

Digital Financial Services: Challenges and Opportunities for Emerging Market Banks

A digital transformation is taking place in the financial services industry, with a host of non-bank innovators offering both customer facing and back office financial technology products and services. This transformation includes emerging market economies, and in many places offers a viable digital alternative to traditional banks, which have left significant populations underbanked. This note explores the challenges and opportunities that financial technology innovations present for banks in these nations.

The digital transformation that has upended industries from retail and media to transport and business-to-business commerce is now sweeping the financial services industry. This was inevitable, as ubiquitous computing power, pervasive connectivity, mass data storage, and advanced analytical tools can easily and efficiently be applied to financial services. After all, money was already extensively (though not exclusively) created, used, stored, processed, and delivered electronically.

Immediacy and personalization have become the norm for consumer goods and services. Consumers have rapidly become accustomed to making purchases with a touch of their finger wherever they may be, receiving tailored recommendations, choosing customized products, and enjoying delivery of almost any item directly to their front door. Businesses failing to adapt quickly to these technological developments can fail dramatically, and many have already done so, including Tower Records, Borders Books, Blockbuster Video, and countless travel agents and brick-and-mortar retailers. Consumers' new expectations apply to financial services as well.

Technology has transformed business-to-business and within-business interactions, too, enabling reconfiguration of design, production, marketing, delivery, and service functions through distributed supply chains, freelance design, outsourced manufacturing, and contract warehousing and delivery. These reconfigurations are mediated by online marketplaces and distributors, and assisted by back-end support operations and data analysis that together drive better risk assessment, faster fulfillment and more efficient customer service.

The same types of disruptive market innovations and reconstituted value chains are now emerging in the financial services industry.¹ This poses distinct challenges for incumbent providers such as banks, finance companies, microfinance institutions, and insurance companies, as financial technology—or FinTech—innovators enter their markets. Incumbents, too, can benefit from these developments, which

will enable them to broaden financial access, introduce new products and services, and serve customers more efficiently by deploying new technologies internally or in partnership with external innovators.

Digital transformation in financial services

Although financial services have been computerized for decades, with products such as retail brokerage using digital channels for some 20 years, a more radical transformation of the industry was delayed due to market advantages of traditional financial services providers. These included the established trust of customers, regulatory barriers to entry in banking and insurance, and supervisory approaches that created a bias to internalizing all or most of the value chain.

The 2008 financial crisis reduced trust in financial institutions, and the regulatory response to the crisis, including increased capital requirements and compliance costs, and made it more difficult and expensive for banks to lend.² Paradoxically, this created an opportunity for less regulated, technology enabled non-banks to thrive. They could offer financial services more cheaply and efficiently than incumbents burdened with legacy infrastructure and regulation.

In addition, digital transformations of other industries made customers more trusting of and comfortable with tech-based financial solutions. It also increased their demand for immediacy and customized products and services. Some of the most prominent FinTech companies are meeting these consumer demands with low cost, convenient ways to transfer money, borrow, and invest.

The impact of FinTech on financial services, however, goes beyond retail and customer-facing applications and services to include all elements of the financial services production process. The transformations in other industries demonstrated how increased availability of data and speed of information transmission could address key issues in contracting and

monitoring that had determined the structures of firms and the degree of internalization of activities. For example, the ability to send designs across the world and monitor the quality of production has enabled the separation of design and marketing from manufacturing and logistics in companies such as Apple and Nike.

Yet commercial banks are still internalizing almost all aspects of channels, product design, and operations as well as a fair amount of private infrastructure (with call centers being an occasional exception, though many such operations were offshored rather than outsourced).

New FinTech entrants can optimize a single link of the financial services value chain to provide a bank-beating solution that can connect to the rest of the financial ecosystem. That might mean delivering services directly to users' mobile devices instead of using bank branches, dispensing with proprietary communication lines by using encrypted Internet transmissions, or avoiding the cost of data centers by utilizing cloud computing.

There are FinTechs offering point solutions in product areas such as payments, remittances, savings and investments, personal financial management, trade and invoice finance, small and medium-sized enterprises (SMEs), lending, and insurance.

Innovations are also directed at processes such as Anti-Money Laundering-Know Your Customer (AML-KYC) compliance, credit scoring, underwriting and risk management, customer service, collections and recovery, capital markets activities, asset securitization, middle- and back-office reporting, trade processing, and connectivity between banking systems.

While this note largely takes a functional or product oriented approach, the potential also exists for innovative technologies to change the scope of what is possible in financial services and disrupt traditional intermediation roles. Technologies with radically transformative potential include digital identities and currencies, distributed ledgers, big data, artificial intelligence, and machine learning. These are already being incorporated into specific products and solutions in familiar institutions, but may in time fundamentally transform financial intermediation.

Impact on financial services value chains

Some FinTechs aim to operate separately from—and compete directly with—banks. Others offer solutions to banks. Virtually all of them need to connect to other financial services and to existing infrastructure (for funds transfers, for example). And banks, whether they want to or not, will be dragged into this age of reconfiguration by market forces and, in some cases, by government interoperability mandates.

Where unitary proprietary bank systems once precluded connection to external solutions, interoperability that will help FinTechs to carve off profitable slices of banks' businesses is

now mandated in some jurisdictions, notably the European Union.³ The digital transformation of financial services is likely to result in more competition, with significant portions of banks' products and profitability at risk. Barriers to entry may have risen in terms of core bank compliance costs, but regulators' willingness to countenance non-bank competitors in product areas traditionally dominated by banks has increased, and the economics of banking have shifted. Cloud infrastructure and mobile channels mean that the provision of financial services no longer requires high fixed-cost mainframe data centers and branch networks, so costs are more variable.

While there may be consolidation in certain lines of business that have very large scale or network economies, at the same time it is increasingly easy for niche providers to offer tailored solutions to a particular market and be profitable with a much smaller asset base. Fintechs have taken market share in high margin slices of banking such as remittances and asset management, and technology-enabled challenger banks have emerged as serious contenders in a number of markets.

The reconfiguration of value chains is also crossing industry boundaries. SoFi, an online personal finance company offers career coaching, while Holvi, a Finnish-based financial startup, provides bookkeeping services and cash flow tracking.⁴ Similarly, data analytics company Atsora, a Polish provider of SME financial management tools, offers its products to SMEs through banks and in turn leverages the data to create cash flow based scoring the banks can use to lend.⁵

As the financial services industry becomes increasingly contestable, decomposable, and reconfigurable, the capacity to innovate will be a key success factor. Banks that learn to adopt new technologies, adapt their products and processes, and become more adept at delivering tailored solutions to their customers will succeed. Given banks' preoccupation with the global financial crisis and regulatory requirements, non-bank innovators have been leading, or have acted as catalysts for, the digital transformation of financial services.

Yet incumbents are increasingly catching on. Just as brick-and-mortar giants Wal-Mart and Target responded to the online threat from Amazon with strengthened online presences of their own as well as modified physical channels such as pick-up locations, almost every financial services provider, from banks to credit unions, now has Internet and mobile channels, and many are adopting new technologies across products and processes as well. FinTech innovations can help banks deliver enhanced risk assessment, reduce transaction costs, make operational back offices more efficient, lower fixed asset investment requirements, and enter new markets. At the same time, banks can help FinTech innovators address their target markets. Adoption of new technologies by incumbents has been aided by the use of standardized Application Program Interfaces (APIs) and the availability of plug-and-play third-

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party technologies, as well as an increasing willingness to partner to deliver value to a jointly shared client base. While sharing customers is difficult, collaboration has been increasing.

FinTechs have come to realize that most will not reach scale without leveraging the customer base and capital that banks have already accumulated, while banks now acknowledge that internal product innovation processes do not always meet customer expectations in terms of time to market or quality.⁶ Both can benefit from partnerships that reconfigure financial services value chains.

What is different in emerging market economies?

E-commerce, online media, and new models in transport are making inroads in developing economies. Financial services transformation is also underway—and in some countries has outpaced the adoption of technology-driven business models in other industries. Mobile money adoption in Kenya and Bangladesh is an example. Still, there are specific challenges for the digital transformation of financial services and the development of FinTech in most emerging market countries. Four key challenges that have affected the digital transformation of financial services in these markets, relative to advanced economies, are:

- Low penetration of formal financial services
- Low income and financial literacy levels
- Underdeveloped technology ecosystems,
- Weak infrastructure.

Not all of these factors are present to the same degree across emerging market economies, but they shape the landscape for the provision of financial services both by banks and FinTechs, as well as the interactions between those two types of financial service providers.

Box 1: Challenges for Banks and FinTech Companies in Emerging Markets:

1. **Low levels of formal financial services** (cash dominance in transactions, informal credit and savings)
2. **Lower income and financial literacy levels** (low value transactions, smaller fees, need for user education)
3. **Underdeveloped technology and venture capital ecosystems** (shortage of skilled tech/finance entrepreneurs, small markets, limited revenue potential)
4. **Relatively weak infrastructure** (underdeveloped payment systems, customer credit data, legal enforcement mechanisms for payment obligations, power, telco/Internet coverage).

The banking-fintech dynamic development space: a cross-country comparison

To provide a more quantitative comparison across countries, in Figure 1 we use two indicators as proxies for these four challenges:

We measure formal banking penetration (representing the first two challenges, and displayed along the y-axis) and venture capital (VC) investment relative to GDP (representing the last two challenges, and displayed along the x-axis). The bubble sizes correspond to the estimated number of unbanked in each country.

Taking the average venture capital penetration and the least-squares trend line for the interaction of the two variables as dividing lines, we get the four quadrants shown in Figure 1:

Quadrant I (Upper Left): “Bank Dominance”

This quadrant includes economies in which the traditional banking sector is already well established and will likely continue to dominate the market. In-sector competition may create a positive dynamic of service innovation among banks. Examples include Alior, Idea, and mBank in Poland.⁷

With only nascent local tech ecosystems, innovation may come from foreign FinTechs. Regulators may seek to create an open environment for non-bank entry in order to foster competition and product and service innovation, but entrenched local banks enjoy a “home field” advantage.

Quadrant II (Upper Right): “Partnering”

In this quadrant banks are well entrenched and serve most of the population. However, the strong tech ecosystem will support innovations offering new value propositions or seeking to take market share from incumbents.

Banks can in turn leverage technology to compete. Some FinTechs will scale up on their own, while others will partner with banks for better access to customers, capital, payments systems, or other operating assets.

Examples include OnDeck Capital, which partnered with JPMorganChase for customer origination and balance sheet placement while providing the loan decision making and servicing, and TransferWise, which markets itself as a bank disruptor while partnering with banks for distribution.

Quadrant III (Lower Right): “Tech Dominance”

Countries in this quadrant have well developed tech ecosystems, while banks have left large segments of the market underserved. This has created an opportunity for non-bank innovators to enter the financial services market.

The regulatory environment and the extent to which it is open to the FinTech sector varies across countries. This is a key variable in determining the balance between FinTech and more traditional banks. China, for example, has been relatively open to big tech companies entering financial services. Ant

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Financial, a Chinese FinTech, has more than 450 million clients, ten times the number served by any one of the world's largest banks and equivalent to about 60 percent of the number of bank accounts in China.⁸ India, on the other hand, has introduced new types of financial services licenses while continuing to require that these new services be conducted by licensed and regulated institutions.

This regulatory environment has resulted in more cross-sector convergence as some tech companies obtain financial services licenses while others partner with banks, and banks seek new functionality via partnerships with FinTechs.

Quadrant IV (Lower Left): “Race to the Finish”

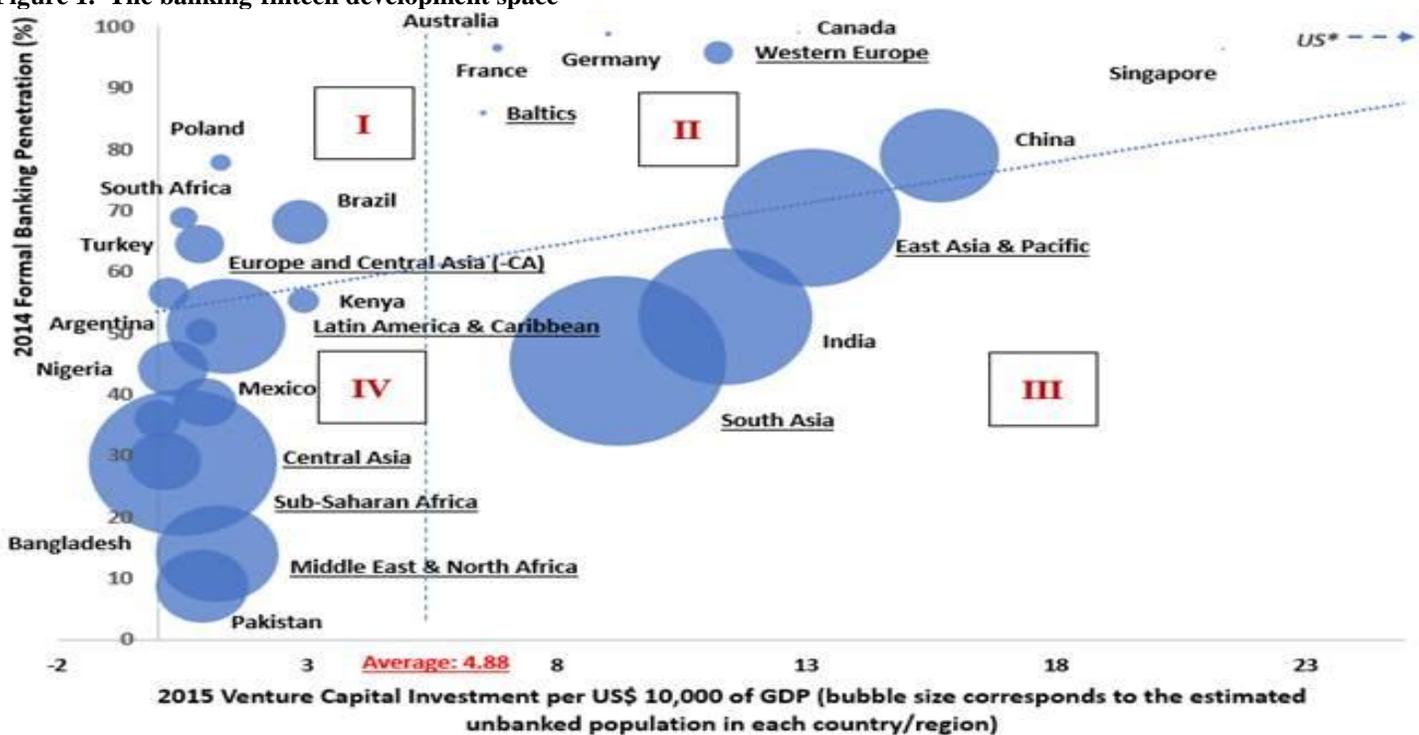
Here we see low levels of bank penetration and underdeveloped technology ecosystems. Telecom companies tend to be the most

significant local tech players, and in some countries have led the digitalization of the financial industry through mobile money products. However, banks have a chance to catch up if they choose to adopt innovations before the telecom firms corner the market.

For example, in Peru the Association of Banks, along with individual banks, mobile phone companies, and the government launched BIM (billetera móvil or mobile wallet) in 2015 as a mobile money platform for interoperable services offered by both financial institutions and mobile phone companies.⁹

This created an opportunity for banks to innovate alongside telecoms in providing digital financial services.

Figure 1. The banking-fintech development space



Source: IFC staff calculations; World Development Indicators, The World Bank, 2016; Global Findex, The World Bank; PitchBook Data, Inc. 2016. The values for the US are outside the shown scale, i.e. 50 for x-axis and 94% for y-axis.

Emerging market banks: challenges and opportunities in Quadrants III and IV

Most developing countries fall into Quadrants III and IV are characterized by lower levels of both funding for technology innovation and of banking penetration. Three country examples illustrate the dynamics of Tech Dominance and Race to the Finish in selected countries.

Example 1: “Tech Dominance” (Quadrant III) - China

Although China’s average income is relatively low, the size of its middle class is roughly similar to the population of Europe.

This, coupled with China’s advanced educational system and its active participation in global supply chains, has resulted in a strong tech ecosystem including large local tech firms, strong engineering and business skillsets, and active private equity and venture capital investors. Thus, the challenge of developing technology and VC ecosystems has largely been overcome in China.

Investment in financial infrastructure such as China UnionPay—the only authorized interbank network in China—has also created a different set of initial conditions relative to

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the infrastructure challenges noted in Box 1 above. There were 5.4 billion outstanding payment cards issued in China by the end of 2015, or about four per person.¹⁰ Purchasing volume by payment cards grew to \$8.4 trillion in 2015, equivalent to 77 percent of GDP.¹¹ China's non-bank payment institutions handle 54 percent of transactions, compared with 46 percent by traditional lenders.¹²

China's retail loan penetration rate is around 20 percent, among the lowest in the world.¹³ Its banking sector prioritized state-owned enterprises and influential borrowers over SMEs and the wider retail market.

Responding to the market gap, over two thousand peer-to-peer lending platforms are in operation in the country, with the volume of peer-to-peer transactions as high as RMB 252.8 billion (USD 37 billion) in value by the end 2014, and that figure quadrupled in 2015.¹⁴

However, a number of prominent platform failures resulted in new regulation on loan sizes and required custodian arrangements for investor funds. Growth slowed in the first half of 2016, with more than 500 platforms closing down. Further consolidation is likely as compliance costs kick in and unsound platforms are weeded out.¹⁵

The large and growing middle-income segment created market momentum and critical mass for service providers who can leverage that base of activity to serve poorer segments as well. As a result, China's alternative finance sector, which includes not only the peer-to-peer lenders but also big tech companies active in financial services and other FinTechs, rapidly outpaced most developed and developing markets. While peer-to-peer transactions will continue to grow, tech companies will play a bigger role in the financial sector.

In 2015 alone, Alibaba's online payment platform, Alipay, had 451 million annual active users and 153 million daily transactions.¹⁶ Alibaba's Ant Financial has become the largest FinTech company in the world by market value.¹⁷ Beyond online payments, the tech giants of China expanded their reach to lending services in 2016. Tencent, Alibaba and Baidu established WeBank, MYBank and Baixin bank respectively, with the aim of helping SMEs gain easier access to capital.¹⁸

While tech companies seem to have the growth edge relative to banks, there is evidence that banks are waking up to the innovation imperative and the underserved market of SMEs and innovators.¹⁹ At the same time, retail depositors have learned that promises of high returns from some peer-to-peer lenders were too good to be true.

Although FinTechs linked to tech businesses like Tencent, Alibaba, and Baidu are building significant financial services brands, it may prove challenging for a broad range of standalone startups to develop sufficient client trust to compete at scale with China's tech giants or traditional banks.

Example 2: “Tech Dominance” (Quadrant III) – India

Like China, India has a world-class tech industry set against the backdrop of a financial services industry that does not yet serve the mass market and small enterprises. A robust tech sector based on world-leading software and information technology companies has developed over recent decades. This has created a tech ecosystem, including skills and capital, that is supporting a burgeoning FinTech sector, including innovators in payments, digital small enterprise and retail lending, personal financial management, and insurance.

India's tech sector had been held back by regulation that limited unlicensed entities from performing banking activities while maintaining high barriers to obtaining a banking license. However, new regulations announced in 2014 will enable tech companies to compete. Many FinTechs have already obtained or sought licenses.

Important advances in infrastructure, especially digital identity that can be linked to bank accounts, have provided an opportunity to reduce the cost of customer on-boarding and ongoing compliance. This enables financial institutions to reach hundreds of millions of new customers. These advances in regulation and infrastructure are paving the way for increased provision of financial services from both traditional and non-traditional providers.

The demonetization of notes announced in November 2016 has accelerated the shift from paper to electronic payments and added momentum to the technology-driven transformation of financial services in India.

Payments banks were conceptualized by the Reserve Bank of India in 2014 as a new model to increase access to financial services for unbanked or underbanked groups such as small businesses, low-income households and migrant workers. The two main differences between a payments bank and a traditional bank are that the former can only accept deposits of up to 100,000 Rupees (\$1,550) per account and are not allowed to issue loans or credit cards.²⁰

Low-cost, paperless operation through mobile phones could allow payments banks to address market segments characterized by low value/high volume transaction. In 2015, the Reserve Bank granted eleven companies, including the country's biggest mobile service providers, “in-principle” licenses to launch payments banks.²¹

The first live payments bank was launched in January 2017 by Airtel, a mobile network operator. India's largest digital goods and mobile commerce platform, Paytm aims to have its new payments bank open 200 million banking and mobile wallet accounts within the coming year.²²

A key element of the support infrastructure needed to reach more customers has been provided by the Unique Identification Authority of India (UIDAI). This government agency, which is

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the world's largest national identification number project, has enrolled more than a billion residents of India since September 2010.²³ UIDAI issues Aadhaar identification numbers, collecting demographic, biometric and other details during enrollment. The Aadhaar number can be used for paperless identity verification when opening a financial account, reducing the risk of identity fraud.

This allows banks to fulfill their Know Your Customer, or KYC, requirements for hundreds of millions of new customers. Aadhaar-enabled e-KYC processes could halve costs and time relative to paper-heavy processes.²⁴ Some 34 banks have used e-KYC to open over three million bank accounts across the country, contributing to a fourfold year-on-year increase in India's mobile banking transaction value by the end of December 2015.²⁵

The identity infrastructure can be linked to the payments infrastructure of the National Payments Corporation of India to access funds and route payments to an individual's phone or bank account. The Aadhaar Enabled Payment System allows the individual to use Aadhaar data for authentication rather than a debit card, in order to perform financial transactions at a banking correspondent. The Unified Payments Interface allows a bank account to be linked to phones and apps.

At the start of 2017 the government launched an inter-operable payment app, Bharat Interface for Money, which became a popular download.²⁶ DigiLocker, a platform for issuing and verifying digitally signed documents and certificates, was recently integrated with UIDAI and will allow further streamlining of financial services.

This "India Stack" of technology built upon Aadhaar will improve credit availability as well. Lenders can link a customer's identity to digital transaction data, enabling more efficient credit appraisals, and use the payments and document functions for efficient underwriting, processing, disbursing and loan collection.²⁷

India has a large SME funding gap that is as much about market size (the number of towns and cities dwarfs the branch numbers of even the largest banks) as it is about traditional banks' reluctance to lend except to known borrowers who have sufficient collateral.

As in some of the developed markets (Quadrant II), there has been strong growth of non-bank alternative lenders addressing this gap in small firm financing with innovative digital solutions, quicker turnaround, analytics and credit-scoring driven underwriting and cost effective customer acquisition. These include NeoGrowth, LendingKart, and Capital Float, technology platforms that lend to SMEs across the country. These lenders use cash flow data, digital transaction history, and other non-traditional information to build credit profiles.

Others, such as KredX, are creating digital platforms for invoice finance.²⁸ Lenders must either obtain a license or book the loans through a bank or Non-Banking Financial Company (NBFC); thus a number of tech companies have partnered with licensed institutions. Since the new lending platforms lack a low-cost deposit base, most of these lenders are funded by banks and institutional investors. Peer-to-peer lending, which serves a combination of retail and micro/small and medium enterprise borrowers, has also been growing rapidly. Currently covered only by the Negotiable Instruments Act, these lenders may be put under a new non-bank finance company category of Reserve Bank licensing.²⁹

In November 2016 the Indian government announced the demonetization of large denomination bills, with the aim of combatting tax fraud, counterfeiting, and corruption. This removed 86 percent of currency in circulation, spurring a sharp increase in electronic payments, including interbank fund transfers, retail bankcard, and mobile wallet transactions.³⁰

Mobile banking and digital payments service providers such as FreeCharge, Ola Money, Oxigen, and Paytm, as well as bank offerings including ICICI Pockets and Axis Bank's LIME have benefitted. Whether this momentum will persist after new cash notes come into circulation remains to be seen, but even a return to the previous trend will mean a continued shift to electronic payments. In March 2017 Amazon was awarded a mobile wallet license, adding another big player to the market³¹, and in May 2017, SoftBank announced a \$1.4 billion investment into Paytm, joining previous investor Ant Financial in helping to expand the company, which aims to serve 500 million customers in three years.³²

With its investment in digital identification, tiered licensing for financial services, and other innovations in financial infrastructure, India has addressed Challenges 3 and 4 (Box 1), creating an opportunity for financial services providers to focus on Challenges 1 and 2, reaching low-income customers with targeted and tailored information and services.³³

Some are actively partnering with FinTechs to expand services and reach and improve efficiency. For example, Fullerton India, an SME-focused credit provider, has partnered with Creditvidya, a startup that leverages alternative data for credit scoring, to perform automated authentication and verification checks to improve the efficiency of Fullerton's loan processing.³⁴

Given the market gaps and the strong tech ecosystem in India, FinTechs and new forms of banks have strong potential to dominate significant market segments. The viability of some of the current business models, however, has yet to be proved, and policy driven changes to pricing, market conditions, and permitted activities will continue to present challenges to standalone tech players. It seems fitting that this market, whose tech companies enabled so much of the business process outsourcing and offshoring that has changed corporate

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operations in developed markets, is now demonstrating how banks can partner with FinTechs to reconfigure product delivery in the home market.

Example 3: “Race to the Finish” (Quadrant IV) – Kenya

An early adaptor of mobile money,³⁵ Kenya appears in Quadrant IV just below Quadrant I, highlighting the expanded reach of its financial sector thanks to Kenya’s mobile-money system, M-PESA, which was launched in 2007 by Safaricom, the country’s largest mobile-network operator. Mobile transactions are transforming Kenya’s payments system; they hit a record \$33 billion in 2016 and accounted for 67 percent of transactions tracked by the National Payments System.³⁶

In November 2012 Safaricom, together with Commercial Bank of Africa (CBA), introduced M-Shwari, leveraging the M-Pesa network to provide deposit and lending products directly onto a phone handset. M-Shwari grew rapidly; by 2014 it had been able to mobilize deposits of \$1.5 billion and had disbursed loans of \$277.2 million. CBA’s market share of deposits rose to 6 percent in 2015 from 4.7 percent in 2012, and its share of the total number of bank accounts grew to 37 percent (12.9 million accounts) from 7 percent in 2012 (1.1 million accounts).

CBA’s contribution to opening bank accounts represented close to 12 million of the total 19 million new accounts in Kenya from 2012-2015, and Equity bank accounted for another 5 million.³⁷ While M-Pesa provided the pipes for CBA’s growth, the capture of value-add in financial services appeared to shift back to the banking sector.

M-Pesa has enabled a number of other advances. Innovators have built on top of the payments infrastructure provided by M-Pesa, developing merchant acquisition networks and innovative pay-as-you-go models for durable goods such as solar lights and panels. That business model innovation has now been replicated in other markets and regions, enabling microleasing of devices that can be remotely controlled and paid for.

This has resulted in a follow-on financial innovation as the solar hardware companies have become de facto leasing companies. Once a device is paid off it can become collateral for further general purpose lending. More recently, the entry of FinTechs using mobile phone data for credit scoring to extend micro-loans (Tala and Branch, for example) may shift the innovation lead back to the technology side.

In another play for the market, Safaricom has recently eliminated fees on low value transactions and reduced the minimum transfer amount from ten to one Kenya shilling with M-Pesa Kadogo. This essentially makes mobile money a costless cash replacement, and potentially positions Safaricom at the center of the merchant payment ecosystem.

It is still not clear who will dominate the provision of financial services in Kenya. For now, consumers are benefiting from reduced prices and increased availability of services, and a recent study has demonstrated the contribution of mobile

money to poverty reduction through increased financial resilience and improved labor prospects.³⁸

The availability of the core payments infrastructure has enabled reconfiguration of the value chain from one in which the banking system provided savings, loan, and payments products to one in which an external payment infrastructure is interwoven into banks’ products and services.

This has underpinned the success of new financial products as well as new business models in other sectors such as pay-as-you-go solar. It has also spurred development of the local innovation ecosystem, as demonstrated by a thriving community of startups, accelerators, and venture capitalists.

Opportunities for Emerging Market Banks

Globally, the digital transformation of banking services allows an expansion of access by leveraging digital channels and customer information, and a reconfiguration of product and process value chains to offer new products and serve customers more efficiently. In this new context, each of the four challenges facing emerging market digital financial transformation, as enumerated in Box 1 above, also presents opportunities.

1. Low levels of formal financial services:

Innovations such as mobile money can take hold more completely in emerging markets where there is a strong need and no incumbent service to displace. Building on the mobile money ecosystem, innovators in emerging markets have leapfrogged conventional financial infrastructures to offer a range of financial services engineered to sustainably service dispersed or low-income populations.

2. Low income levels:

Operating bank branches is expensive in emerging and developed markets alike, and the shift to digital channels helps reach more customers at lower cost across markets. The imperative for complete digital transformation from front-end customer channels, through the credit and payments engines, to servicing and processing is greater, though, in emerging markets where financial access is a goal.

In wealthier markets, mobile channels and improved processing efficiency are add-on benefits to help meet customer expectations and improve profitability. Among low-income communities, however, these are must-have features that enable the sustainable provision of financial services to lower income consumers.

3. Underdeveloped technology and VC ecosystems:

Flying under the radar of the global tech/venture capital community can create space for local innovators to serve their markets while the giants are looking elsewhere. For banks, this can also create opportunities if they can lead in introducing unique local value propositions, as CBA did with m-Shwari in Kenya.

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4. Weak infrastructure:

While forward thinking regulators in some countries have created an environment favorable to digital financial services, whether by offering a flexible regulatory environment (Kenya) that allowed non-bank infrastructure to develop, or investing in critical identity and payments infrastructure and a tiered licensing system (India), in many countries much work remains to be done.

Where general-purpose financial infrastructure is lacking, the networks and infrastructure of incumbent banks retain significant value. The opportunity for banks is to leverage their position of already having payments, identity and trust assets in place as new infrastructure comes on-line. Banks can leverage their capital, customer bases, and brands to expand rapidly in partnership with Fintechs that can help fill gaps in banks' channels, product sets, and processing capabilities.

Conclusion

While the final structure of a digitally transformed financial services sector could take different forms, the degree to which banks continue to play a role will depend on a combination of initial conditions and adaptability.

In markets where the formal banking system is well-entrenched and had been providing reasonable services to the mass market, banks may continue to play a dominant role—even where the technology ecosystem can support significant FinTech incursions. In markets where the banking sector has lagged, FinTechs have a greater chance of taking over functions and market share.

In countries where the tech ecosystem is relatively weak, with only isolated solutions such as mobile money being offered by tech companies, banks have thus far been able to catch up. Kenya is an example where an extensive FinTech infrastructure for payments was put in place by a telecommunications company, but the financial services value add has been reclaimed by banks. Even so, an array of new entrants leveraging that technology infrastructure may shift a portion of financial services out of the banking sector.

China and India offer examples of different potential outcomes in markets where broad penetration of formal banking was low, leaving a large underserved market, while the tech ecosystems were strong. In China, where the regulator has permitted

significant innovation outside the banking system, a huge number of marketplace lenders has emerged, and a number of tech companies have made significant inroads into financial services, notably in payments and investments. India has also seen a proliferation of new lenders and payment offerings.

While the marketplace lending and wallet booms in these countries may not be sustained, the big tech companies in China are well positioned to play a significant role in financial services going forward. In India, the banking regulator has taken a more conservative approach: innovators must partner with banks or obtain one of the tiered licenses now available. Convergence may be the result. As the infrastructure for digital financial services is rolled out, banks are increasingly partnering with innovators even as tech players are looking to obtain payments bank or other licenses.

Across all Quadrants in our mapping, technology enables expanded reach and the reconfiguration of product delivery in the financial sector, as it has in other industries. Market position and regulatory privilege provide a window in which banks can continue to lead in the provision of financial services in the digital age, but this window will only remain open as long as they innovate to provide what customers need. Banks don't need to accomplish all this innovation by themselves.

Banks have an opportunity to learn from the experiences of the automobile, electronics, retail, and other industries where product design, production, branding, marketing, delivery, and servicing no longer take place within a single corporate entity, but value chains have been constructed to optimize the best solution at each link.

As markets develop, more will shift to Quadrant II, in which banks partner with technology innovators to provide enhanced products and services to an ever wider customer base.

Matthew Saal, Principal Industry Specialist and Head of Digital Finance, Financial Institutions Group, IFC (msaal@ifc.org)

Susan Starnes, Strategy Officer, Financial Institutions Group, IFC (sstarnes@ifc.org)

Thomas Rehmann, Senior Economist, Thought Leadership, Economics and Private Sector Development, IFC (trehmann@ifc.org)

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