Accelerating Financial Inclusion with New Data

A joint report from the Center for Financial Inclusion at Accion and the Institute of International Finance

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Accelerating Financial Inclusion with New Data

AUTHORS

Ethan Loufield, Director of Strategy and Operations, CFI
Dennis Ferenzy, Associate Economist, IIF
Tess Johnson, Research Associate, CFI

PROJECT DIRECTORS

Elisabeth Rhyne, Managing Director, CFI
Kristen Silverberg, Managing Director, IIF
Conan French, Senior Advisor for Innovations, IIF

FOREWORD BY

Islam Zekry, Chief Data Officer, CIB Egypt

DESIGNER

Mounika Ramaji, Program Assistant Digital Design, IIF

EDITOR

Virginia Moore, Director of Communications, CFI

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FOREWORD

For the financial institutions that aim to serve the 1.7 billion people globally who lack access to formal financial services, new data tools offer an unprecedented opportunity. The ability to capture and analyze vast amounts of data supports real-time, in-depth analytics to improve credit models, identify new customers, understand the products they need, and create a seamless customer journey. These new capabilities and improved economics help financial institutions extend quality financial services to unbanked and underbanked populations, deepen financial inclusion, and accelerate economic growth.

One country that stands to benefit significantly from advances in data analytics is Egypt, where two-thirds of the population lacks an account at a financial institution and the informal economy is estimated to be around USD 90 billion. Currently, borrowers without a financial identity are automatically locked out of the credit market, and individuals with limited financial data are categorized as "higher default risk clients" and typically charged higher interest rates or have greater collateral requirements. Traditional credit scoring methodologies, which exclude most of the potential customer base, need change.

Commercial International Bank (CIB) Egypt recognizes the prospects of data analytics for financial inclusion. Converting non-traditional data into credit insights that help banks assess an individual's willingness and ability to pay will become the cornerstone for an alternative credit scoring system, enabling smart lending. CIB's newly established Analytics and Data Management department is moving in this direction—our bank is leveraging descriptive and predictive analytics and historical behavioral trends, while ensuring that all opportunities pursued make financial sense. The ultimate goal for CIB is to increase profitability, enhance our ability to serve various customer segments, and quickly tap into the lucrative opportunities that the emerging Egyptian economy offers.

I welcome this report by the Center for Financial Inclusion at Accion and the Institute of International Finance, and applaud the efforts of both organizations in encouraging the mainstream financial industry to safely and responsibly leverage data for positive customer outcomes. As digitization and new data tools continue to enhance our ability to analyze alternative data sources for the unbanked and identify viable opportunities, our collective efforts will bring about further advances in financial inclusion.

One can barely begin to imagine the list of potential opportunities that new data holds for the future. Expanding access to credit, fueling growth in developing economies, increasing the tax base, optimizing subsidy disbursements, and much, much more are closer to our reach than ever before.

Islam Zekry, Chief Data Officer, Commercial International Bank (Egypt) S.A.E.

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This report is part of a two-year initiative, *Mainstreaming Financial Inclusion: Best Practices*, which aims to help advance efforts of financial institutions to reach customers at the base of the economic pyramid. It is the fourth of six reports in this series. The initiative and this report were made possible by generous financial support from MetLife Foundation. CFI is also grateful for generous support from its founding partner, Credit Suisse. However, the views and opinions expressed in the report are those of the authors and do not reflect the views and opinions of the interviewees, the advisory group members, or MetLife Foundation. All errors are our own.

INTRODUCTION

As financial services increasingly go digital, finding innovative ways to leverage new kinds of data and tools is fast becoming a necessity for financial service providers, both to remain competitive in traditional markets and to tap into vast new markets.

This report, which is based on interviews with banks, fintechs, and other actors,[i] examines how new types of data and analytics tools are being used in the financial sector to reach underserved markets. Our aim is to take stock of how the data landscape is evolving, to describe new types of data tools, and to assess how firms are innovating around data, and where they have experienced setbacks. As this report will discuss, there are many internal and external challenges that providers must address for the promise of new data to be fully realized. From getting the right culture and technical talent in place to engaging with regulators and partners on data sharing and management, there are numerous obstacles to negotiate in capitalizing on the explosion of new data to reach underserved markets with new commercially viable solutions. This is not an attempt to provide a "how-to" guide for navigating the various stages of the data value chain. There are too many contingencies to prescribe a "one-size-fits-all" solution. Instead, it is an effort to shed light on the potential of data to improve financial services for the underserved.

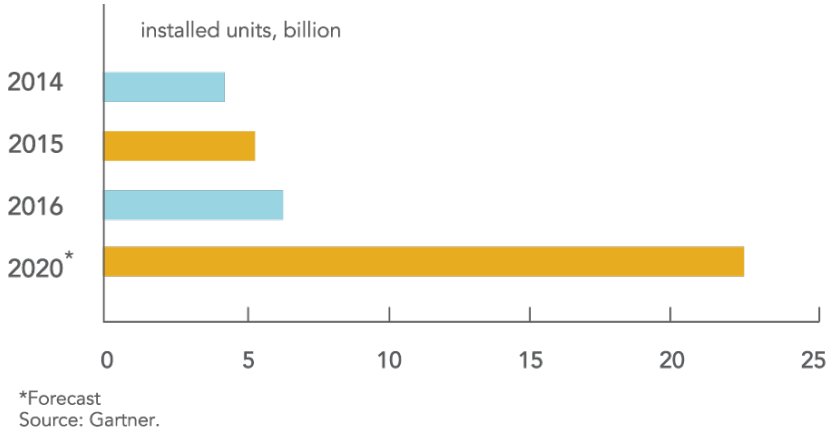
While underserved markets may not be as lucrative as more developed markets today, they represent a great opportunity for mainstream financial institutions: they are unsaturated and likely to represent a much larger share of growth in the years ahead.

But along with the influx of new types of data and tools also come new kinds of competitive threats. The traditional boundaries separating players in adjacent industries are blurring, and the future market for financial services is up for grabs. Mainstream providers must therefore accelerate their efforts to confront these challenges and future-proof themselves for what the data revolution has in store.

i The scope of this paper prevents us from exploring how data is being leveraged by insurers. For more information on the topic, please see Inclusive Insurance: Closing the Protection Gap for Emerging Customers and Innovation in Insurance: How Technology is Changing the Industry.

STATE OF AFFAIRS: HOW BANKS AND FINTECHS ARE USING NON-TRADITIONAL DATA AND TOOLS

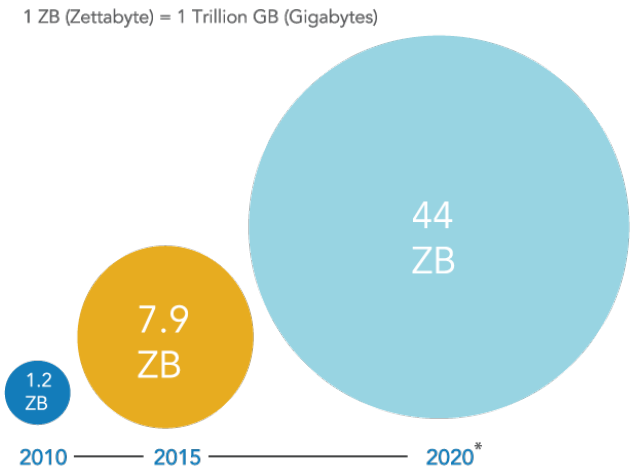
FIGURE 1
INTERNET-CONNECTED DEVICES



*Forecast
Source: Gartner.

Over the last decade, the digital revolution has intensified with the proliferation of online devices (see Figure 1); new and cheaper solutions to store, manage, and process data; a substantial rise in computing power; a decline in related costs; and the ubiquity of connectivity. In turn, these breakthroughs have fueled exponential growth in the amount of data being generated globally. According to International Data Corporation, a market-intelligence firm, the digital universe is doubling in size roughly every two years. This data explosion (see Figure 2), combined with a growing capacity to collect, structure, and analyze data continually and in real time, is fundamentally transforming the financial services landscape and giving rise to new opportunities for banks, fintechs, and others to reach vast new markets.

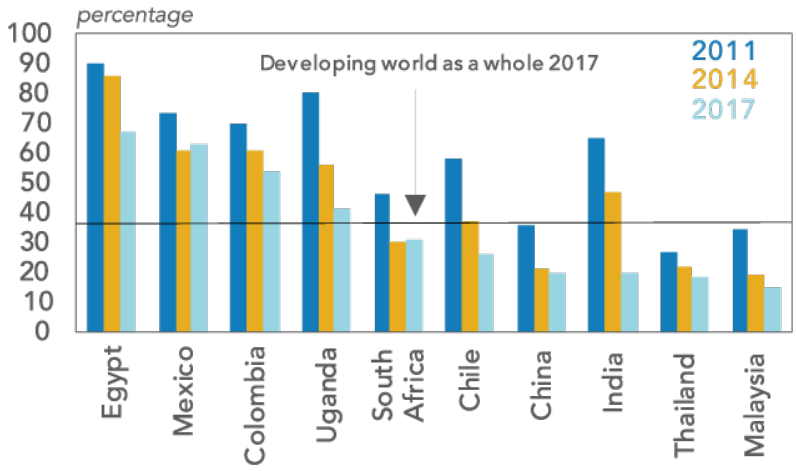
FIGURE 2
GROWTH OF GLOBAL DATA



*Forecast
Source: CSC, IDC.

With over 1.7 billion people still without access to formal financial services (see Figure 3, pg. 8), one of the most important implications of this new data-based economy is its ability to foster greater financial inclusion. New forms of alternative data are playing a key role in expanding financial services to lower income customer segments. Alternative data—including social media activity, email usage, utility payments history, mobile phone records, and psychometric testing—coupled with advanced data analytics tools, bring an unprecedented opportunity to better understand and serve clients, especially credit-seeking "thin-file" clients who are otherwise excluded from the formal financial sector. A 2015 report by Omidyar Network, a philanthropic investment firm, suggests that in the world's six biggest emerging markets alone—China, India, Brazil, Mexico, Indonesia, and Turkey—big data has the potential to help between 325 million a nd 580 million people access credit for the first time.[1] Moreover, data-driven innovation extends well beyond credit analytics into applications such as customer segmentation, engagement, and insights; client onboarding; automation; product design; fraud prevention; identity verification; and the overall expansion of service offerings to traditionally excluded segments.

FIGURE 3
UNBANKED POPULATIONS IN SELECT EMERGING MARKETS



Unbanked = % of population (age 15+) that does not have an account at a bank or another type of financial institution and has not used a mobile money service in the past 12 months.

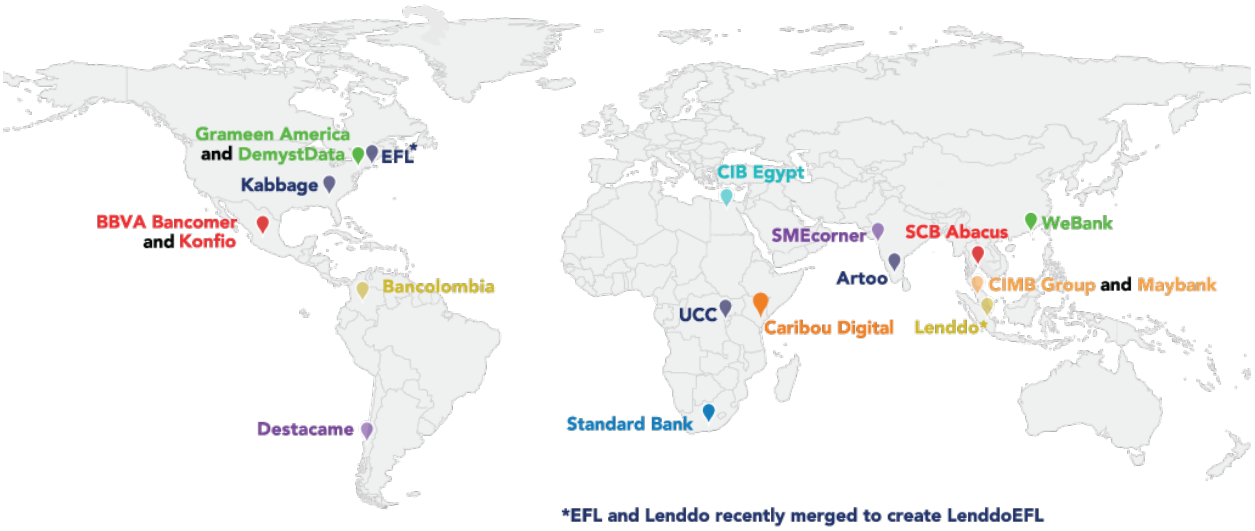
Detailed methodology can be found at: https://globalfindex.worldbank.org/.

Source: The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. World Bank.

Getting from Here to There with Data

In a world increasingly awash in data, it is challenging to decide which data to capture and how to put it to good use. Across our interviews (see Figure 4), we observed a stark contrast between how constrained the actual use of data is relative to the vastness of the expanding universe of data. With both traditional and non-traditional data, the practical challenges of obtaining and converting raw data into actionable insights are immense. Pointing to the lack of open APIs across banking and other sectors in Thailand, Natth Bejraburnin of SCB Abacus, a subsidiary of Siam Commercial Bank (SCB), noted the difficulty of getting third parties to share data and remarked that it could be easier for SCB to build its own platform for collecting more data internally, rather than relying too heavily on external partners.[ii]

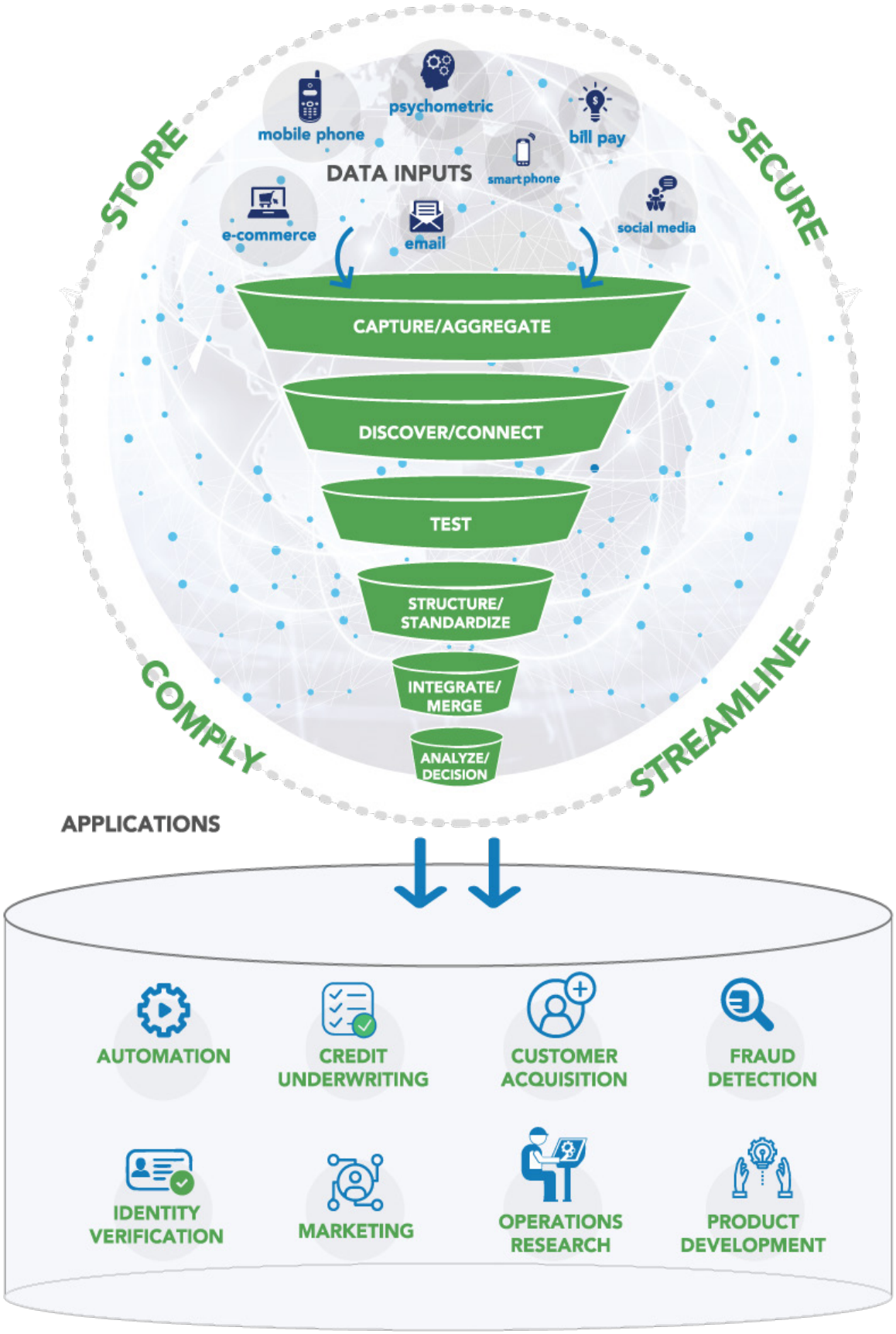
FIGURE 4
PARTICIPATING INSTITUTIONS



However, despite the oceans of data that are out there, in practice, it is difficult for financial service providers to use more than a few scoops at a time without significant collaboration with third party data providers, such as utility companies, social media providers, mobile network operators, and other specialized data vendors. In fact, although progress is being made on this front, much more needs to be done to build the connections and standards necessary for data to flow more readily and securely from its point of generation to its final point of utilization. This is especially true for underserved markets around the world where new sources of data may be all that is available.

ii Unless otherwise noted, all referenced interviews are listed in Appendix B.

FIGURE 5
DATA JOURNEY



While this report does not provide an in-depth technical assessment of the flow and management of data, it is useful to take a moment to understand the various steps involved in taking data from raw form and converting it into valuable insights. With all the new types of data that exist, it has become that much more important to streamline the process of identifying and connecting to the growing number of external sources of data. As noted in a recent open letter from the Institute of International Finance to the U.S. Treasury Department regarding Executive Order 13772 on Core Principles for Regulating the United States Financial System, "All market participants should be encouraged to invest in systems, models, and teams that produce and utilize high-quality data, which in turn enable them to provide customer products and services more economically."[2]

Harvesting data is essentially a careful curation process that involves exploring the universe of data to identify holders of data to connect with, testing that data for usefulness, structuring it for standardization, and integrating it with internal data and systems for analytics and decisioning. All of this must also be done in an efficient, secure, and compliant manner (see Figure 5). Greater collaboration and infrastructure are vital in navigating the increased fragmentation and complexity inherent in the explosion of data, even for large players, often necessitating external partnerships. Matt Hennessy of DemystData, a data technology company that helps financial institutions harness data, underscored the importance of partnerships in helping clients overcome the general fear that many have about the onslaught of data so they can proceed with workflow and cost-benefit analyses to identify actionable solutions.

The legal and regulatory environment also contributes to this complexity because of varying rules pertaining to data privacy, protection, and ownership; know your customer (KYC); anti-money laundering (AML); personally identifiable information (PII); and data localization (cross-border data flow) requirements. This increasing complexity not only heightens the need for specialized expertise in data management and compliance, but also for greater engagement with, and guidance from, policymakers and regulators. In this regard, the recent implementation of the General Data Protection Regulation (GDPR) in Europe shows that while new rules can be cumbersome and involve trade-offs, the silver lining is that they do bring greater regulatory clarity and direction for providers. As noted in *The Economist*, given that "many of the firms preparing for the GDPR's arrival in Europe enthuse that the law has forced them to put their data house in order,"[3] it would be worth examining whether authorities in emerging and frontier markets could borrow certain elements of the GDPR to help catalyze collaboration around the secure and responsible use of new types of data. In many cases, clear regulation, even if not ideal, is preferable to unclear or continually changing regulation.

One final but fundamental point is the importance of the underlying infrastructure for managing the flow of data. Just over a decade ago, Amazon Web Services (AWS) came onto the scene offering cloud computing services, which allow companies to essentially rent access to pooled computing resources instead of purchasing and maintaining the infrastructure themselves. Competitors, such as Microsoft, Google, and IBM, later entered the market, helping to drive down data storage and processing costs and fuel the introduction of new security, compliance, analytics, application, and other complementary services. In discussing how essential these cloud services have become, a recent article in Bank Innovation referenced the rapid growth of Robinhood, a commission-free trading app, noting that just two DevOps professionals at the startup were able to leverage 18 distinct AWS services to address compliance, fraud detection, anti-money laundering, and other needs in building out a system at a scale and speed that would have been impossible without the cloud.[4]

Clearly, cloud technology has greatly expanded the computing power that is now accessible to organizations of all sizes. Nearly all of our interviewees, ranging from early stage fintech startups to large multinational banks, spoke to their use of cloud services. Both Artoo, a provider of customer relationship management solutions for lenders serving low-income segments in India, and Destacame, a digital alternative credit scoring platform in Chile and Mexico, use Microsoft

Azure and AWS to store and secure data in the cloud. And Bancolombia, Colombia's largest financial institution, has started to use AWS machine-learning tools for its mobile bank product to scan pictures taken by users at account opening for fraud detection purposes. Bancolombia would also like to collaborate with competitors in the region to create a centralized image database to help combat fraud, and they believe cloud services would help to make this possible. As these examples show, cloud computing is a key component in opening new possibilities for using data to drive financial services and serves as a foundation upon which a new era of data-driven innovation is being built.

New Types of Data: Pros and Cons

With the advent of the internet, mobile phones, and smartphones, we have seen a steady influx of new types of data that either did not exist or were inaccessible just two decades ago. All of these new forms of data are called "alternative" or "non-traditional" because they are separate from the credit history data that centralized bureaus have developed an entire industry around. New categories of data are emerging that span a much wider range of people than ever before possible. This is creating opportunities to reach markets that have previously been excluded or poorly served.

While all these new types of data hold great promise, they have one challenge in common: fragmentation. The surge in data has been spread across a growing number of holders of data, resulting in much more variation in where data can be accessed and how it is structured and shared. Just as the traditional credit bureau industry had to solve the problem of aggregating data from a large number of sources, so too will the alternative data ecosystem. Reflecting on this point, Spencer Robinson of Kabbage, an online small business lender, said, "I think the way we look at data is a natural evolution. What we view today as underserved are really populations [that] did not generate data in a 'fashion' that the traditional world today collects it." This aligns with the notion that certain segments of the population are underserved in part because they are financially "invisible." Solving the broader challenges around sharing and aggregating new types of data could bring greater visibility into underserved markets and open new growth opportunities for providers.

The best data to use varies from case to case, and as Figure 6 (pg. 12) shows, various factors come into play that make different types of data more or less useful, depending on the situation. Our interviews suggest that no one alternative data type is superior, nor is there one absolute way to rank them based on their predictive power. Instead, assessing their utility is contextual, and the appropriate types of data to use depend on the particular product and use case in question and the corresponding relevance and coverage of available data types.

For example, Spencer Robinson at Kabbage said that for small businesses generating a significant portion of revenue through online sales, access to eBay or Amazon data would be needed to make an accurate credit decision. In comparison, for small businesses in construction, Kabbage would need access to their accounting package to gain more context around the deposits in their checking accounts. Also, Experian, a leading credit rating agency, has experimented with a range of alternative data sources in an effort to create credit models for thin-file customers.

Our interviews found mobile phone data to be appealing to many providers. However, getting mobile network operators (MNOs) to share their data can be difficult. In some instances, larger financial institutions are able to partner with MNOs or other third parties to access mobile phone data. Carlos Lopez-Moctezuma with BBVA Bancomer in Mexico said that they have just started working with intermediaries that aggregate mobile phone data. But that has been the exception rather than the rule, and many interviewees reported experiencing barriers on this front.

FIGURE 6
PROS AND CONS OF NEW DATA TYPES

DATA TYPE	PROS	CONS
MOBILE PHONE	Low costs, deep market penetration	Difficulty accessing data from mobile network operators (MNOs)
SMARTPHONE	More data capture options	Lower market penetration, high cost of data plan
SOCIAL MEDIA	Scaling rapidly	Consumer distrust, restrictions on use
EMAIL	Widespread availability and use	Time required to analyze messages, fragmented across different email providers
UTILITY | BILL PAY	Additional source of payment history data	Effort required to collect and verify payment history
E-COMMERCE	Useful for assessing micro, small, and medium enterprises (MSMEs)	Limited applications beyond MSME lending
PSYCHOMETRIC	Can be used to test anyone	Time required to take test

Abdul Musoke of the Uganda Communications Commission noted that regulators need convincing to prioritize taking more meaningful action, while MNOs need more regulatory guidance and incentives to open up. "Regulation has to help move this forward. MNOs don't want to lose their data advantage over fintechs and banks."

Smartphones, email, and social media platforms have opened new possibilities, but they too involve a variety of constraints. Although smartphone penetration has been increasing due to reduced handset costs, data (plan) pricing remains a significant barrier to increased usage and functionality for low-income consumers. As Thabani Ndwandwe of Standard Bank pointed out, more and more people have access to smartphones, but in low-income segments they don't use data because it is too expensive. In addition to the cost of data plans, the lack of high-speed mobile network coverage, insufficient battery capacity, low processing power, and many other technical issues present significant obstacles to the growth of smartphone usage, and the corresponding potential for increased data capture, in developing markets. As Leon Perlman, a specialist on digital financial services, cautioned, "While smartphone-using apps and 3G+ networks may become dominant in the future, bringing enhanced services with them, that future has not yet arrived—especially for customers in the developing world who live in rural areas or who cannot afford high-end smartphones."[5]

As for email, which is widely used, albeit across a number of different platforms, assessing metadata such as inbox structure, message length, or the timing of when an account was created can be useful for fraud detection and credit scoring. But as Rodrigo Sanabria at LenddoEFL—an alternative credit scoring and verification provider active in 20 emerging markets—cautions, "The time required to gather this data is demanding, so quick decisions can't be made when analyzing full bodies of emails." While email data is not the "bread and butter" for LenddoEFL or any other interviewees, it was referenced as a widely available source of supplemental information that can be useful when combined with other types of data.

With the exception of WeBank, China's first private online-only bank, the interviewees in this study have not found social media data especially useful. Like mobile phone data, social media data is held by large players that have their own ambitions in the financial services space. While social media platforms do have mechanisms through which third parties can obtain customers' consent for accessing their data, there are limits on the kinds of data available and how it can be used. Rodrigo Sanabria said that Facebook's terms of service prohibit the use of data for credit scoring purposes, for example. And restrictions aside, there have also been questions about the quality and predictive power of social media data. Mah Kam Lin with Maybank in Malaysia referred to social media data as "unicorn data," and added, "I can post a picture of me having a cup of coffee in Paris even though I'm in Kuala Lumpur … It is aspiration data … I prefer organic and transactional data. Those are very real."

We found evidence to suggest that the big tech platforms may be best suited to use social media data to its full potential in financial services. For example, as we show in the following section, WeBank is using data from Tencent, one of the world's largest internet companies, for credit decisioning. Although banks and fintechs have less traction with social media data, we expect that social media data will play an important role in the future of financial services.

Bill pay, e-commerce, and psychometric data all have useful applications. The beauty of bill pay data is its universality and the fact that it reflects actual payment performance, much like traditional credit history data. How customers pay their phone or utility bills may be fairly indicative of their creditworthiness. However, an ongoing challenge with bill pay data is the friction associated with collecting it. For example, Destacame informed us that their customers usually do not have their bills at hand when accessing the alternative credit scoring company's platform and that utility bills are sometimes associated with the household as opposed to the individual. E-commerce data may be more readily available, but so far, its use is limited primarily to micro, small, and medium enterprises (MSMEs) that conduct sales online or for online retail finance. Psychometric data can also aid in scoring those without credit histories or much of a digital footprint, but it requires more effort by the customer, who must actually take a test.

This discussion gives a brief sense of the landscape of new data and where providers are gaining traction or hitting friction. Given that many of these new data sources and technologies did not exist much more than a decade ago, it is encouraging to see how far things have progressed. Next, we will take a closer look at specific products and use cases fueled by data-driven innovation.

Products and Use Cases

As consumers use financial services, they rarely consider what has to happen behind the scenes for everything to work. It's up to providers to figure that out. To provide a fresh glimpse into how providers are leveraging new data sources, we present snapshots of recent initiatives, as shared by interviewees. Some of these examples highlight the tradeoffs between data privacy and access to financial services.

Snapshot 1: WeBank Uses Tencent Data for Unsecured Personal Loans in China

WeBank was launched in 2015 as China's first private online-only bank. It offers a full spectrum of consumer financial services, but its unsecured personal loan product is by far the most active. As of mid-2017, the bank extended total loans of RMB 200 billion (approximately $30 billion)[iii] in value with a typical loan size of RMB 8,000 (approximately $1,250).[6] WeBank has the enormous advantage of having Tencent, one of the world's largest internet companies, as its single largest shareholder, which allows social media data, particularly from Tencent's WeChat messaging app, to be a centerpiece of its strategy. WeBank's Jared Shu noted that WeBank uses blacklist data from Tencent's WeChat and QQ platforms as a filter for fraud risk. WeBank is also experimenting with social graphs derived from social media data to further assess applicants for fraud. These social graphs, which trace the evolution of profiles and frequency of communication, help detect whether certain profiles have been fabricated or are associated with organized crime, for example. WeBank also uses these analyses to independently assign proprietary social scores to inform loan decisions. WeBank's collaboration with Tencent is an ongoing learning process, but with data on over one billion users, there is great potential, considering that roughly two-thirds of Chinese people lack traditional credit histories.

Snapshot 2: BBVA Bancomer Uses Blend of External and Internal Innovation in Mexico

BBVA Bancomer, a subsidiary of BBVA Group and Mexico's largest bank, has run many pilots with fintech startups through their open sandbox project. For example, they have been working with Destacame to test new types of data for alternative credit scoring and have also worked with Juntos, a U.S.-based fintech, to drive customer engagement through automated SMS messaging. Today, the bank is pursuing a new internal strategy using behavioral economics techniques, A/B testing, and transaction data to change how customers use transactional products, such as checking and savings accounts. Specifically, BBVA Bancomer is trying to optimize how customers use digital channels. BBVA's Carlos Lopez-Moctezuma explained that it was important to get customers to leave money in their account rather than withdrawing all the cash each time they receive a deposit. When customers use debit cards and digital banking tools to make purchases or send money to other people, more data can be captured that can help the bank better understand their use of their accounts.

Snapshot 3: Grameen America Takes a High-Touch Approach to Internal Data Collection in the U.S.

Grameen America—a U.S.-based nonprofit microlender which helps low-income women and immigrants build small businesses through credit, training, and support—has served about 100,000 customers since its launch in 2008 and aims to reach one million people over the next 10 years. Following the model of Bangladesh's Grameen Bank, the nonprofit works with self-organized groups of borrowers who all have income-generating activities. Each group must first undergo five consecutive days of training to learn basic financial skills and demonstrate commitment. Upon completion, each borrower receives her first loan, which averages about $1,500, and then attends weekly meetings and makes weekly repayments. Grameen America does not gather credit reports, scores or other external data to make lending decisions, but instead collects data directly from customers using mobile devices and stores it on the cloud. They use this data to assess repayment channels, improve offerings, make follow-on lending decisions, and inform outreach to the community. Grameen America also works with Common Cents Lab at Duke University on how to use data to help customers shift toward use of digital channels.

iii $ denotes U.S. dollar throughout the report.

While they do embrace digital and data-driven tools, Grameen America is unapologetically high-touch. As Marcus Berkowitz said, "Our most valuable data points are the ones that we can only collect because we are meeting with someone face to face."

Snapshot 4: SCB Abacus Spins Off from Parent Bank to Accelerate Advanced Analytics in Thailand

SCB Abacus is an advanced data analytics subsidiary of Siam Commercial Bank, the oldest and one of the largest banks in Thailand. In 2017, SCB Abacus was spun off into a wholly-owned subsidiary of the bank to give it greater autonomy in pursuing digital innovation projects for the bank. This flexibility facilitates cross-industry collaboration on bilateral data partnerships and new business offerings in financial services. Combining data from non-bank entities with traditional financial data yields deeper insight into target customers. SCB Abacus has started to use a combination of non-traditional data for several products. For example, they have developed a customer rewards feature (named My Deals) through their main banking app that uses artificial intelligence (AI)[iv] and machine learning (ML)[v] to offer personalized promotions and discounts. The content shown is personalized to each individual user through the use of an AI-powered recommendation engine. This feature aims to provide the most relevant offerings available for the bank's customers. Another project focuses on the area of credit scoring, by sharpening the bank's ability to lend to thin-file borrowers through new underwriting techniques. Alternative sources of data are especially valuable for such borrowers with limited credit history. This is part of an initiative to better serve small and medium-sized enterprises (SMEs) in Thailand by providing greater access to capital to grow their businesses.

These snapshots exemplify how data-driven innovation is creating tangible products and services for customers. While they represent different philosophies and business models, what they share is their use of new types of data and tools to reach segments that previously had been underserved or not served at all. These institutions know the digital revolution is bringing vast new markets online and that those players that get it right will be rewarded with their business.

CHALLENGES

Despite impressive recent advances, banks face myriad challenges in leveraging data for financial inclusion, both within the organization itself as well as in the broader ecosystem. We categorize these challenges into three main buckets: i) internal preparation; ii) data journey management; and iii) regulatory environment (see Figure 7, pg. 16).

The following paragraphs examine these challenges in detail.

Internal Preparation

The first category of challenges banks must address to get the most out of data-driven technologies and increase their odds of successfully leveraging data for the purpose of driving financial inclusion is internal preparation, including changing the banking culture, attracting and retaining the right talent, and modernizing legacy IT architecture.

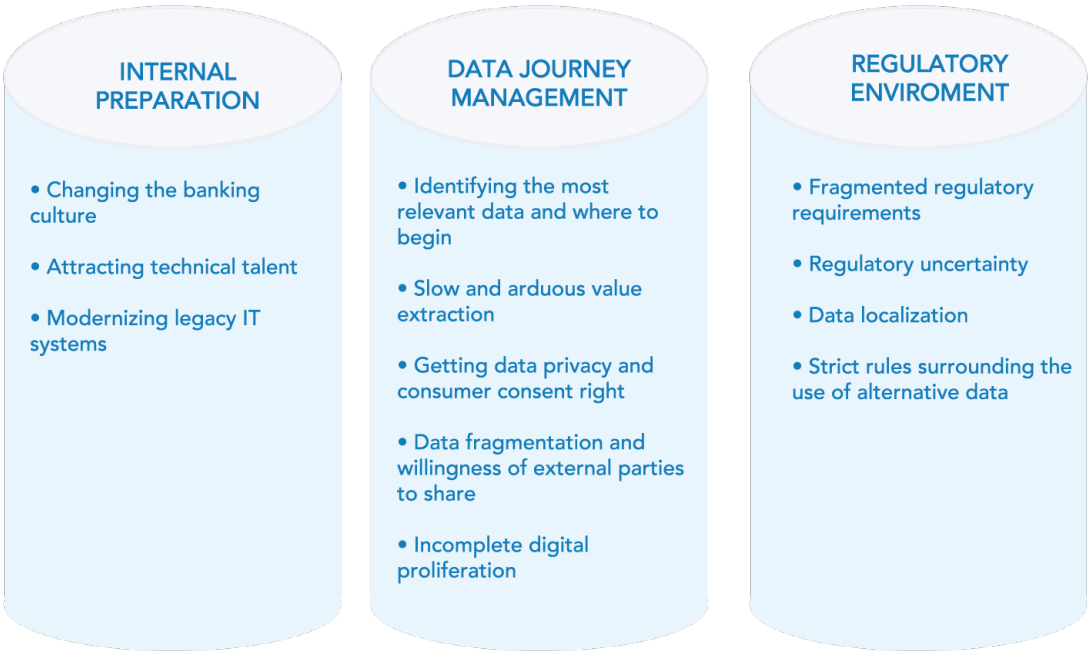
iv Artificial intelligence enables software to exhibit human-like intelligence, including learning, planning, reasoning, problem-solving, and decision-making.

v Machine learning is the science of getting computers to parse through and learn from data in order to perform targeted tasks.

Changing the Banking Culture

A number of interviewees explained that many banks remain risk averse and hesitant to embrace change. According to Hussam Sultan at CIMB, a commercial bank headquartered in Kuala Lumpur, the global financial crisis and large regulatory fines imposed on multinational banks in recent years have helped further entrench this cautious culture.

FIGURE 7
KEY CHALLENGES TO LEVERAGING DATA FOR FINANCIAL INCLUSION



Several interviewees described how important it is to counteract this trend and implement a culture within their organizations that helps foster innovation and collaboration, promote risk-taking and experimentation, and capitalize on data-driven technologies. To achieve this, banks need to introduce an innovative mindset into their culture,[7] embrace fresh ways of thinking, and challenge how operational processes are traditionally performed.

Numerous interviewees emphasized that this cultural shift must start at the top and permeate the entire chain of command. Without committed support from leadership, including the CEO and Board, it is extremely difficult to innovate. Establishing a new culture requires leadership to clearly communicate to all employees the implications for existing roles, incentive structures, and expectations.[8] It also helps when top executives at an institution have an innovation or fintech background. For example, Bancolombia's President, Juan Carlos Mora Uribe, previously served as the banking group's head of innovation, and BBVA's Group Executive Chairman, Francisco González, was a programmer at one point in his career. Both leaders are firm believers in financial technology and are helping to change the business culture within their organizations.

For several of the financial institutions we spoke with, instilling the will to proactively and continuously explore and experiment with alternative data and tools is a high priority. Reflecting Maybank's efforts on this front, Mah Kam Lin said, "All 44,000 employees are going through an upskilling program in terms of data awareness, programming, how to use data to make better decisions, human-centered design, and agility." She added that the leadership at Maybank is very supportive of this culture change and wants to make sure the bank future-proofs its workforce, as organizations that do not will be ill-equipped to support the underserved.

"All 44,000 employees are going through an upskilling program in terms of data awareness, programming, how to use data to make better decisions, human-centered design, and agility."

-- Mah Kam Lin, Maybank, on the financial institution's efforts to embrace data technology.

Attracting Technical Talent

The scarcity of technical talent challenges incumbents in the transition to a more data-dependent world. Banks face a tremendous shortage of experienced data scientists and engineers, as well as AI experts, all of whom are needed to help convert big data "noise" into meaningful insights. Even relatively basic data skills are lacking in many major institutions, resulting in wasted resources, project delays, and squandered opportunities. For example, fintechs that partner with banks often find themselves training their counterparts, slowing down collaboration and product launches.[9]

The ability to recruit, develop, and retain workers with proficiencies in fields related to computer programming and data engineering is increasingly vital to the banking industry's capacity to expand services to the underserved and to its overall success in general. According to Gabriel Di Lelle of Bancolombia, attracting people with the right set of skills is "the number one challenge" as banks are not the preferred destination for employees with data skills, who typically gravitate toward cool, innovative, and less formal working environments. Mr. Di Lelle went on to say that this challenge is not exclusively a banking problem, but one that many industries around the world are grappling with, as the demand for data specialists far outstrips supply.

Moving forward, banks, especially in certain emerging markets where the talent shortage tends to be more pronounced, will need to pay special attention to devising effective strategies outlining how to attract top technical talent.

Modernizing Legacy IT Systems

One of the biggest internal challenges facing banks as they incorporate new data and analytics is modernizing legacy IT systems. Many of today's banks rely on infrastructure created well before the digital era. Over the years, these systems have been updated incrementally to tackle immediate pain points and have been merged, split, and joined again by other systems as banks went through various mergers and acquisitions. Furthermore, in many instances, technology teams in different parts of the organization address pain points independently. While this decentralized, incremental approach has historically allowed banks to muddle along, it contributes to siloed systems, redundancies, and increased complexity.[10] The rapid digital transformation currently underway creates an urgent need for banks to completely overhaul IT systems while ensuring regulatory compliance.[11] Not doing so hinders a bank's ability to collect, structure, analyze, and leverage data fully, and makes it difficult to collaborate with external partners. Unfortunately, the end-to-end restructuring of IT systems is a complex, costly, and time-consuming undertaking that requires long-term vision, dedicated leadership, and cooperation across many departments (not just IT) and, sometimes, jurisdictions. Moreover, these changes must be done while preserving the availability and continuity of secure customer services[12] and maintaining acceptable quarterly results for shareholders and investors. Nevertheless, building state-of-the-art IT architecture is worth pursuing. The resources required up front are likely to pay off in the long-term as companies become better positioned to capitalize on data, streamline decision-making, mitigate risks, facilitate automation, and improve overall business efficiency.

An innovative example of a bank modernizing its IT infrastructure for a data-driven world is SCB Abacus, the first advanced data analytics spin-off of its kind within the Thai financial industry. The subsidiary entity was created to unleash innovation, experimentation, flexibility, and efficiencies that were tricky within the traditional organizational and IT structure of its parent company, according to Natth Bejraburnin of SCB Abacus.

One key challenge with respect to IT infrastructure is security. As data technology permeates banking, and as the frequency and sophistication of malicious virtual attacks grow, cybersecurity is increasingly critical. Repeated breaches can damage operations, profits, and reputation, potentially jeopardizing a bank's ability to attract and retain customers. Safeguarding sensitive client information and protecting internal systems is thus essential to the success, and, ultimately, survival of banks. Astute banks are exploring next-generation cybersecurity technology as they transition from static security models to dynamic ones that offer new layers of defense, are more predictive, and are built to not only prevent attacks but also to adapt to various circumstances and easily detect and resolve breaches within large and complex banking networks.[13]

Data Journey Management

The second category of challenges facing banks is navigating the broader data ecosystem. As outlined above, data is abundant and is constantly being produced. However, a number of obstacles related to collection, structuring, security, and value extraction can arise along the complex data processing journey, as we will see below.

Identifying the Most Relevant Data and Where to Begin

The sheer volume of available data can be overwhelming. Many banks are unsure of where to start, what to look for, and how to identify and capture the most appropriate data. Even tech-savvy banks with dedicated data teams are struggling to extract the full value from their data, simply because of its vastness. According to Gabriel Di Lelle of Bancolombia, "There is a belief inside Bancolombia that we are probably not even doing 10 percent of what we could be doing with our transactional data." Moreover, during our conversation with CIMB, Hussam Sultan estimated that, in general, "85 percent of the data made by banks is wasted." This is one of the reasons why banks often collaborate with third parties (see partnership section on page 21).

> *"85 percent of the data made by banks is wasted."*
> *--Hussam Sultan, CIMB*

Slow and Arduous Value Extraction

The amount and complexity of data, especially semi-structured and unstructured data, often require multiple players to turn it into something of value. Collecting, structuring, managing, and analyzing the data is a lengthy process that can involve several collaborators. Depending on the technical abilities of each partner, this process may be slow and arduous.

Getting Data Privacy and Consumer Consent Right

In a world of serial data breaches, hacking, and misuse, a practical challenge is protecting consumers' data privacy and maintaining their trust. Consequently, banks are oftentimes reluctant to turn to outside partners that could help them harness consumer information as they worry about the third party's commitment to safeguarding data.[14] Foregoing collaboration with specialized data companies, however, can limit the bank's ability to extract data's full value. In addition, customers can also be reluctant to provide consent. According to Thabani Ndwandwe of Standard Bank, one of the biggest challenges when it comes to alternative data is obtaining customer consent, as many customers do not feel comfortable giving banks access to additional personal data such as social media activity. Customers, however, are usually more willing to provide consent if it is in exchange for a valuable service that they need, and do not have access to, such as credit. In the current climate, being able to demonstrate particularly strong and cohesive processes can be a competitive asset for banks. Enhanced transparency towards the customer vis-à-vis other competitors could also enhance customer trust and their willingness to give consent.

Data Fragmentation and Willingness of External Parties to Share

According to DemystData, "While, historically, the bulk of actionable data was controlled by a small number of players, the proliferation of data means there are now a myriad of data owners,

each of which contribute only fragments of a customer's full data profile."[15] Moreover, some data owners are hesitant to share information. Despite numerous partnerships between banks and telecommunication companies ("telcos"), for example, some telcos hesitate to share their mobile data with banks. According to one bank executive we spoke with, trust between telcos and banks is difficult to achieve in certain markets, particularly when they are competitors offering similar financial services. Other interviewees suggested that telcos are not sharing their data as much as they could. This might be due to a number of reasons, including regulatory concerns as well as protecting and capitalizing on their own data. Therefore, this data fragmentation makes it harder to obtain and derive value from the consumer's full data profile.

Incomplete Digital Proliferation

While the digital revolution has reached a large number of the underserved and unserved population worldwide—making it easier for financial service providers to harness the data they generate to better serve them—inadequate data still persists for certain sub-sections of this community.[16] For example, some older customers are not comfortable using computers or mobile phones. Marcus Berkowitz of Grameen America told us that many of their older members appreciate the fact that they can participate in the loan programs without having to use new technology. Carlos Lopez-Moctezuma at BBVA pointed out that a major challenge to obtaining data on certain customer segments is incentivizing customers away from cash. Even with the ability to use mobile wallets—which provide a gold mine of data—some lower income consumers can be reluctant to give up their cash and convert it into digital money, as they've grown accustomed to the tangibility of paper notes and coins. For many, cash is indeed still king. Other factors contributing to a lack of data on particular segments include lower income and education levels—which can limit an individual's usage of data-capturing technology—as well as certain cultural and social norms that can lead to distrust of large organizations, such as banks, and restrictive roles for women.[17] Therefore, thanks to economic, demographic, psychological, social, and cultural factors, the digital footprints of these types of consumers tend to be narrower or non-existent, reducing banks' ability to harness data to serve them.

Regulatory Environment

The third category of challenges facing banks is the current regulatory landscape within which they operate. National and international regulations on data sharing and privacy have a large impact on how banks can use consumer information. Complicating matters for banks operating in various jurisdictions are overlapping and sometimes contradictory regulatory requirements, which make compliance a complex and expensive undertaking. Given the patchwork of regulations related to new data sources and tools, it is not surprising that banks and fintechs alike seek guidance from policymakers on these issues.

In many instances, relevant regulation simply has not yet been developed or is relatively light, but this too creates its own barriers. It can increase uncertainty and cause financial service providers to hesitate to pursue data-dependent product offerings. Although lack of regulatory clarity leaves some providers searching for answers, others adopt best practices from markets with more mature regulatory landscapes as a preemptive move. In a separate project, the IIF is working to inform and engage regulators globally on the transformative potential of AI and ML technologies in credit and risk modeling. As part of this project, the IIF surveyed 60 member financial institutions and will share key findings in a forthcoming paper.

Fintechs sometimes follow regulations placed on their more regulated partners to inform their compliance standards. For example, Artoo is not directly subject to lending regulations, but finds that it must comply with the data management standards that its partner lending institutions must meet. It obtains consent of the borrower through SMS at the point of data capture. Beyond its direct lending operations to small businesses and consumers in the United States, Kabbage has developed a white-label Software as a Service (SaaS) platform to enable partnerships with lending institutions overseas, namely, ING, Santander, and Scotiabank. While some partners

connect to the lending platform directly, Kabbage has also established overseas data centers in other cases to handle certain country-specific data storage requirements. Considering this, it views PII as a liability, preferring to work with anonymized data unless absolutely necessary to the credit approval process.

Data localization regulations are particularly challenging to financial institutions with regional and global reach, especially those that are looking to leverage the benefits of cloud computing services. New data technologies work best to generate insights when data can be stored and accessed in centralized, consistent, and structured ways; however, restrictions on the ability to share, store, and access data across borders complicate this. According to a 2017 article by the American Bar Association, "more than two dozen countries have enacted or considered policies that require retention of data within their borders."[19] Data localization rules could lead large banks to avoid serving certain jurisdictions entirely or require them to build and maintain multiple data centers across the globe.

Another overarching challenge is that policymakers are cautious in setting new standards and face competing regulatory priorities. In Uganda, where telecommunications regulators are focused on ensuring competition in the telco market (and tend to limit data sharing), they are not necessarily incentivized to prioritize financial inclusion or work towards getting telcos to open their data to banks and fintechs. Until greater consensus on how to best proceed is reached internally among regulators, actors looking to leverage new data sources—banks, fintechs, and others—will either need to proactively seek out opportunities for data collaboration or continue to make do with what they have.

In jurisdictions where regulation is more rigid, financial service providers face obstacles in deploying innovations. Colombia's data protection regulations, based in part on European models, have restricted the ability of financial service providers to partner with telcos and use specific types of data (e.g., geolocation data, information on customers' physical movements) that could improve credit scoring models and product offerings. Bancolombia has had even less success in convincing traditionally-minded regulators in other Latin American countries of the benefits of working with new sources of data.

In South Africa, according to Thabani Ndwandwe at Standard Bank, credit regulations designed to protect consumers have made it much more challenging and costly for regulated providers to lend to underserved, low-income clients. Specifically, rules around documentation to verify a client's income prevent lending to consumers earning 1,000 rand a month or less (approximately $83), given that many low-income clients work outside the formal economy and do not have bank statements or formal pay slips.

OPPORTUNITIES

Engagement with Regulators and Policymakers

Despite obstacles outlined above, a significant number of interviewees shared positive experiences working with regulators and are looking for regulatory guidance on these issues. Many institutions have benefitted from engaging directly with regulators and other policymaking bodies. In India, Sameer Segal of Artoo highlighted that their legal counsel has drafted model legislation on compliance issues that are important to their partner lending institutions, such as whether lenders working with Artoo comply with data privacy regulations when using the company's machine learning services and whether they need explicit consent from customers to use these services.[vi]

vi To avoid running into issues regarding the handling of personally identifiable information (PII), Artoo's machine learning service only uses anonymized data.

Similarly, in South Africa, Standard Bank has done advocacy work, engaging with parliamentarians and regulators to convince them of the virtues of using new data sources and tools for the benefit of reaching low-income segments.

In Malaysia, Maybank interfaces regularly with the central bank (Bank Negara Malaysia) and has played a significant role in supporting Bank Negara's regulatory sandbox and other efforts to support fintechs and innovators in this space.

Financial service providers and regulators can work together to troubleshoot unanticipated obstacles as they arise. For Bancolombia's mobile-only banking product, Nequi, it was essential to work with Colombia's regulators to remain in compliance with KYC regulations. Launched in 2017, Nequi accounts feature a simplified KYC process, with balance limits that justify the simpler identification requirements. However, as Nequi customers began to hold larger balances, Bancolombia had to develop a solution to graduate these clients to different account types in a way that would be easy for the customers. In-person interviews are extremely costly, so Bancolombia came to an agreement with regulators which allowed for chat-based interviews to be conducted over Facebook Messenger.

Regulators recognize their responsibility to take the lead and initiate broader ecosystem discussions pertaining to new and alternative data sources and tools, especially given the diverse array of players looking to get into this space. In Egypt, where financial inclusion is a top priority of the government's strategy for 2030, the central bank has kicked off initial conversations on cloud computing—a crucial piece of technology that CIB Egypt, the largest private bank in the country, expects will help minimize the costs of going down-market—and is drafting data sharing regulation similar to the GDPR.

Abdul Musoke of the Uganda Communications Commission is in favor of a regulatory sandbox whereby regulators can oversee the development and testing of products within the confines of a controlled environment. SCB Abacus is currently going through such a process with the Bank of Thailand. In order to bring digital credit products that leverage machine learning techniques to market, SCB Abacus and their compliance team submitted a proposal to the Bank of Thailand detailing the types of data and models they would use, and the key performance indicators they would measure—all in advance of submitting a separate application to join the regulatory sandbox. Even if the specific products do not graduate from the sandbox into the market, such experimentation would serve well to establish greater trust and collaboration among banks, fintechs, and regulators.

As data-driven technologies fuel further innovation and transformation, it will become increasingly important for banks to engage with officials and encourage standard-setting bodies to develop regulatory guidance that protects consumers while also addressing cross-border inconsistencies and regulatory fragmentation. This will help ensure that banks can effectively leverage data technology across jurisdictions to improve their ability to expand quality financial services to emerging customer segments.

Partnerships

Partnerships between banks and fintechs offer enormous opportunities to leverage data for the purpose of driving inclusion. Fintechs, which are increasingly viewed by banks as valuable partners rather than direct competitors, face fewer legacy hurdles and benefit from greater specialization, risk tolerance, and agility. This complements banks' deep pockets, brand recognition, large customer base, and existing data.[20] Because innovation within many banks is fairly difficult due to their size, legacy constraints, and extensive approval processes, collaborating with fintechs is a great model as it typically enables greater flexibility for trial and error, speeds up time to market, and reduces the risks associated with innovation. These mutually beneficial partnerships allow fintechs to scale their technology and access capital, while banks gain assistance in harnessing

customer data for purposes such as improving product offerings, increasing efficiency, lowering costs, and expanding their customer pool.

Our publication on bank-fintech partnerships noted, "As it turns out, these are all goals with special relevance to low-income customers who look for products that are more convenient, less expensive, and higher quality, and that makes financial institution-fintech partnerships a crucial strategy for meeting the financial needs of the underserved around the world."[21]

We will briefly spotlight a few banks we spoke to that are partnering for the purpose of harnessing data. CIB Egypt—the first bank in the Middle East with a dedicated data science team, according to Islam Zekry—has begun working with Fawry, a local electronic payments provider, to offer a bill payment solution on its CIB Smart Wallet. The expectation moving forward is that the smart wallet will provide data on customers' payment habits which can be used to profile and target customers for lending and deposit products. CIB Egypt is also collaborating with Careem, the region's leading ride-sharing company. The new relationship provides Careem-Egypt with an integrated set of digital financial solutions to efficiently manage driver incentives and payment disbursements via the CIB Smart Wallet. Moreover, the mobile wallet allows drivers to receive payments from Careem, send money, pay bills, and make deposits or withdraw cash through the bank's large network of ATMs and agents. What makes this relationship relevant from a data use perspective is that CIB merges transaction data from the wallet with driving performance and rider ratings from Careem to develop a persona for each driver and assign a credit score, which enables CIB to lend to high-performing drivers.

Other examples of banks involved in data collaboration include BBVA and Bancolombia. BBVA is exploring partnerships with several intermediaries that leverage telco data for use by financial institutions. These intermediaries purchase the data from the telcos, structure it, and analyze it to provide key insights to banks. This type of data could provide valuable insights into an individual's willingness and ability to repay loans. For example, in some data models, initiating calls (as opposed to receiving them) and lengthy conversations tend to correlate with creditworthiness. On the other hand, above-average call activity during regular business hours and a small network of people in one's calling circle correlate with low credit scores.[22] Finally, Bancolombia is exploring a pilot with a fintech focusing on social media-based credit scoring. This type of data can also potentially help assess whether a person is likely to pay back a loan. Possible indicators of creditworthiness include longstanding social media accounts and a large network of contacts.[23] It is worth emphasizing that these exploratory partnerships are in the early stages of collaboration, and the effectiveness and viability of these alternative modeling systems are still being assessed by the banks.

Some of the fintechs we interviewed work primarily by forming partnerships that support financial institutions. Matt Hennessy at DemystData—a SaaS provider—stated, "A huge opportunity for us is leveraging partnerships with consulting and analytics firms who specialize in helping financial institutions implement solutions faster." The fintech has contracts with approximately 30 financial institutions worldwide and is exploring relationships with 10 others. DemystData provides a technology platform to standardize and clean partner banks' data, source additional data from third parties, and test data in an efficient and secure manner through a single integration point. The firm's platform allows banks to verify customers in real-time and assess credit risk for potential new customers by enabling access to new data sources for customer verification and underwriting. Banks can review information from various data sources, conduct tests and validation, and then select customers based on their internal risk appetite. The banks still own all the customer data and access DemystData's cloud-based platform through an API connection. These kinds of partnerships help financial institutions around the world harness data to better serve more consumers.[24]

In India, Artoo, a company offering a cloud-based platform that digitizes the entire credit process, works with eight institutions, including Ujjivan, a small finance bank, to help expand credit throughout the country. Artoo's platform allows Ujjivan field agents to input customer data and onboard customers digitally, which helps improve the tracking of sales and portfolio performance. Moreover, because Ujjivan agents can capture more data points on potential customers, higher quality information is generated for the bank to use in credit decisions. And while data is captured on the fintech's platform, it is owned by the bank, just like in the previous example. According to Sameer Segal of Artoo, it typically takes three months to go live with a partner and the benefits for both parties are tremendous. Forecasts suggest that over the next couple of years Artoo's partners will disburse approximately $2 billion in loans leveraging the fintech's data platform. Finally, Destacame's Sebastián Ugarte informed us that his company works with approximately 20 financial institutions in Chile and Mexico, including BBVA Bancomer.

Partnerships, however, do come with their own set of challenges. A number of organizations we spoke with highlighted regulatory challenges surrounding data sharing arrangements. For example, in its relationship with Ujjivan, Artoo had to switch from Amazon Web Services, with servers housed in the U.S., to a local Microsoft-based cloud service provider, as customer data had to remain within the country's borders. Interviewees based in Latin America informed us that regulation often limits the flow of data between banks and alternative risk modelers, for instance. This is a point of much contention in many markets and can create some tension in certain partnerships. Banks seek to maintain control over customer financial data, while fintechs hope to gain access and use data for a variety of applications (e.g., credit assessment, lead generation, etc.). Conversely, fintech partners aim to keep their risk models proprietary while banks face regulatory requirements to disclose their models.[25]

Other obstacles can arise around negotiations, integration, approvals, coordination, and getting institutional buy-in—even between institutions that are well-organized to innovate and partner. Nevertheless, we believe the challenges that emerge during collaboration tend to be outweighed by the complementary strengths each party brings to the table. Moreover, collaborative experiences over the past couple of years have taught banks and fintechs valuable lessons that are now being heeded.

Moving forward, partnerships will continue to facilitate expansion of services to new customer segments and drive bank innovation. Through partnerships, banks will learn more quickly what is possible and shift their strategies accordingly. Greater collaboration will enable them to test technology in low-risk ways, understand how it works for their customer base, and speed the time to roll out a new product. As the number of successful examples of partnerships rises and their impacts become increasingly apparent, we expect to see more, and stronger, collaboration between banks and fintechs.[vii]

Emerging Technologies

Two emerging technologies with the potential to create enormous opportunities around data and how it can be leveraged to deepen financial inclusion in the longer-term are artificial intelligence and blockchain.

According to Sameer Segal of Artoo, AI is opening up a new dimension and will play an important role as human-machine collaboration expands what is possible. Bancolombia, BBVA, CIB Egypt, SCB Abacus, and Standard Bank are just some examples of the companies we interviewed that are already using artificial intelligence in some way. AI is helping organizations collect, connect, structure, and analyze enormous amounts of data more efficiently. Moving forward, the technology is expected to play an increasing role in modernizing processes and digital infrastructure of financial institutions.

vii For more information and detailed case studies on how partnerships between financial institutions and fintechs drive financial inclusion, please see the first report of the *Mainstreaming Financial Inclusion: Best Practices* series by clicking here.

"The analytical power you can get through machine learning, deep learning, neural networks, and other types of AI technologies will really push the boundaries of credit scoring and serving customers in a much more personalized way and without human intervention."

--Gabriel Di Lelle, Bancolombia

Thanks to its ability to independently gather, process, and analyze enormous amounts of data quickly and effectively, AI could help banks make more informed decisions, automate processes, and reduce operational costs so that it becomes more profitable to provide affordable services for low-income customer segments. Furthermore, because AI software is easily scalable and can enhance automation, banks utilizing the technology could offer services at a level of sophistication, customization, and scale never before possible, while also reducing operational costs as the need for manual tasks gradually declines. According to Gabriel Di Lelle at Bancolombia, "The analytical power you can get through machine learning, deep learning, neural networks, and other types of AI technologies will really push the boundaries of credit scoring and serving customers in a much more personalized way and without human intervention."

AI software could, for example, automatically collect real-time credit data on an individual seeking a small business loan and then make a near-instantaneous decision on their application and set a personalized interest rate based on their risk profile. Samir Bhatia of SMEcorner, an online lender in India, envisions future underwriting to be performed via interviews conducted on video conferencing platforms where AI technology will both ask questions and analyze answers, facial expressions, and emotional cues to help determine credit decisions. This could help bring greater consistency to decision-making within the industry and make processes more cost-effective, efficient, and timely, with less human involvement. These scenarios, however, will undoubtedly be influenced by the evolving national and international regulations on data and technology.

Similarly, blockchain, because of its enormous potential to form the underlying architecture for myriad applications, could also help deepen financial inclusion. For example, distributed ledger technology could increase efficiency by automating identity verification—the lack of reliable identity papers among lower income segments in emerging markets being a significant obstacle to their inclusion. This is especially true for the most vulnerable populations, including refugees. According to ID2020, a public-private partnership dedicated to solving challenges of identity through technology, 1.1 billion people globally lack an officially recognized identity, leaving them susceptible to economic exclusion. Creating a digital identity through blockchain could help bring them into the formal economy. Blockchain could also help banks streamline KYC processes and ameliorate the customer onboarding experience for less vulnerable but still underserved populations.

By acting as an information-sharing mechanism and providing a universal source of truth that is tamper-proof and distributed, blockchain could lead to increased efficiency and improvements, including establishing a level of accountability and transparency that hitherto was impossible; reducing human error, fraud, data duplication, processing delays, and transaction costs; and providing easier and improved data access to both internal and external parties. Moreover, with the potential to create reliable decentralized databases, give people control over their data, and create borderless, immutable financial identities, blockchain could have a considerable effect on emerging customers and financial inclusion. That being said, blockchain is unlikely to have a significant impact on emerging customers in the near or medium term.

While these emerging technologies demonstrate valuable applications today and show significant future promise, some interviewees warned not to overhype the potential impact. According to Marcus Berkowitz of Grameen America, emerging technologies have "the potential to be transformative in certain ways and for certain people … but they are not a silver bullet for financial inclusion."

THE COMPETITIVE LANDSCAPE MOVING FORWARD

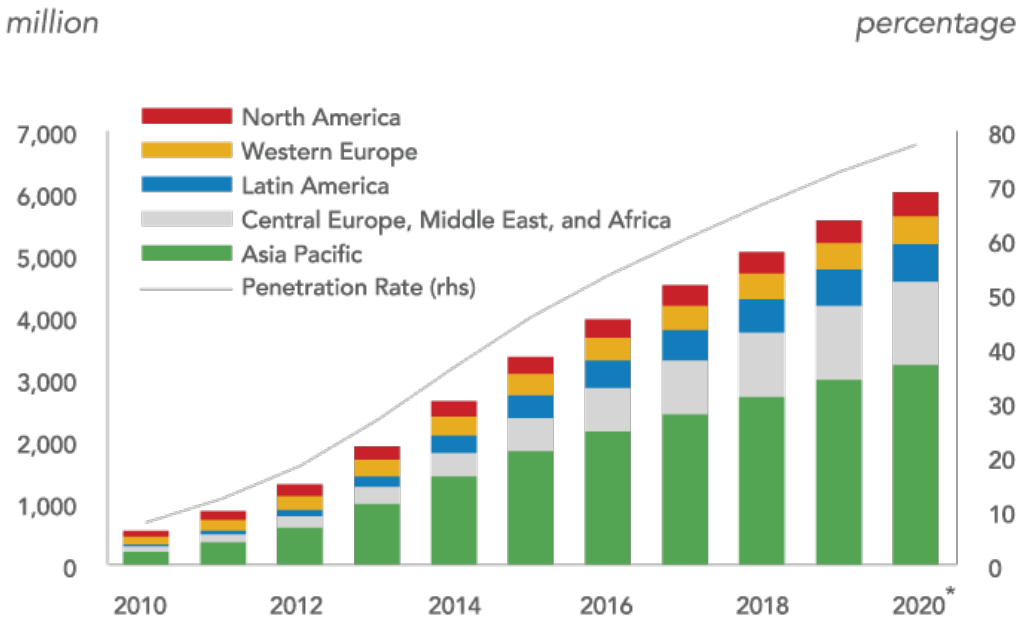
Data can be a powerful force for financial inclusion, and its promise is alluring. The business opportunity at the inclusion frontier is indeed enormous, as there are billions of underserved customers globally, and internet-connected devices such as smartphones continue to proliferate (see Figure 8). For example, according to CIB Egypt, the business opportunity presented by the untapped market within Egypt is comparable to the traditional banked customer segment—around 1.8 trillion Egyptian pounds (approximately $90 billion). And as we have pointed out, although banks face a number of challenges to harnessing data's full potential for expanding financial services to new customer segments, many are embracing innovation, integrating data-driven technologies into their "organizational DNA,"[26] and pursuing mutually beneficial partnerships with fintechs.

As they seek to become competent data deployers, and consider leveraging data to reach emerging customer segments, incumbent banks must also reckon with growing competition. Many of our interviewees stated that banks that fail to capitalize on the explosion of data and continue to rely on legacy systems will find themselves losing market share in existing markets and failing to gain a foothold in new ones.

Ultimately, what is at stake may be the continued centrality of banks in the financial lives of customers.

With new players like Alibaba and Tencent growing rapidly and others like Amazon and Facebook dipping their toes into financial services, incumbents feel pressure to innovate to protect their market share. Many bankers view these "BigTechs"—firms that provide intuitive online platforms, excel in utilizing customer data, and are well capitalized—as their primary future competitors. Such platform companies already have powerful multi-dimensional data on their users, providing them with a more complete picture. If firms like these expand their role in financial services, as anticipated, traditional banks will need to innovate significantly in order to compete. If not, they could fade into the background, becoming transaction processors with limited direct customer relationships. Jared Shu at WeBank suggests that this is already happening in China, where the

FIGURE 8
GLOBAL SMARTPHONE SUBSCRIPTIONS AND PENETRATION RATE



*Forecast
Source: United Nations, Ericsson, GSMA Intelligence, IIF.

customer-facing entity is not usually a traditional incumbent.[27] He foresees increasing separation between financial product manufacturing and distribution in China. Banks will produce the financial products, but tech companies with large networks will distribute them to the customers. The bank's role will become increasingly invisible to customers. This potential disruption to the industry will not be an exclusively Chinese phenomenon.

Banks also face competition from other banks that embrace innovation. Astute banking executives increasingly view data-driven technologies and innovation in general as key to remaining competitive and long-term success. This has led many banks to challenge the status quo and accelerate the shift toward digitization, by changing the banking culture within their organizations, partnering with third parties, and modernizing and integrating digital systems and infrastructure. As a result, it is becoming ever more important for *all* banks to embrace data-based technologies to improve efficiency and their understanding of customer needs. Speaking to this point, Carlos Lopez-Moctezuma of BBVA, told us, "We are trying to generate as much analysis as we can from the market and our current customers so that we can be relevant in the different product offerings that we have." Moving forward, banks that lead in the space will be in a much better position to overtake the competition and increase market share while simultaneously cutting operational costs.

We end this report as we began, with a call to action. Banks recognize the need to use new data and tools to tap the vast underserved market segments at the base of the pyramid. But much of the real work lies ahead. A greater sense of urgency is needed, especially from the leadership of mainstream financial service providers, to embrace data-driven innovation as a key to unlocking underserved markets in a commercially viable way. Adopting data-focused strategies—including developing a culture of innovation, attracting technical talent, modernizing IT systems, collaborating with fintechs and other parties, and engaging with regulators—can help banks reach these markets more quickly and efficiently, and in doing so, support financial inclusion, poverty alleviation, and economic growth. Moreover, such strategies can help banks future-proof their business models and increase their chances of success.

APPENDIX A: STUDY METHODOLOGY

This study examines how financial service providers are leveraging new (and existing) data sources and tools to address challenges associated with serving customers at the base of the economic pyramid, primarily in emerging markets. CFI and the IIF carried out in-depth interviews over two months with 21 people from 18 financial institutions, fintechs, and other entities. A list of interviewees can be found in Appendix B and a sample interview guide is available on request. In addition, an advisory group of stakeholders and industry experts (see "Acknowledgments" section) provided the researchers with guidance.

APPENDIX B: INTERVIEWS

Institution	Interviewee	Title
Artoo	Sameer Segal	Founder and CEO
Bancolombia *	Gabriel Di Lelle	Vice President of Innovation and Digital Transformation
BBVA Bancomer / BBVA *	Carlos Lopez-Moctezuma	Head of New Digital Businesses and Financial Inclusion
Caribou Digital	Maha Khan	Senior Manager, Research and Knowledge Management
CIMB Group *	Hussam Sultan	Head, Transaction Banking and ESG Integration
Commercial International Bank (Egypt) S.A.E. *	Islam Zekry	Chief Data Officer
Commercial International Bank (Egypt) S.A.E. *	Amin Khairy	Risk and Support Functions Analytics Manager
DemystData	Matt Hennessy	Director, Strategic Accounts
Destacame	Sebastián Ugarte	Co-Founder
Grameen America	Marcus Berkowitz	Senior Director, Technology and Innovation
Kabbage	Spencer Robinson	Head of Strategy
Kabbage	Winn Martin	Head of Data Strategy
Konfio	David Arana	Co-Founder and CEO
Konfio	Francisco Padilla Sánchez	Co-Founder and CTO
LenddoEFL	Rodrigo Sanabria	Director, Partner Success, Latin America
Malayan Banking Berhad (Maybank) *	Mah Kam Lin	Group Data Scientist
SCB Abacus / Siam Commercial Bank *	Natth Bejraburnin	Senior Data Scientist
SMEcorner	Samir Bhatia	Founder and CEO
Standard Bank *	Thabani Ndwandwe	Head, Credit for Personal and Business Banking, South Africa
Uganda Communications Commission	Abdul Musoke	Manager, Economic Regulation
WeBank *	Jared Shu	Head of Strategy

* Denotes IIF member.

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