

ISSUE BRIEF

Fintech

Powering Inclusive Growth in Africa

APRIL 2018 ALEKSANDRA GADZALA

From cryptocurrencies to blockchain to mobile money, financial technology or “fintech” is revolutionizing the basic structures of the global economy. Financial services delivered through fintech are becoming more accessible, efficient, and personal. In sub-Saharan Africa, where only 34 percent of adults have bank accounts, 16 percent have access to formal savings, 6 percent to formal borrowing,¹ and where 94 percent of transactions are made in cash,² fintech companies are already providing financial products and services to millions of unbanked and underserved Africans in ways that traditional financial institutions cannot. In many African markets, traditional banks are not retail-focused and require expensive account fees and cumbersome paperwork, or they have branches that are far away from where unbanked communities work and live. They are often disconnected from and little trusted by low-income populations.

While not without its challenges, the long-term prospects for fintech to overcome these barriers and drive financial inclusion in Africa are intact and profound. Advances in fintech also have positive spillovers for other sectors including insurance, energy, and agriculture. This brief helps potential investors and policy makers better understand the waves of fintech innovation unfolding in sub-Saharan Africa. It explores trends, opportunities, and challenges in mobile money, cryptocurrencies, and blockchain solutions. Finally, it reflects on the factors necessary for fintech’s long-term success.

Mobile money in Africa

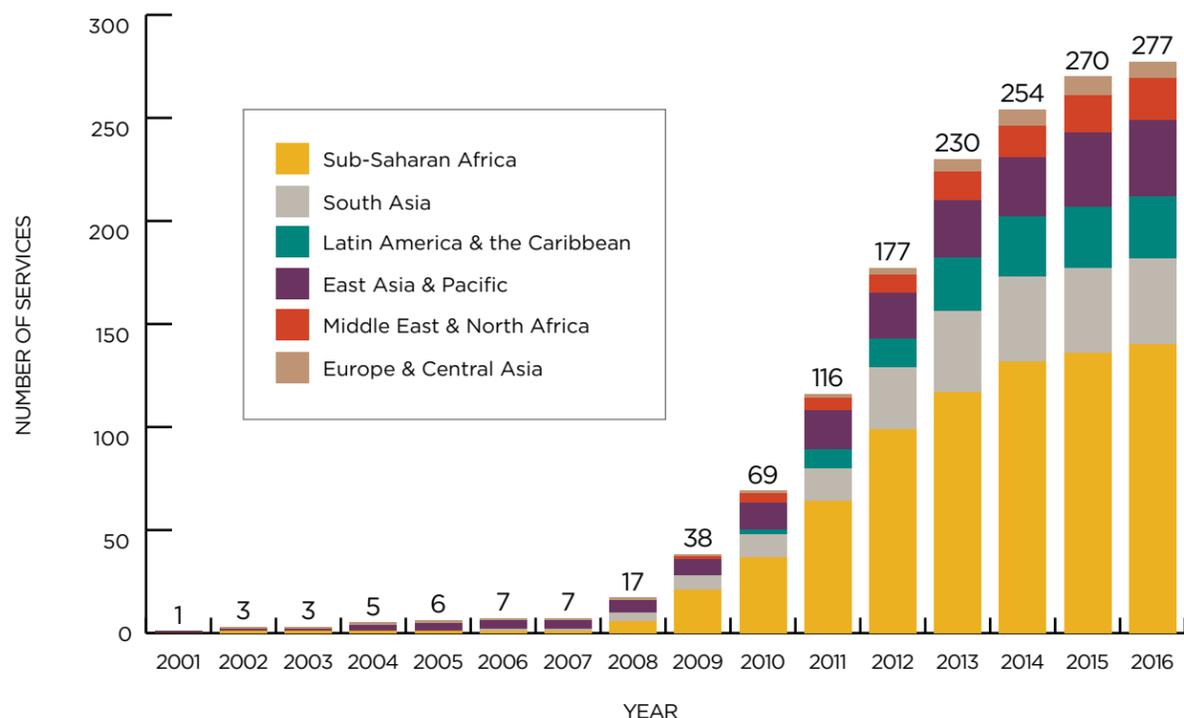
Propelled by the rapid adoption of mobile phones across the continent, fintech companies are introducing new financial distribution models and payment channels that are aligning financial products to the needs of Africa’s low-income consumers. In the first wave of financial innovation, fintech companies began mainly as mobile money platforms

The Africa Center promotes dynamic geopolitical partnerships with African states and shapes US and European policy priorities to strengthen security and promote economic growth and prosperity on the continent.

1 “Global Findex Data: Sub-Saharan Africa,” World Bank, last updated 2014, <http://data-topics.worldbank.org/financialinclusion/region/sub-saharan-africa>.

2 Bisi Lamikanra and Joleen Young, “Payment Developments in Africa: Volume 1” KPMG, 2015, <https://assets.kpmg.com/content/dam/kpmg/za/pdf/2016/09/Payment-Developments-in-Africa-2015.pdf>.

Figure 1. Adoption of Mobile Money Services, by Region



Source: Global Mobile Money Dataset, GSMA.

on the back of the distribution capabilities of mobile network operators (MNOs). “Mobile money,” broadly, is a technology that enables customers to receive, store, and spend money securely using their mobile phones. At its most basic, it is a cash transfer system: users deposit cash with mobile money agents that electronically transfer it to other users, who withdraw the cash from other agents. Although it is technology based, cash is still at its core. Sub-Saharan Africa today accounts for more than half of all mobile money deployments worldwide, with one-hundred-and-forty active mobile money schemes across thirty-nine of Africa’s fifty-four countries.³ In seven countries—Kenya, Namibia, Ghana, Gabon, Tanzania, Uganda, and Zimbabwe—more than 40 percent of the adult population actively uses mobile money.⁴

3 “The State of Mobile Money in Sub-Saharan Africa,” GSMA, 2016, accessed January 17, 2018, <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/2016-The-State-of-Mobile-Money-in-Sub-Saharan-Africa.pdf>.

4 Ibid.

The most distinct and celebrated mobile money success story is M-Pesa, which was created by the Kenyan MNO Safaricom in 2007. Initially launched as a simple peer-to-peer (P2P) money transfer system to enable consumers and small businesses to send and receive money, M-Pesa’s estimated 30 million users now pay bills, transfer money, save, make purchases, and perform traditional banking services with just their mobile phone. Mobile money has evolved beyond M-Pesa’s initial offering to include a range of additional functions: mobile wallets, mobile payments, core banking services, and wealth management services. More and more mobile money providers are focusing on solutions beyond financial services like taxation, education, insurance, and business administration.

Mobile money in sub-Saharan Africa has also evolved beyond M-Pesa. Several other mobile money providers have been successful, including MTN Mobile Money, with forty-one million registered customers across fifteen countries; Orange Money, with sixteen million registered customers across fourteen countries; and

Tigo Money, with eight million registered customers across five African countries.⁵

These and other mobile money providers fall into three overarching categories: MNO-led, bank-led, and a hybrid of the two that involves partnerships between MNOs and banks. In MNO-led models, the MNO is responsible for most of the value chain, including the virtual telecommunications network, the physical agent network, and the issuing and processing of payments; a commercial bank is the deposit holder. For example, a customer wanting to make a basic payment transaction through her M-Pesa account will deposit cash with a Safaricom agent, usually at a corner store in return for an e-float—a virtual deposit in her mobile wallet stored on her mobile phone. Soon after making the deposit, she receives a text message confirming that the e-float has been deposited. She can then either transfer the e-float to another phone whose user can pay out the e-float with a Safaricom agent or keep the e-float and pay it out at a future date. At the core of this model is a mechanism for safeguarding customers’ funds: the e-float is backed by deposits held at commercial banks. The earned interest does not benefit Safaricom and the funds held in trust are not fungible with those of Safaricom, making them safe from claim in the event the MNO becomes insolvent.

In bank-led mobile money models, banks provide access to their agent networks and payments issuing and processing capabilities. The role of MNOs is restricted to providing the telecommunications infrastructure through which services are offered. For example, the Central Bank of Nigeria (CBN) defines mobile money as a banking service and allows only licensed bank and non-bank (but not MNO) organizations to operate mobile money systems; any organization wishing to operate such a system must be licensed by the CBN. Leading the Nigerian mobile money sector so far has been Paga, a non-bank mobile money provider, which has expanded its customer base 81 percent annually, from one million customers in 2013 to over six million in 2017.⁶ Paga evolved from a mobile money operator to a fully-fledged and licensed mobile payments company.

5 Mutsa Chironga, Hilary De Grandis, and Yasser Zouaoui, “Mobile Financial Services in Africa: Winning the Battle for the Customer,” McKinsey & Company, July 2017, <https://www.mckinsey.com/industries/financial-services/our-insights/mobile-financial-services-in-africa-winning-the-battle-for-the-customer>.

6 Ibid.

M-PESA: AN EXCEPTIONAL CASE

M-Pesa’s success is highly unique among mobile money operators. When it launched, Safaricom had a nearly 80 percent market share in Kenya and was unregulated by the central bank. This unique combination of favorable market and regulatory conditions allowed Safaricom to innovate freely and capture significant economies of scale in ways that have since proven difficult to replicate in other settings. M-Pesa’s entry into South Africa, for instance, was much less successful. Despite its partnership with Nedbank, one of South Africa’s largest banks, M-Pesa ended its operations after six years with just 76,000 users. M-Pesa calls for a big MNO player with a dominant market share, flexible regulations, the capacity to attract an ecosystem of banks and agents, and aggregate transaction volumes.

In 2016, it processed US\$500 million in payments.⁷ Paga customers can transfer money via their mobile phones, and businesses can integrate Paga’s checkout payment processes into their operations and allow customers to pay with Paga’s mobile services and then receive their payments through Paga’s agent network.

Between the bank-led and MNO-led mobile money models is a hybrid model like that pursued in Ghana.

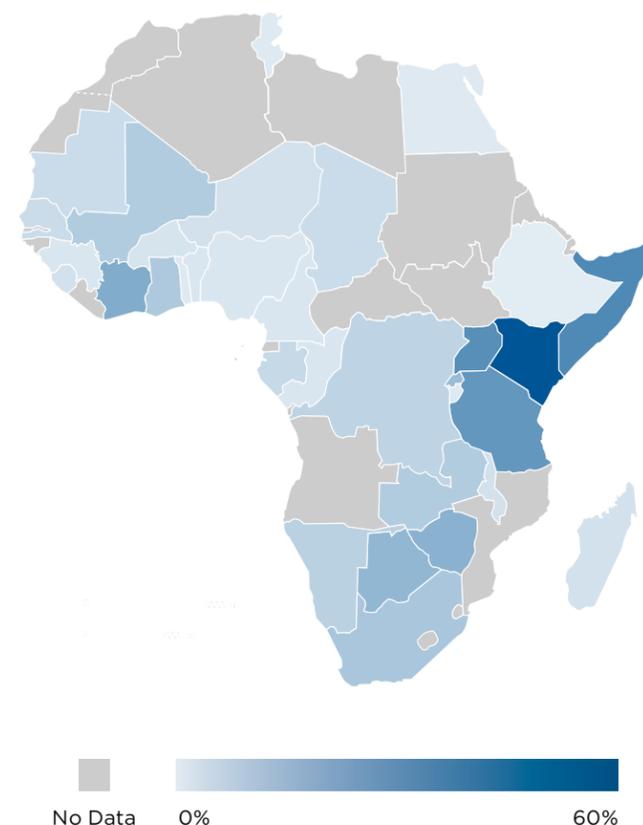
7 Ibid.

Although mobile money is regarded as a banking service, the Bank of Ghana has liberalized the banking sector to include non-banks (including MNOs) in providing mobile money services. MNOs can be licensed as agents of banks or as financial service providers to offer what the central bank calls “branchless banking.” Under this approach, MNOs provide the technology for the receipt and transfer of cash, the agent networks, and have ownership of the mobile money brand that incentivizes them to drive customer acquisition. In Ghana, the MNO MTN operates mobile wallets for multiple partner banks including Ecobank Ghana, Fidelity Bank, Merchant Bank, Ghana Commercial Bank, and Barclays Africa.⁸ Nearly 40 percent of Ghanaians have mobile money accounts—nearly the same as in Kenya and significantly more than the six percent in Nigeria.⁹

Interoperability challenges and cryptocurrencies

One of the challenges encountered by mobile money platforms is interoperability within and between countries, as well as the continued reliance on cash for deposits. Interoperability refers to interconnection across mobile money providers, including transfers between mobile money accounts or mobile money and traditional bank accounts, both domestically and internationally. Recent interoperability agreements signed in and by Uganda, Kenya, Rwanda, and Tanzania now facilitate cross-border mobile money transfers. Fintech companies like Flutterwave, a US company operating in Ghana, Nigeria, and several other African Countries, are also building digital payment infrastructures for processing payments across card, bank account, and mobile money platforms and across African countries. A little over a year after it launched in 2016, Flutterwave had processed US\$1.2 billion in payments across ten million transactions.¹⁰ As cryptocurrencies continue to gain attention, they are also being proposed as a means of facilitating interoperability and deepening financial inclusion in Africa.

Figure 2. Percentage of Population (Age 15+) with Mobile Accounts, 2014



Source: World Bank Databank, Global Financial Inclusion, <http://databank.worldbank.org/data/reports.aspx?source=1228>.

A cryptocurrency is a decentralized digital asset that is designed to work as a medium of exchange using encryption and a decentralized computer network to process transactions and generate new units. It is not backed by any sovereign, and unlike a stock or bond, it has no intrinsic value other than the cryptocurrency itself. Because of the decentralized nature of cryptocurrencies, those who hold the currency—which is, or can be, anybody—also own the financial infrastructure on which it is based, thereby eliminating the need for third-party authorities in financial transactions. At their most basic, cryptocurrencies like Bitcoin or Ethereum are essentially P2P payment solutions.

In sub-Saharan Africa and other developing economies, cryptocurrencies are becoming attractive as a means of

8 “About Mobile Money,” MTN, accessed January 18, 2018, <https://www.mtn.com.gh/personal/mobile-money/about-mobile-money>.
 9 International Monetary Fund, “Use of Financial Services, Mobile Banking: Registered Number of Mobile Money Accounts for Nigeria,” 2016, https://alfred.stlouisfed.org/series?seid=NGAFC-MARNUM&utm_source=series_page&utm_medium=related_content&utm_term=related_resources&utm_campaign=alfred.
 10 Sara Ashley O’Brien, “26-Year-Old Founder Wants to Change Payments in Africa,” CNNTech, July 31, 2017, <http://money.cnn.com/2017/07/31/technology/business/flutterwave-africa/index.html>.

exchange and a store of value. This is especially true in economies where there are restrictions on taking cash abroad, where inflation is high, and political turmoil likely. In Zimbabwe, where inflation in 2015 was more than 500,000,000,000 percent,¹¹ the value of the most well-known cryptocurrency, Bitcoin, surged to over ten thousand dollars in November 2017. Possibly propelled by the coup d’état that ousted President Robert Mugabe, the price was a 75 percent premium on global Bitcoin prices.¹² For Zimbabweans, Bitcoin and other cryptocurrencies are a financial safe haven and a way of purchasing needed imports from foreign markets. The leading Zimbabwean cryptocurrency exchange, Golix, trades six cryptocurrencies with approximately one million dollars in transactions per month.¹³ Nearly 37 percent of all Golix customers use it as a savings mechanism.¹⁴ Similarly in Nigeria, a weakening naira caused a nearly 1,500 percent increase in Bitcoin trading in 2017,¹⁵ surpassed only by China.

Like a growing number of Africans, Nigerians are also turning to Bitcoin and other cryptocurrencies as a solution for sending and receiving remittances. Remittances comprise the sub-Saharan region’s largest source of foreign income yet remain cumbersome and costly to send.¹⁶ In the absence of third party financial intermediaries, however, transaction costs for cryptocurrencies are low or negligible, and cryptocurrency remittance services are emerging as

alternatives to Western Union and MoneyGram services. Through BTCGhana, a Bitcoin-based remittance platform, users outside of Ghana can buy Bitcoins and quickly send them to Ghana-based recipients with Tigo Money, MTN Mobile Money, and Airtel Money accounts. Recipients receive the payments in Ghanaian cedi, which they can pay out with MNO agents.¹⁷

In sub-Saharan Africa and other developing economies, cryptocurrencies are becoming attractive as a means of exchange and a store of value.

Despite the seeming promise of cryptocurrencies, however, they are not without their risks. The cryptocurrency market is so far unregulated, illiquid, and prone to significant price swings that severely limit the transactional use of the assets. In 2017, the price of Bitcoin rose by more than 600 percent and tumbled by double-digit percentages—what would be considered a financial crisis if it happened to the value of a sovereign fiat currency. Because cryptocurrencies are so far concentrated in a few hands and their owners not clearly defined, opportunities for market manipulation, hacking attacks, and ransom are also ripe. How governments will address these risks is as yet unclear. In 2015, the Kenyan government cautioned Kenyan financial institutions against dealing in cryptocurrencies or transacting with entities engaged in cryptocurrencies at risk of “appropriate remedial action from the Central Bank.”¹⁸ In South Africa, the central bank has partnered with the Bitcoin-based platform, Bankymoon, to experiment with cryptocurrency regulation. If African government authorities determine that cryptocurrencies pose too great a systemic or security risk, it is not impossible that they could regulate them out of existence.

11 “Zimbabwe: Backs to the Wall,” *Economist*, October 3, 2015, <https://www.economist.com/news/middle-east-and-africa/21669966-drought-and-weak-rand-may-do-more-decade-sanctions-spur>.
 12 Rob Urban, “Bitcoin is the New Crisis Currency,” *Bloomberg Technology*, November 17, 2017, <https://www.bloomberg.com/news/articles/2017-11-17/bitcoin-emerges-as-crisis-currency-in-hotspot-such-as-zimbabwe>.
 13 William Chui, “Zimbabwe Bitcoin Exchange Golix Processes \$1m Monthly. Now Profitable,” *Techzim*, November 1, 2017, <https://www.techzim.co.zw/2017/11/zimbabwean-bitcoin-exchange-golix-processes-1m-monthly-now-profitable/>.
 14 Lorenzo Fioramonti, “Bitcoin is Already Playing a Key Role in the Unsteady Financial Systems of Some Developing Markets,” *Quartz Africa*, July 4, 2017, <https://qz.com/1021155/bitcoin-is-being-taken-up-in-zimbabwe-nigeria-south-africa-and-venezuela-among-developing-countries/>.
 15 Aline Oyamada and Camila Russo, “Bitcoin Trading Thrives Wherever Regulators Crack Down Most,” *Bloomberg Technology*, December 13, 2017, <https://www.bloomberg.com/news/articles/2017-12-14/bitcoin-trading-thrives-wherever-regulators-crack-down-most>.
 16 Sub-Saharan Africa is the most expensive global region to which to send money. Remittance transactions cost 9.72 percent of the total amount sent. See: “Remittance Prices Worldwide,” World Bank, December 2017, <https://remittanceprices.worldbank.org>.

17 “BTCGhana,” BTCGhana, accessed January 18, 2018. <https://btcghana.com/#about>.
 18 Gerald Nyaoma, “Banking Circular No 14 of 2015 Virtual Currencies – Bitcoin,” Central Bank of Kenya, December 18, 2015, https://www.centralbank.go.ke/uploads/banking_circulars/2075994161_Banking%20Circular%20No%2014%20of%202015%20-%20Virtual%20Currencies%20-%20Bitcoin.pdf.

Beyond mobile money: Expanding financial access in Africa

The first wave of financial innovation in Africa has been broadly characterized by the emergence and expansion of mobile money and by early-stage experimentation with cryptocurrencies for P2P transactions. Encouraged by the success of this first wave, other companies have begun to leverage some of its innovative technologies to expand financial service offerings for low-income consumers in the region. The P2P model has already expanded to include peer-to-business, business-to-business (B2B), and peer-to-government transactions. What may be seen as a second wave of financial innovation is so far characterized by further financial service innovations—significantly, insurance technology (insurtech)—and the integration of mobile money and cryptocurrency solutions into parallel sectors like energy and agriculture.

Financial innovation in African insurance

Like banking penetration, insurance penetration in Africa is low—below 2 percent in most markets. In the most advanced insurance market, Kenya, the banking penetration rate is 3 percent.¹⁹ In South Africa where the rate is a misleading 13 percent, insurance coverage is mostly limited to the costs of funerals and burials (which are important cultural events in sub-Saharan Africa), while the casualty and property market is still undeveloped.²⁰ Like many financial products, insurance products are overall unaffordable and poorly tailored to the needs of low-income customers.

Because banking penetration in Africa is low, many traditional insurance companies are unable to rely on traditional payment channels provided by banks for premium collection and claim payouts. Mobile insurance providers, on the other hand, can leverage MNO mobile distribution channels: thirty-seven African countries have ten times more registered MNO agents than bank branches. In Kenya, for example, Safaricom has more than 130,000 agents with whom customers can cash in and cash out. By contrast, leading banks in Kenya have approximately 15,000 agents.²¹

This scale, coupled with innovations in mobile money technology, has given rise to new insurance models that aim to be more customer-centric and better suited to the needs of Africa’s low-income populations. Through P2P insurance platforms, for example, groups of individuals can pool their insurance premiums together to share risks rather than pay a traditional insurance provider to insure their risks individually. Group members are connected to each other through a digital platform on their mobile phones independent of location. Through South African insurtech startups Pineapple and Casava Insurance, for example, policyholders can connect with friends and family to assist each other during or after claims. Casava calls its model “the Facebook of insurance.”²²

Another emergent insurtech model, on-demand insurance, provides insurance protection when it is required and for a set period. This model is especially attractive for Africa’s emergent sharing economy in which users do not own assets but use them for a limited period. Through index-based insurance products, too, customers can receive benefits on the basis of a predetermined index—for instance, insufficient rainfall levels that will result in loss of harvest. Digital technology enables the system to collect indicator data in a systemic and detailed way and transmit it to the insurer. Payouts are automated and streamlined via mobile money platforms, bypassing the need for cumbersome and costly claims assessment processes.²³

ACRE Africa, a Kenyan-based insurtech company with operations in Tanzania and Rwanda, is an example of an index-based insurer. It matches weather data obtained via satellites with weather conditions required by crops, and automatically pays out claims when the recorded weather data deviates from a predetermined range. Claims are paid into farmers’ mobile wallets or as discounts on subsequent fertilizer and seed purchases; this ensures that farmers can replant their crops and avoid total loss.²⁴ MobiLife, a fully mobile South African-based life insurance company, similarly pursues an unorthodox approach to claim payments.

19 John Aglionby, “Africa’s Insurance Market a ‘Giant Waking Up,’” *Financial Times*, June 28, 2016, <https://www.ft.com/content/bc87016a-2430-11e6-9d4d-c11776a5124d>.

20 Klaus Kessler et al., “Improving Financial Inclusion in South Africa,” Boston Consulting Group, April 11, 2017, <https://www.bcg.com/en-us/publications/2017/globalization-improving-financial-inclusion-south-africa.aspx>.

21 Chironga et al., “Mobile financial services in Africa: Winning the battle for the customer.”

22 “Awesome Insurance for Africa,” Cassava, accessed January 16, 2018, <https://cassavafintech.com/>.

23 See for example: Herman Smit, Cat Denoon-Stevens, and Antonia Esser, “InsurTech for Development: A Review of Insurance Technologies and Applications in Africa, Asia, and Latin America,” The Centre for Financial Regulation and Inclusion, March 2017, <http://www.microinsurancenet.org/sites/default/files/Cenfri%20InsurTech%20for%20Development%20Research%20Study.pdf>.

24 “ACRE Africa,” ACRE Africa, accessed January 16, 2018, <https://acreafrica.com>.



The second wave of financial innovation in Africa has seen the meaningful incorporation of fintech into business operations across industries. M-KOPA, for example, requires customers to make payments for their solar home systems through the M-PESA money platform. *Photo credit: Vodafone Group/Flickr*

Rather than paying a lump sum in the event of death, MobiLife provides policy beneficiaries with weekly grocery vouchers; the vouchers are for a set period up to five years. Customers receive weekly text messages with a code that they can use to buy goods at various South African supermarket chains.²⁵ In the event that customers miss payments because of volatile incomes, MobiLife does not cancel the policy but reduces the payout amount until regular payment resumes. Its products are affordable, accessible, and simple, and in this way tailored to the needs and circumstances of South Africa’s low-income consumers.

Mobile money’s positive externalities

Another important characteristic of this second wave of financial innovation in Africa is the integration of mobile money and cryptocurrency solutions into other

25 “MobiLife: About Us,” MobiLife, accessed January 18, 2018, <https://mobi.co.za/about-us/>.

industry sectors and the emergence of new business models, notably in energy and agriculture. The ability of divergent industries to meaningfully incorporate fintech innovations into their business operations is one of the key factors behind fintech’s staying power.

One new business innovation is based on so-called micro-payments that allow people to transact in small amounts. Examples already in existence include pay-as-you-go solar power for households, irrigation systems purchased on layaway plans, and school tuition fees distributed into small, frequent payments.

In East Africa, M-Kopa Solar uses a pay-as-you-go model with payment made over the M-Pesa mobile money platform; through this, five hundred thousand homes now have solar electricity.²⁶ Customers put down

26 “M-Kopa Connects Half a Million Homes,” M-Kopa Solar, April 27, 2017, <http://www.m-kopa.com/m-kopa-connects-half-a-million-homes-1/>.

a US\$35 deposit and make daily payments of forty-five cents for a year, after which the solar energy system is theirs. Beyond M-Pesa, other pay-as-you-go energy providers have also been successful, including Fenix International, which has partnered with MTN Mobile Money to provide off-grid solar energy to nearly one hundred thousand households in Uganda and Zambia²⁷ and PEG Africa in Ghana and Côte d'Ivoire, whose business model additionally rewards customers who pay promptly with free hospital insurance through BIMA—an insurtech company that provides customers life and hospital insurance for as little as thirty cents per month.

The increased transparency and information about users generated by mobile money can give rise to more customized product offerings. New credit-scoring models that analyze user data can help lenders assess the credit risks of a broad set of customers. Fenix International collects customer repayment histories to create customer credit scores on the basis of which it offers additional products. Mobile money ecosystems and information services have also emerged. In Côte d'Ivoire, the French MNO Orange has partnered with N'Kalô, a social enterprise focused on providing West African cashew nut farmers with critical market information. Together, Orange and N'Kalô have introduced a text messaging service that provides West African farmers with regular market and price updates for nineteen cents per month. A producer might receive a text message that reads: “Buyers are leaving the country, the end of the sale period is approaching. You are advised to sell the rest of your cashew. Price: 500-550 CFA/kg, trend downward.”²⁸ In Ghana, farmers can similarly access weather forecasts, market prices, and farming best practices through Farmlin's text messaging-based service. Farmers can dial *399# on any mobile network and receive information tailored to their location and stage of production.²⁹

Orange and other MNOs including Safaricom and Millicom (which operates on the continent under the “Tigo” brand) have piloted mobile money payments in Africa's agriculture value chains. Agricultural supply chain financing is a challenge in Africa: many buyers do not pay their suppliers immediately after delivery, and

payments are often made only once during the main harvest.³⁰ This makes wealth management as well as medium- and long-term savings a challenge for Africa's smallholder farmers, who comprise nearly 70 percent of the region's population.³¹ In Côte d'Ivoire, Orange has partnered with Biopartenaire, a subsidiary of the cocoa producer Barry Callebaut, to implement a scheme to pay cocoa farmers directly into their mobile wallets after the delivery of cocoa beans. The mobile money can be used for payments at stores, public institutions, or can be paid-out with Orange agents.³² SmartMoney International's “E-Villages” similarly link farmers, small businesses, merchants, and public institutions in rural communities in Tanzania and Uganda. SmartMoney customers receive harvest payments directly into their SmartMoney mobile wallets and can use the mobile money to buy goods at nearly 2,600 E-Village rural merchants.³³ Over the long term, such mobile money networks are likely to create expanded and aggregated mobile money platforms and client bases—the third wave of financial innovation.

The blockchain opportunity

The blockchain is most frequently debated in the context of cryptocurrencies—especially Bitcoin, which is based on blockchain technology—as it is used to facilitate various transactions of digitized data, including property registrations, birth certificates, insurance records, and bills of lading. It straddles the first and second waves of Africa's financial innovation and is likely to be hugely significant for financial inclusion in Africa, and for Africa's long-term economic development.

A blockchain, often called a distributed ledger, is, essentially, a way of moving information between parties over the internet and storing that information and its transaction history on a disparate network of computers. Think of an enormous global spreadsheet that runs on billions of computers. It is open source, so anyone can change its underlying code and can see

30 Susie Lonie et. al., “Opportunities for Digital Financial Services in the Cocoa Value Chain in Côte d'Ivoire: Insights from New Data,” World Bank Group, 2017, <https://www.ifc.org/wps/wcm/connect/2d3ae2fc-ae9a-45e1-bb9a-f039927a2f89/IF-C+Cote+d%27Ivoire+Digitizing+Cocoa+Value+Chain+report+EN-GLISH.pdf?MOD=AJPERES>.

31 Daudi Sumba et. al., “Africa Agriculture Status Report: The Business of Smallholder Agriculture in Sub-Saharan Africa,” Alliance for a Green Revolution in Africa (2017).

32 Ibid.

33 “What We Do,” Smart Money International, accessed January 18, 2018, <http://www.smartmoneyinternational.com>.

27 “Vision,” Fenix International, accessed January 16, 2018, <https://www.fenixintl.com/vision/>.

28 Elizabeth Willmott-Harrop et. al., “Going to Scale with ICTs for Agriculture,” Technical Centre for Agricultural and Rural Cooperation CTA, 2017, 16.

29 “Products,” Farmlin, accessed January 18, 2018, <http://farmerline.co/products/>.

all data activity. It uses state-of-the-art cryptography. And it is fully P2P, allowing individuals and businesses to interact directly without the need for third party intermediaries to verify or authenticate transactions. This may potentially allow for faster and cheaper transactions, even though the transacting parties may not know with whom they are dealing. Because it is decentralized and immutable, transactions on the blockchain are theoretically protected from hacking.

Bitcoin provided the first widespread use of blockchain. Since then, a number of experiments have been initiated that attempt to broaden the use of blockchain beyond its use as a digital currency. These range from relatively straightforward solutions like money transfers, to more complex instruments enabled by the introduction of smart contracts—self-executing digital contracts—like trade clearance and settlement. Significant for financial inclusion is the potential use of blockchain for payments, including remittances; supply chain finance; and personal identification. Many low-income individuals lack official documentation, which often precludes them from accessing formal financial services and government resources. A blockchain-based system like OneName or BitNation can provide an innovative and cost-effective way of establishing a digital identity that can develop over time as a user builds a credit history, for example, or accrues property and other assets. In such a system, a username is generated and added to the blockchain directory where the user data is stored. The end-user owns and controls her personal identity, data, and digital assets; she can digitally sign claims, transactions, and documents; own and transfer value; and interact with other distributed applications.

Like the holders of cryptocurrency coins who become owners of the digital financial infrastructure, individuals on a blockchain similarly become owners of the stored data. In a supply chain, blockchain eliminates the need for multiple copies of the same document stored on numerous databases; each participant in the supply chain updates the blockchain to reflect the latest transaction. This allows all parties to conduct due diligence, trace the location and ownership of goods, and make swift payments to suppliers. On AgriLedger, a blockchain-based mobile application (app) designed to streamline the operations of smallholder farmers, farmers can record each transaction and receive immediate order and delivery confirmation. Members of farming cooperatives can keep precise, matching records of data such as purchases, communal labor

hours, equipment sharing, and crop sales.³⁴ BitPesa, a pan-African fintech company that provides foreign exchange and B2B Bitcoin-based payments, also enables parties in a supply chain to store data about the origin, quality, and certifications associated with the traded goods. This ensures transparency and helps to mitigate against food fraud.

A blockchain-based system can provide an innovative and cost-effective way of establishing a digital identity.

BitPesa, which is most commonly used by companies for cross-border money transfers, is also a remittance platform. BitPesa customers transact in Bitcoins, which can be sent to the mobile wallets of recipients in Nigeria, Kenya, Tanzania, and Uganda with Paga, Tigo Money, Airtel Money, MTN Mobile Money, and M-Pesa accounts. Recipients can then exchange the mobile money for local fiat currency or store the money in their mobile wallets. Other blockchain remittance platforms like Nigerian-based SureRemit do not allow its crypto product to be redeemed for cash. Instead, SureRemit has connected its crypto product to a network of merchants in Nigeria, Kenya, and Rwanda. Customers can use their SureRemit mobile app to pay for goods like utility bills, school tuition, and online goods—including through African e-commerce giant, Jumia.³⁵

Blockchain technology is still evolving and will face numerous hurdles, some technical, some regulatory, some organizational, and some even societal rooted in notions of trust. Concepts are still being market-tested, but they will not be able to reach their full potential without industry collaboration, common standards, and significant institutional buy-in. At the most basic level, for blockchain to work, all relevant parties must simultaneously adopt the technology.

34 “Agriledger,” AgriLedger, accessed January 18, 2018, <http://www.agriledger.com>.

35 Jake Bright, “Africa's SureRemit Joins the Tokenized Race to Win the Global Remittance Market,” *TechCrunch*, December 11, 2017, <https://techcrunch.com/2017/12/11/africas-suremit-joins-the-tokenized-race-to-win-the-global-remittance-market/>.

Success factors

Addressing the challenges faced by blockchain and other fintech innovations will require patience. While the transformative potential of fintech is likely to be immense, the process of adoption will be gradual as the innovation gains momentum. Success will depend on supportive ecosystems, sound regulations, and network security.

Supportive ecosystems

Collaboration—between regulators, MNOs, financial institutions, fintech companies, and other businesses including retailers—is key to nurturing continued fintech innovation and adoption in Africa. For fintech companies, collaboration with MNOs is particularly central. Such partnerships allow fintech providers to piggyback on MNO’s brand recognition and customer networks, building a customer base and trust in the market. For example, the MNO MTN, the largest MNO in Africa, has 171 million customers, whereas leading pan-African banks like Ecobank, Standard Bank, and Barclays Africa typically have between eleven and fifteen million customers.³⁶ Ghana offers an interesting example of a potentially supportive fintech ecosystem. Mobile money is enabled by a financial regulatory framework that necessitates cooperation between key stakeholders, and which, by allowing both banks and non-banks (including MNOs) to provide mobile money services, also encourages market competition. After South Africa, Nigeria, and Kenya, Ghana has the most fintech startups on the continent. And the steady rate of mobile money adoption suggests that this framework has the potential to drive fast mobile money penetration and financial inclusion.

Over the long term, partnerships between fintech companies and MNOs can additionally provide fintech companies with access to new data that can be used to better understand customer needs, develop more tailored products, and create new market opportunities. Today, many fintech companies still lack detailed localized information about the regions where they deploy solutions. Solutions are often one-size-fits-all schemes in subjectively selected areas—usually based on connections or location. Off-grid energy providers, for example, often make planning and scaling decisions with limited hard data and rely instead on anecdotal evidence.³⁷ Mobile phone data has already been shown

to provide accurate proxies of detailed geographical distributions of energy needs. The types of datasets include: the number of mobile phone subscribers in a given area; hourly voice and text messaging traffic between mobile phone subscribers including total call duration, number of calls, and number of text messages; and user mobility patterns.³⁸ As more user data is generated and integrated with artificial intelligence and big data capabilities, it can be leveraged by fintech companies in other sectors to spawn new business models and scale existing solutions.

One requirement for supportive fintech ecosystems in Africa is financing. Africa’s fintech companies are proving interesting for investors. Between 2015 and 2017, the continent’s fintech startups jointly raised US\$100 million.³⁹ Some of this activity stems from the large number of fintech startups across Africa, as well as investor awareness of the long-term demand for, and social impact of, fintech services—and the likely associated favorable returns. This combination of returns and impact has allowed African fintech firms to tap into several funding pools, including traditional early-stage venture capital and social impact funds. Yet this combination has, in some cases, also led to mismanaged expectations: investors use Silicon Valley-style term sheets with Silicon Valley return expectations, even though those companies have more long-term views. This requires new and creative ways to de-risk investments in early-stage African companies. Companies like GroFin and Kiva have offered debt structures, revenue-sharing agreements, and royalty-based financing for early-stage companies. Rather than equity purchases, royalty-based capital allows investors to extend capital in return for a percentage of future ongoing gross revenues. Repayment is based on a set percentage of revenue; if there is no revenue in a month, payment is generally not required. For fintech companies that require early-stage funding and do not want to dilute their ownership, this may be a more desirable option than venture capital for instance. Investors who innovate on different structures

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38 E.A. Martinez-Cesana et. al., “Using Mobile Phone Data for Electricity Infrastructure Planning,” Cornell University Library, April 15, 2015, <https://arxiv.org/ftp/arxiv/papers/1504/1504.03899.pdf>.

39 Yomi Kazeem, “Why African Fintech Startups Are Becoming Even More Attractive for Investors,” *Quartz Africa*, August 6, 2017, <https://qz.com/1043573/african-fintech-startups-like-flutterwave-and-paystack-are-raising-funds-to-drive-financial-inclusion/>.

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37 Brian Spatocco and Donald Sadoway, “GridForm: Rural Mapping

of capital—not just the products and services of their investments—will be most successful.

Regulation

One of the most significant players in fintech ecosystems is the regulator. Fintech regulation needs to strike a careful balance between protecting consumers, investors, and governments; avoiding disruptive financial crises; and giving fintech companies space to innovate and compete. In markets where mobile money has so far been successful, the regulatory framework has allowed MNOs to compete with banks in a fragmented financial services market. In markets where mobile money has stagnated, the mobile money activities of MNOs are restricted. In South Africa, for instance, only registered banks are allowed to issue mobile money; the only way for non-bank actors to enter the market is through bank-led sponsorship agreements. This ties fintech companies to strict and cumbersome banking sector regulations that may hinder innovation. In the absence of such regulations, however, the risk of illicit transactions, money laundering, and financial terrorism may present increased risks.

Prudential regulation should ensure that fintech providers remain healthy and hold enough capital to avoid losses from such events. Protection of consumers is also needed, especially for low-income consumers who are often at risk of being exploited. Regulations are also required to govern data localization; cross-border data traffic and system interoperability; anti-fraud and personal data protections; and cybersecurity.

Yet the rapid pace of financial innovation has left regulators unable to keep up. Fintech platforms are loosely regulated by multiple statutes and rules, usually in a reactionary and ad hoc manner. Many African countries lack adequate frameworks to support fintech innovations and are unclear on where to assign regulatory responsibility. While this may in some instances prove advantageous—as it did in M-Pesa’s case—it may also lead to confusion in the long term. What is needed is an open and consultative process between the regulator and other players in the fintech ecosystem of each country. Regulators need to understand the distinctive characteristics of the various fintech solutions, including client behavior and needs; the characteristics of products and services; the implementation challenges that fintech companies face; and the potential solutions they can employ.

One way of achieving this is through “regulatory sandboxing”—the creation of controlled environments

REGULATORY SANDBOXES

Regulatory sandboxes will play an increasingly important role in encouraging fintech startups to develop products and services. Despite country-specific differences in sandbox structure, focus, and approach, their net result is that more regulators are becoming receptive to fintech services. Outside of Africa, the Hong Kong Monetary Authority’s (HKMA) Fintech Supervisory Sandbox allows banks and technology firms to conduct fintech trials without having to be fully compliant with HKMA’s supervisory requirements. Through a Fintech Supervisory Chatroom, banks, tech firms, and HKMA are able to provide feedback to each other throughout all stages of the projects.

within which innovation can occur and which allow regulators to observe and learn about the implications of fintech initiatives in their country. The partnership between Bankymoon and South Africa’s central bank is one example. In Zambia, the central bank has similarly established a regulatory sandbox with Zazu, a startup that is building a pan-African mobile-only bank. This gives Zazu the ability to test its products and services with real customers while signaling to regulators what legal limits should be set, how to potentially tax the products, and where and what kind of consumer protections might be necessary. Central banks and other stakeholders in fintech ecosystems can learn a great deal from such sandboxes, as well as those in other jurisdictions. The United Arab Emirates, Singapore, Bahrain, India, and fourteen other countries have regulatory sandboxes. While fintech companies often prefer to fly under the radar to avoid regulation, such constructive engagement may facilitate more transparent and accommodating regulatory measures.

Network security

Fundamentally, the successful adoption of fintech solutions requires widespread mobile phone ownership and access to affordable data plans. Low-

income consumers are generally familiar with mobile technologies, and their use can increase trust and open new avenues of customer engagement. Fintech has so far been successful in Africa precisely because of deepening mobile phone penetration. At the end of 2016, there were 420 million mobile phone subscribers in sub-Saharan Africa, equivalent to a penetration rate of 43 percent; the region's mobile phone market continues to grow faster than any other region globally.⁴⁰ However, governments and the private sector may have to intervene in remote areas where markets are not delivering. Mobile ownership must be additionally supported by a vast network of cash-in and cash-out points to enable customers to access cash when they need it, and by a broad set of businesses that accept digital payments.

Critical to fintech's success, however, is a secure mobile infrastructure. Transacting parties should be able to interact safely without risk of hacking, cyberattack, or privacy breaches. This is a special challenge for blockchain. On blockchain platforms the details of all smart contracts are public—including senders and recipients, transaction data, the code executed, and the data stored inside the contract. This is a problem when transactions involve financial and personal data, as they

often do. Developers globally are working toward various privacy solutions, but many solutions are still early in their development, while others have proven difficult to implement. Personal data protections in Africa are also so far ill-equipped to address the unique protections required by decentralized and distributed technologies. Until robust network security is established, full-scale adoption of fintech solutions will continue gradually.

Yet even at a gradual pace and with many challenges, fintech is proving an important innovation for advancing financial inclusion in Africa. The industry has made significant advances since M-Pesa first launched in 2007, with other stakeholders and governments moving in to facilitate solutions to the continent's varied needs over the past decade. The demand is great, and the investment opportunities are ripe. Fintech's potential to deepen financial inclusion in sub-Saharan Africa, to spur economic growth, and to introduce new business models is immense. Ultimately, it is just a matter of time.

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⁴⁰ "The Mobile Economy: Sub-Saharan Africa 2017," GSMA, 2017, <https://www.gsmainelligence.com/research/?file=7b-f3592e6d750144e58d9dcfac6adfab&download>.

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