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by Cornelia Lévy-Bencheton

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Preface

Banking. That old, established, venerated industry is under siege. Digital technologies, changing demographics, and demanding consumers are all colliding. Financial technology, or *fintech*, startups are coming on stream and no one is able to predict how the competition will reshape legacy bank infrastructure and customary thinking. There is an atmosphere of instability combined with excitement.

“Data, Money, and Regulation: The Innovation Dilemma,” our first O’Reilly financial report, discusses how heavily regulated, technologically challenged financial services and banking are at odds with innovation. The need to adapt and become agile could not be more apparent.

“Data Science, Banking, and Fintech: Fitting It All Together,” our second report, examines the disruptive impact of fintech and reviews key participants, products, and technologies. With their massive infrastructure investments and decades-old client relationships, banks have a distinct advantage. How might they fight back against the new crop of fintech companies chipping away at their dominant market position? A strategy and survival plan for continuing relevance are in order.

This report, “Fintech, Open Source, and Emerging Economies: Digital Banking for Everyone,” is the third in this series. Here, we examine how fintech is connecting previously isolated financial systems and populations, allowing them to share in transformative economic benefits. In the developing world, fintech and mobile technologies enable needed financial inclusion. The new, digitally connected world is one in which everyone should have (and can have) access to data and to the financial marketplace. The entire economic pyramid

can benefit, not just those at the top. Other market forces are working together, zeroing in on the unbanked to demonstrate how philanthropy and profitability do not have irreconcilable differences.

Buckle your seatbelts: banks are evolving into tech companies with options. A digitally enabled customer experience is front and center.

It's the End of Banking (as We Know It)

The year is 1995. *Terminator 2: Judgment Day*, the box office smash hit directed by James Cameron, explores the battle for survival between the human race and Skynet, a highly advanced artificial intelligence construct that threatens our civilization with extinction. Working through servers, mobile devices, drones, military satellites, robots, sentient computers, androids, and cyborgs, the film leads us to picture a radically different futurescape, one not unlike our technically sophisticated landscape of today.

With advents in fields like robotics and artificial intelligence, the tension, uncertainty, and chaos of this entertaining cinema classic accurately mirror the current state of the financial world, disrupted as it is by the shadow of impending change cast by financial technology (fintech) and now Brexit.

It's the end of banking as we know it.

Things have never been more unsettled since the anxious period after the 2008 financial crisis. Currently, the problem is not the misbehavior of big banking institutions but rather the limits of those institutions and the threat of disintermediation coming from startups that are faster, simpler, and cheaper, and also offer vastly improved customer experiences. In today's financial ecosystem, there is much ado about experimentation through myriad new formats, including accelerators, labs, incubators, acquisitions, and part-

nerships involving stakeholders throughout the value chain, all diligently working on a response.

Banks are scrambling to find their way. And the frenzy often seems driven by fear, desperation, hope, and copycatting success from other fields like Uber or AirBnB. The incumbents are seeking out adaptive strategies in their rush to grow market share and to stay competitive and relevant...much like the humans trying to escape extinction in *Terminator 2*.

We covered key aspects of fintech, the disruptive megatrend taking hold of the financial world, in another O'Reilly Report, “[Data Science, Banking, and Fintech: Fitting It All Together](#),” in which we reviewed key participants, products, and technologies.

In this report, we focus on several unexpected and extraordinary consequences of the fintech evolution enabled by digital and mobile technologies and the ubiquitous smartphone:

- Big new commercial opportunities in global emerging markets making the efforts of investors, startup founders, and tech visionaries worthwhile
- The socially transformative impact of fintech on financial inclusion for the previously unbanked
- A trickle-back effect from emerging market activity reshaping and affecting the future of fintech and financial services in the developed world

The Fintech State of Mind

Fintech is not a phenomenon located in the isolation of banking centers in New York, London, and Singapore. It is closely associated with the financial services industry, which plays a key part in almost every major life decision we make, from buying a home to opening a bank account, setting up a credit card, starting a business, paying for a college education, or retiring, no matter where we are located. Fintech is about making the role banks and financial services play easier and more efficient. It is the oil, the fuel, the platform, the electric current through which money is moved, spent, saved, and loaned. It is not the preserve of old, white men in pinstriped suits meeting in stuffy conference rooms. It is the agora, the gathering place, the bazaar or marketplace for a wide variety of consumers at all levels

and backgrounds of the economic pyramid to come together to transact. It is global and it is local.

In part, what has accounted for the excitement, interest, and investment capital in fintech are big, new disruptive ideas, particularly in the payments area: there are emerging technologies and platforms such as the Internet of Things (IoT), robotics, and AI, as well as fascination with distributed ledgers and blockchains (and the new technology layers added via the blockchain). Fintech overall, however, is much broader than that. Fintech is a movement and a concept in addition to being a technology. Elizabeth Lumley, director of global ecosystem development at Startupbootcamp FinTech and Startupbootcamp InsurTech—as well as a prominent fintech luminary—defines fintech as follows, adding a potent redirect to understanding what fintech really represents:

Don't pigeonhole the benefits of fintech. ... Fintech is a mindset, not a sector. It's the way you develop products around a consumer or business problem and that's the real benefit fintech will have on this industry.

Consider this: digital and mobile technologies with fintech applications bring efficiency, effectiveness, and more comfortable living to Western populations. We all have smartphones. And we don't think twice about consulting our handheld devices numerous times a day. We use them for everything from texting to email to Internet access and calendar appointments. A wide variety of app choices allows us to download, upload, or go shopping all day long. Point, swipe, click, and we're done.

But to the less fortunate, these platforms provide access to far more basic needs. They are connecting previously isolated systems and populations, allowing them to share in economic and financial benefits that completely transform their lives. Fintech in emerging societies ushers in a dramatic leap forward in economic progress for the underserved, unbanked, and underbanked. Thanks in large part to the ubiquitous mobile phone and now the smartphone, poorer countries have become hot spots and big business, revenue, and market opportunities.

Mobile Enabling Broad Change

Wallets stuffed with credit cards, ATMs on every corner, meals ordered up through Seamless, vacations via Airbnb, the Uber app ready to get us where we want to go. Why carry cash? It's no longer necessary. Swipe, point, and click. Need to see your balance? How about a loan? No problem. This is what normal looks like for most of us today. This is inclusion. It is hard for those of us living in first-world, industrialized nations to picture anything other than the digitized convenience to which we have become accustomed and the privileges afforded by access to financial services.

For Others, a Very Different Story

But, here's what exclusion looks like. In third-world or developing countries, for those living at the base of the economic pyramid, cash still reigns supreme. Buying something requires carrying cash around or hiding it somewhere around the house at the risk of being robbed. Sending money to a friend or relative in need can mean taking a day off from work without pay, or, perhaps, taking a child out of school or not bringing the child to school at all if that can't be arranged. Delivering the cash in person is dangerous because a robbery could happen along the way. Trusting someone with delivery carries the risk that it might never reach its destination. In an emergency, borrowing money incurs extortionate usury rates from moneylenders. Investment means buying another chicken or goat which will lose value over time. If your money is tied up in investment property like animals or jewelry, how do you make a payment?

Africa Heating Up as a Mobile Money Market

For purposes of this report, we spotlight Africa as an example. Of course, fintech comes into play in other emerging markets as well. However, although those populations and opportunities are sizeable, including them here skews our discussion with dissimilar variables.

Why is Africa a good example? With its young demographic, it has successfully integrated mobile financial technology into daily living. Africa has a very young population. They are digital natives whose average age is 18 (by comparison, in the United States, the average age is 37) and we know that population age is highly correlated to speed of technology adoption. Another factor is infrastructure or lack thereof. African precincts are not dotted with brick and mortar bank branches and so legacy banks, regulations, and habits have not gotten in the way of penetrating this market. African populations are extremely receptive to mobile tech development. Even in sub-Saharan Africa, about 12 percent of adults already have mobile bank accounts, compared to about 2 percent globally. Lastly, a large percentage (about 80 percent) of Africa's adult population does not use formal financial services. The upside potential is enormous.

In a recent report, the Consultative Group to Assist the Poor (CGAP) recognizes stand-out opportunities for fintech companies in four African countries (see [Figure 2-1](#)): Kenya, Tanzania, Ghana, and Rwanda. Kenya and Tanzania had previously been identified as mobile money success stories because more adults there had mobile money accounts than had bank accounts. According to new information, technology can also be effective in other African markets like Rwanda and Ghana. Key factors in Ghana include: 1) 92 percent of adults in Ghana have the required ID necessary to open an account, 2) a 95 percent rate of numeracy, and 3) 91 percent of Ghanaians already own a mobile phone. Poorer populations in the developing world often do not have a formal financial history or identity records. Some don't have identity documents (like birth, graduation, or marriage certificates). As mobile subscriptions have risen dramatically across Africa, the cost per device has dropped, making phones very affordable and allowing widespread use of smartphones to bring more people online across the continent. Along with declining price, improved infrastructure, faster transmission speeds, and better connectivity for popular social products

like Facebook and Twitter, financial services too, can now reach a growing middle class as well as Africa's remote rural areas.

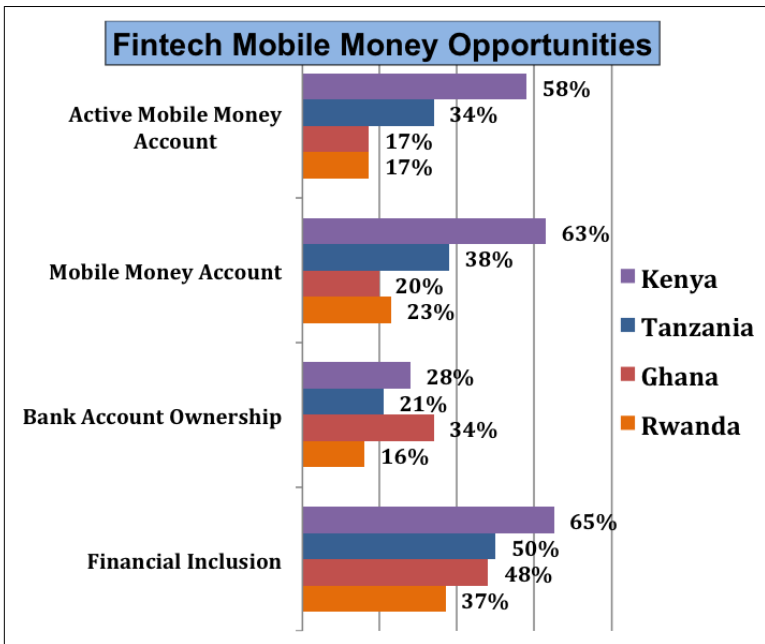


Figure 2-1. Fintech mobile money opportunities in four African countries. (rendered by Cornelia Lévy-Bencheton; source: <http://bit.ly/2cpTKgn>, page 4)

Mobilizing with Financial Data

It's all about the data. And mobile data is the silent engine driving financial inclusion and the new products that will certainly emerge in the future. Even at a very early stage, there is much promise and potential in the data being gathered, mined, and analyzed. Analyzing data from mobile wallets and cell phone usage is the gateway to product innovation. In developed countries, people are already storing money digitally on their phones and using them to make purchases, as if they were debit cards. By 2020, 2 billion people who don't have a bank account today will be doing the same thing. And after that, mobile money providers will be offering the full range of financial services, from interest-bearing savings accounts to credit, insurance, and other facilities that we can only imagine.

It seems unlikely that the lack of traditional financial infrastructure will change anytime soon because the cost of creating it would be prohibitive and unnecessary—millions of people don't even have access to cash machines or bank branches. It also seems unlikely that this will stop the pace of progress. What is more likely is that mobile money transfer transaction volumes and revenues will rise, purchasing power for consumers will increase through online access, the standard of living will continue to improve, tax revenues for governments will grow, and banking and telecom companies will have increasing opportunities to grow their businesses.

For providers, mobile is the gateway to innumerable financial services delivery such as money transfer, cash deposits and withdrawals, third-party deposits into a user account, retail purchases, prepaid cards fueled by cash, and other services, all of which have a much higher adoption potential with and on mobile. Mobile applications provide a common development and ready-made distribution platform.

Just M-Pesa Me the Money

Professional photographer and photojournalist **Wendy Stone**, who lived in Kenya for 24 years starting in 1988, witnessed the breathtaking life style and cultural changes brought about by M-Pesa as she traveled throughout Africa working on projects for numerous NGOs, international organizations, and creative and media outlets. Initially launched in 2007 in Kenya by Safaricom (a subsidiary of Vodafone) as a means of facilitating microfinance to avoid some of the inefficiencies of the country's cash economy, M-Pesa took off. It was an immediate hit. During our interview, Stone recalls:

It changed our lives in a very dramatic way. The average Kenyan does not have bank accounts. But they do have mobile phones. It's a rural society, they're agriculturalists [see [Figure 2-2](#) and [Figure 2-3](#)]. The majority of the people still live on tiny homesteads called in Kiswahili "shambas." M-Pesa works on a very basic level. If they want someone to send money, they'll say, "M-Pesa that, please." Nobody uses a bank check. Credit cards are extremely rare. People want to be M-Pesa'd because it's an easy and safe way to move cash. And it's instantaneous. Instantaneous! That's the thing. It doesn't have to go through the banking system.



Figure 2-2. An entrepreneurial woman farmer engaged in a thriving microbusiness in Kisumu, the largest marketplace in Western Kenya (photo courtesy of Wendy Stone/Getty Images; used with permission)



Figure 2-3. M-Pesa facilitates transportation and sale of vegetables and produce from remote villages to thriving commercial markets like the one above in Kenya (photo courtesy of Wendy Stone/Getty Images; used with permission)

With M-Pesa, a few taps on a cellphone enables people in Kenya to send and store money, pay bills, or even run a business from the palm of their hand. With more than 20 million users currently, M-Pesa enjoys the distinction of being the world's most widely used mobile money transfer and financial network, and Kenya leads the way in mobile money. A variety of circumstances contributed to Kenya's success, not the least of which is access to fiber-optic cables running under the sea from the Arabian Peninsula.

Safaricom's far-reaching M-Pesa network strategy laid the foundation to broadly expand the market, allowing connecting partnerships with more than 140 financial institutions and revolutionizing the ability of banks to scale up fast. M-Shwari, an account combining savings and loans, and M-Changa, an app for lending and crowdfunding, are examples of highly networked products that reach millions of people quickly. Previously, money exchanged hands (largely via cash—in person or remotely) in a centuries-old practice known as *harambee* (Kiswahili for fundraising) without transparency. All that is changing.

Many m-payment services have sprung up with collaboration between banks, mobile network services, and payment providers. As of this writing, it is not known whether there is one network that can connect the entire African continent and all its countries with network interoperability. However, the activity and product potential make Africa a giant experimental laboratory in defining the future of money, banking, and mobile technology. It is remarkable that Africa has so quickly caught up to the developed world, skipping over the stages of brick and mortar infrastructure and accompanying red tape, and going straight to mobile tech.

The Gender Differential

An unexpected consequence of the success of mobile technology in countries such as Kenya is the spectacular improvement of individual and household welfare and the spike of activity in micro-, small-, and medium-sized enterprises and in cottage industries, many of which—surprisingly—are run by women (Figure 2-4 and Figure 2-5). Stereotypical casualties of the gender gap and certainly cast as underrepresented minorities in tech, women are now taking the lead as both beneficiaries and drivers of economic development in this new business model. Women have become emboldened as

entrepreneurs by the handheld mobile phone. In our interview, Wendy Stone explains how the dynamism of women is very much a cultural and historical artifact:

Women have always been the workers in developing countries, not the men. It's a cultural difference. Traditionally, a man's job was to take care of the livestock and settle any clan or tribal disputes. That was the role of men. The women are the real workers. They take care of everything else.



Figure 2-4. Émilienne, a successful peanut cookie trader and entrepreneur in Benin, West Africa (photo by Kakpota, Benin, courtesy of The Hunger Project; used with permission)



Figure 2-5. Microfinance at the Ndereppe Epicenter in Senegal (photo by Johannes Odé, courtesy of The Hunger Project; used with permission)

Megan Colnar, director of monitoring, evaluation, and learning at The Hunger Project¹ (<http://www.thp.org/>), who has lived in Kenya and is now working in the eight African countries where her organization has a presence, confirms, during our interview, the strategic importance of targeting and including women as a make it or break it success factor:

Women are less likely to own phones. But, even with mobile banking, if you're not targeting women specifically and if you're not really looking and caring for their needs, understanding why women don't have phones as often as men and looking into some of those social factors as well as the physical and geographical factors, you might miss the mark in delivering the kind of services with the success you hope to achieve.

1 The Hunger Project is a global nonprofit organization whose mission is to end hunger and poverty by pioneering sustainable, grassroots, women-centered strategies and advocating for their widespread adoption in countries throughout the world. The Hunger Project works in 12 countries across Africa (Benin, Burkina Faso, Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Uganda), South Asia, and Latin America.

Because women are also 28 percent less likely than men to own an account at a financial institution according to a recent report by the Consultative Group to Assist the Poor (CGAP; <http://www.cgap.org/about/faq>) on adults in developing countries living below the \$2/day poverty line, it would be easy to overlook how critical their involvement is.

The Hunger Project deploys mobile phones as though they were Internet of Things (IoT) connectivity devices to collect, manage, share, and document program inputs, outputs, outcomes, and especially impacts on its network. It uses sophisticated data-driven and digitized research techniques to measure progress on its many initiatives in eight African countries including Benin, Burkina Faso, Ethiopia, Ghana, Malawi, Mozambique, Senegal, and Uganda. Through iFormBuilder, a mobile data collection platform for iOS and Android, it has established that projects in rural, emerging, and sub-Saharan territories can be measured and monitored.

Through financial services provided as part of The Hunger Project's **Epicenter Strategy**, rural women are better equipped to launch their own income-generation projects and invest the profits toward the financial independence needed to improve the lives of their families. Because mobile phone reception and computer literacy is expanding, the rural banks, set up in partnership with The Hunger Project, are increasingly able to digitally track loan and savings accounts.

Those living in poverty are even more so required to make strategic choices about the products they need. Megan Colnar shared additional insights from her work in Africa: "Poor people are just as savvy about buying things and knowing what they need. Conscious of value, they are interested in end products that meet those needs." She cited a market research study in Kenya by Gamos: "**The Next Generation of Low-Cost Energy-Efficient Appliances and Devices to Benefit the Bottom of the Pyramid**" (known as the LCT [Low-Cost Technologies] project). The report uses discrete choice modeling with logistic regression to fit predictive models for the technology options proposed. Although not specifically about financial services, it clearly shows how poor people know exactly what they need and what they are willing to pay for products and services that meet those needs, even products that cost a bit more. Countries such as Kenya have created products ahead of many developed countries. Africans, for example, were texting money with M-Pesa years before Venmo arrived on the scene in the developed world.

Another organization that works in this space, **Women's World Banking**, identifies the same trend of rural women transformed into micro-entrepreneurs, emboldened through computer literacy and advancing down the highway to financial inclusion. Its website is replete with stories, blogs, anecdotes, and research detailing how women—inherent savers and quite thrifty—when they are empowered, do the heavy lifting to create small enterprises, taking responsibility for the education, health, and welfare of their families.

Smartphone screens that replace bank tellers in our culture are replacing banks altogether in the developing world. With their built-in database and memory capability for audit and tracking, these also serve as IoT devices that capture data, record transactions, and serve as sensing dashboards to monitor activity. The rate of adoption is phenomenal as is the data-mining potential. It is the smartphone that has leapt over habitual structure and process to transform culture. And now the developing countries are leading us onward.

An Expanding Universe of Stakeholders and Players

New, unexplored markets beckon and the profit motive is not dormant. A business opportunity is a business opportunity. Many factors offer attractive returns to established players looking for growth, market testing of use cases, and compensatory strategies for offsetting downside risks back at headquarters. Meanwhile, philanthropic organizations see light at the end of the tunnel.

Fintech: Unstoppable Growth

The explosive growth in fintech is undeniable. And it does not look to be slowing down anytime soon. Venture capitalists, private equity firms, corporations, and others have poured an unprecedented amount of money into global financial technology startups. The fintech industry and its ever-expanding ecosystem promise to be gigantic in years to come. The number of investments and acquisitions is increasing year-over-year at an incredible rate. The spectacular growth seen in 2014 of \$12.7 billion USD (quadrupling the \$3 billion USD level of the year before) was overshadowed in 2015 by the stunning figure of \$22.3 billion USD, an increase of 75 percent, including startups and investments. And this breathtaking expansion continues. Already in Q1 2016 fintech investments have surpassed the same period for last year, challenging our expectations of growth of any kind associated with financial services.

According to an **Accenture report**, collaborative fintech ventures—those primarily targeting financial institutions as customers—are gaining ground over so-called “disruptive” players that enter the market to compete against those institutions. Funding for collaborative fintech ventures, which accounted for 38 percent of all fintech investment in 2010, grew to 44 percent of funding in 2015, with the remaining investments made in ventures that compete with financial institutions.

Mobile Heating Up, in Step

Mobile and fintech are in lockstep. According to **the Mobile Ecosystem Forum**, all areas of mobile money are showing growth including carrier billing, proximity payments, person-to-person (P2P) transfers and services for the unbanked, and contactless payments—all pointing the way to the future. **IDC forecasts** of worldwide mobile payments, made using mobile devices, are reflected in Figures 3-1 and 3-2. Does this dramatic growth mean the end of physical cash?

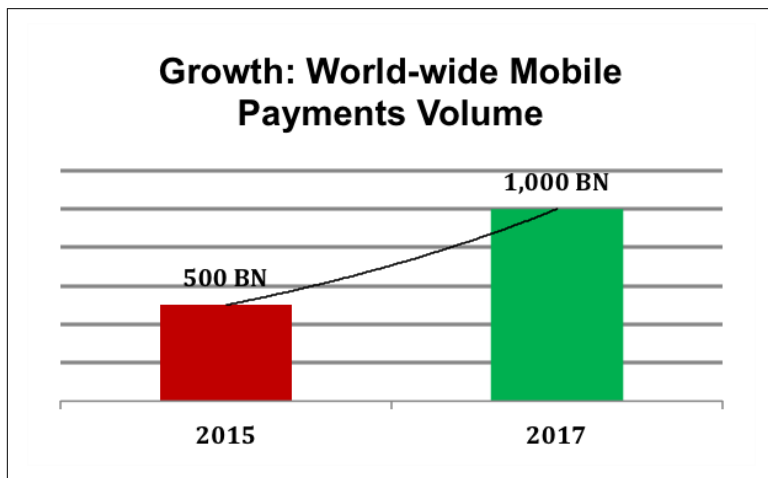


Figure 3-1. Growth of worldwide mobile payments volume (rendered by Cornelia Lévy-Bencheon; source: <http://bit.ly/2cxQTVY>)

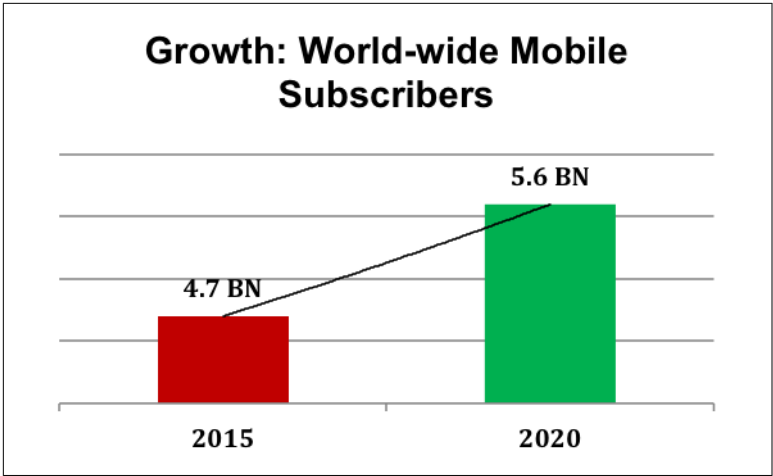


Figure 3-2. Growth of worldwide mobile subscribers (rendered by Cornelia Lévy-Bencheon; source: <http://www.gsma.com/aboutus/>)

Such spectacular growth will clear the way for development and adoption of numerous new device and product innovations in funds transfer, account types, retail purchases, and prepaid services.

Ready for Another 2.5 Billion Customers?

That's what's available. **World Bank research** tells us that there are more than 2 billion people—or 38 percent of all adults on the planet—who don't have access to the most basic financial services. And 2.5 billion have no banking account. This includes more than half of adults in the poorest 40 percent of households in developing countries. Essentially, we should consider that about 73 percent of the world's population is unbanked, that is, financially excluded. And that is an extraordinary opportunity. A huge number of companies including micro, small, medium, and large enterprises are commercially in need. The developing world has huge masses of new prospects and customers and needs the resources to satisfy and manage these. The International Finance Corporation (IFC) estimates at more than 200 million the number of these enterprises in developing economies that are unserved or underserved in their financing needs.

The explosive growth of fintech and mobile platforms makes emerging markets a hotspot, hot market, and pivotal hub for digital tech-

nology and mobile commerce development. This creates a digital marketplace where consumers and businesses alike can participate for market share, revenue, and new products. Some of the common factors that are going to propel this growth are P2P payments, cross-border and intercontinental money transfers, mobile commerce, proximity payments, wallets, and government services that are going mobile.

Fast Tracking on the Inclusion Bandwagon

The time has never been better to take advantage of new consumer and business opportunities in emerging markets. The Universal Financial Access initiative (UFA2020: <http://bit.ly/2c1x5Yp>) was launched in 2015 by the World Bank, the International Monetary Fund (IMF), and the International Finance Corporation (IFC). Teaming up with a broad global coalition of 14 partners, it has pledged commitments for 1 billion financially excluded adults to gain access to formal financial services by 2020. The project details strategies, diagnostic measurements, and tracking across the 25 targeted countries where 73 percent of the world's financially excluded are located. Included are 12 of Africa's 56 countries.

Players abound. The World Bank, the Gates Foundation, IMF, IFC, M-Pesa, M-Kopa, Cellulant, MFS Africa, Tigo, Airtel, MTHN, Vodafone, The Hunger Project, Women's World Banking (some of which you've seen in this report), along with other multinational agencies, foundations, banks, credit unions, card companies, micro-finance institutions, networks, telecommunications companies and carriers, and device manufacturers are some of the broad-ranging organizational forces to converge on the financial inclusion bandwagon, a meeting of both financial and social value incentives.

In June of this year, MasterCard increased its UFA2020 commitment, setting an additional goal to connect 40 million micro and small merchants to its electronic payments network within five years. Under the leadership of Ajay Banga, president and CEO of MasterCard, the firm has redefined itself as a "technology" company, not just a card company, and strengthened its intention to use technology in the global digital payments ecosystem to bring consumers, financial institutions, and merchants into the financial mainstream.

Although a clear philanthropic movement is underway—affecting social good and inclusion for the underserved, unbanked, and underbanked—mobile money and fintech agility are adding to shareholder financial value. Philanthropy and the profit motive are not at odds.

Open Source, APIs Drive Innovation

Digital technology, open source architecture, and application programming interfaces (APIs) are driving toward more collaboration and data sharing. We can expect a galaxy of new and profitable products, services, and processes from the fintech zeitgeist.

Monetizing the Model

Does the developing world offer a profitable business model? Yes! Practitioners in markets across the globe show they are able to monetize the strong growth of mobile and data traffic. This is a key factor at a time when revenues in the developed world from more traditional channels are squeezed. In financial services, added productivity issues and a sluggish economy lure attention elsewhere to growth opportunities. **None other than Bill Gates affirms the financial success of serving emerging economies.** Companies pioneering mobile banking find it profitable to serve the poor because “the marginal cost of processing a digital transaction is near zero. And because so many people in developing countries have mobile phones—more than 70 percent of adults in many countries are subscribers now—the volume of transactions can be very high. By making small commissions on millions and millions of transactions, mobile money providers can make a profit serving poor customers.”

Here’s an illustration. Financial opportunity is highlighted when forward-thinking giants like MasterCard are approaching unbanked

areas of the globe. As all is going virtual, digital, and biometric, MasterCard describes itself as a “technology” company. Under Ajay Banga’s leadership, the firm is innovating with facial-recognition software, mobile payments systems, touchless transactions, and a new take on the digital wallet, all of which will address issues of fraud prevention, cybersecurity, data governance, and security. During our interview, Subu Musti, vice president of mobile solutions, digital payments at MasterCard, and an authority on financial inclusion, corroborates Gates’ assertions about the enormity of the opportunity and common sense economics of sound business practices:

Obviously there is some level of risk involved with the fact that you want to launch products in an underserved market. But, if the product is a hit, then you will be rewarded. The more comprehensive the user experience that you can provide, the higher your chances. You just have to deliver a very differentiated service, highly localized, very customized to their particular situation with all their nuances taken into account. And, you need big data to get these insights.

For commercial success, building infrastructure, and creating the exceptional, differentiated experience customers in emerging markets anticipate, Subu emphasizes mobilizing key operational factors:

- Programming and software
- Infrastructure
- DevOps

Programming and development teams will be highly motivated to create compelling applications and products that have a value-add for the consumer and bring revenue back to headquarters. The infrastructure ecosystem piece offers economies of scale, reduces costs, and will provide additional incentive. Per Subu, “It is usually preferable to include local parties and support the indigenous country to build trust.” The role of DevOps is in bringing cost factors down and providing an efficient, agile implementation. He cautions, “Everything needs to be automated and seamless so that human capital is not involved in regular system maintenance and updating.”

Radically Improved Customer Experience

Since the Hadoop Distributed File System (HDFS) and MapReduce frameworks were first developed about a decade ago, there have been numerous open source initiatives, many of which are now part of the Apache Software Foundation projects. Additional software packages can now be installed on top or alongside of these (Hive, Pig, Spark, Sqoop, and others). Open source fostered new product design, business processes, legal structures, speed of execution, and clusters of new software languages (i.e., Ruby, Kafka, PHP, Python, and so on) through collaboration, education, and source code sharing. Today, we can see the same dynamic rate of innovation in the adoption of application programming interfaces (APIs), which are becoming key drivers for the data and mobile economy and the creation of new services in numerous industries. These build out from open source based on strong foundations of collaboration and data sharing. Financial has been slow to adopt open source, but less so with using APIs. Once an app is published on iOS and Android, it reaches millions of users, bypassing the need to build new infrastructure.

In an ever more connected world, APIs allow firms with huge legacy systems to muscle their way into competitive advantage by becoming more flexible and more digital. APIs are the sandbox for developers to exercise creativity in designing new user experiences through highly interconnected technology architectures, entering new consumer markets with greater speed. From a consumer's perspective, the benefit is more choice, more personalized services, and better integrated and more localized services.

In a nutshell, the API is a way for developers to access services and resources from other pieces of software code that they did not write. For fintech, APIs are a tool for survival and relevance in the mobile and smartphone universe. APIs unite financial services, banking, and fintech firms in the creation of breathtaking apps to access the vast data supply stocked at financial firms and the ingenuity of other products with speed and agility using the following building blocks:

- Integrating content from partners
- Creating new lines of business
- Developing new revenue streams

- Extending product offerings by using data in new ways
- Offering consumers fast access to products with a first-mover advantage
- Getting developers up to speed and delivering quickly

Leading the way in API “microservices” is forward-thinking MasterCard. Explains Subu Musti, “Every organization, including ours, places heavy emphasis on APIs and how to promote their capabilities in microservices so customers can then consume our APIs. We create compelling experiences for the consumer.” This expanded use of APIs lays the groundwork for enormous interconnected, interoperable networks that facilitate access, and revolutionize speed, ease, and connectivity, ultimately accelerating financial inclusion. The social betterment aspect is obvious.

The use of APIs by banks, in partnership with fintech firms, is becoming increasingly common given that APIs drive speed and cost-effectiveness in entering new markets. Coupled with cloud services, APIs enable startups to quickly scale up without heavy investment in hardware. Thus, they can economically meet peak demand. They are the gateways that aggregate payments, transfers, and wallets into a single platform that customers can use whenever they want. Currently under development is a **global Open Banking Standard** that would set the framework for taking banks, their customers, and regulators into a truly 21st-century connected digital economy, resolving issues of security and consumer protection as data sharing increases and removing any lingering doubt about the benefits of sharing models.

With open source technology iteration and the compound effect of open source and API adoption, fintech emerges as having the potential to completely redefine financial services.

The Rebounding Effect for Banking as a Platform

The industry needs to shift—and is shifting—from serving only the top of the world economic pyramid to serving the entire pyramid. There is a concerted effort to make this happen and trends are all in alignment. Many organizations are now discovering that financial benefits and humanitarian values are not incompatible. They are rethinking their risk-reward models for these markets in more comprehensive ways. In our new digitally connected world, everyone should have access to data and to the financial marketplace. In our Internet of Things (IoT) future, global commerce is growing and pushing us beyond the limitations of traditional financial services.

Mobile banking and the mobile phone have already played a pivotal role in **financial inclusion in Africa** making lives better for the local populations. This is happening very fast and in ways that are impossible to anticipate or measure at the same time (Heisenberg's uncertainty principle about position and momentum at play). Bigger business opportunities are on the horizon. Developing a pan-African money transfer and payments ecosystem within and between countries, a fully interconnected platform for the African continent, cross-border, cross-currency, and cross-network, while dependent on improved infrastructure, could have an even more dramatic impact on people's lives. But banks also stand to benefit financially and otherwise from such developments, as they drive momentum that reimagines their own capabilities. Implementing big strategic visions through programs like Universal Financial

Access (UFA2020) can give the industry an image makeover, shifting perceptions from capitalist villain to heroic savior and from stuck-in-the-past dullards to innovative leaders.

For sure, native ingenuity and energy abounds in Africa. The absence of a powerful national electrical grid, for example, never stopped mobile phone expansion. Problem: no electricity? Solution: bring custom-designed charging stations to the people. That's the way they roll. Ingenuity is abundant. Consider this example: rapid fire local response invented eco-friendly, solar-powered kiosks wheeled out to meet users who were in need of a charge. Developing and extending the utility of these kiosks for other needs, **they now serve as free-standing schools and substitute teachers.**

What Is Banking as a Platform?

Although fintech will exert continuous pressure on the financial services industry to innovate and shape customer behaviors and business models, activities undertaken in emerging countries might create a powerful ricochet impact back onto the industry where it originated—in the developed world. It's as certain as Newton's third law and having an equal and opposite reaction. This feedback might impact long-term structure and favor the emerging concept of what we refer to as Banking as a Platform (BaaP). In the BaaP model, the bank operates like a financial supermarket. Consumers shopping in this setup have access to a wide variety of products and services. The bank functions less as a single brand and more like a portal providing access to a multiplicity of other choices. An example would be shopping for insurance with a broker who offers plans from many different insurance firms. Open source and open standards have favored modularized product and service stacks with interface openness leading to a sleek future financial marketplace.

Two financial and fintech cognoscenti, David Brear and Pascal Bouvier, have explored the concept of BaaP in great depth in **“The Financial Brand.”** In a nutshell, if a smartphone were a bank, it would be an excellent example of BaaP. The phone device comes equipped with a suite of easily accessible products, financial and otherwise, along with a host of applications developed through APIs and pulled through. These include contact data, weather, and numerous other information feeds like Twitter, Facebook, and Internet access.

Fintech and Brexit

It never ends. Disruption, that is. It's ongoing, not a one-time occurrence. The latest financial news from the United Kingdom will surely affect London as a world financial capital and center of fintech activity. June's Brexit decision, even in these very early days, has provoked intense controversy. Anticipating overall opportunity, however, is Nile Gardiner, Ph.D., director, Margaret Thatcher Center for Freedom, Davis Institute for National Security and Foreign Policy, The Heritage Foundation, in Washington, DC. At a recent "Brexit or Brexit" conference in New York, he postulated:

Brexit will strengthen fintech in London, rather than weaken it. With the City of London freed from the shackles of EU regulation, investment in fintech from across the world will grow. As the European Union faces economic turmoil and decline in the coming years, especially within the Eurozone, London and its fintech sector will become increasingly attractive to global investors, seeking lower costs, less red tape, a highly skilled workforce, and a city with a truly global outlook.

A colleague on the same panel added how fintech in London can now focus on other geographies, those located, for instance, on the other side of the Mediterranean, in Africa.

About the Author

Cornelia Lévy-Bencheton is a communications strategy consultant and writer whose data-driven marketing and decision support work helps companies optimize their performance. As principal of CLB Strategic Consulting, LLC, her focus is on the impact of disruptive technologies and their associated cultural challenges that open up new opportunities and necessitate refreshed strategies. She concentrates on big data, IT, Women in STEM, social media, and collaborative networking. Ms. Lévy-Bencheton has held senior marketing and strategy positions in well-known financial services firms, and is currently on the board of The Data Warehouse Institute (TDWI), Tri-State Chapter and the board of the Financial Women's Association (FWA). She earned her MA from Stanford University, MBA from Pace University, and holds several advanced certificates from New York University.