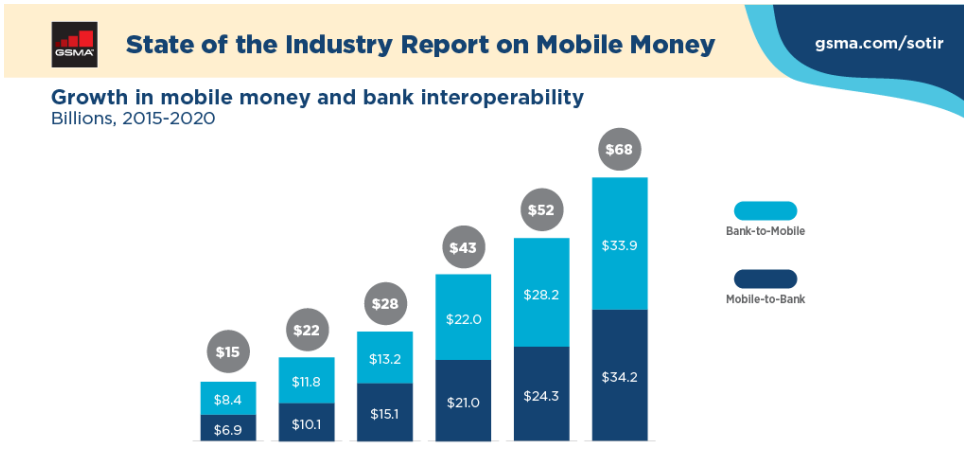
Figure 3: Worldwide mobile money flows, December 2020



Source GMSA (2021), State of the Industry Report 2021 (graphic used with permission)

The ecosystem is of particular interest, given circulating digital value drives interoperable transactions. Transactions between mobile money and bank accounts represent 13% of value in and 14% of value out. Interoperability between mobile money and banks has increased from US$ 15 billion to US$ 68 billion from 2015 to 2020. Given that over US$ 2 billion is transacted through Mobile Money Operators (MMOs) worldwide daily, a considerable value remains within the ecosystem circulating between persons and merchant payments.

Figure 4: Interoperability between mobile money and banks



Source GMSA (2021), State of the Industry Report 2021 (graphic used with permission)

Intra-mobile money transactions are not separately identified in the GSMA report; these will be significant but are captured under person-to-person transactions.

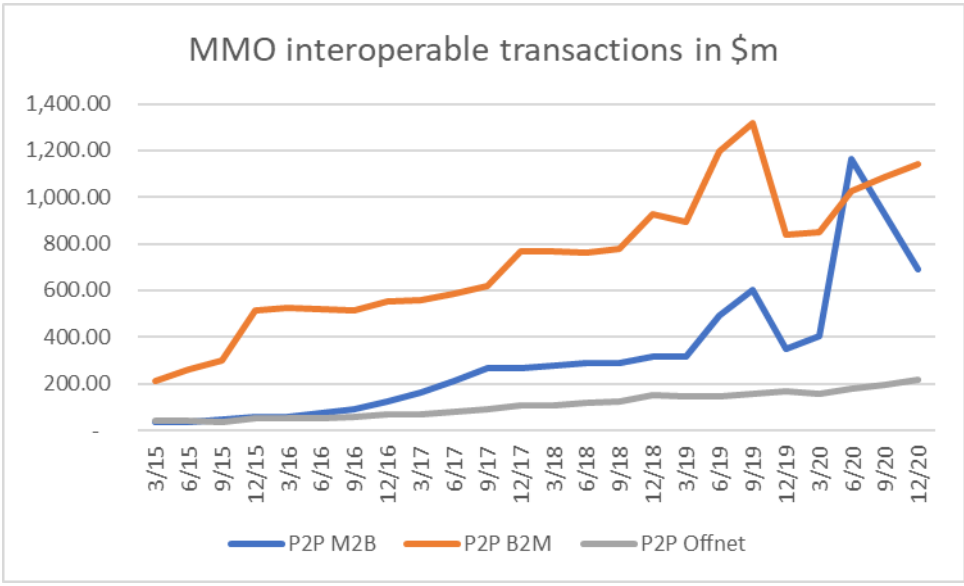
2.4 Data on Interoperability in East Africa

Data on interoperability is limited. GSMA provided some data directly from mobile money operators in East Africa. The data is aggregated at regional level and is provided quarterly from 2015 to 2020. Figure 5 and Figure 6 below consider the value and volume of mobile money to bank transactions (P2P-M2B), bank to mobile money transactions (P2P-B2M), and mobile money to mobile money transactions (P2P offnet)[10] in East Africa.

Given the level of aggregation, only high-level interpretation is possible. However, the following can be surmised. There is a growing importance of bank to mobile transactions as banked customers refill their mobile wallets from their bank accounts. Transactions in the first half of 2020 are different, particularly in the value of wallet to bank transactions. The reason for this trend is unclear, but it is likely to reflect mobile money usage for retail transactions during the early stages of the COVID-19 pandemic. In this case, retailers accept mobile money payments, which are accumulated and sent to the bank periodically. This accounts for a spike in the value of wallet-bank transactions and a more modest increase in the number of wallet-bank transactions. There is limited mobile money interoperability in Uganda, Kenya, and Rwanda (as discussed in the country profiles), which implies the offnet transactions are largely reflective of mobile-mobile transfers in Tanzania.

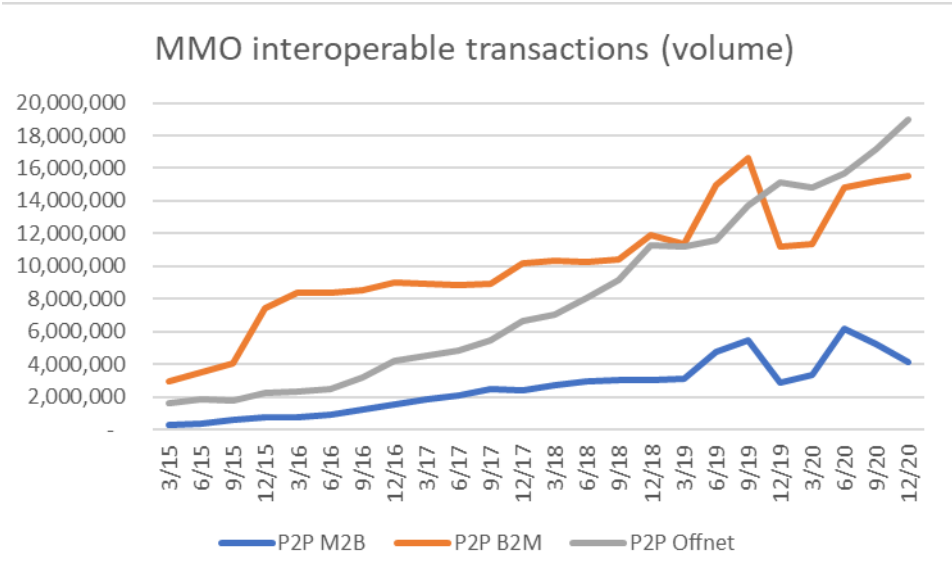
10 "Off-net" refers to the mobile money network, not the Global System of Mobile Communications (GSM) network. An "off-net" recipient may be on the provider's GSM network but is either not formally registered on the mobile money network or may be a customer of a different mobile money scheme (GSMA – 2013 Global Mobile Money Adoption Survey).

Figure 5: MMO interoperable transactions in East Africa in US$ millions



Source: GSMA

Figure 6: MMO interoperable transactions in East Africa (volume)



Source: GSMA (2020)

According to GSMA, there were an average of 27 banks connected to MNOs during the period 2015-2020. Safaricom, which connects to most Kenyan banks, will account for majority of these inter-connections, though the actual data was not provided.

Q1. What are the benefits that industry experts anticipate from best-case interoperability?

The conventional view is that for customers, interoperable digital payments offer customers' funds, in real time, on systems that are continuously available, which are channel agnostic, which support transactions, which are often low value and high volume (Benson and Loftesness, 2013) state:

> "A robust environment of interoperability in payments systems benefits all participants in the payments ecosystem. End-users, including consumers, merchants, governments, and other types of enterprises, find it easier to make and accept payments" (CGAP, 2013).

The Bank of Tanzania (BoT) reinforces this perspective. It regards the "potential benefits offered by interoperability of financial services including ease of payment, fast, cost effective and secure means of payments" (BoT, 2021).11

Similarly, a lack of interoperability is seen as a problem. The Kenya's National Payment Vision and Strategy states the "lack of interoperability between different stores of value means that businesses require multiple devices for multiple channels" and "[a]s with businesses, the government is affected by the lack of interoperability between stores of value," and "closed loop payment systems and bilateral agreements between PSPs creates a lack of transparency (CBK, 2021).

Advocates of interoperability in East Africa point to the increased volumes of transactions resulting from interoperable platforms, usually quoting the example of Tanzania's mobile money interoperability, where over 30% of transactions take place between different mobile money operators. However, interoperability supports an increasing range of transactions which includes:

a) Person to person transfers across networks (wallet-to-wallet transfers);

b) Remittances between financial service providers, fintech firms and MMOs;

c) Bank to wallet and wallet to mobile transactions, which in turn fund merchant transactions; and

d) Electronic commercial transactions requiring payments across platforms.

Interoperability is often considered in terms of payments. However, interoperability of data is becoming increasingly important. This underpins the value addition of the India Stack (India Stack, 2021) and the working of interfaces between institutions through switches and Application Programming Interfaces (APIs).

However, the case studies to follow demonstrate how interoperability is achieved is important in stimulating competition, developing new products and services, or "use cases", and supporting equitable access to the payment system. The case studies and respondent comments highlight that "best case" interoperability is extremely difficult to achieve in practice.

Bank of Tanzania - BoT (2021) webpage - https://www.bot.go.tz/PaymentSystem/Initiatives, accessed on 24th September 2021.

Q2. Projected value propositions from interoperability

Value propositions focus on customers. In 2017, William Cook put forward three hypotheses for the value of interoperability for consumers (Cook, 2017). These were:

Hypothesis 1: Interoperability encourages existing customers to transact more

In best case examples, this appears to be the case. BFA and CGAP (2018) carried out research on mobile money interoperability in Tanzania. From a survey of 1,024 telephone interviews, they found that over 838 customers had used mobile money interoperability during the last year. They noted that where interoperability works well, users find it fast, convenient, cheap, private and that it avoids problems with agents related to the availability of float.

They noted that scheme interoperability does not eliminate alternative forms of interoperability. They found that over the counter transactions through agents were still common, 327 surveyed customers had used alternative forms of interoperability in the past 12 months. In aggregate, BFA found that interoperable P2P transactions had grown from 5% of volume and value of transactions since Vodacom joined in 2016 to 28% of all transactions by volume and 26% of all transactions by value.

Hypothesis 2: Interoperability promotes new ways for users to transact

This appears to be the case. Interoperability is at the heart of certain products and services. In particular, the ability of customers to top up e-float from bank accounts greatly facilitates merchant services and encourages e-commerce more generally. Agent interoperability has enabled agents to efficiently manage their float. The promotion of digital finance during COVID-19 has seen a significant increase in small businesses signing up to receive payments through mobile money merchant platforms.

Hypothesis 3: Interoperability expands access to digital financial services

It is easy to see that “Absent interoperability, customers create workarounds to transact that often are difficult and costly. Examples include maintaining accounts with several providers, using an agent to intermediate, and reverting to cash” (Cook et al., 2021). However, it is more difficult to see how much interoperability drives access (BFA, 2021).

Q3. What are the price structures to the consumer and costs to the participating institution – how does this compare with alternatives?

Pricing of financial services is both an art and a science (Cracknell and Messan, 2006), representing the requirement to balance the interests of different stakeholders, cover costs, and generate profits. Customers want lower fees and instant transfer of funds. Mobile money operators and fintechs achieve profits by maximizing transaction income and maintaining low costs. Scheme managers and switch operators need revenue to cover their costs and provide profits.

Payment participants are keen to reinforce the perception that prices are fairly determined:

> "*The prices, according to banks interviewed, are set individually largely based on costs incurred in the transactions, third party costs, recovering investments made in setting up the systems while others will factor in convenience fees. Convenience fees factor in what one would have otherwise paid to physically walk into a bank to make a withdrawal or use an Automated Teller Machine*". MobileMoney Africa (2021)

Fees to scheme participants include switch fees (typically support fees, connectivity fees, onboarding fees and transaction fees) and scheme fees (typically legal fees and transaction fees). In addition, interparty fees can be set which seek to compensate parties for their existing or future investments in infrastructure.

However, the pricing picture is usually complex. The CBK (2021) highlights a lack of transparency in market-based payment systems:

> "*The benefits of digitisation of payments are yet to be fully passed on to customers. Prices and tariffs of some payment services are high in relative terms, while others are too complex to be understood by the average consumer. Further, where institutions utilise payments rails, services are availed to end-consumers with multiple charges. The inability to put in place effective and easy-to-access mechanisms to address price related complaints, particularly on digital channels, has undermined trust".*

There are multiple motivations for pricing financial services. Cook et al. (2021) note that participants may be motivated to cover costs, recover lost revenue, or to strategically protect their network. Llewellyn and Drake (2000) note how pricing financial services influences consumer behaviour.

Pricing is used strategically. In 2014 "Equity Bank doubled service charges for over-the-counter withdrawals in a bid to decongest banking halls and direct customers to alternative channels such as ATMs and mobile banking" (Business Daily, 2014). In Uganda, MTN and Airtel appeared to set premium prices for cashing out across networks, perhaps to encourage customer loyalty. However, off net transactions were

valued by customers, and pricing of cash out across MMO providers in Uganda was perceived by customers as very expensive (Friends Consult, 2017), a factor that directly contributed to the use of agent-assisted transactions, bypassing direct interoperability.

In a similar vein, Richard Mutabazi, posted on Twitter:

> "*@MTNRwanda, and Banks you are not helping the @RwandaGov agenda of cashless economy by charging clients push and pull fees that are way higher than withdrawing from ATM or Momo Agents. This needs to be resolved" MobileMoneyAfrica (2021).*

Pricing is made more complex through taxation. Uganda in July 2018 and more recently Tanzania in September 2021 implemented mobile money taxes. In Uganda 0.5% tax was charged on amounts withdrawn and in Tanzania taxes between Tsh 7 and Tsh 7,000 are charged depending on the amount transferred or withdrawn. Depending on how the taxes are applied, they have been shown through qualitative studies to influence consumer behaviour. For example, in Uganda, the tax encouraged a shift in transactions towards agent banking (UNCDF, 2021). In particular, the study noted that taxation was regressive, having a disproportionate impact on customers who did not have a choice in their transaction mechanism.

At the same time, as pricing being used as a strategic tool to influence customer behaviour, pricing is also culturally and market-specific. Arguably, the transition of Equity Bank in 2002 from monthly fees to transaction-based fees (Wright and Cracknell, 2007), helped to acclimatize the Kenyan market to fee-based payment services. Similarly in Rwanda, many accounts offering free services, making it more challenging to introduce fee for service products.

The market-based, strategic reality of pricing, and the challenges it represents, is recognized by regulators:

> *"The CBK is determined, working with the industry, to change this reality and ensure that benefits of digitisation translate to affordable, transparent, and customer-centric payment services. The main initiative will be the gradual roll out of pricing principles that were introduced by the CBK in December 2020 across the payment's ecosystem" (CBK, 2021)*

A further factor in pricing may be the nature of the institutions themselves. The GMSA notes in its State of the Industry Report (GSMA, 2021), that MMOs over-rely on customer fees.

> *"In the medium to long term, revenue models must diversify to become more resilient. As the mobile money industry matures, revenue sources should also evolve and expand. In June 2020, respondents to the Global Adoption Survey reported that, on average 87 per cent of their revenues were generated by customer fees. A downside of heavy reliance on customer fees is greater exposure to future short-term shocks."*

Commercial banks, however, generate income from investments, in their loan portfolio and on their transactions. Their strategic reality, and therefore their pricing motivations, are different from those of MMOs, which are highly sensitive to changes in transaction pricing.

A final factor in pricing is the need to encourage remote access and financial inclusion, specifically in the provision of rural financial services. Rural financial services are considered much more expensive to provide and generate fewer returns than urban financial services, and there are significant challenges in liquidity management (Cracknell, 2021). Agent interoperability, both at the transaction and float level, are part of the solution, as offered in Uganda through the shared agents initiative of the Agent Banking Company (ABC).[12] However, an element of cross subsidy may be required.

Q4. How has interoperability worked in practice across East Africa – have industry benefits and customer value propositions been realized?

Interoperability in East Africa has a varied history, influenced by the attitude of policy makers and regulators and the nature of competitive markets in each country. In a 2015 study, Anderson et al. (2015) considered the attitudes of policy makers and regulators to interoperability and the supporting infrastructure for interoperability across the sampled countries. This analysis has been updated for East Africa.

Table 4 shows the regulatory attitude towards interoperability. Policy makers generally encourage, interoperability. All regional regulators have objectives in their national payment strategies to promote interoperability. Uganda's policy mandates that mobile money operators must be able to interoperate. In Rwanda, a draft 2021 law proposes a new provision that allows the Central Bank to impose interoperability - a set of arrangements, procedures and standards that allow participants in different payment schemes to conduct and settle payments across systems.[13]

12 See Agent Banking Company's website (2021) "About Us" available on https://bit.ly/3FhG9W3, accessed on 4th October 2021.

All Africa Blog Rwanda: "New Law Seeks to Enable Payment Interoperability", available on https://bit.ly/2YfErDs, accessed on 5th October 2021.

Table 4: Regulatory attitude towards interoperability

Country	Interoperability is mandated	Technical capacity for interoperability is mandated or MNOs must have a plan to interoperate	Interoperability is encouraged or permitted	Interoperability is not regulated
Kenya			X	
Rwanda			X	
Tanzania			X	X
Uganda		X	X	

Source: Author's observations

Table 5 shows infrastructure for interoperability. There is mobile money account to account interoperability in all markets except Rwanda. There are government-led switches pending in Rwanda and Tanzania.

Table 5: Infrastructure for interoperability

Country	MM Account to Account (A2A) interoperability	Government led National Switch or RTGS connect to process mobile money	Non-Government Third Party Providers (platforms or agents that provide interoperable mobile money services	Other
Kenya	X			PesaLink
Rwanda		Pending		
Tanzania	X	Pending	X	
Uganda	X			

Source: Author's observations

The following country case studies contain lessons for interoperability in Sub-Saharan Africa. Each has a covering theme which highlights potential lessons, but as will be seen, both failure and success are highly contextual.

a) Tanzania: A model for MMO interoperability

b) Kenya: Institution-led platform level interoperability

c) Rwanda: An active state role for interoperability

d) Uganda: Unintended consequences of MMO interoperability, and shared agents' successes.

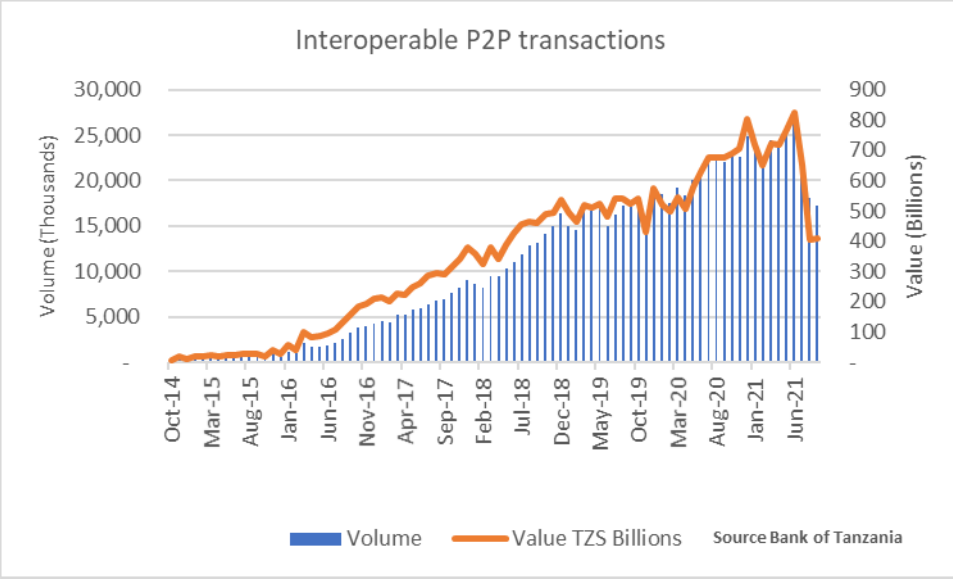
The country case studies follow a similar format, taking information which is available from secondary sources, and then discussions with key respondents. To encourage participation, frank discussion and objectivity, respondents are normally not named directly, but are identified by type of respondent.

Tanzania – a model for MMO interoperability?

The Tanzanian case illustrates how interoperability between mobile network operators can have benefits for consumers and for providers. However, it notes the specific circumstances that made this 'model' case possible.

In 2014, Tanzania became the first country to launch mobile money interoperability. It is often given as the most successful example of interoperability in East Africa (Cook, 2018), with many advantages accruing to customers (BFA and CGAP, 2018).

Figure 7: MMO interoperability in Tanzania



Cook and the BFA note that interoperable transactions account for approximately 30% of all P2P mobile money transactions. In addition, 60% of customers transact across networks. However, in an Alliance for Financial Inclusion (AFI) blog, Komba (Komba, 2016) notes that "Tanzania was well-suited to a market-based approach to interoperability, with its supportive central bank, conducive regulatory framework,

and a sufficient level of market competition and maturity." Specifically, Komba noted consideration of the value proposition of the private sector, and the public policy imperative of financial stability and financial inclusion in building the solution.

Komba's comments need to be understood in the competitive context of mobile network operators in Tanzania, and from the perspective of Tanzanian demographics. First, is market share; unlike in Kenya where Safaricom has a dominant market share of around 70% of voice traffic (Communications Authority, 2022). Voice market share is much more evenly distributed in Tanzania, with the three largest providers relatively evenly matched: Airtel with 26.8%, Vodacom 30%, and Tigo 25.6% (Tanzania Communications Regulatory Authority, 2021). Secondly, multi-sim usage is common. Historically, this was encouraged by patchy network coverage across Tanzania. A more recent study by Walwa (2019) notes significant multi-sim holding in Tanzania, encouraged by multi-sim handsets. He notes that multi-sim holding provides an incentive for MNOs to "improve network quality, promotional activity and customer care in order to win the customers' share of spend."

It is important to acknowledge the process of establishing interoperability. It involved the mediation of the Bank of Tanzania (BoT), facilitated by the IFC in an industry led interoperability project with financial support from the Bill and Melinda Gates Foundation and FSD-Tanzania (IFC, 2018).[14] The exercise began in September 2013 through meetings to create an understanding of the regulatory framework, market demand, payment systems and rule development. Wallet-to-wallet operating rules were developed, with interoperability commencing from February 2016.

The IFC study produced a lengthy list of learning points, which included: allow the industry to define the rules, have an industry champion, have a neutral broker, ensure everyone is speaking the same language, have a strong in-country manager, have a plan, and do not expect to achieve everything at once.

What Next for Interoperability in Tanzania?

The BoT is developing the Tanzania Instant Payment System (TIPS) (BoT, 2021). The BoT envisages the system will enable the Government, individuals, and businesses to transact with each other regardless of provider.

> *"TIPS will facilitate instant payments, easy connections by multiple participating institutions and low-cost payments. It will also provide a single national switch that will facilitate BoT oversight supervision of payment systems, improve financial inclusion through usage of electronic payments platforms and promote cash-lite economy" (BoT, 2020)"*

Golder Kamuzora from PWC Tanzania (Kamuzora, 2021) writes, "If successful, [TIPS] might be a game changer within the Tanzanian financial services industry,

IFC, "Achieving Interoperability in Mobile Financial Services", Tanzania Case Study, IFC available on https://bit.ly/3CX0Pke, accessed on 28th September 2021.

reducing transaction costs for consumers and potentially connecting millions of new customers with the banking system... Moreover, any instant payment or money transfer solution introduced to replace legacy solutions should be robust, adaptable, scalable, and extensible to keep up with upcoming technologies... In addition to being compliant to existing payment standards, these new solutions should also introduce new, open standards that will allow developers to innovate on top of the solution… the underlying infrastructure should include monitoring and logging features that can be used to detect and mitigate fraud, money laundering and other liquidity risks."

While Kamuzora (2021) is generally positive about TIPS, respondents from the industry and from the BoT note design issues that still need to be resolved:

Governance: During the pilot test, TIPS is being managed by the BoT. However, some participants would prefer to have TIPS run by an independent body. There are concerns that if TIPS remains housed within the BoT, it will lack the flexibility to provide wide ranging solutions through the platform.

Regulatory participation: Views on regulatory participation differ significantly, reflecting the complexity of interoperability in practice. Respondents from the BoT suggested that an assertive regulator had been important in bringing the industry together to participate in TIPS, and that banks and MMOs must be able to accept incoming transfers. Prior to an assertive regulator, there was a preference for peer-to-peer connections. Other respondents feel equally strongly that the market should determine how participants interoperate and not the regulator, for example:

> *"There are gaps in the market, and transfers can be challenging, but the regulator should be pushing the industry to reorganise itself; in the current plan, bringing innovation will be difficult. If the industry cannot come to agreement, then the Central Bank should provide guidance rather than intervene directly."*

Sustainability: In peer, or association-developed platforms, funding for development is often an issue. Respondents from the BoT were confident that resources would be allocated as required for platform development. They noted that it is intended to further develop the system to facilitate government payments and to link into the national identity database. Against this assertion of readily available funding is a history of extensive donor investment in Tanzanian interoperability.

Participation: The platform as currently envisaged is intended to only onboard regulated financial institutions and the MMOs. There is no provision for direct connection to TIPS for either financial technology companies or MFIs. They will need to be onboarded through a participant in the platform.

Innovation: One respondent noted that the role of different actors was often unclear in centralized platforms. The roles noted included leadership, driving product

development and innovation and ensuring effective competition. This required more than a technology solution; it needed to carefully consider the business case and how it was likely to evolve, the challenge of "getting it right without going back."

Pricing: Proponents of TIPS mention that being a public enterprise can have positive impact on the pricing of interoperability as the state is "not seeking to price for profit, but for sustainability." However, the pricing structures of TIPS are yet to be published, so it is difficult to judge at this point.

Operating difficulties: It will take time for all participants to connect to the platform, connections will be API led, and while technical specifications have been shared, most participants require their own funding and development to take place.

System constraints: According to a respondent from the BoT, it was noted that while many financial institutions initially preferred peer-to-peer connections, it was recognized that a network of peer-to-peer connections could become very expensive on their current platforms. Connecting to a central platform should create cost savings.

Kenya: Institution-led platform level interoperability

Kenya's mobile money revolution has been extensively documented by Ndung'u (2021) and others. The Kenya Banker's Association led PesaLink[15] platform by Integrated Payment Services Limited (IPSL) is a further step in this revolution. An aspect less fully documented is the part that institution-led interoperability has played in this revolution. Notably, is how Safaricom has embedded an interoperable ecosystem through its M-Pesa platform, and how Equity Bank facilitated fintech interoperability through its Eazzy 24-7 platform.

The M-Pesa timeline (Safaricom, 2017) provides an indicative, though incomplete, timeline devoted to the development of the M-Pesa platform over its first ten years. The timeline shows:

- An initial focus on expanding agents and signing up customers;
- From 2008, a series of bilateral connections with financial institutions. This has evolved to wallet-bank-wallet relationships with 29 banks and 5 deposit taking microfinance institutions;[16]
- Cash-out through institutional relationships and through ATMs via vouchers;
- An expansion of bill-payment relationships;
- The launch of MShwari loans in 2012;
- The launch of Lipa na M-Pesa merchant services in 2012;
- The launch of the M-Pesa Application Programming Interface in 2015; and
- The launch of an upgraded developer Application Programming Interface in 2017.

15 IPSL (2021) "Home page" available on https://bit.ly/3AbiN0e accessed on 4th October 2021.

16 See Safaricom's website for updates https://bit.ly/2XQuPPs, accessed on 27th September 2021.

The initial wallet-bank-wallet connections were made through direct bilateral connections. Through the launch of successive APIs, Safaricom has underlined its intention to facilitate connections to its ecosystem and its customer base. This commitment to interoperability predated the commitment made by the CBK in its 2021-2025 National Payments Vision and Strategy (CBK, 2021) to introduce open APIs in the banking system.

Through its own platform, Safaricom has created platform-level interoperability. Safaricom's 98.9% mobile money market share (Communication Authority, 2021) and its developer API ensures that M-Pesa's Lipa na M-Pesa is integrated into government payments, e-commerce, and almost all fintech-based services.

When PesaLink was launched in 2017, it was billed as a collective banking sector response to M-Pesa (East African, 2017). PesaLink by IPSL is an initiative of the Kenya Bankers' Association (KBA). It is a real time payment gateway for over 6 million banked customers, offering immediate value transfer for customers, and same day settlement for participating institutions. From launch to end 2020, KBA reports over Ksh 360 billion in value transferred since commencement, doubling from Ksh 180 billion reported to end 2019.[17] As of 2021, IPSL intends to launch PesaLink 2.0 and intends to make PesaLink interoperable across banks, telcos and fintechs, to offer additional non-switching services, and engage with fintechs to facilitate the bank transformation agenda (Kenya Bankers' Association, 2021).

From the banking sector, Equity Bank has been leading the digital banking revolution, closely followed by Kenya Commercial Bank. In its year end 2020 investor brief Equity Group Holding, 2020) counted 874 million transactions through its digital and payment channels, compared to 38.5 million transactions through its branches and ATMs.

Equity developed its range of digital services through its fintech subsidiary, Finserve, in 2018 (FinServe Africa, 2021), facilitated by its Mobile Virtual Network Operator (MVNO) Equitel,[18] and its award-winning app, Eazzy247.[19] Finserve developed the Jenge gateway, which accepts payments from 180 countries, including EMV, mobile money and international digital wallets such as PayPal, Alipay and WeiChat. The Jenge API allows fintech's to incorporate Jenge payments into their products and services (Techweez, 2018).

In 2021, the Harvard Business Review recognized that Kenya is becoming a global hub of fintech innovation (Chitavi et al., 2021). It specifically acknowledged two institutions, namely, Safaricom and Equity Bank. However, while Kenya is becoming

17 For 2019 data on PesaLink see Kenya Bankers' Association (2020) "Turning Points – Annual Report and Financial Statements 2019", available on https://bit.ly/3tPKXN5, accessed on 17th September 2021.

Equitel.com (2021), "Homepage", (webpage) available on https://equitel.com/my-money/ accessed on 8th October 2021.

19 Equity Banks Eazzy247 has won multiple banking awards, including those from Think Business. It won Best Bank in Mobile Banking in 2021.

a global hub of fintech innovation, as KBA acknowledges in its report on PesaLink, there is no end-to-end interoperability across the financial system. The Central Bank of Kenya (CBK) Draft National Payments System Vision and Strategy (CBK, 2021), stated that the CBK intends to enhance interoperability, in several ways:

1. "*CBK will facilitate interoperability across various payment systems, anchored on the vision, its principles, and its strategic objectives. This will enable users to affordably access their stores of value from different channels and providers to seamlessly pay for goods and services and to facilitate economic activities. CBK will work with industry stakeholders in order to outline the framework required to develop and implement the appropriate model, governance and infrastructure integration for efficient interoperability*". (Section 5.3.1)
2. "*CBK will develop, and where necessary review and adopt, common standards that can be used to enhance usefulness. The adoption of common user experience standards will make the use of various payment instruments easier to use. This will include standards and procedures on payments such as QR code payments. NFC payments, mobile push payments, domestic card payments and cashless withdrawals… this will include adopting the ISO20022 messaging standard for financial transactions".* (Section 5.3.3)
3. "*CBK will facilitate the emergence of effective interchange frameworks where it is required to enable or promote interoperability. For each payment stream and channel, an interchange framework may be needed to enable the continued financing of the acceptance infrastructure and the issuance of the instrument. Various models will be considered defining interchange fees and a strategic interchange fee model. Stakeholders' views will be incorporated to ensure that the outcome is not dominated by the interests of any one group or lead to anti-competitive practices*." (Section 5.3.4).

The CBKs stance is an indication that it intends to create an enabling environment for interoperability for a wide range of stakeholders, and that it is willing to become more interventionalist to do so. It is an implicit recognition that markets may not interoperate fully without intervention, and that the current status quo of interoperability through stakeholder-based platforms is not sufficient. It acknowledges the challenges inherent in defining interchange fees, and that there is the potential for anti-competitive practices.

Battle of the platforms

Competition between the platforms looks set to increase (Business Today, 2022). In January 2022, Equity Bank announced One Equity. This offers businesses a single

till number that allows customers to make payments via M-Pesa, Airtel Money, PesaLink, Equitel and the Eazzybanking app. It integrates QR code functionality, M-Visa, Masterpass, and Union-Pay. The One Equity solution enables businesses to collect payments directly into their bank accounts, and thereby avoid making multiple transfers from mobile wallet to bank accounts.

There are additional media reports (Business Daily, 2021) that the CBK intends to launch a national payment system, which will force Safaricom to accept cash from rivals through to the Lipa na M-Pesa merchant platform. The CBK reports that merchant payments were constrained through lack of interoperability, with growth expected to "continue increasing once initiatives such as interoperability are fully rolled out, allowing customers to seamlessly transact across the ecosystem irrespective of their provider".

Respondent views

Respondents commenting on the Kenyan experience noted the impressive ecosystem built by Safaricom. However, some industry respondents reported a "deliberate compliance with the letter of the regulatory guidance given rather than the spirit," the view was "how to protect your market position whilst complying with the regulator". As an example, the respondent noted that MMO interoperability was possible, but it was hidden in multiple menus. The nature of regulatory compliance may be a factor in the CBK becoming more assertive.

Other respondents noted the existence of vested interests, particularly among institutions that dominate the payment sector, which made progress very slow. "*In an ideal world PesaLink would be providing a wider range of services and would be providing equitable access to financial service providers and fintechs, with robust risk management in place*".

A further concern from a service provider, which was said to limit interoperability, was the extent of older (so called legacy systems) used in the banking sector. This suggests that the current infrastructure could not support significant modernization, with specific weaknesses in terms of cybersecurity and data centres.

Rwanda – An active state role for interoperability?

Pathways to interoperability differ, as indicated by Nautiyal et al. (2020). The Kenyan, Ugandan, and Tanzanian cases demonstrate interoperability through the evolution of markets as distinct from creating a national architecture for interoperability, which could be called interoperability by design, the best case of which is the so-called India Stack (India Stack, 2021). The India Stack visioned by Nandan Nilekani, the co-founder of Infosys, comprises four interoperable layers: an identity layer built on the Aadhaar

biometric identity,20 a payments layer, a consent layer, and a documentation layer. It connects over 1 billion Indians, and 339 million bank accounts.

In 2014, the National Bank of Rwanda mandated interoperability, publishing an interoperability policy (National Bank of Rwanda, 2014). The policy defined settlement through the RTGS, settlement through settlement banks, with irrevocable transactions, and with justified clearing models.

The vision for a cash lite Rwanda was reaffirmed in the "Rwanda Payment System Strategy – Towards a Cashless Rwanda 2018-2024" (National Bank of Rwanda, 2018). The payment strategy acknowledges that the legal framework needs to be updated, sandboxes need to be introduced, and enhanced consumer protection, data protection and cyber security are required. The strategy identifies significant shortfalls in point-of-sale infrastructure, the need for government digitization and financial education for consumers. To facilitate the transformation to cashless payments, the need for interoperability is restated, which includes APIs, data portability and labs, and accelerators for financial technology. Other institutions are to be onboarded to the national switch, and the real time payments system is to be upgraded. The cash lite vision is clear.

The interoperability blueprint for Rwanda was established in a "Business Plan for the Rwanda National Digital Payment System (R-NDPS)" (National Bank of Rwanda and Access to Finance Rwanda, 2018). The R-NDPS was envisaged as a platform to facilitate the processing and settlement of P2P transactions, send money, requests to pay, government collections, merchant payments, bulk disbursements and at a later stage to facilitate business-to-business and intra-agent transactions. The R-NDPS is further intended to facilitate access to the payment system to "non-traditional players" such as fintechs.

While the R-NDPS proposed architecture, operations and governance are set out in the business plan, initial discussions with industry participants were unable to establish the processing and interchange fees with different ecosystem participants backing different models. The plan noted that "further discussions with industry participants are required".

Despite strong policies and blueprints, practical interoperability has remained elusive in Rwanda, despite Parliament requesting the Rwanda Utilities Regulatory Authority (RURA) to enforce interoperability between MTN Rwanda and Airtel/Tigo (The New Times, 2021). The Governor of the NBR noted:

Unique Identity Authority of India (webpage), "Home Page" available on https://bit.ly/3iwN7wp, accessed on 4th October 2021.

> *"Currently, if you are a subscriber to MTN mobile money you are not able to pay a subscriber to Airtel money. When you have a digital payment channel in a given bank you can use it only for transactions in that bank," he added. "But, after we have linked those channels, you can have a product in a given bank and use it for payment through MTN, or Airtel network, Equity, BK among others".* Central Bank Governor, John Rwangombwa

Respondent views

Respondents on interoperability in Rwanda noted the central position of RSwitch in providing interoperability. It is Rwanda's only national payment provider. Respondents suggested that the limited progress on interoperability was, therefore, at least in part an outcome of a "payment bureaucracy". Nevertheless, other respondents noted that central pressure from policy makers and regulators could be effective in Rwanda, and that there is current market engagement on the go live process for interoperability.

Uganda: Unintended consequences of mobile money interoperability, and shared agents' successes?

The Uganda case study looks at the initial implementation of mobile money interoperability, the ABC Shared Agents Initiative and it introduces a new mobile money platform player – Wave Money.

Mobile money launched in Uganda in 2009, through Airtel, MTN, and Warid, and was quickly being used across the country. In 2013, the Bank of Uganda (BoU) produced mobile money guidelines (BoU, 2013), in which they mandated that "[m] obile money service providers shall utilize systems capable of becoming interoperable with other payment systems in the country and internationally, to facilitate full interoperability"(BoU (2013).

Mobile money interoperability

All providers enabled money to be sent across networks. This was described as sending money from a registered user to an unregistered user. However, instead of transacting across networks, many Ugandans preferred to conduct an Over the Counter (OTC) or agent assisted transactions.

The International Telecommunication Union (ITU) defined an OTC transaction as "a transaction that the agent conducts on behalf of a sender/recipient or both from either the sender's or agent's mobile money account" (Wright and Singh, 2016). The study found that OTC increases anti-money laundering and combatting the financing of terrorism risks, limits product evolution, locks providers into an indirect delivery model, reduces providers profitability and creates volatility in market share.

In 2017, FSD Uganda commissioned a study of mobile money operator interoperability in Uganda. The Friends Consult study (Friends Consult, 2017) was to ascertain the demand for interoperability from the perspectives of consumers and agents, the hinderances from a lack of interoperability, and ascertain willingness to pay for interoperability.

The study was of 2,000 Ugandans and 500 agents. It found that 48.6% of respondents were multi-sim, 57% had an awareness of interoperability, but only 18% had used network to network interoperability. A total of 98% of respondents said off net transfers were important. However, 90% of participants felt that sending across networks was more expensive than agent assisted transactions. Despite this, 69% were willing to pay a small premium for transferring across networks.

Most agents in Uganda were independently agents of MTN and Airtel: 96% of respondents were agents of MTN, 82% of respondents were agents of Airtel. Agents wanted to be able to top up e-float between networks but were unwilling to pay a premium for doing this, despite the significant costs already involved in rebalancing float. The most common need for interoperability was for P2P transfers. A voucher system was developed to enhance interoperability through agents.

In the Ugandan case, providers effectively discouraged interoperability through their pricing strategies; creating a customer value proposition that encouraged OTC transactions. This is despite the mandate to interoperate.

The GSMA, (Naji, 2020) then reported:

> "In 2017, the BoU acted swiftly on regulation announced four years earlier— the 2013 Mobile Money Guidelines—to mandate immediate interoperability between Mobile Money Providers (MMPs) over a period of a few months. This short timeline led two of the country's major MMPs to initially use an aggregator before connecting bilaterally in 2019. However, they continue to use third parties for interconnection with smaller MMPs."

The study failed to acknowledge earlier interoperable practices.

An industry respondent opined that while the MMOs are connected and money can be pushed from one provider to another, few customers do so. This is in part because the service is not promoted, and that moving money through USSD is not user friendly.

Shared agents

Uganda is unique in East Africa for launching a service to interoperate bank agents. The following information draws on a study for FSD Uganda by MSC "Making Elephants Dance" (MSC, 2021). Uganda passed amendments to the Banking Act in 2016, which led to the launch of agent banking. Initially, agent banking was launched by Centenary Bank, Stanbic Bank, DFCU Bank, KCB, and Equity Bank on closed loop systems. The Uganda Banker's Association (UBA), alongside a technology service provider, Eclectics International, formed a joint venture to facilitate shared agents,

titled 'The Agent Banking Company'. The premise for founding shared agents was to increase access through financial institutions, and to efficiently compete with mobile money operators, avoiding cost duplication.

As of the end of 2020, there were 10,600 shared agents (62% active), serving 19 banks, with a cumulative 4.6 million transactions, UGX 5.14 trillion (US$ 145 billion), serving 533,562 unique customers.

The benefits to the banks were said to be increased distribution network, scalability, interoperability of agents, and collective efficiency. It is anticipated that the platform may be used in future to connect financial technology companies and a range of competitive services through and to agents.

ABC has been supported by FSD Uganda. It established the business model, common pricing principles, customer services standards, and agent training. The study noted the high costs in establishing and training the agent network and integrating with diverse banking platforms.

The MSC study noted the following as the forces promoting competition and collaboration:

i) Remuneration, technology management, float management, branding and training for agents.

ii) The threats from new entrants - access to market, shrinking margins, new services and multi-banked.

iii) The threat from substitution, including shrinking margins, customer attrition, technology superiority, and product cannibalization.

iv) The `bargaining power of customers in terms of product pricing, customer service, high availability of services and deposit mobilization.

The achievements listed in the report include better service of underserved populations; reduced overall investment in infrastructure; enhancement of the agent banking model; enhanced operational efficiency; mobilization of deposits; and socio-economic benefits.

Industry respondents noted that ABC in practice has had more challenges than suggested by the FSD Uganda study. Paul Mbugua, the Managing Director of Eclectics the architects of ABC, noted the following challenges:

i) Integration and onboarding: Integration forced banks to pay vendors, and there were specific challenges for banks that were customers of certain vendors, which meant that they were restricted in their operation of ABC. Onboarding new banks could be difficult because banks usually have their own procedures for onboarding third parties.

ii) Tariffs: It was difficult to negotiate intra-bank tariffs, given that there were multiple charges to agree.

iii) Regulatory requirements: A range of regulatory requirements had cost implications, for example the requirement for printed receipts (not

required under mobile money) and the application of full KYC. Furthermore, flexibility will be required from the regulator to facilitate onboarding new services to the ABC platform.

iv) Challenges with go to market: Take up on the ABC platform was not uniform. Some banks were acquiring, other banks were acquiring and issuing. Agents can be active for multiple solutions (for ABC and "on net" transactions) with several POS devices. Every bank with its own agent network prioritizes marketing its own agents. MFIs cannot integrate directly and had to participate through a sponsoring bank.

Industry respondents noted a range of additional challenges:

Competition with on net solutions: Other respondents noted that banks have implemented ABC differently and have been influenced by the business case for bank. In particular, the banks with large customer bases had already implemented their own "On net" agent networks, which they encourage their customers to use.

Interchange fees: A respondent from a major bank, which provided many agents to ABC, felt the nature and amount of the interchange fee provided through ABC did not compensate for the significant investment the bank made in maintaining its agents.

Functionality: One respondent noted that there was always likely to be a patchwork of inconsistent implementation, given the competing commercial positions of the major banks, and that there needs to be a win-win for all the institutions that are using the platform. One way that this might be achieved is by adding 'use cases' that can be accessed by fully participating banks through the platform. As an industry participant opined, "the only way to disrupt the status quo is to create more services".

Paul Mbugua would agree with the desire to add more functionality to the ABC platform, and to extend use cases beyond "cash in" and "cash out". However, this exposes a major challenge in peer-to-peer platforms; the ability of owners to invest in their platform.

Another respondent opined that given the number of agents that were now in Uganda - c180,000 mobile money agents and 26,000 bank agents (of which 16,000 are ABC agents), there would be limited extension in new agents, so there needed to be a greater drive for all services to be provided through all agents. To do this may require new initiatives such as rolling out common float management and extending the range of banking transactions that agents could perform.

Operations: It was noted that ongoing investments were required in the back office, with several respondents noting that at the time of writing this paper, several institutions were choosing not to connect to the ABC platform due to potential financial exposure.

Investment: The ABC platform requires periodic investment to accommodate increasing transaction volumes in systems and staffing and increased functionality. But where are funds to come from? The ABC platform is owned by the Uganda Bankers' Association and Eclectics. Major investments could require funding to come from the Uganda Bankers' Association members, which could be a significant challenge

to organize. Mbugua sees a role for donors to invest in adding functionality to the platform, particularly where it could contribute to the goal of financial inclusion. Other respondents have opined that a third investor may be required, possibly the State, given that ABC is in part supplying a public good. A well-informed respondent noted the considerable value of ABC, but that there "*needed to be a long-term strategic vision for the platform*."

National Payments Act: Another respondent noted that, over time, greater alignment will be driven by the National Payment Act, opining "*however, we haven't got this far yet, everyone is fighting to protect their market share, telcos are now looking to expand their services into remittances*." He further noted that according to the National Payment Act that the technology would have to sit on servers operated by the BoU.

Regulatory attitude: Respondents, recognized the significant potential of the ABC initiative, but noted that to leverage the potential of ABC, the BoU would require more openness towards innovation, and that the BoU was currently focused on control rather than opportunity.

Wave Money – A Future Platform Player?

Wave Money[21] is a new entrant into Uganda, offering mobile money with a difference. Upon registration, users are issued with a QR code, which they can share to enable others to pay money into their account. Once verification is completed on signing up to the app, the QR code can be used to deposit funds into the account with no identification needed. Deposits are free if the user is depositing into their account, otherwise it is treated as a transfer from others, and a fee of 1% of the amount transferred is charged; withdrawals are free. At the time of writing, payment and remittance functionality is limited with only airtime purchase offered.

Ease of use, pricing, and that the app is agnostic of mobile network operator are attractive features. However, it will be the value-added services to be added to the app over time that will determine how disruptive Wave will be as a platform provider. Innovation is likely.

Q5. What are the factors that have influenced the success of interoperability in East Africa or lack of?

A study across 12 countries on instant payment schemes by BFA (BFA/DFI, 2022) ranked stakeholder views on outcomes judged three East African interoperability schemes[22] lower than many other schemes in the survey. The team from BFA judged scores against achieved offnet transactions, stakeholder assessments of whether the objectives of the scheme had been achieved and the actual and anticipated benefits to financial service providers and users. They judged the effectiveness for users in

For more details see the Wave Money website - www.wave.com

22 Specifically – mobile money interoperability Taifa Moja, Tanzania, Pesalink in Kenya, and mobile money interoperability in Kenya.

terms of accessibility, affordability, user experience, and use cases. This raises the question: what factors have influenced the success of interoperability in East Africa? The following appear relevant:

Willingness to invest: By far the most successful, interoperable platform in East Africa, is Safaricom's M-Pesa, even if that interoperability is at a platform level only. Safaricom does not publish spending on interoperability. However, Safaricom has significant ability to invest - its annual capex, across voice, data and M-Pesa of approximately US$ 35 million (Safaricom, 2021) - dwarfs investment levels in other interoperable platforms, which is reportedly typically around US$ 10 million to operationalize the platforms.[23]

National interoperability is seen through the lens of competitive advantage at an institutional level: Initial implementation around interoperability has been heavily influenced by strategic and commercial considerations, with Equity Bank and Safaricom building their own interoperable platforms and ecosystems, and MTN and Airtel's pricing of mobile money cash out transactions in Uganda. Even the success of mobile money interoperability in Tanzania can be seen through this lens, where there was a strong collective interest in interoperability among the major mobile money issuers. In the case of Ugandan agent banking, each of the major financial institutions has its own on-net network of agents, which it encourages its customers to use over the shared agent platform.

Institutional responses to mandated interoperability have often frustrated policy makers' intended impact: Regulators have often mandated interoperability, but results have been underwhelming. In Rwanda NBR (2014), in Uganda the ability for MMOs to interoperate was mandated (BoU, 2013), in Kenya mobile money interoperability was mandated and was launched on Unstructured Supplementary Service Data (USSD) only (CBK, 2018). However, simply mandating interoperability has not been sufficient to achieve widespread interoperability.

Donor investments have underwritten interoperability: Nationally, interoperable systems in developing countries are often partly donor-funded. TIPPs is supported by the Bill and Melinda Gates Foundation and is implementing its interoperable platform based around Bill and Melinda Gates Mojaloop.[24] The WAEMU digital financial services interoperability platform[25] is supported by the Africa Digital Financial Inclusion Facility, a project of the African Development Bank.

Inevitable duplication of costs through failing to optimize interoperability: "Today retail banking in East Africa services half the value of mobile money using three times the infrastructure. Banking technology is often implemented at sub-scale levels

23 According to respondents.

Level One Project, "Homepage", available on https://bit.ly/3DrjPYj (webpage) accessed on 8th October 2021

Africa Digital Financial Inclusion Facility, "WAEMU digital financial services interoperability platform" (webpage), available on https://bit.ly/3BnP3yI, accessed on 8th October 2021

for every use case and in every market, increasing cost and friction for payments. As scheme discussions progress across East Africa, shareholders should instead focus on driving economies of scale" (Cook et al., 2021).

So, what conclusion can we draw from this picture?

There is inertia and collective inaction, which is difficult to overcome: It is difficult to assess progress on interoperability without concluding that there is collective inaction whereby the financial sector and mobile money operators without encouragement fail to move forward. One respondent opined "there is a tendency to say – 'yes' in conferences and workshops, and then backpedal institutionally." The discussion then must explore how to overcome this inertia.

Industry lobbies: Proponents of interoperability are divided on how this should be achieved. Some argue for the continued role of the private sector and working with the private sector to negotiate between competing interests, to establish and promote areas of mutual advantage, and to offset potential losses through interchange fees. Therefore, out of this, there would be a protracted process of negotiation, and roles for a wide variety of stakeholders, including bankers' associations, GSMA, donors, policy makers, regulators, and regulator's forums. Emerging best practices, tools and guides are shared. This process can work, but it may be that it works easiest in less mature markets where competitive interests are less entrenched, and where legacy investments are smaller.

Regulatory assertiveness: This then sets the scene for increased levels of regulatory assertiveness. It is not clear whether the level of regulatory assertiveness is a result of frustration with regulatory avoidance, or collective inaction, or whether all avenues of negotiated settlement have been exhausted. Regulatory assertiveness takes two forms:

i) Kenya: Improving the ability to interoperate through the application of standards, APIs, and to control for misbehaviour.

ii) Tanzania, Rwanda: Interoperability through a centralized, regulator promoted, platform.

Q6. What is the potential impact of interoperability on financial inclusion?

There are multiple assumptions relating to the impact of interoperability on financial inclusion from increased availability of services, lower prices, and enhanced evolution of the financial sector. However, it is difficult to assess the benefits of interoperability.

Are the assumptions of the benefits of interoperability realistic?

Assumptions are made in relation to interoperability and financial inclusion, which relate to the projected benefits of interoperability, namely that interoperability increases competition, increases choice, and reduces prices. However, the extent and nature of the benefits realized must be documented. The GSMA stated:

> *"Understanding how an interoperable market can enhance domestic payment landscapes and contribute to broader socioeconomic objectives for financial inclusion and cashless economies will be essential to strengthening the business case for integrations between MMPs, banks and other financial system players. Once in place, assessing the impact of interoperability—domestically, regionally, and internationally—will require a concerted effort to measure and track progress"* (Naji, 2020).

Where there is information, in a competitive market, such as mobile money in Tanzania, transactions across networks have increased following interoperability. In the case of Uganda's shared agents, the ability to interoperate has enabled 19 banks to benefit from a network of shared agents. At the same time, the banks with the largest customer numbers all have their own agent networks, including many of the same agents.

Donors are currently trying to understand how financial inclusion has been enhanced by interoperability. The Bill and Melinda Gates Foundation has funded an ongoing study by BFA to examine 12 payment schemes across Canada, EU, UK, Kenya, Tanzania, Ghana, South Africa, Jordan, India, the Philippines, and Thailand. The questions the study seeks to address are:

1. Why interoperability? Is interoperability necessary for full financial inclusion? We shall be evaluating outcomes from various journeys.
2. What policy design features are relevant for achieving interoperability success? Where success is registered, what interventions were deployed? (e.g. pricing caps, common standards, mandated participation).
3. When should policy makers advocate for interoperability? What defines the right time – is it at the beginning, or should the market be able to evolve over time before intervening?

In terms of the link between interoperability and financial access, BFA noted that "Interoperability can be helpful for financial access – but it does not drive it."

The BFA study attempted to measure the propensity for financial inclusion across six criteria, namely: (i) entities with business models suitable for low end segment participation; (ii) entities with business models suitable for low end segment that is involved in rule making; (iii) accessibility – USSD access for non-smartphone users; (iv) valued extension of use cases beyond P2P; (v) accessible user experience; and (vi) affordability.

On these scales, the schemes in East Africa[26] were found to be mid-ranking but were outperformed by schemes designed with financial inclusion in mind, notably the UPI in India and Financial Inclusion Triangle in Ghana.[27]

Wallet to bank to wallet interoperability

The GSMA (GSMA, 2021) notes that there has been a four-fold increase in transactions between banks and mobile money operators between 2015 and 2020. However, the values involved, while significant at US$ 68 billion in 2020, are a fraction of the values transferred on mobile money at US$ 2 billion per day. But they noted:

> "*This type of interoperability not only provides better access to the formal economy for the underserved and financially excluded, but also helps to prevent two tier financial systems, or even parallel economies from becoming entrenched. It is therefore important that integrations between banks and mobile money providers continues to be encouraged and strengthened*" (GSMA, 2021)

Evolution of the financial system

Missing from discourse to date is seeing interoperability as a vital component in the evolution of financial systems and specifically fintech facilitated products and services. Cracknell and Wilkinson (2021) observe an evolution in digital finance in Africa, which flows through the following generic stages.

i.) Channels: The establishment of mobile money and usually agent banking. Agent-assisted onboarding of customers is assisted by digital/national identity systems. The launch menu of products and services is similar and focuses on Cash-in and Cash Out (CICO), P2P, bill payment, and airtime top-up. The core agent ecosystem is established, and there is an intensive focus on customer onboarding.

ii.) Channel based products: In this phase, channel-based products drive not only the volume of transactions but increase the value of transactions. These products include nano-credit, betting, remittances, merchant services, and pay as you go solar power. The services are market-specific. Interoperability can help determine which products and services establish themselves. Safaricom's extensive, early bi-lateral interoperability boosted its merchant services.

iii) Fintech: micro-payment interoperability is important in the evolution of national financial technology industries. The ability of fintechs to connect efficiently to the financial sector through interoperability, third party aggregators, and open APIs facilitates the volume-based business case that drives financial technology. There is a rapid expansion in use cases at this stage.

26 Schemes considered were mobile money interoperability and Pesalink in Kenya, and mobile money interoperability in Tanzania.

27 Findings presented at a DFI/BFA Webinar on 20th April 2020.

iv) Platform-based services: This stage sees the development of highly tailored technology facilitated financial, lifestyle and business services for groups, or businesses that are highly tailored. The clearest examples at the time of writing include those targeted at farmers, such as Safarcom's Digifarm (Safaricom, 2021c) and KCBs Mobigrow (KCB, 2021).

v) Fintech as a national asset: Kalifa (2021) describes Fintech as a national asset. In the Kalifa Review of UK Fintech, fintech represents the final observed evolutionary phase, where financial technology is driving policies towards investment, education, immigration, and skills development.

In this observed evolution, interoperability assists the development of channel-based products, and the emergence of strong local fintech industries, and supports the development of platform-based services.

Q7. Can financial technology address some of the issues identified?

Financial technology is already facilitating interoperability, and its role will grow as financial institutions in East Africa increasingly adopt digital finance. A range of technologies - open APIs, shared platforms, banking as a service, payments as a service, and cloud-based services are being and will be adopted by financial institutions across the region, particularly as technology results in reduced costs, and increased competition.

APIs: The CBK's National Payment Vision and Strategy 2021-2025 discusses the application of common standards for data exchange and the implementation of open APIs across the Kenyan banking sector. This implies that the cost of incremental interconnections between financial institutions and between financial institutions and financial technology providers should significantly reduce. Klienbaum (2020) expresses the potential benefits.

> *"In financial services, APIs are viewed as a potential means by which traditional financial institutions, especially small and midsize banks, could partner with upstart financial technology companies (fintechs) to offer innovat[ive] products, especially to low-income customers. These partnerships can create a symbiotic relationship: financial institutions have the regulatory approvals, infrastructure, and customer base that fintechs lack, while nimble, iterative, and product oriented fintechs can develop products quickly, which has been a historical struggle for banks."*

Shared platforms: Shared platforms will enable many small to medium-sized financial institutions to access cloud-based, perpetually updated, core banking solutions. These solutions can connect to Payment as a Service (PaaS) providers.

> "*While outsourcing of the full payments stack is a possibility, a new generation of technology providers has emerged allowing banks to expand quickly and modernize their payments product portfolio without incurring high upfront investment. Payments-as-a-Service (PaaS) players operate cutting-edge cloud-based platforms to provide specialized services, such as card issuing, payments clearing, cross-border payments, disbursements, and e-commerce gateways.*" (McKinsey Global Payments Report).

Cloud supported services: Shared platforms, Payments as a Service (PaaS), and Banking as a Service (BaaS), typically make extensive use of cloud-based services for storing data. This brings issues related to data residency, and potentially with data protection. Against this, cloud-based storage offers participating institutions access to benefits, including security, lower costs, flexibility and scalability, increased efficiency, faster product development, and consumer insights (The FinancialBrand.com (2021).

Digital ecosystems and interoperability: While the technology to support interoperability, APIs, shared platforms, payments as a service and cloud supported services is in place and continues to develop, there is an even greater driver towards interoperability, and that is the development of an interoperable digital ecosystem. The clearest example of this is the "India Stack".

Most of the discussion on interoperability to date has been around "payment interoperability." The India Stack is a collection of systems that support four interconnected layers. These include:

i) Presenceless layer: Where a universal biometric digital identity allows people to participate in any service from anywhere in the country;

ii) Cashless layer: A single interface to all the country's bank accounts and wallets to democratize payments;

iii) Paperless layer: Where digital records move with an individual's digital identity, eliminating the need for massive amount of paper collection and storage; and

iv) Consent layer: Which allows data to move freely and securely to democratize the market for data.

Regulatory attitudes: A gradual transition to open APIs, cloud-based services, shared platforms, PaaS, BaaS, will be key to leveraging the advantages of interoperability, and reduced infrastructure costs, beyond payments. For this to become a reality, several respondents noted that regulators should be more supportive of innovation. Regulatory constraints were said to relate to data residency, cryptography, and legal requirements.

Supporting ACFTA through interoperability

The Africa Continental Free Trade Agreement raises new issues in relation to interoperability, specifically in relation to data, both commercial and financial. This point was discussed with Sam Omukuko, the Managing Director of Metropol CRB.

Free trade across African countries requires the right data infrastructure, which can validate: a) the movement of goods and contains proxies for trust; b) provide for the movement of money; and c) the movement of data. For this to happen, platforms need to be synchronized. Three regional central banks have agreed in principle on cross border data sharing. To support international trade through technology will require standardization of data elements, the use of templates, and relatively few mandatory fields that can be expanded over time. Data will be required, which identifies the entities, people, documents which creates a "single point of truth." Payment systems will then need to be tied to the transaction, dispute and error mechanisms designed. The need for integrity, efficiency and accessibility of data will dictate the technology and policy issues.

Q8. What can SSA economies learn from East African Community financial inclusion, market development and interoperability?

Observations

From the literature review, the country studies and the respondent interviews, the following observations have been made:

Emerging best practice guidance – incorporates lessons from East Africa: Learning from the experience of interoperability in East Africa and other parts of the world presents an emerging body of best practice on how to interoperate, and where challenges can be expected. The Alliance for Financial Inclusion published a "Framework for Digital Financial Services Interoperability in Africa." AFI (AFI, 2018) and CGAP published "Building Faster Better – A Guide to Inclusive Instant Payment Systems", (Cook et al., 2021).

The need to reconcile multiple agendas: Implementing payment interoperability means reconciling multiple, sometimes competing agendas and interests. Institutional priorities frequently rank higher than commitments to collaboration and ecosystem development, with institutions most heavily invested in the status quo being late to join common initiatives. Respondents who had experience implementing initiatives alongside the Level One project team noted that the team spent long trying to bring the market together. However, this was likely much easier in markets where the financial sector was less developed and integrated, such as Myanmar, than in established financial sectors.

There is an evolving role for regulators and policy makers: Regulators and policy makers have a key role to play in moving from interoperable schemes to national interoperability. Even in developed markets such as Kenya where players have already invested in schemes and their own interoperable platforms, a more interventionist approach can be seen. The CBK published its pricing principles in its National Payment System Strategy and Vision (CBK, 2021) and is moving to allow Airtel to interoperate merchant payments through the Safaricom M-Pesa platform. In Tanzania, the BoT was actively involved in promoting mobile money interoperability and in the ongoing promotion of the TIPS scheme.

Interoperability stimulates the emergence of financial technology: Financial technology benefits significantly through easy access to payment services and data interoperability. This can best be seen through the rapid development of financial technology in Kenya, built on the M-Pesa mobile money platform, supported by Kenya's national identity system, and established credit reference bureaus. Payment and some data interoperability have supported the extension of digital credit and e-commerce.

There are competing viewpoints on how to create change: There are strongly held but competing views on how change should be introduced. These can be characterized as "market-led" and "interventionist". The market-led respondents argue that private sector players, often MNOs, have created significant change in a very short period through heavy investment in their own systems and building a network of bilateral connections. These institutions need time to recoup returns to investment. "Interventionists" usually agree that private sector players are hugely important in stimulating innovation, but that the vested interests in a financial sector make coming to consensus a very lengthy and sometimes fruitless activity. Interventionists argue that there comes a time when policy makers and regulators need to cut through "vested interests."

Challenges

Implementing interoperability has many observable challenges. These include:

Interoperability by mandate: Taking long-term decisions influencing the financial system is difficult to make in a dynamic environment. East African regulators have taken different positions with respect to interoperability. However, imposing interoperability by mandate risks regulatory avoidance.

Interoperability and competition: In their study, "Review of the Interoperability and Regulations of Mobile Money" Anderson et al. (2015) raise important caveats related to the evolution of interoperability. These are as follows:

1. Private sector interests can be opposed to interoperability. "Large MNOs with extensive infrastructure and upfront investment in mobile money networks have little incentive to ` interoperate with smaller MNOs if they have cornered the market".

2. Businesses do not want to interoperate without recouping the substantial investments they have made into developing services and related infrastructure.
3. Many MMOs have a catalogue of services on their platforms to encourage customer loyalty.

Scheme interoperability vs national interoperability: To date, interoperability in East Africa has operated at institutional or scheme level, not at a systemic level. Therefore, the MMOs interoperate in Tanzania, the banks in Kenya can interoperate on PesaLink, or in Uganda can share agents. Real time micro-settlement systems are in development for Tanzania (TIPS) and Rwanda. In both cases, the central bank and policy makers have been extensively involved, and the systems have been partly funded by international development partners. With well-established, competing ecosystems in Kenya at institutional level and at scheme level, it is not clear how systemic interoperability will be achieved in Kenya. However, CBK requirements for data standards and APIs suggest that future interoperability will be driven in part through promoting standards that facilitate interoperability. Recent actions by the CBK have suggested that the Central Bank will encourage Safaricom to open greater access to its platforms to competing institutions.

Competing revenue models: The revenue models for MMOs, fintechs, and commercial banks are different, which makes the commercial case around national interoperability difficult. The GMSA (2021) noted the need for MMOs to diversify their revenue models from fee income because "on average 87% of MMO revenues were generated from customer fees." By contrast, a commercial bank has a revenue model based on three significant sources of income: fees, investments, and interest, each of which is a significant revenue centre. Bank interoperability does not rely on transaction fees alone for its business case.

Lack of data: Searches for data and direct contact with central bank respondents and with GSMA showed that there is very limited publicly available data on interoperability. According to at least one industry respondent, there is "an unwillingness to share data which may be used by competitors". Even in cases where data is available, it is frequently highly aggregated. Furthermore, in many cases, the data is not collected by responsible authorities. This implies that policy is being made on a presumption of the benefits of interoperability, with limited ability to quantify the 'real world' benefits of interoperability.

The lack of data suggests that beyond centralized platforms, it is difficult for policy makers to assess how well interoperability is working in practice, to determine which institutions are promoting and/or restricting interoperability, and to take appropriate corrective action.

One respondent responded that without objective data for policy, there was considerable "noise" around payment ecosystems, in part promoted by donors. Such noise made it difficult for regulators and policy makers to assess or question the conventional wisdom to determine national policy and appropriately include ecosystem participants.

Q9. What do the research findings mean for future interoperability?

This paper shows an evolution in interoperability across East Africa from bilateral connections to peer (or scheme) interoperability towards national interoperability with one outlier, Kenya, where de facto national interoperability through the Safaricom platform is dominant. In fact, it is the Safaricom case which provides the best evidence of the benefits of interoperability in terms of the evolution of products and services, and the fintech ecosystem more generally.

The study highlights a very slow path towards payment interoperability, with multiple constraints related to ownership, governance, ability to invest, defending market position, competition, legacy platforms, and seemingly regulatory avoidance. There have been some attempts to push for consensus, particularly in Tanzania, through the introduction of TIPS, but consensus building is usually difficult, time consuming and often meets with limited success.

Systems such as ABC in Uganda are lauded for their actual and potential impact, but also show the challenges and limitations related to ability to invest and the competing realities of market participants which have their own on-net solutions. The potential for these platforms to evolve, develop their value proposition, and onboard services for the entire banking sector is clear, but how that potential is to be realized is not.

The findings show that national interoperable systems have involved interventions and mandates from policy makers and regulators, and that donors have part funded these systems. Historically, narrowly focused mandates on interoperability have had limited practical success, potentially contributing to more interventionist policy from central banks.

Participation so far in evolving national platforms focuses on regulated financial institutions and MMOs and not other financial institutions or financial technology providers, which are generally assumed to connect through banks or mobile money operators. While it may be difficult to onboard immature institutions or fintechs, thought should be given to integrating more payment service providers and aggregators in future phases.

Regulatory and policy responses are evolving too, with regulators moving towards more interventionist stances perhaps to respond to market failure. Central banks, led by the CBK, are beginning to look beyond payment systems, to the ability to interoperate, with a focus on data standards and APIs.

Future interoperability must consider an infrastructure that goes beyond payments, and can handle identity, payments, consent, and data as identified in the operation of the India Stack, and that will support cross border, international trade facilitated by distributed ledgers and smart contracts. Regulators and policy makers will need to consider the ability to compete more than the interests of entrenched providers of services.

But future interoperability means facilitating the digital banking revolution, promoting shared platforms, APIs, cloud storage, and facilitating the data revolution.

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Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

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Contact Us
African Economic Research Consortium
Consortium pour la Recherche Economique en Afrique
Middle East Bank Towers,
3rd Floor, Jakaya Kikwete Road
Nairobi 00200, Kenya
Tel: +254 (0) 20 273 4150
communications@aercafrica.org