FOCUS NOTE

FINTECHS AND FINANCIAL INCLUSION

Looking past the hype and exploring their potential

CGAP

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EXECUTIVE SUMMARY

FINTECH COMPANIES COMBINE TECHNOLOGY WITH ACCESS TO data to deliver new financial services and experiences to customers. They have been proliferating in emerging markets and developing economies (EMDEs), and some are creating solutions specifically for underserved, low-income, or remote customers. Yet for all the general excitement that fintechs have generated in the global development community, there is little information available about how specific fintech innovations solve pain points in financial inclusion.

In 2016, CGAP launched a program to understand fintech innovations and draw clear links to financial inclusion, where they existed. We supported pilots with 18 fintechs in Africa and South Asia that targeted financial services to low-income or underserved customers. Our goal was to explain innovations in a detailed way and generate insight on whether the services (i) work as stated, (ii) create value for underserved customers, and (iii) ease age-old pain points in delivering financial services to underserved customers.

This paper is written for funders—whether donors, investors, development finance institutions, or philanthropic organizations—who engage with fintechs to advance financial inclusion. Based on CGAP's work, it identifies five types of fintech innovation that offer potential for financial inclusion. We also highlight challenges that these fintechs, particularly those in early stages, face that inhibit their ability to impact financial inclusion.

Key Findings

FINTECHS ARE BRINGING INNOVATION TO EVERY PART OF THE FINANCIAL SERVICES SECTOR

The excitement around fintech is not without merit. Fintechs are innovating at every step of the financial services value chain, often through new value propositions, including flexible products and better ways to address the financial challenges faced by low-income customers. They are making financial services more affordable and accessible. They are improving the customer experience of financial services and accelerating use and engagement. They are also building the groundwork—including easier digital identity verification, collaborative customer due diligence, data sharing, and payment schemes—that can catalyze a host of financial services.

FIVE INNOVATION AREAS DISPLAY THE POTENTIAL FOR FINTECHS TO IMPACT FINANCIAL INCLUSION

The following list is not an exhaustive set of innovations in the fintech space, but each represents a powerful idea for financial inclusion. While most focus on payments and credit today, we expect there will be a diverse array of products in the future, as providers capture more data about their customers and are able to provide other services at marginal cost:

Interactive customer engagement. Fintechs are using SMS and other communication tools to reduce the cost and effort of engaging with customers. These tools ease complaint resolution, feedback gathering, and information dissemination. The result is greater use, trust, and loyalty. See Table ES1.

TABLE ES1. **Interactive customer engagement pilots**

Fintech	Service
Juntos	Mobile messaging and customer service
Arifu	Mobile advice and information
People's Pension Trust	Mobile nudges and incentives to encourage long-term savings

Smartphone-based payments. Fintechs are delivering intuitive, engaging smartphone-based payments applications with low data costs and low storage requirements. These solutions are reducing account dormancy and expanding use cases for payments. See Table ES2.

TABLE ES2. **Smartphone-based payments pilots**

Fintech	Service
Wave Money	Payments app
NALA and Hover	Payments app with no data requirements
Fundu	P2P ATM app

Connections-based finance. Fintechs are creating or leveraging social connections to build customer creditworthiness and offer connections-based finance for low-income people who cannot easily access cheap, timely credit to bridge cash-flow gaps. See Table ES3.

TABLE ES3. **Connections-based finance pilots**

Fintech	Service
M-Changa	Digital crowd-funding site
MaTontine	Digital savings groups and credit advance
Pezesha	Digital P2P lending
Patasente	Digital lending marketplace for MSMEs
Social Lender	Social-score-based lending

Location-based finance. Fintechs are using satellite data and machine-learning techniques to analyze physical location and offer insurance or credit at reduced cost to smallholders, who are some of the world's most excluded groups. See Table ES4.

TABLE ES4. **Location-based finance pilots**

Fintech	Service
Farmdrive	Digital loans for farmers
Apollo	Digital loans for farmers
Pula	Satellite data-based digital insurance

De-risked nonproductive finance. Fintechs are helping low-income people pay sizable or unexpected expenses while using unique features to reduce risk for the financier. See Table ES5.

TABLE ES5. **De-risked nonproductive finance pilots**

Fintech	Service
Microensure	Digital health insurance bundled with microcredit
Tulaa	Digital credit for farm inputs
Biolite	Energy products on credit

FUNDERS HAVE A ROLE TO PLAY IN SUPPORTING EARLY-STAGE FINTECHS

The funding that reaches EMDEs primarily goes to more established fintechs that have proven their business models. Without support from "angel" investors, many early-stage fintechs struggle even though they may have potentially game-changing ideas. Supporting these fintechs could unlock innovation and produce relevant lessons for the entire financial services market.

However, because their business models are unproven, they may be too risky for private capital. Global development and impact investing communities can invest patient capital, but they may need to take the following steps:

- **Bring clarity to a crowded marketplace of ideas.** Fintech innovation is varied, and because much of it is new, there is a lack of universal understanding of new business models and their potential to scale.

- **Link solutions to financial inclusion.** There are too few metrics for success and impact on financial inclusion goals.

- **Extract lessons from successes and failures.** Global lessons about how fintechs attempt to resolve pain points in financial inclusion would provide a realistic sense of fintechs' effects on financial inclusion.

FINTECHS FACE A UNIVERSAL SET OF INTERNAL CHALLENGES

Funders should be aware that all fintechs must overcome one or more of these four internal challenges, particularly during early-stage innovation:

- **Develop a clear value proposition.** Since financial services for the poor are scarce in emerging markets and competition is low, fintechs often fail to invest enough time to test and articulate their value before launching services.

- **Assemble the right human and technological resources.** Having all three core skills and resources—technology, market insight, and leadership—can be rare for start-ups in emerging markets.

- **Balance digital and in-person customer interaction.** Ensure underserved customers are comfortable using unfamiliar services or technologies that may require in-person interactions. However, a business model that relies heavily on physical interactions through stores and agents may limit the ability to scale.

- **Form strategic partnerships.** Many early-stage fintechs depend on partnerships to get their ideas off the ground, either because they lack scale, capabilities, or adequate licensing. However, their newness and size may make it difficult for them to forge equitable partnerships with established institutions.

Conclusion

After two years of experimentation, we see preliminary evidence that fintechs have the potential to affect financial inclusion, but more granular research is needed. Going forward, CGAP will support the global development sector, policy makers, and the impact investing industry by facilitating a common understanding of emerging business models in fintech that have the potential to advance financial inclusion. We will also extract granular lessons from fintech innovations that can shed light on what creates value for the poor and on the limitations of new approaches.

INTRODUCTION

A NEW SET OF TECHNOLOGY-BASED COMPANIES ARE disrupting the financial services market globally. Fintechs, as they are called, have developed a market presence in the decade since the 2008 financial crisis. They have garnered attention because they combine technology with access to alternative data and innovative approaches to deliver new kinds of financial products, services, and experiences to their customers. They have challenged business-as-usual by being nimbler, serving underserved segments, or improving unit economics. Their success is reflected in the number of customers that adopt their services and how they influence established financial institutions to compete with more innovation and more customer-centric features and services (PWC 2017).

Fintechs often begin as start-ups, but many have scaled dramatically. SoFi, a credit marketplace founded in 2011 to offer digital, unsecured loans had issued more than US$9 billion in loans by 2016 and expanded to offer personal finance, billing, payments, insurance, and even pensions (CNBC 2016). Robo-adviser Betterment uses big data to reduce the cost of investing for a large base of U.S. customers.[1] It charges customers just 0.25 percent of their assets every year and does not require a minimum balance—all offered through a user-friendly, interactive interface. After 10 years, Betterment manages US$13 billion in investments.

Some fintechs are creating solutions specifically designed for underserved low-income customers.

Until recently, the fintech phenomenon was largely limited to developed markets. Now, fintechs are beginning to disrupt the financial ecosystem in emerging markets and developing economies (EMDEs) as well. While most solutions globally still focus on affluent customers who are well served by financial services, some fintechs are creating solutions specifically designed for underserved low-income customers. The rise of fintechs such as PayTM, Zoona, Jumo, and Cellulant in EMDE markets inspired CGAP to study them to understand their potential effects on financial inclusion.

Fintech innovation and the role of fintech firms

Fintechs are not alone in using technology to innovate. The term "fintech innovation" refers to activities by a broad range of actors, including incumbent financial institutions, and others. In fact, established financial institutions (e.g., banks, credit card companies) around the world are using innovative technologies for improving everything from customer complaint

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1 Robo-advisers provide financial advice or Investment management online with moderate to minimal human intervention. They provide digital financial advice based on mathematical rules or algorithms

resolutions to fraud control. When innovation is combined with an established institution's scale, brand recognition, and trust, the potential for impact can be high. In practice, however, adopting innovation has proven to be challenging for established organizations. Legacy IT systems, heavy operational processes that are difficult to change, and a business model that relies on physical infrastructure make the cost of transformation high and limits the potential for reaching underserved segments. Nevertheless, Equity Bank in Kenya, Capitec in South Africa, and DigiBank in South East Asia are examples of established financial institutions that use innovative technologies to grow and expand their offering in emerging markets.[2]

On the other hand, fintechs typically begin as small firms with an innovation culture. Their size and newness give them the agility to change and develop infrastructure built for digital operations. They have a consumer-centric perspective that is frequently lacking in traditional finance. Their survival depends on their effectiveness in bringing an innovation to market. Therefore, fintechs can be a driver of competition, diversification of financial services offering, and efficiencies in markets.

A quick look at the *kinds* of innovations brought by fintechs reveals another distinction from traditional finance institutions. Fintechs often focus on needs not addressed by incumbents in the markets they operate in, and therefore they tackle pain points for underserved groups (e.g., those without credit scores or those who have a history of default) or groups that are dissatisfied with current products (e.g., millennials). In emerging markets, fintech offerings often align with financial inclusion goals.

Despite the distinct effect fintechs could have in markets through new technologies and approaches, they often need to partner with established financial institutions to scale. Some question whether the numerous and often narrow solutions brought about by fintechs could have substantive and cohesive impact. Because of the large number of companies and business models emerging, it's difficult to assess which are most useful for financial inclusion. Nonetheless, through their iterations, these companies may open doors that have been closed to some customers. The success of a substantial mass of fintechs could influence established financial institutions to adopt more efficient approaches, broaden the markets they serve, and become more responsive to customer pain points.

Fintech catalysts in EMDEs are unique

In developed markets, fintechs benefit from widespread internet access, savvy digital customers, and prevalence of digital money. EMDEs generally lack these conditions, but fintechs have still managed to do well in several EMDE countries. Some of the following factors may explain why:

- Widespread digital payment schemes have created an enabling infrastructure to bring new businesses to market.

- Third-party integration mechanisms have made it easier for innovation to reach customers.

- Rising smartphone penetration has improved customer experience.

- New data sources have enhanced delivery and reduced costs to serve.

- Regulatory sandboxes are beginning to enable safe experimentation.

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2 In fact, even governments, most notably the Indian government, have used technology to offer digital solutions that enhance the entire national financial services architecture.

WIDESPREAD DIGITAL PAYMENT SCHEMES

In the past decade, many emerging markets have adopted regulations that allow new entrants into the financial services sector, especially in payments. These new players range from mobile network operators (MNOs) and electronic money issuers that offer store-of-value accounts and payments services accessible from any mobile phone. MNOs attract vast numbers of agents that conduct cash-in and cash-out functions on behalf of mobile money providers and aggregators that facilitate the integration with mobile money platforms. Fintechs have used this infrastructure to target customers (i.e., business-to-consumer services) or to conduct operations on behalf of large financial institutions (i.e., business-to-business services).

THIRD-PARTY INTEGRATION MECHANISMS

Banks and MNOs want to increase their customer base, build deeper customer loyalty, and expand use cases for digital transactions, and this has fueled interest to integrate with fintechs offering a variety of new services.[3] MNOs have enjoyed a growing mobile money business, but in many markets, this is somewhat stagnant. Most transactions are focused on cash-in and cash-out, person-to-person (P2P) payments, and airtime top-ups (GSMA 2018). Unless MNOs reach scale and partner with new actors to drive up digital transactions, research suggests that the unit profit of mobile money from these services will not justify underlying investments and operating costs (Osafo-Kwaako et al. 2018).

GSMA (2017) reports that MNOs with the highest activity rates are integrated with seven banks, 95 billers, and 31 organizations for bulk disbursements and with 6,500 merchants (GSMA 2017). Other established financial institutions are doing the same. A PWC (2017) global survey of 1,300 senior managers across banks and asset management and insurance companies showed that the percentage of these companies partnering with fintechs rose from 32 percent in 2016 to 45 percent in 2017. On average, 82 percent of those surveyed expect to enter into more partnerships with fintechs over the next three to five years. In another example, Absa, a prominent bank in South Africa, announced in 2017 that it is partnering with nine fintechs to develop a new digital identity that would help it to keep pace with growing millennial segments (ABSA n.d.).

The spread of open application programming interfaces (APIs) in EMDEs is likely to promote further partnerships between financial services companies and fintechs.[4] Globally and across sectors, API architecture has dominated the evolution of digital services and is becoming increasingly visible in the financial services ecosystem. APIs can significantly reduce the cost and time of integration and, thus, reduce the cost of innovation.

RISING SMARTPHONE PENETRATION

Smartphone penetration is steadily growing in EMDE markets due, in part, to low-cost devices, low-cost data plans, and the availability of tools to compress the size of apps and allow for more data use. GSMA (2018) estimates that by 2025, three in four mobile connections will operate on smartphones. Smartphones enable services to more directly reach consumers through an engaging interface. They also enable more complex interactions and allow for more guided customer journeys.

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3   GSMA indicates that increasing the number of digital transactions conducted on accounts (as a ratio per cash-in) can generate EBITDA margins of up to 20 percent (Almazan and Vonthron 2014).
4   APIs enable the interconnection of disparate systems to offer a seamless product or service that relies on capabilities of different firms. Open APIs offer commercial terms and conditions that are public, uniformly applied, and available to any individual or firm meeting eligibility criteria.

NEW DATA SOURCES

Customers' growing digital footprints mean that fintechs can leverage alternative data sources—ranging from digital payment records to satellite data to social media behavior—to market to targeted segments and to build customized credit and insurance models. These efforts, when used responsibly, are cost efficient and can expand financial access to more people.

REGULATORY SANDBOXES

Several regulators are allowing private firms to conduct small-scale, live testing of innovations in a controlled environment—called sandboxes—by providing a special exemption, license, or other limited, time-bound exception under the regulator's supervision (Jenik and Lauer 2017). Countries that permit sandboxes include Sierra Leone, Kenya, Jordan, Mexico, and Thailand. These sandboxes encourage firms, including fintechs, to test innovative solutions in a safe and discreet environment to understand customers and adjust their business models before sorting out what kind of licensing scheme is needed, if any.

Yet, fintech investments in EMDEs are few

The rapid rise of fintechs and the promise of financial returns have attracted private investors. Globally, total venture capital and equity investment going to fintechs have steadily risen at above 40 percent compound annual growth rate (CAGR) in the past five years. In 2018, the total amount invested in fintech was estimated at US$40 billion across 1700 deals.[5]

Most venture capital and equity investments in fintech are in the United States, Europe, China, and to a lesser extent in other developed markets (KPMG 2018). As fintechs appear the financial services markets in Latin America, Africa, and South Asia, they attract private investments, accelerators, and incubators. Notably, companies like PayTM (India), Cellulant (Kenya/Nigeria), and Mercado Libre (Argentina)—considered start-ups not long ago—have received considerable investment (Sen and Shrutika 2018; Bright 2018).

But much of this investment in emerging markets are in fintechs that are in a growth stage. Investment in seed and early-stage start-ups is low, and in the absence of angel and philanthropic investing in these markets, many start-ups struggle to survive during crucial periods of prototyping and establishing their value proposition. Skewed funding also forces companies to be cautious about sharing their data, leading to a dearth of industry-level lessons on successes and failures.

Fintechs bring relevant innovations to the financial services sector

Fintechs are innovating at every step of the financial services value chain. Their innovation enhances access and use of financial services for underserved, low-income customers. They also resolve complex pain points in financial inclusion efforts in emerging markets. (See Figure 1.)

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5   See "Fintech Trends 2019," CB Insights, https://www.cbinsights.com/research/report/fintech-trends-2019/.

FIGURE 1. **Fintech's effect on the customer and the market**

FOR THE UNDERSERVED, LOW-INCOME CUSTOMER			FOR EMERGING AND DEVELOPING MARKETS		
Better experience	Improved products	New value propositions	Better infrastructure (financial)	Greater competition & choice	Use cases for payments accounts
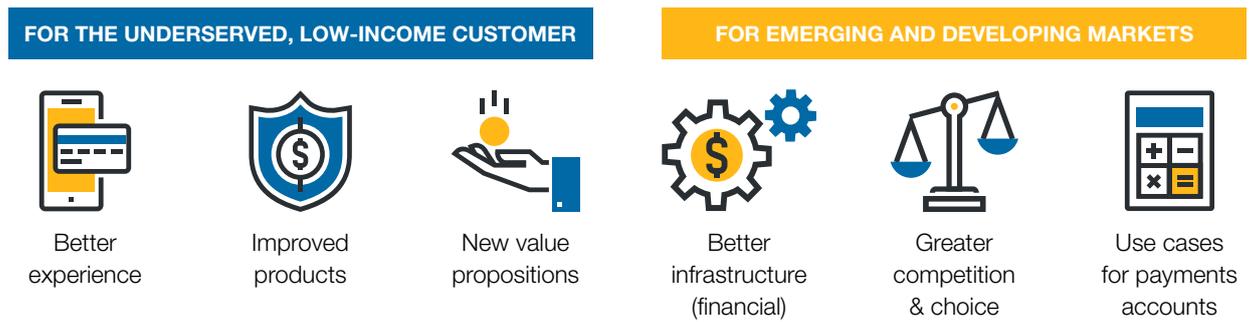
Fintechs potentially enhance financial services for the poor in the following ways:

Better experience. Some fintechs offer services and applications (apps) that improve how customers experience financial services, increase their use, and increase trust and customer engagement. These services may be offered on smartphone apps or they may use simple SMS conversations to observe behavior, offer advice, or provide an interactive option for customers to resolve complaints.

Improved products. Other fintechs improve financial services, such as credit, insurance, and pensions, by introducing digital features or creating operational efficiencies that could bring greater access and affordability for the end consumer. In the process, they often collect better data, which creates more options to further improve products.

New value propositions. Some fintechs explore how they can combine improvements in products and experience to offer entirely new value propositions to underserved customers. These services might offer flexibility and customization that was not available before; they could also offer new and different solutions that address specific financial challenges experienced by low-income customers.

Fintechs can add to market development in the following ways:

Sound financial infrastructures. Some fintechs help build a foundation that catalyzes other financial services. These include services that verify digital identity, ensure collaborative customer due diligence, and allow for data sharing and easier payments, including cross-border remittance solutions. Because these solutions may be offered to any entity within a market, they have a role at the ecosystem level.

Greater competition and use cases. As fintechs scale, they create greater choice and competition in the market. By innovating around the products and experience, they create more use cases for digital accounts.

Lessons from experiments

After our preliminary research, we sought to better understand fintech innovations on the ground and draw clear links to financial inclusion, where they exist. We wanted to understand innovations in a granular way and generate insights on whether the services (i) work as stated, (ii) create value for underserved customers, and (iii) ease age-old pain points in delivering financial services to the underserved.

Through a formal selection process that included a public call for proposals, we identified 18 promising fintechs to study. Each company targeted underserved populations, and all, except for three, were based in Africa. The companies were early-stage start-ups; all of them, except for one, already had a financial service that had been designed but not tested.

CGAP funded pilots with each company and provided technical assistance to design experiments and analyze results. Since most of these were early-stage companies, each pilot involved reaching an average of 1,000 customers. In addition, each pilot had differing metrics for success based on the nature of the product. Most pilots had quantitative metrics, but some testing was more qualitative. As is the nature of start-up innovation, not all pilots were successful. In fact, few were successful in exactly the way we envisioned. When successful, we saw the beginnings of an effective company and noteworthy value creation for an underserved customer. But some failures, too, revealed important directions for future strategy, and these were just as valuable.

With seven of these start-ups, we also conducted an independent post-pilot evaluation, in collaboration with the Busara Center for Behavioral Economics, to measure the value created for customers, through interviews with customers and fintech staff.

This paper details the lessons we learned through this two-year research, piloting, and interviews.

In the ***first section,*** we focus on the innovations, grouped into five innovation areas. Each area is connected to a pain point in financial inclusion, and we summarize lessons on what it takes for each group to work and scale.

The ***second section*** moves beyond innovations and discusses common challenges early-stage fintechs face that inhibit their impact.

SECTION **1**
EMERGING AREAS
OF **INNOVATION**

We sorted the 18 fintechs we worked with into one of five innovation areas:

- Interactive customer engagement

- Smartphone-based payments

- Connections-based finance

- Location-based smallholder finance

- De-risking unproductive expenses

These five areas do not encompass all the innovation in this space, but each represents an innovative idea for financial inclusion, brought to market through a variety of players in different ways, that is experiencing early traction. Table 1 shows the different innovation areas. A detailed look at the areas and the pilots follow.

Interactive Customer Engagement

PAIN POINT
Digital financial services are not interactive because engagement is expensive.

Early retail financial services were rarely interactive, and a decade ago, we would be hard pressed to find senior executives in finance who could talk about their engagement strategy with retail customers. In the past decade, fintechs have attracted customers by offering a service or product that is easy to reach and interactive. This has made incumbent financial institutions take notice and improve their offerings.

But even today, a low-income customer with low-ticket transactions in Sub-Saharan Africa or South Asia is unlikely to engage with a customer service agent to resolve issues with her payment transactions or pensions account. The low-cost, no-frills business model employed by banks to serve low-income clients doesn't leave much room for communication and engagement. It is expensive to ensure customers understand services and trust in them. Microfinance institutions (MFIs) and other local financial services with high-touch models find it difficult to scale.

Fintechs use SMS, audio recordings, and video along with digital analytics and automation to interact with customers on the right topics at the right time.

TABLE 1. **Innovations, fintechs, and services addressed in this paper**

Innovation Area	Fintech	Service
Interactive customer engagement	Juntos	Mobile messaging and customer service
	Arifu	Mobile advice and information
	People's Pension Trust	Mobile nudges and incentives to encourage long-term savings
Smartphone-based payments	Wave Money	Payments app
	NALA and Hover	Payments app with no data requirements
	Fundu	Mobile-based person-to-person ATM app
Connections-based finance	M-Changa	Digital crowd-funding site
	Ma Tontine	Digital savings groups and credit advance
	Pezesha	Digital person-to-person lending
	Patasente	Digital lending marketplace for MSMEs
	Social Lender	Social-score based lending
Location-based smallholder finance	Farmdrive	Digital loans for farmers
	Apollo	Digital loans for farmers
	Pula	Satellite data-based digital insurance
De-risked nonproductive finance	Microensure	Digital health insurance bundled with microcredit
	Tulaa	Digital credit for farm inputs
	Biolite	Energy products on credit

Low-income customers may experience stress when they use payment services. For example, if they mistakenly send half their salary to the wrong account, they may fear that they won't be able to reach someone to help them. Or, they may fear that they won't be able to access their own savings in an emergency. The cost and difficulty of interaction also affects products such as microcredit, pensions, and insurance. Either customers do not understand the products and stay away, or in-person interaction—which is crucial when assessing a low-income customer for a small and medium enterprise loan or when providing insurance products to farmers—becomes difficult to scale and therefore leads to limited access.

THE INNOVATION

Fintechs in this area combine communication technologies like SMS, audio recordings, and video with digital analytics and automation to interact with customers on the right topics at the right time. This improves the customers' experience with a product or service and can lead to the collection of more information, increased engagement, and fast resolution of customer complaints. These solutions include chat bots that use SMS and USSD to reach customers who do not have smartphones.

Both business-to-business and business-to-customer variations exist. Some companies partner with banks and other financial services providers (FSPs) to improve their customer engagement and make their services accessible and targeted. Others target the end customer directly with engagement that acts as a gateway to other services. Still others use information and communication technologies to make complex financial services like credit, insurance, and pensions easier to understand and to use. In each case, the customer has greater access to information and an easy access point of contact should they have issues with their service.

THE SERVICES

Juntos

Juntos uses mobile messaging to interact with customers and build greater engagement between them and their FSP, such as a bank or a mobile money provider. Juntos does not offer financial services directly to customers. It has contracts with FSPs that need help getting over a pain point or that are launching a new product. Juntos helps these FSPs engage their customers more deeply, educate their customers, and improve use rates.

Juntos uses a centralized and automated messaging service that sends messages to a large customer base. As customers reply, the service responds with individualized responses based on customer messages. Because more than 90 percent of messages are automated, providers can offer standardized information, with customized interaction, to their customers at a very low cost. Through these messages, Juntos establishes relationships with customers on behalf of the FSP, informs them about new services, and offers them tips and guidance to access and use a product effectively. Customers respond with questions or issues they face and receive real-time automated responses from Juntos. The pilot studied the effect of Juntos' interaction with customers in their use of certain financial services.

Arifu

Arifu in Kenya uses mobile messaging to offer topic-based learning to low-income customers. It partners with FSPs to offer their current and potential customers financial information in a cost-effective way and uses these interactions to direct customers to specific financial services offered by the FSP. Interactions with customers are structured around learning topics such as "setting financial goals" or "expanding your business." Customers navigate content on their messaging app, which Arifu makes available in simple bits. At the end of an information module, customers take a test that measures and tracks learning progress. If an FSP partner can integrate its customer data with the Arifu platform, Arifu can tailor its messaging to suit specific business goals, such as reducing dormancy and increasing use. The pilot tested how well Arifu's platform identified and profiled FSP customers and its potential to improve customers' engagement with financial services and products.

Services like Juntos and Arifu interact with customers and tailor communications based on customers' responses. In places with deeper smartphone access among low-income customers, these services may begin to use more visual and video-based formats and test for greater engagement.

People's Pension Trust

People's Pension Trust (PPT), in Ghana, is a fully licensed pensions company that offers pensions to informal workers, ranging from urban market vendors to rural cocoa farmer associations. While PPT is not a conventional fintech, its core product (a long-term savings plan) depends on a digital customer interaction strategy to drive customers toward constant savings.

Informal workers have volatile incomes and find it hard to save regularly for their old age. Without adequate information and interaction on how pension products work, saving for old age quickly becomes a low priority. On the other hand, with the prospect of a low rate of voluntary contributions, it is hard for pension companies to find a business model that works.

Through its customer research, PPT found that low-income informal workers want to have safety nets for themselves. Workers who had access to a pension scheme often stayed away from it because they did not know how the schemes worked. PPT hypothesized that

regular and low-cost interaction with customers would increase customers' understanding of the value of pensions and help scale its business, albeit gradually.

In our pilot, PPT conducted extensive behavioral testing to understand which digital strategies—SMS, calls, automatic deductions, etc.—would best complement physical interactions and be a low-cost way to encourage customers to use its pension product. At the end of the pilot, each of the treatment groups had greater engagement with PPT than the control group did, showing that digital nudges tailored to specific segments could improve contributions.

This pilot showed that for a new and evolving product, an interactive channel can be used to support onboarding and respond to feedback and requests for new features from customers.

Apollo Agriculture, a fintech that provides loans to farmers in Kenya, tested SMS and automated calls to nudge farmers to repay their loans and to offer agronomic advice. Although purely behavioral nudges were not effective at incentivizing early repayment, interventions involving lotteries where farmers participated by making a partial payment did prove to incentivize small prepayments. **NALA**, a fintech that provides a payments app in Tanzania, effectively embedded WhatsApp as a customer touchpoint.

CONDITIONS NECESSARY FOR SUCCESS

1. **Safeguarding customer data.** Since many of these fintechs communicate with customers of an established financial institution that has an established brand and fiduciary responsibilities, they need to be responsible communicators to their customers and keep customer data safe. FSP concerns around competition and customer ownership need to be resolved upfront, particularly if cross-selling is involved. Without adequate provisions and obligations, FSPs will find it difficult to trust a third party with customer communications.

2. **Integrating systems and data exchange.** To demonstrate success, these fintechs need to measure the effects of their customer interactions along business metrics, whether for themselves or for their FSP contractors. If this is done in-house, the process is straightforward. However, if measurement involves a contractual relationship, then FSPs must provide adequate access to their data and the fintech must create the necessary infrastructure to enable dataset analysis. In the Juntos pilot, it was essential to test many iterations of messages, and this required frequent access to business data. System-level integration can increase the effectiveness and efficiency of the process of tailoring dialogues and maximizing impact.

3. **Choosing an appropriate channel.** Because appropriate channels, whether SMS, multimedia, or voice call, are important elements of this model, customer capability and existing infrastructure need to be assessed. Juntos and Arifu rely on simple SMS messaging while PPT uses different channels for different segments—one segment receives SMS messages and another receives voice calls and in-person interactions. Smartphone-based content can be more visually appealing, and it can be tested where smartphone prevalence among underserved customers is high enough.

4. **Iterative testing.** Even if the channel is right, messages need to be tailored to effectively communicate with a specific audience. Juntos invests considerable time on A/B testing to determine what content and language to use in different anticipated situations.[6] Arifu

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6 A/B testing is comparing two versions of a service to see which one performs better

also conducts preliminary research with customers before it designs its learning content. In its pilot, PPT worked with four treatment groups, each with its own form of nudge or incentive, in addition to a control group to determine the right strategy.

5. **Determining an adequate price point for these services.** The price for these services must be commensurate to the incremental value produced for the business by the interactions. Fintechs must be able to measure and track the impact of their customer engagement on the FSP's business and price their services accordingly.

Smartphone-Based Payments

PAIN POINT
Poorly designed user interfaces contribute to dormancy in payment accounts.

Mobile money can reduce the operational costs for delivering financial services to the underserved. The proliferation of mobile phones and mobile money or bank agents has resulted in scores of mobile money accounts being opened. However, many of these are dormant, and dormant accounts erode the business case for serving the poor. In some cases, negative experiences from working through long USSD menus and clunky interfaces keep users away from digital financial services (Chen, Fiorillo, and Hanouch 2016).

Fintechs are delivering intuitive, engaging smartphone-based payments applications with low data costs and low storage requirements.

THE INNOVATION
The term "next billion" is used to define internet users coming online in the next few years. Most of these users are in emerging markets, and of these, most are low-income millennials who will go online using a mobile phone (Sengupta 2018). Google, the global search engine and creator of the Android Operating System, believes that, given their low literacy and lack of experience with digital technologies, most next billion users are unlikely to email or read content. Google predicts that, instead, these users will communicate in a combination of languages and consume services via voice recognition, video, and images.

Low-end smartphones and low-cost data plans are spreading rapidly through Asia and parts of Africa, representing a significant opportunity for FSPs to create more compelling interfaces that can help users better understand and trust digital payments services. Fintechs are creating smartphone apps that are fun, simple, and engaging and that leverage intuitive user interface or user experience (UI/UX) to build user confidence in digital payments and encourage greater use.

Some of these companies create payment services that use simple text and voice recognition and communicate with images. Others have tutorials and helplines built into their apps to help customers. Intuitive UI/UX helps users navigate the service despite poor literacy. While good visuals often require higher bandwidth, fintechs are creating visually compelling apps that work in environments with slow data connections and low storage capabilities (Bellman 2017). Most of these are payment apps, but intuitive UI/UX methodology is increasingly being applied to other financial services offered on a smartphone (Chen 2016).

THE SERVICES

Wave Money

CGAP partnered with Wave Money in Myanmar to use principles of human-centered design to develop and test a mobile wallet app for smartphones (80 percent of mobile devices in Myanmar are smartphones). [7] (See Figure 2 for examples of Wave's app interface.) A series of iterative tests was conducted to learn how low-income users understand the smartphone app interface and its features and to identify the interfaces users found to be easy to operate. The results led Wave Money to identify a set of principles that can help developers design apps that feel more natural for customers, especially for customers who are new to digital services. [8]

FIGURE 2. **Wave Money screens**

NALA

Some of the lessons learned from the Wave Money pilot were used in a pilot with NALA and Hover in Tanzania. NALA is a smartphone app that works offline (powered by USSD in the background) to encourage customers who have smartphones with limited data packages to make mobile payments. Its partner, Hover, provides developers the technology to integrate mobile money into their applications, even when APIs and for payment integration do not exist.

The pilot tested how customers interacted with simple payment features, including budgeting tools, transaction history, and management of several SIMs securely—features not generally available on USSD menus. We used knowledge gathered from customer workshops and feedback from customers participating in the pilot to create an app that is tailored to meet customer's needs and preferences. The app proved to be particularly useful for customers making complex transactions (such as bill payments, which requires capturing multiple data). The smartphone interface listed the services available and the

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7   This was the only project in our research where the product did not exist beforehand. The project in-volved project design and piloting.

8   For more details, see Chen (2016) and Chen, Fiorillo, and Hanouch (2016).

customer accounts, which helped to reduce the possibility of entering the wrong bill pay number or account number (see Figure 3).

FIGURE 3. **NALA application screens**
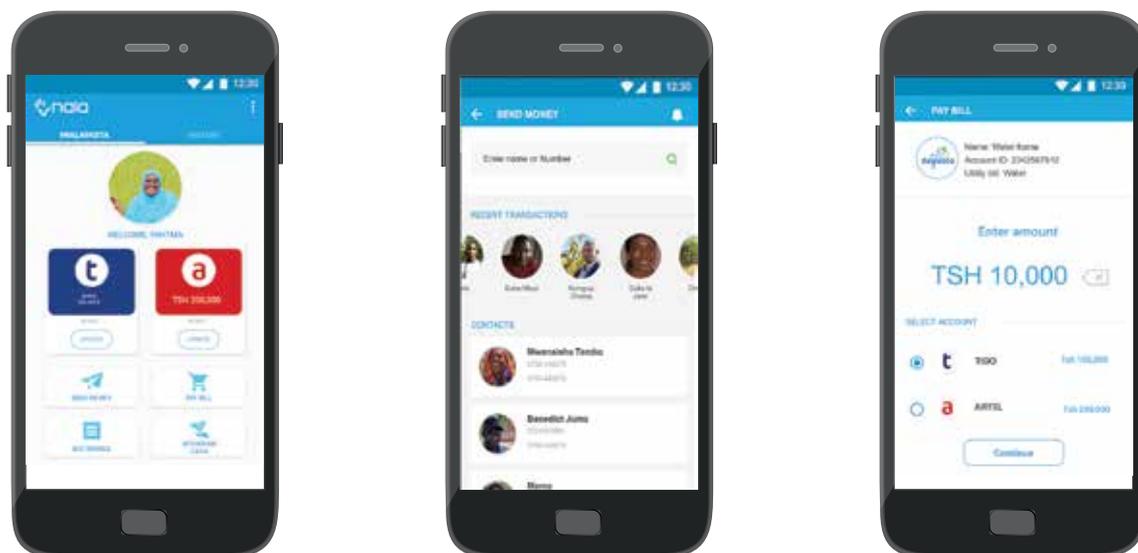
Fundu

In another project, we worked with Eko Financial Services in India to pilot Fundu**,** an app that gives customers a secure and fast way to get cash from fellow Fundu users and cash points, on the go. The app uses the Unified Payments Interface and is targeted at India's approximately 400 million customers who have recently acquired smartphones and have bank accounts, but who primarily earn and spend in cash because there are surprisingly few cash-out points (ATMs). [9] For these customers, daily access to cash is critical. In response, Fundu promises to facilitate cash-on-demand when and where the customer needs it. The app has the potential to build consumer confidence in other digital financial services.

Fundu's interface is designed to enhance and facilitate person-to-person interaction using the three key components that are typically available on any smartphone: location (Google Maps), relationships (contact book), and time (clock). The pilot tested how these features would help to facilitate key steps in the customer journey. Users make a request for cash, and the app finds another user who is physically near and willing to exchange e-money for cash (users can also exchange e-money for cash from someone in their contact book or an ATM or an Eko agent). Once a match is made, the app indicates how long it will take the seeker to reach the provider's location. When the pilot launched, each point of customer drop-off was recorded, and the app designers iterated on design in response. (See Figure 4.) Note that because Eko marketed Fundu as an ATM, the company ran into regulatory issues, and Fundu is no longer functional in the market.

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9   The Unified Payment Interface enables all bank account holders in India to send and receive money instantly from their smartphones without the need to enter bank account information or user ID/ password (https://indiastack.org/).

FIGURE 4. **Fundu application screens**

CONDITIONS NECESSARY FOR SUCCESS

1. **Intensive iterative testing**. Since the success of each service hinges on users finding the app easy to use and intuitive, fintechs must invest in several rounds of direct user testing to determine how features look and feel to underserved customers and whether they encourage greater use.

2. **In-app assistance and validation for crucial steps.** A key barrier for some customers is fear of making a mistake, such as typing the wrong number, and losing their money. Providing clarity and validation along the way is crucial. An easy-to-reach customer helpline can prevent drop offs.

3. **Data infrastructure**. In many emerging markets, even if smartphone penetration is high, there might still be low connectivity where underserved customers live. Data packages may be expensive for the low-income customer, and customers may use data sparingly, which poses a challenge for these kinds of applications. Several fintechs try to mitigate this by having apps that run on low data or even use USSD infrastructure where connectivity is low.

4. **Networks**. The success of apps like Fundu hinges on the availability of a large acceptance network that can make requests for cash and respond to them. This is often not easy to build from scratch, and while Eko was working to expand its user base, it also relied on an existing agent network to facilitate customer acquisitions in the beginning.

5. **Business models**. Fintechs often begin with the design and experience of the app and the need to drive use and engagement. The business model is not always determined from the start, but soon enough, these companies will need to determine their revenue and cost factors to have a sustainable business model. This makes it hard to find early-stage funding for such innovations.

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Connections-Based Finance

PAIN POINT
Low-income people cannot easily access cheap, timely credit to fill cash-flow gaps.

Traditional financial institutions often view low-income people as uncreditworthy because they do not have formal credit or payment transaction histories. Nonetheless, low-income people often have complex financial lives that involve financial relationships with others in their community, their profession, or their families. These informal financial relationships are undocumented and deeply rooted in the social context. But as several studies based on financial diaries have shown, low-income people's informal financial behavior can demonstrate financial acumen, application of complex strategies, and varied risk appetites.

Fintechs are using digital technologies to connect individuals and to build creditworthiness and offer credit to low-income people.

Low-income people often need small amounts of cash for emergencies and to smooth expenses in times of low cash flows. They often turn to savings groups where pooled savings offer access to finance when needed. Some experiments to formalize and scale these groups have succeeded, notably in India, but operation costs to scale are high, and many remain informal. The lack of access to a customer's payments record inhibits linkages with formal financial institutions.

THE INNOVATION
Fintechs in this group use digital technologies to create or leverage connections between individuals to build creditworthiness and offer credit to low-income people to fill cash-flow gaps. These fintechs help customers connect to their savings groups and keep an electronic record of their payment behavior. They also help customers connect with others in their network or beyond when cash is needed for an emergency. Some fintechs use data generated from these connections and transactions to help customers—whether individuals or entrepreneurs—to access small and timely amounts of credit. Small amounts keep credit risk low. The timeliness of credit is key to helping customers better plan for cash-flow gaps and emergencies.

THE SERVICES

MaTontine
MaTontine, in Senegal, uses a mobile payments platform to digitize traditional savings circles (known locally as "tontines"). Tontines typically involve a group of customers saving a fixed amount monthly and a given member receiving the ensuing lump sum on a rotating or random basis. These monthly contributions continue until every customer has "won" once. MaTontine adapts the natural pattern of payments and winnings of the tontine to provide small loans to regular members. Loans are repaid when customers win the lump-sum contribution.

The MaTontine pilot tested whether the cost of borrowing could be reduced because of lower risk and whether, with regular payments, MaTontine could build payment histories of each customer and eventually offer larger loans and other financial services as the customer relationship grows. The pilot showed that the ability to borrow against a foreseen win allows customers to use part of the funds in a planned way that suits them (as opposed to waiting their turn, which could be January or December, and then hurriedly using the cash when it comes). This leads to more short-term stability in their homes and businesses.

MaTontine relies on FSP partners to provide loans and other financial services. Once it builds the financial histories of its customers, it can create better, stronger partnerships or provide services directly.

Social Lender

Social Lender, in Nigeria, offers digital credit based on social reputation. Typically, low-income customers in Nigeria must put up traditional forms of collateral to secure a loan. Social Lender asks customers for access to their social network instead of collateral. Applicants share their contact information, and in turn, these social contacts validate the applicant's identity, and they sometimes agree to guarantee a portion of the applicant's loan. The pilots tested two versions of the Social Lender product: an SMS-based product targeted at the lowest income customers and a web-based product (with Sterling Bank) that required customers to connect their social media accounts with a smartphone or computer. The latter targeted customers who had bank accounts but who did not qualify for the bank's traditional credit products. The scores based on this social data appeared to correctly rank borrowers in terms of default risk: borrowers with higher social scores showed lower default rates on their loans.

M-Changa

M-Changa is an online fundraising platform that allows customers to leverage their connections digitally to access funds. M-Changa does not offer loans; rather, it helps customers to source social giving (known as "harambees" in Kenya) from people on a digital platform, when they have immediate cash needs for life events like marriage or funerals. The platform makes it easy to crowdsource funds because customers can readily access their networks and even expand to their network's network when a cash-flow emergency arises. In this pilot, M-Changa and the Busara Center for Behavioral Economics conducted a series of experiments with current and potential customers in Kibera, Nairobi, to better understand the factors that motivate people to contribute to harambees. The goal was to understand how technology can reduce costs and expand networks within harambees, without taking away core elements, such as the social connections and sense of giving, that have traditionally driven engagement within them.

Pezesha

A pilot with person-to-person lending company Pezesha, in Kenya, sought to better understand the value of peers as a source of capital for loans. The goal was to find out whether receiving a loan from a fellow Kenyan, rather than a bank, changed the likelihood of borrowers repaying the loan (e.g., because of people feeling more obliged to the lender). Pilot results did not support any statistically significant difference in repayment rates based on the origin of funds, though other peer-lending services with different features could prove to be successful. Since the pilot, Pezesha has shifted its business model to focus on a social-circle-based marketplace for financial education to help underserved borrowers build their credit scores and to connect them with institution lenders to ensure long-term scale on both the demand and supply side of the marketplace.

Patasente

Patasente is an online merchant platform in Uganda that connects different points of a goods and services supply chain so that participants can bring their businesses online, purchase goods, settle payments, and secure invoice financing. The businesses on Patasente's platform range from smallholder dairy farmers to large corporations, but the pilot focused on microbusinesses.

Microbusinesses often face cash-flow gaps if their buyers cannot pay them when the supplies they ordered are delivered. In turn, buyers struggle to find reliable suppliers that can deliver a product and wait 30–90 days for payment. Microbusinesses cannot access credit from their buyers or banks because they lack collateral. Patasente secures interim financing for suppliers by assessing the credit worthiness of their buyers through reverse invoice factoring. Funding is secured through private lenders who are offered competitive returns.[10]

This pilot tested the strength of the credit score Patasente used to make its platform-matching work. A USSD version of the platform was tested with dairy farmers to explore whether this service could be rolled out to customers who do not have smartphones. As in the Fundu pilot, the success of Patasente services is based on two-sided or multi-sided networks and depends on growing each side robustly and having adequate connections.[11] The Patasente model also calls for building strong credit scores for each buyer and finding investors who agree to assess risk based on the credit score and lend.

CONDITIONS NECESSARY FOR SUCCESS

1. **Building a robust user network and credible scores.** The biggest challenge for each of the companies is to prove its ability to scale its user networks and the connections between them and then to prove that the credit models based on the connected transactions are sound, to attract greater investment. However, this appears to be a chicken-and-egg dilemma, because to show scale and build strong credit models, companies need to have funds to iterate and pilot various models with various customer segments and to generate proof points to scale.

2. **Lending small.** Since most services involve lending based on pooled risks or proxy scores and are geared at establishing identity and creditworthiness, they carry some risk and are generally better suited for quick, short-term cash flow issues rather than larger loans.

Location-Based Smallholder Finance

PAIN POINT
Most of the world's 500 million smallholder households cannot be appropriately assessed by traditional credit and insurance service providers.

More than 500 million families around the world rely primarily on smallholder agriculture for their livelihoods. Many are underserved by formal financial services. However, many financial institutions do not have the tools to properly assess risk in agricultural settings, and therefore, they devote disproportionately lower shares of their loan portfolios to agriculture compared to the sector's share of GDP.

Lack of access to finance, which is partly related to a lack of risk mitigation tools for weather, yield, or other risks, forces many farmers to purchase low-quality inputs or insufficient amounts, which limits yields and keeps their income low. Some smallholder farmers obtain loans from informal lenders or through buyer's credit—both are expensive options that often require some form of collateral (assets or future crops). Since most

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10 For the pilot, Patasente had no history on these supply chains, so it used physical records from the past to build credit scores to test its platform through one round of invoice-based loans.
11 Both Eko Fundu and Patasente need two or more distinct groups of users to join the platform.

smallholders live in the informal economy, they make few formal financial transactions, which means that they don't have the credit history needed to qualify for formal credit.

Even when they have access to credit, many farmers hesitate to take loans to buy high-quality inputs. Many depend on rain-based agriculture, and the changing patterns in weather from climate change make them vulnerable not only to losing their inputs but to ending up in debt. Because of this, area yield insurance is important for smallholder farmers. It uses yield information to insure against weather patterns that reduce yields (e.g., little rain during the planting season). However, delivery models for area yield insurance are labor intensive, costly, and often unaffordable for smallholder farmers.

THE INNOVATION

Fintechs are using digital technologies and alternative data sources to reduce cost and expand access to financial and extension services to smallholder farmers. The specific digital technologies and sources of data can vary, from using machine learning on large quantities of payment data, to using remote sensing and geospatial technologies (primarily satellite images and Global Positioning System [GPS] coordinates) to improve credit-risk analysis, monitor yields to inform insurance payoffs, and provide agronomic advice to enhance farmers' creditworthiness.

Fintechs are using digital technologies and alternative data sources to reduce cost and expand access to financial and extension services to smallholder farmers.

The statistical models that drive these services require many years of varied data and application in different climatic regions to ensure reliable conclusions. These companies need to attract "patient" venture capital based on the strength of their ideas to test, apply, and scale their models. Even if only a few of these fintechs succeed, they will radically change access to finance for a large, chronically underserved population.

THE SERVICES

For more than other innovations, the viability of these services depends on the quality of the data and the technologies and analytics applied to design the service. There is a wide variety of experimentation afoot in this space, which should render good lessons for the future. However, there are few examples of strong, scalable business models.

Farmdrive

Farmdrive in Kenya provides loans to farmers. The pilot tested how satellite data could improve Farmdrive's credit risk models. The biggest challenge was addressing inaccurate farmer locations. Because addresses in rural Kenya are not precise, a farmer's plot cannot be pinned to a satellite map at a sufficiently granular level. Therefore, satellite data did little to help Farmdrive assess farmers for loans. However, data analyses did produce a model that was able to predict yields from maize crops—one of the most commonly planted crops in Kenya. The pilot tested the hypothesis that there is potential for satellite data to inform predictions of farmers' income and repayment capacity if issues around farmer location could be resolved.

Apollo Agriculture

Apollo Agriculture, also in Kenya, uses satellite imagery to assess credit risk for smallholder farmers. Apollo gathers data on the exact size and location of each farmer's plot using the GPS on a smartphone to ensure that the farmer's actual field is reviewed. The pilot was launched during Apollo's first lending season, in which it used a minimal underwriting

process to establish an unbiased data set to develop its credit model. It then applied the credit model ex-post to assess its predictive power. Although satellite data performed well, results could not be fully generalized because they rely on a specific season and its weather pattern in that year. To develop robust models, Apollo will collect data from more seasons and geographic locations. It also plans to test other data sources that are less prone to sample biases, in addition to satellite data.

Pula

Insurance businesses for smallholder households are mired with high operation costs. Current business models for yield-based insurance call for sampling agricultural yields at a community level.[12] This involves high delivery costs and limits scale, leading to high prices for end customers. Pula is a fintech that is experimenting with satellite data to create efficiencies to achieve a lower price for the end customer. Like the credit companies, Pula sought to build a new algorithm based on existing yield and insurance data along with new satellite data to drastically reduce the need for yield sampling and to lower the cost of reaching smallholders in remote rural areas (Hernandez, Goslinga, and Wang 2018). [13]

The pilot initially focused on developing an algorithm that predicts individual farmer yields with satellite data. However, the data proved to be less predictive, and the focus shifted to creating an algorithm that defines larger units of area insured, which translates into important operational savings for area-yield index insurance products.

CONDITIONS NECESSARY FOR SUCCESS

1. **Building strong models based on varied data and application.** It is difficult to reach robust conclusions on the predictive power of satellite data for credit risk analysis or for building yield models, especially for follow-up seasons after the pilot, given that start-ups are very new and have limited historical data. Although some of the tests did well, the results could not be generalized because of insufficient variability in datasets and concerns with overfitting to small amounts of data. [14] Therefore, the statistical models that drive such services require more years of varied data and application in different climatic regions before conclusions can be made.

   For example, to predict drought in an area, we will need to look at rainfall across several years along with any correlating factors. A model based on only one year of data will predict the same outcome for the following year, since it has no other data points to rely on. Because there is no variability in the data (i.e., if it rained, then it will always rain, if it didn't, then it will never) the model will artificially look very accurate. The statistical models that were produced require more years of data and application in different climatic regions to ensure that conclusions are reliable.

   In general, machine-learning models require a high volume of cross-section and temporal data at a relatively granular level. The results of the machine-learning-based models are difficult to interpret. Ways to explore and better understand the features of these models are yet to be proven.

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12 Generally, the field sampling required by insurers to determine average yields in each community or unit of area insured is costly and imposes a heavy logistical burden. In the Pula example, farm yield measurements were notoriously expensive, with each costing US$25–50.

13 Pula collected over 1,000 direct yield measurements across several North-Central Nigerian states and compiled about 15,000 yield measurements from the past seven years from local agribusiness partners who work with smallholders. The data included GPS coordinates and variables related to seed and fertilizer use.

14 In statistics, overfitting happens when the model uses data that are so specific that the analysis cannot be generalized to make reliable future predictions that use additional data that are subsequently generated.

2. **Bundling with other financial products to improve product economics.**
   Bundling yield insurance with input credit improves the economics of agricultural products. In the case of Apollo Agriculture, bundling allowed it to recover losses from nonperforming loans to farmers who had poor yields due to severe droughts; this solution was highly valued by the farmers. However, bundling can also make it difficult to adequately explain the product to customers and to make sure they understand the features of the combined product. For instance, in the case of Apollo, some farmers who took loans did not fully understand how the insurance product worked, which sometimes led them to believe they did not need to pay back their loan if there was drought in their area (the insurance covered part of the loan depending on the severity of the loses caused by draught).

De-Risking Unproductive Expenses

PAIN POINT
Low-income people often must meet sizable, unexpected expenses that are hard to finance through traditional credit.

Fintechs are helping low-income people pay sizable or unexpected expenses while using unique features to reduce risk for the financier.

Certain (often sizable) expenses cannot be avoided—paying a doctor when someone gets sick, buying seeds and fertilizer when planting season begins, or paying tuition fees at the beginning of the school year. Low-income people struggle to save the money to pay those expenses, even when these expenses are expected, but especially when they are unexpected. Irregular income flows and the sizeable nature of the expense often mean that funds are not available when payments need to be made. Not having access to finance can have dire consequences when low-income people are faced with a medical emergency or when a farmer misses a planting cycle. These needs underline the vulnerability of poor and low-income customers.

Providers lending for these needs take on higher risk because the size of the loan can be large and there is either no income or highly unpredictable income associated with the expense. Traditionally, this would constitute "consumer finance"; however, in the case of poor people, the term does not reflect the seriousness of these situations. Few business models serve customers appropriately in their time of need (better than informal sources) and recover these loans, maintain operations, and scale at the same time.

THE INNOVATION
To counter this pain point, fintechs use technology to reduce the credit risk of financing big, unexpected expenses so that the end customers can access key services, such as farm inputs, education, or health services, when they need them.

There are a few different ways to do this. They could reduce risk by preventing loan diversion (using money for a different purpose). For example, some services ensure that the customer never receives the actual loan in cash by enabling direct access to the service. For big expenses, such as farm inputs or solar energy units, companies may rely on proven capacity to save (deposits or collaterals). In other cases, the product allows funds to be used only at qualified locations, such as health clinics, or at a specific time, such as at the

start of the school year. Sometimes repayment is tied to digital or automatic mechanisms. In other cases, bundling finance with savings, insurance, and other products reduces risk and improves the business model.

In each case, digital payments and mobile communications enable tailored product features, better data generation for future loans, and better timing and servicing to ensure the customer can access basic services or inputs when they need them, and investors' finance is de-risked. These services leverage basic technology to help expand access to basic services. The pilots showed that customers repay their loans so that they can access loans later. While models are still emerging, and lessons are just beginning to take shape, these types of products have the potential for substantial development impact.

THE SERVICES

MicroEnsure

MicroEnsure designed Fearless Health to help low-income customers manage minor health events that would otherwise disrupt their lives. This integrated insurance and credit product helps customers get the inpatient and outpatient care they need—without having to delay treatment because of costs. Fearless Health offers on-demand loans for primary healthcare at outpatient clinics, medical advice by phone (whereby customers use SMS to text their health questions and then receive a call from a doctor), and insurance for inpatient care that provides a cash payout if a customer or family member has a health emergency that requires staying three or more nights at a hospital. Limiting the insurance component to inpatient care only, while offering loans for outpatient needs, allowed MicroEnsure to keep premiums low because administrative costs related to outpatient claims tend to drive up premiums. By bundling financial products in this way, MicroEnsure hoped customers could experience the benefits of insurance without having to make costly, separate insurance premium payments.

MicroEnsure viewed the loans as the key way to introduce customers to Fearless Health's other features. It marketed the loans at participating clinics to help patients cover the cost of their treatments. Borrowers were insured and had access to the telephone health information service during their loan repayment periods. Mobile money is essential to this model, and all payments to and from customers are digital. From MicroEnsure's perspective, cash is not viable given the potential for making several payouts per client and receiving regular loan repayments from them. For customers, receiving loans and hospital cash payouts quickly via digital channels was critical so they could pay for immediate expenses.

The pilot tested the bundle and identified areas for improvement. It showed that MicroEnsure's plan to offer credit to patients when they were at the clinics and needed it most should be reconsidered. Most patients at clinics had already brought enough cash to cover minor outpatient expenses. The target market for Fearless Health did not bother going to clinics because they do not have the funds to pay for medical services. MicroEnsure learned from the pilot that it needs to find ways to market the product outside of clinics.

Tulaa

Tulaa, a technology start-up in Kenya, provides inputs on credit to smallholder farmers and brokers the sale of their crops at harvest time. Its digital platform enables farmers to order agricultural inputs such as fertilizers and to apply for a loan to purchase the inputs. Tulaa conducts a credit assessment using a proprietary tool that is based on alternative data. If

the loan is approved, Tulaa pays the nearest retailer for the stock and sends an electronic voucher to the farmer for collection. The average loan size is US$150 and is tied specifically to fertilizer, seed, and crop protection products.

At the time the pilot launched, Tulaa was not underwriting the loans itself; rather, it worked through local MFIs. The pilot included determining Tulaa's performance in sourcing loans and getting them sanctioned. The pilot used techniques that prevented loan diversion and nudges and incentives to save collateral and repay to measure how Tulaa could influence higher loan repayment.

Biolite

Biolite is an energy company that provides low-income customers in Kenya, Uganda, and India access to cooking, charging, and lighting devices. At the time of purchase of the Biolite products, when customers owe the full payment, Biolite partner MFIs provide customers with financing to afford the devices. The pilot tested the predictive nature and effectiveness of credit underwriting based solely on the use of Entrepreneurial Finance Lab's (EFL's) psychometric scoring tool. It would allow partner MFI Juhudi Kilimo to shorten loan processing time (because there would be no need for in-person credit assessment of home/business) and potentially reach lower-income rural segments. Although EFL's tool has proved successful in other tests, given several challenges around implementation, the sample generated through this pilot did not have a predictive value. It was difficult to test the tool because it was embedded into Juhudi Kilimo's pre-existing process, which was designed for productive group loans, not individual consumption.

Digital financial services that address basic needs can be a great onboarding ramp for other financial products. Many PAYGo companies, for instance, have found that a solar loan is a customer's first experience with a formal financial service (Sotiriou 2017). PAYGo companies are beginning to offer other products to customers who have repaid their solar loan. What began as customers' desire for energy access has the potential to lead to financial access. Other products can work in the same way: If the value proposition and initial product meet customers' basic needs, they are likely to use other financial products that address their other needs.

CONDITIONS NECESSARY FOR SUCCESS

1. **Portfolio management.** Since the risk profile of these loans is very specific and is likely different than traditional lending, providers should consider isolating this loan portfolio to effectively track performance and manage lending parameters. Because loans are often tied to specific needs in specific sectors, isolating the loan portfolio could help attract impact investors who may consider financing these portfolios because they suit their investment profile.

2. **Debt financing**. These models require investors who are willing to offer debt finance to these companies to enable them to expand their portfolios. The companies' ability to attract and manage this debt is therefore crucial.

3. **Deep contextual knowledge and customer insights**. Perhaps more than in other cases, this model requires a deep understanding of the value proposition and customer context so that the financial service can be tailored to fulfill the need, facilitate repayment, and reduce financial risk.

4. **Integration with digital payments.** These loans involve recurrent small payments, which can be expensive to manage unless there is significant investment in physical

infrastructure. Therefore, most of these services rely on digital payments. A close integration with payments providers would allow a better customer experience, which would make it easier and compelling for customers to submit their payments via mobile money.

5. **Partnership with service providers.** Most of these companies provide bundled services with the loan, which involves setting up partnerships with schools, clinics, input sellers, or other FSPs. These partnerships need to be strong, and the companies' operations need to be well-synced, for seamless service delivery.

TABLE 2. **Innovations areas explored by pilots**

Innovation Areas	Conditions for success	Proof of concept
Interactive customer engagement—SMS or other kinds of messaging to improve use and engagement. Examples: • Juntos • Arifu • People's Pension Trust	• Safeguarding customer data especially if a business-to-business fintech • Integrating systems and files between engagement platform and business • Choosing an appropriate channel to reach customers • Iterative testing to fit customer needs • Fixing an appropriate price for service	• Customer responsiveness to interactions • Customer use of financial services after engagement (repayment, transactions, deposits) increases • Business metrics for the financial company improve, either revenue and profits
Smartphone-based payments—Intuitive user interface/user experience to drive transactions and use cases. Examples: • Wave Money • NALA and Hover • Fundu	• Iterative testing to fit customer needs • In-app assistance and validation of crucial steps • Working with low-data settings • Building a strong user base • Finding use cases and viable models	• Customer use of apps • Lowered data costs for customer • Increased use cases for payments (bill pay, cash exchange, etc.)
Connections-based finance—Credit or funding based on social networks. Examples: • M-Changa • MaTontine • Pezesha • Patasente • Social Lender	• Building a strong user base and credible score • Lending small amounts to contain risk and build credit scores • Ensuring person-to-person lending decisions are facilitated and customers trust the service	• Group activity that generates reliable and safe social credit scores • Other FSPs lend, insure, etc., based on this score • New digital connections created on platforms to facilitate access to finance
Location-based smallholder finance—Use of data and machine-learning to expand access to finance for farmers. Examples: • FarmDrive • Apollo • Pula	• Building strong models based on varied data and application • Adequate bundling with other financial products to improve product economics	• Predict agricultural credit risk and offer more affordable credit • Reduced total cost of yield sampling for area-yield index insurance
De-risked nonproductive finance—Digital and nudge to reduce the risk of finance for emergency or big, risky expenses. Examples: • Microensure • Tulaa • Biolite	• Deep contextual knowledge and customer insights • Integration with digital payments • Partnership with service providers • Debt financing so companies can scale	• Bundling credit with other products to reduce risk • Loan diversion to improve repayment rates • Nudges to improve repayment rates

FINTECHS AS CATALYSTS FOR FINANCIAL INCLUSION

S**EVERAL CHALLENGES AROSE DURING THE 18 PILOTS IN THIS STUDY.** Some related to a company's strategies and internal processes and others related to a fintech's external environment such as funding sources, regulatory rules, etc. Some challenges were innovation-specific, but most were common across all the pilots. We sorted the challenges into two broad groups: internal and external. Companies can overcome internal challenges, but solving external challenges may involve several actors in the fintech's ecosystem.

Internal challenges

An innovative idea is only the first step on a company's path to product development. The real challenge often begins when a new fintech starts to assemble the right team, partnerships, and technology to bring a service to market. All fintechs need to do the following, particularly during early-stage innovation:

- Develop a clear value proposition

- Assemble the right human and technological resources

- Balance digital and in-person interaction

- Form strategic partnerships

DEVELOP A CLEAR VALUE PROPOSITION

To perfect the value proposition for its customers, companies need to experiment with the product and develop the right product-market fit. Fintechs often do not invest enough time and other resources to test and articulate their value proposition before launching services. They may feel pressured to accommodate preferences of investors. Sometimes the emphasis on the technology overshadows the needs of customers.

Several companies have attempted to digitize savings groups around the world, but Bernie Akporiaye, founder of MaTontine, believes most of them fail because they focus on creating remote digital savings groups. Although remote groups may be convenient, they do not deliver on a core customer value: saving-group members derive great sociocultural value in meeting face to face. Even large groups of 120 members form subgroups and meet in their neighborhoods. A digital product must reflect a fintech's understanding of what customers value. Even though digital payments do make things more convenient, MaTontine

encourages face-to-face meetings. For a small commission, a few community members from within tontine groups represent MaTontine physically. Community members help solve complaints, train members in the beginning, and tell them about new product offers.

Even if a company understands its customers, testing a product prototype could often reveal errors or assumptions in logistics and delivery models that must be improved.

George Bakka, CEO of Patasente, an online platform for microbusinesses, offers three value propositions on his merchant platform. He must simultaneously satisfy *suppliers* seeking receivables finance, *buyers* seeking digitized invoices and payments, and *investors* looking to make money. His research has primarily focused on matching customer needs to a business model. On the one hand, he must keep invoice-based loans cheap for his supplier customers, who are largely low-income businessmen; on the other hand, he must keep these packaged investments attractive for investors who believe they deserve higher returns for riskier loans.

Even if a company understands its customers, testing a product prototype could often reveal errors or assumptions in logistics and delivery models that must be improved. For example, one of the fintechs in our study faced delays and added costs because of incorrect assumptions about logistic requirements of delivering services to its customers. Although the team had extensive skills in finance and IT, it lacked crucial insights in the context of the rural customers it was trying to serve. Lean product or prototype design and testing helps to correct errors at the prototype stage, rather than during market roll-out (Grasser 2017).

The PPT pilot in Ghana looked into the effect of different types of nudges on deposit frequency and amounts into customer pension accounts. PPT wanted to test three types of interventions, ranging from SMS reminders to direct deposit requests. However, since not all PPT agents were trained in the principles of behavioral research, some distortions occurred. There were some spillover effects where customers in different treatment groups were near each other. In a few cases, agents had made subjective decisions on how to deliver a treatment.

Juntos designs a new set of interactions that are tailored for each new financial institution. With each financial institution, it programs a short qualitative research stint that is followed by many sets of interactions, each of which is tested on customers, before a final one is rolled out to all customers. (See Box 1 for more about A/B testing, which is commonly used by fintechs.)

ASSEMBLE THE RIGHT HUMAN AND TECHNOLOGICAL RESOURCES

A successful company is likely to be led by a strong and inspiring management team and a talented workforce. In the 21st century, this must be combined with technology, insight, and continuous innovation. Fintechs need to think carefully about their human and technological capital because it can translate into a valuable competitive advantage. This may be challenging because having all three core skills and resources—technical, contextual, and leadership—can be hard to come by for start-ups in emerging markets.

Several incubator and accelerator organizations that support fintechs play a role in sourcing and training human capital. The skills required to run a successful fintech start-up are not surprising or unique—the right combination of leadership, market context, and technical and technological capabilities can distinguish a company in any sector. But often, fintechs do not focus on this aspect early enough, and they may fail as a result (see Box 2).

BOX 1. **Do's and don'ts of A/B testing**

Start-ups frequently use A/B testing to choose one element over another and assess its effectiveness. Busara Center for Behavioral Economics advises start-ups to use A/B testing for deciding which (1) product features (incentive schemes, product design), (2) processes (sign-up processes, customer experience), (3) communications and customer engagement (SMS, emails, physical mail), and (4) marketing materials (website display, message framing) to use.

- **Do** ensure that the testing rigor matches the level of impact expected. Setting up rigorous tests for small effects on small samples likely won't give you valuable results for the expenses incurred.

- **Do** use testing to validate that data systems are functioning, dynamic, and reactive. Testing should be viewed not only to learn new things but also to ensure you can detect and monitor changes.

- **Don't** assume testing will solve all your problems. A broken product likely needs more than just some tweaks and nudges.

- **Do** quantify and evaluate effects, even if small. Small, piecemeal changes are what drive bigger systematic progress, and it is critical to understand the value of each test.

- **Don't** test everything at once. Even if you have a huge sample to deal with, interventions require time, energy, and patience, and it is better to focus on three to four interventions at a time, get feedback, and spin off another set.

- **Do** make sure to have a clear plan for evaluating tests. Without having some plan for how to evaluate the effectiveness of interventions with some data, the test could be wasted.

- **Do** set up tests to run one after another. Getting a test running takes time, but the investment can be worthwhile if another test is run immediately after.

Source: Busara Center for Behavioral Economics

BALANCE DIGITAL AND IN-PERSON INTERACTION

Fintechs that serve higher-income customers in developed markets like the United States, Europe, and increasingly India, Brazil, the Philippines, and China offer a fully virtual experience in which customers register for a service with a click of a button and conduct their entire relationship with the provider virtually. Many customers in these markets trust digital financial services, making this "low-touch" approach to customer relations possible.

Conversely, with underserved customers, particularly those in developing markets, fintechs first need to help consumers become comfortable with unfamiliar services and technologies. At the same time, a business model that relies heavily on physical interactions through storefronts or agents may have a limited ability to scale. Every fintech must find its own balance between digital and in-person interaction, and this balance will need to evolve as customers become comfortable with digital services and as the company needs to scale.

Using basic technologies for low-tech segments

Smartphone penetration in many parts of Africa is low, and most low-income customers still use basic phones. Fintechs need to create products and services that can work on SMS and USSD technologies if they want to reach a large part of the low-income segment.[15]

MaTontine created a web version of its product, but quickly realized that its virtual savings group had to be accessible through USSD menus until more of its customers used smartphones. It now uses SMS to remind all savings group members (sometimes as many as 120 in a group) to make regular payments, identify members in default, and reward lump sum winners every month (see Figure 5). Customers make payments using mobile money, and they track their eligibility for additional loans and insurance by SMS or by dialing a call center.

Sometimes app-based solutions are created not for the end user, but for the company's field agents who use smartphones for a specific purpose in the business—e.g., to enroll and register customers in-person. In Kenya, Tulaa agents need to capture and sync detailed information to their databases for credit checks. Tulaa Product Manager Alex Royea points out that it is important for Tulaa's customers, who may have never bought inputs remotely, to be able to see their inputs on a screen. USSD menus don't have these capabilities, so Tulaa agents use a tablet or smartphone app for customer registration, input

BOX 2. **Is the focus on fintech leadership valid?**

The heavy focus on founders in the start-up world is not entirely unwarranted. A good leader can pitch an idea with passion, attract funding, and drive the company's vision. In our pilots, we met several such leaders. They were especially effective when they had a clear understanding of their value proposition with their customers and when they could use this to inspire their staff.

Nonetheless, while founders often have great ideas or deep knowledge about a sector, they may not have the financial and business skills to take an idea and build a business around it. The ability to pull together a credible business plan, be aware of assumptions, and find strategic investors are all critical skills a start-up needs. Some organizations that work with early-stage start-ups (e.g., Village Capital, LHOFT Luxembourg, among others) focus on creating these capabilities in the founding teams at an early stage.

PPT CEO Samuel Waterberg takes time out every month to meet with his pension customers.

15 Three fintechs in the study—Fundu, Wave, and NALA—that focus on customers in India, Myanmar, and Tanzania exclusively use smartphone apps.

FIGURE 5. **MaTontine SMS screens and USSD menus**
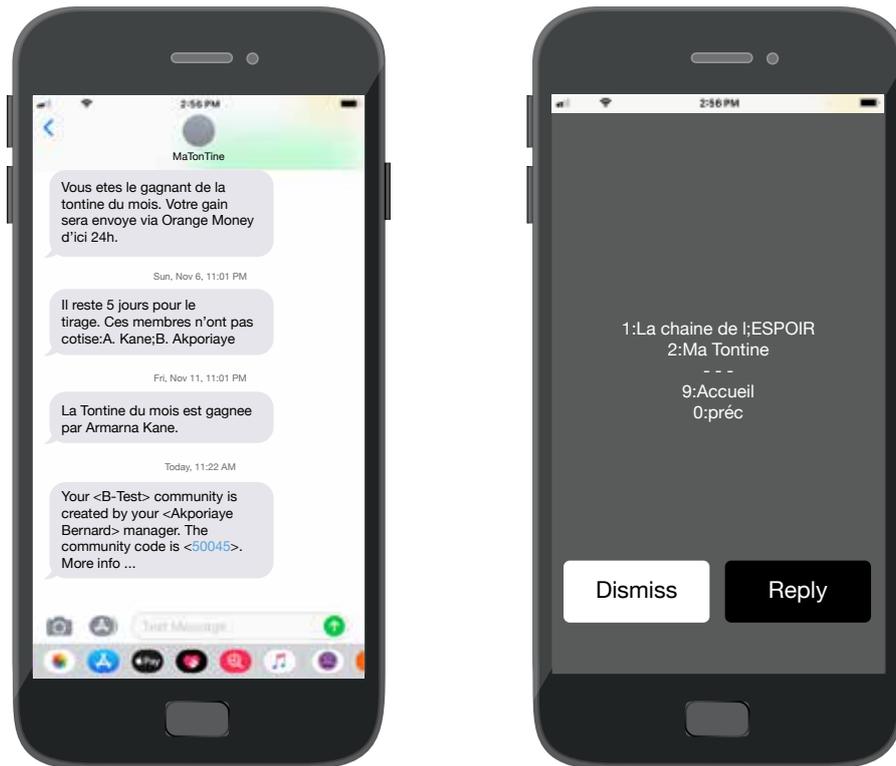
selection, and loan application. Customers use their basic phones to make USSD-based payments and to interact with Tulaa via SMS.

Others, like NALA, which offers a smartphone app, include simple onboarding screens and instructional videos to help customers register. The app's Mama NALA feature facilitates customer support via WhatsApp to provide one-on-one guidance for the many customers who struggle to onboard by themselves. See Figure 6.

Nudging customers toward the digital experience

In areas where digital payments often fail or lead to fraud, fintechs may need a high-touch approach during acquisition and strategies to slowly ramp up digital interactions as customers become comfortable with the digital experience. For example, when Social Lender moved from its smartphone-based product to an SMS product to reach lower income customers, it realized it needed to change its marketing strategy as well. It hired agents to explain the product in-person at local markets and other busy areas. It also used a referral reward system to turn early customers into ambassadors who could explain the product to other potential customers in their communities.

Beyond customer acquisition, face-to-face engagement is also important when training customers on how to use a complex solution. Bernie Akporiaye, who started MaTontine, says this kind of engagement is as necessary when finance is linked with strong communal ties and relationships as it is in savings groups and associations. Financial decisions are often done in the context of a group. "If the group doesn't trust you, the solution doesn't work," he says.

Even in cases where customers receive money, as with Social Lender's mobile loan in Nigeria, there can be skepticism. Customers in Nigeria are used to being asked for collateral, so

FIGURE 6. **NALA onboarding screens**
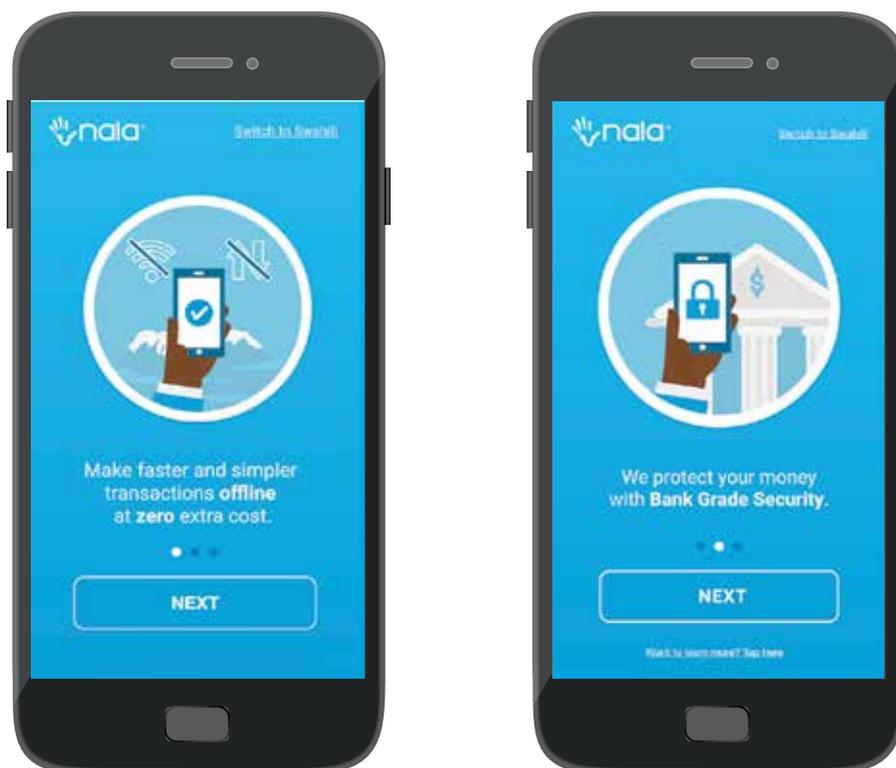
when Social Lender offered a loan based solely on "social" collateral (references provided by the borrower) instead of physical collateral, many thought it was a scam. This was one of the reasons why Social Lender decided to include in-person touch points to its onboarding strategy and leverage early customers who could vouch for the validity of the product.

Getting to the right balance may also depend on the nature of the product, especially for complex services, such as pension, insurance, etc., that are being offered digitally. Apollo, which bundled insurance with its loan product to protect customers and its portfolio from weather conditions, found that customers had difficulty understanding its complex product in a digital setting. Almost half of Apollo's clients had never received a loan and less than half had used insurance, so they had little or no experience with this type of bundling.

PPT, which offers pensions in Ghana, knows it cannot avoid physical interaction during onboarding. Yet its business model relies on being digital to break even. At the outset, PPT works with cocoa associations and large savings groups to acquire customers when they are in large group environments they trust. Acquiring customers in mass also keeps operation costs down. PPT CEO Samuel Waterberg says building trust in-person during onboarding is crucial:

> *"Imagine being asked to save your hard-earned money digitally with a pensions company you don't know and all year, you've heard of mobile payments frauds. You will get this money when you are 60, and you are told it's not entirely certain how much you will get. Why would you save? We need to build a value proposition that is based on some transparency and flexibility of taking money in and out. Without the right incentives, we would be at a dead-end."*

Waterberg had been observing his operations and had sought constant feedback from his operations team. This, and what he learned from the pilot, gave him some indication of his

company's future. Subsequently, a partnership with Vodaphone went live, and in a strategic board meeting in May 2018, a "high touch-low touch" segmentation strategy was adopted. To keep costs in check and still do right by customer needs, PPT divided its customer base into three segments with different operational costs and considerations (see Table 3). PPT might even experiment with different pricing. In each of the two high-touch customer segments, agents would have targets to nudge customers toward digital payments.

TABLE 3. **PPT Segments**

Segment	Context	Strategy
Urban market vendors	Customers operate in urban markets in Accra and in professions with volatile earning. There are many competing savings products with daily collection agents visiting markets daily.	High costs from the many in-person visits. Assign 2 agents to jointly manage 2–4 markets so they can substitute for each other. Visit every customer weekly, but slowly convert 10–20% to digital every few months.
Rural cocoa farmer associations	Strong "formal" and organized informal associations. Looking for formal pensions they can contribute to. But remotely located with low digital capabilities.	Moderate costs because of the high cost of acquisition, but costs eventually decrease. Appoint and train agents in associations to be both customers and sales agents. Keep regular communication between headquarters and these agents and ensure monthly visits. It is not necessary to set up expensive branches and an agent force. Slowly convert 10–20% to digital every few months.
Vodaphone customers	Comfortable with fully digital experience.	Low costs. 100% digital. Low operation costs. Focus on steady, older customers who can become regular pension contributors.
Small business customers	Employees of small companies without pension plan and/or individuals who want to save additional money.	Low costs. Need a fully digital experience and full access to account details. Contribute high amounts with each deposit and help balance costs for lower-income groups.

Despite its name, fintechs need not always be hi-tech. Companies must be able to articulate how technology is key in serving poor customers, but also what its limits are. Many feel the pressure (or see the benefits) to pitch themselves as a technology company because they want to (i) follow the general "craze" (and are quick to use buzz words like artificial intelligence and machine learning) and (ii) make themselves more attractive to funders. In some instances, fintechs claim to have a technology that they do not have. In others, they do have the technology, but it does not actually play a key role in their product or service. Ultimately the right technology is simply what is necessary to serve customers and sustainably scale.

Ultimately the right technology is simply what is necessary to serve customers and sustainably scale.

FORM STRATEGIC PARTNERSHIPS

Many early-stage fintechs need partnerships to get their ideas off the ground, either because they do not have scale or capabilities or because getting adequate licensing does not make sense until after they have proven their business.[16] But because they are new and small, it can be difficult for them to forge equitable partnerships with more established institutions.

Establishing and managing early partnerships with FSPs and NGOs was key to the success of many fintechs in the study.

Partnerships are often forged with incumbent FSPs, but they could also be with nongovernment organizations (NGOs), technology firms, and other institutions. Partnerships must be mutually beneficial—fintechs can leverage the existing infrastructure and brand of an established institution to deliver services or build a customer base, while FSPs can look to fintechs to bring innovation and diversity to their portfolios or access to new markets or customer segments. Establishing and managing early partnerships with FSPs and NGOs was key to the success of many fintechs in the study.

Types of partnerships

Early-stage fintechs often partner with relatively small MFIs because these MFIs are more accessible than traditional banks. However, MFIs tend to lack robust IT systems and often rely on manual and paper-based applications. On the other hand, if fintechs partner with large incumbent FSPs like national banks or large MNOs, they often have the weaker of the two bargaining positions and find it hard to achieve their business goals. Large FSPs can be unwilling to dedicate the time and resources to establish customized operations (such as menus or screens) when the revenue stream from the fintech is small.

Open APIs can play a big role in helping fintechs leverage various strengths and assets of more established players and prove their value proposition without a strain on either party.[17] By integrating their systems, information can flow seamlessly between platforms, so that clients can take advantage of the services of both partners. A key caveat is that the cost for linking APIs should be affordable for start-ups. Open APIs are not widely available in emerging markets, and fintechs will need ad-hoc integrations with partners.[18]

Fintechs may also rely on farmers' associations, savings groups, and other social organizations to sign up and manage relationships with large groups of new clients. These partners can help explain new financial services to a big group of new clients, thereby bringing down costs of face-to-face interactions. Working through these associations also helps fintechs to develop the trust of members. For example, Patasente, an online supply chain financing platform for small businesses, is working with a dairy cooperative in Uganda to help convene farmers for registration sessions and to collect data on milk supplies. The data on milk supplies increase the chance of farmers receiving a loan from the Patasente platform. The cooperative shares some of the costs in the hope that its farmers will receive a package of services that is more valuable than what they usually get from other cooperatives.

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16 Here we are not referring to business-to-business fintechs that act as vendors to FSPs, but to companies that partner with each other in a way that distributes risk between them.

17 See "Open API Strategies: How to Plan for Success," CGAP, https://www.cgap.org/topics/collections/open-apis.

18 To address this gap, the Dutch Development Bank has launched Finforward in Africa to accelerate and reduce the cost of integration between financial institutions, mobile money providers, and fintechs (see https://www.finforward.tech/).

Risks to the customer journey and value proposition

A fintech may encounter issues or breakdowns at different points of customer interaction that it may not always be able to control, such as delays and lack of response, but it may still be the one to lose credibility with the customer.

For example, Eko connects to the Indian UPI infrastructure and banking system through its app. There are often standard screens from the banks or from UPI that must be incorporated into the Eko app even though these screens may not be as user friendly as Eko's own screens and may cause customers to drop off. See Table 4 for a brief look at Eko partnerships and those of other fintechs.

Unlike PPT, which partners with Vodaphone and has a unique short code for its customers, Patasente does not have a direct relationship with a mobile provider in Uganda; it works through a mobile-payments aggregator. Its short code is not easy to remember, which can be a problem for customers.

Negotiating the right kinds of partnerships is crucial for fintechs. In cases where fintechs can convince FSPs of their value proposition, they can negotiate stronger positions for themselves in the partnership, including on factors such as data ownership and appropriate

TABLE 4. **Sample partnerships across selection of fintechs**

Fintech	Partners	Partnership Type
Tulaa—provides smallholder customers financing for inputs	Input distributors and retailers and MFIs or any FSP authorized to provide credit. Tulaa intermediated between all.	**Heavy dependence**—delays in approving loans or getting inputs ready jeopardized Tulaa's credibility with the customer, which led the company to start its own lending.
Biolite—provides clean energy products (cookstoves, solar light systems)	MFI that finances the purchase.	**Heavy dependence**—delays in approving loans or rejecting potential customers directly impact Biolite's ability to sell.
Eko Fundu—provides person-to-person cash exchange using app	Banks. Eko cannot accept deposits, so it relies on the Indian UPI and connects to the banking infrastructure to withdraw and deposit funds into users' bank accounts. It has a partnership with two banks that may hold deposits.	**Moderate dependence**—the Indian UPI infrastructure is largely independent and open, but apps still need to be approved after a long audit. It is at the individual banks' discretion to offer customized screens that are included on the Eko app.
Farmdrive—offers digital loans to smallholder farmers	Payments aggregator to process loan disbursements and repayments.	**Moderate dependence**—although the payments aggregation did not seem like a central strategic part of the business (there are multiple providers available), there were significant delays in the Farmdrive pilot because its payments aggregator went out of business, leaving FarmDrive without a way to recover or disburse loans while it set up the integration directly with the MNO.
Patasente—provides online marketplace linking small investors to invoice factoring for microentrepreneurs	Payments aggregator.	**Low dependence**—Patasente is licensed to lend and offer investment products directly. But it is a very young company, with a very small customer base. To scale, it would need partnerships with big FSPs and MNOs.

access to customers. Tulaa in Kenya articulated key aspects of a partnership agreement with FSPs. Through its pilot, it learned that if it could not directly offer loans, contracts with FSP partners will need to include the following:[19]

- Complete system integration through an API.

- Mandatory training of FSP staff, including those in branches, before launch.

- Aligning incentives for branch staff and loan officers with the partnership objectives.

- Clearly defined project governance structures.

External challenges

Fintechs are also vulnerable to their external environment and require industry-level efforts from a broader set of stakeholders. Because most fintechs are small and often have limited influence in their early days, they are not likely to overcome these challenges on their own. A single fintech may not be able to convince a large African bank to open its APIs. Or, a single fintech may not be able to convince impact investors or development finance institutions to invest in early-stage start-ups. The pilots demonstrated three kinds of market-level, external challenges that inhibit the impact fintechs can have: (i) entering a crowded marketplace of ideas, (ii) translating ideas into capabilities, and (iii) extracting lessons, especially from failures.

ENTERING A CROWDED MARKETPLACE OF IDEAS

Fintechs offer a variety of financial products and services, through many delivery channels, ranging from mobile insurance to blockchain payments. Many of their business models are entirely new, too. Since much of this innovation is new, there are no universal classifications that delineate this space.

With too many models, and too little clarity, funders who may be used to funding banks and MFIs with traditional business models in emerging markets don't easily engage with fintechs. Funding for fintech is focused on familiar models, such as payments or traditional credit; frontier innovation tends to receive less funding. Partnerships between large banks and fintechs are ad-hoc, and in the absence of open APIs, only the influential fintechs break through.

Without clear frameworks, regulators find it challenging to keep up with new models. This can have an effect at two extremes—it may impede innovation when regulations are too rigid or it may put customers at risk if regulations are too open.

Translating ideas to capability

In a crowded space with many ideas, there are few metrics for success. Despite having a good idea, it is difficult to assess the operational performance of early-stage fintechs. Funders and established financial institutions that wish to partner with fintechs find it difficult to assess whether a start-up has adequate skills, knowledge, and execution capabilities to bring its idea to market successfully. We need greater clarity on how an idea translates into strong business models that can scale and impact financial inclusion to draw in key stakeholders (see Figure 7).

19 In the end, these conditions were very difficult to meet, which is why Tulaa opted to start lending from its balance sheet. Hillary Miller-Wise, Tulaa's CEO, noted that, while this decision certainly increases financial risk for the company, it enables Tulaa to control the customer experience and ultimately the company's reputation in the market.

FIGURE 7. **Fintech and the "Valley of Death"**

Growth Capital

Early Stage Venture Capital

Succeed

Net cash flow

"Valley of Death"

Fail

Time

Fail

| Initial Concept | Working Prototype | Product/ Market Fit | Systems & Process to scale |

Start-ups lack funding to address natural challenges in early stage

Funders lack mechanisms to channel "adequate" funding

Funding Gap
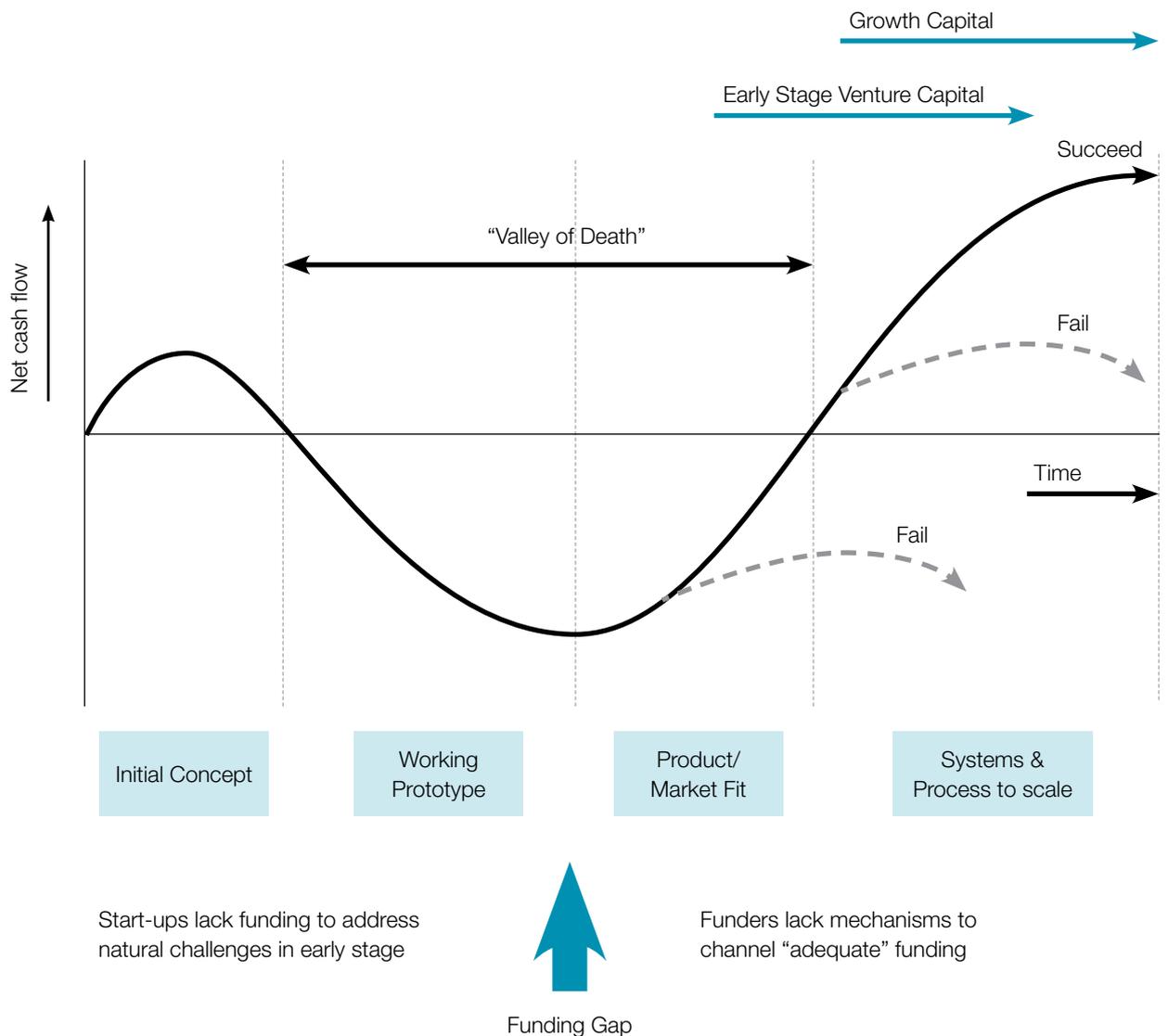
Without metrics to assess a firm's capabilities and risks, regulators will struggle to regulate and supervise new kinds of services. A regulatory sandbox—a space for testing innovative ideas in a live environment with time-bound permission—may be a viable solution (Jenik 2017). Sandboxes allow regulators to test solutions, monitor risk, and assess impact before providing a full license. Regulatory sandboxes are growing in popularity, although mostly in developed financial markets. However, they are being considered in India, Malaysia, and other EMDE markets. (See Figure 8.) They have the potential to break down some barriers on innovation and experiences. They can gather lessons within a safe testing environment, without risks to consumers or the market.

EXTRACTING LESSONS, ESPECIALLY FROM FAILURES

Global, detailed lessons about the progress fintech companies make in solving pain points in our sector would give the industry a realistic sense of their effects on financial inclusion. Lessons on success could crowd-in other innovators and incumbents. Even lessons from failures may result in valuable learning for the market. New start-ups would benefit from lessons learned from other fintechs. However, such lessons are scarce.

FIGURE 8. **Regulatory sandboxes around the world**

■ Countries with regulatory sandbox

■ Countries considering regulatory sandbox
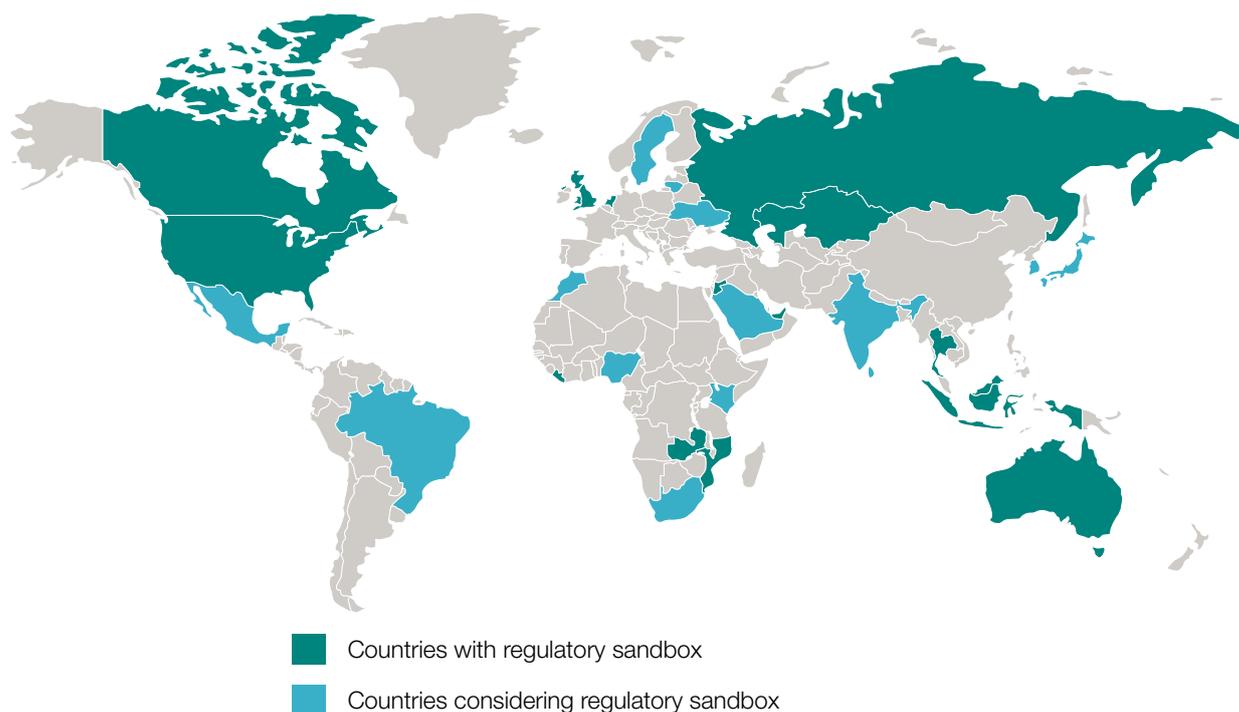
A 2010 CGAP grant project tested a promising new digital credit product called Jipange Kusave (JKS) designed by start-up Mobile Ventures Kenya. The product launched successfully, but failed because of partnership dynamics and regulatory restrictions, and it shut down. In the process, lessons from this effort seeded ideas in the market that eventually contributed to Safaricom and CBA launching the very successful MShwari digital credit product. JKS' failure affected its early investors but for the sector at large, it exposed a massive customer need and a market opportunity that incumbents had missed (Breloff and Gonzalez 2013).

Each of these challenges, if not resolved, may curtail the overall impact of fintech innovation. In some mature fintech markets, like Latin America, fintech associations that represent the industry are springing up and have effectively clarified issues and created linkages. Where these associations don't exist, there is a need for better connections between fintech and the broader ecosystem of funders, regulators, and established financial institutions.

CONCLUSION

After two years of experimentation, we see preliminary indications that fintechs have the potential to advance financial inclusion. There is a cohort of companies beginning to emerge that focuses on underserved segments or solutions for complex pain points in financial inclusion efforts.

Whether the innovation is simple or complex, fintechs will need to mature, prove their business models, and demonstrate impact. The financial services ecosystem, including funders, regulators, and established financial institutions, will need greater clarity on fintech business models, so they may create stronger connections, more effectively help underserved customers, and achieve financial inclusion goals.

Going forward, CGAP will support the global development sector, policy makers, and the impact investing industry by facilitating a common understanding of emerging business models in fintech and their potential to advance financial inclusion. We will also work to extract lessons from fintech innovations that can help inform industry about what creates value for the poor and what the limitations of new approaches are.

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