Digital Solutions for Analog Agents

New Technologies to Manage Agent Networks

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About FIBR

Launched in 2016, FIBR is an initiative of BFA in partnership with Mastercard Foundation to create new ways to connect low-income populations to financial services that meet their needs. Rapid uptake of smartphones in these markets means we can digitize data about how individuals otherwise informally, transact as employees, customers or suppliers in their communities and with local businesses. The digitization of these trusted business relationships allows for new data that a broader range of providers can use to offer tailored financial products and services to this demographic. FIBR focuses on how technology can enable the generation of data insights to empower employers, employees and customers in the MSME and PAYGo sectors with financial services to achieve their goals. For more information and to sign up for our newsletter, please visit: www.fibrproject.org. Follow on Twitter @FIBR_BFA #inclusivefintech.

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Mastercard Foundation works with visionary organizations to provide greater access to education, skills training and financial services for people living in poverty, primarily in Africa. As one of the largest private foundations, its work is guided by its mission to advance learning and promote financial inclusion to create an inclusive and equitable world. Based in Toronto, Canada, its independence was established by Mastercard International when the Foundation was created in 2006. For more information and to sign up for the Foundation's newsletter, please visit www.mastercardfdn.org. Follow the Foundation at @MastercardFdn on Twitter.

About BFA

BFA is a global consulting firm specializing in using finance to create solutions for low-income people. Our approach is to seek out, create and implement financial solutions to help people manage challenges and seize opportunities. We partner with cutting-edge organizations that touch the lives of low-income consumers such as financial institutions, fintech companies and information providers. In creating solutions, we integrate our deep expertise in customer insights, business strategy, new technology, and growth-enabling policy and regulation. Founded in 2006, BFA's clients include financial institutions, technology companies, donors, investors and policymakers. BFA has offices in Nairobi, Delhi, Boston, Medellín and New York. For more information, please visit: www.bfaglobal.com and follow on Twitter @BFAglobal.

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FIBR Publications

1. Inclusive Digital Ecosystems of the Future - Dec 2017
2. Escaping Darkness - Understanding Consumer Value in PAYGo - Dec 2017
3. Briefing Note - PAYGo Solar - July 2017
4. Briefing Note - Marketplace Lending: Lendable - April 2017
5. Briefing Note - Alternative Lending - March 2017

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DIGITAL SOLUTIONS FOR ANALOG AGENTS: NEW TECHNOLOGIES TO MANAGE AGENT NETWORKS

Foreword: The FIBR Project and Agent Networks

Financial Inclusion on Business Runways (FIBR) is an action research project by BFA in partnership with Mastercard Foundation that explores how to use business relationships to drive financial inclusion. To do so, FIBR focuses on how technology can enable the next generation of data insights to empower merchants and pay-as-you-go (PAYGo) companies, employees or customers with financial services to achieve their goals.

Agent networks are a backbone for the delivery of financial services. While the report refers specifically to the management of agent networks for the delivery of digital financial services, the findings presented here are relevant for the numerous forms of agent networks that the FIBR project is working with: networks of PAYGo sales agents, networks of micro or small merchants and distributors, or networks of cash in, cash out (CICO) points.

In many countries, such as in Kenya, these agents tend to be local micro- and small merchants who are increasingly using smartphones. Smartphones open up a new channel to collect data which can enable financial relationships for appropriate products. FIBR is currently working in Ghana to transition an agent network to using smartphones, so that these benefits can be better understood.

Strengthening agent networks with better digital tools can improve the whole retail financial system. Further, these agents would benefit from tools that improve operations, capture historical transaction data and enable deeper financial inclusion.

Given the integral and outdated nature of today's agent networks, the opportunities for financial services providers are huge. We have invested in this research to learn about the current state of the industry, where it is headed, and the type of support that is needed. Therefore, this paper is written for industry professionals with some basic technical knowledge of digital finance and is relevant for donors, policymakers, banks, mobile network operators and fintech companies. We hope that the frameworks and information in this paper will help key industry stakeholders understand the importance of investing in agent networks, and what they might be able to do to help push the industry forward.

Acknowledgements

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Executive Summary

It is ironic that most digital money is delivered through very analog agent networks. These networks are defined by large field teams, stacks of paperwork and layers of cash management logistics. The problems the first generation of agent networks faced ten years ago are still issues today, and the tools companies are using to manage networks are so antiquated that they limit the evolution of the whole industry.

As a result, only about half of digital finance agents are active, agents still commonly run out of liquidity, and the customer experience and level of compliance with company policies vary greatly by agent outlet. Further, most providers have little idea how well their agents are trained, monitored or branded.

This makes building and managing an agent network very difficult and expensive, and therefore generally a task that only big corporate banks and telecoms can execute. This is an important problem for the industry because big corporates are not good at innovation, and because they are limiting the products distributed through their channels to only those they offer themselves. Thus, we have not seen many new products in digital finance since its inception over a decade ago.

This paper argues that strategic investment in technology for agent network management can not only improve the quality of service these agent networks offer but can also lower the requirements for building networks enough to encourage new players to enter the industry. These new players could be distribution companies that are incentivized to disseminate products for everyone, not just those of their own brand. This is the most likely scenario for getting innovation to market in digital finance.

The story is complicated by restrictive agent licensing regulations, powerful competitive forces, emerging social enterprises and macro telecommunications market dynamics that bring the opportunity for big change, yet also make the future hard to predict. It is clear that digital money needs more modern technology-driven distribution solutions, but the best path forward is still unclear.

Some providers are implementing piecemeal technologies to solve specific problems, while others are developing comprehensive agent management systems. Some systems are being repurposed from adjacent industries, while others are being built entirely from scratch. Each of these choices has its own costs and benefits, and given the unpredictable macro variables mentioned above, there is no clear superior approach.

This brief begins with a high-level description of the current state of agent networks. It then systematically examines the strategic operations of these networks, pointing out major problems that present opportunities for technology solutions. The paper spends time explaining the complexities of the industry, the relative merits of different approaches to modernizing agent networks, and explains why it is so important to focus our efforts on improving them.

While this report refers specifically to the management of agent networks for the delivery of digital financial services, the findings presented here are relevant for the numerous forms of agent networks that the FIBR project is working with: networks of PAYGo sales agents, networks of micro or small merchants and distributors, or networks of CICO points.

The State of Agent Networks for Digital Money

In the developing world it is still extremely common to be paid in cash. Cash is also the preferred medium for most retail purchases. This means that people who want to use digital finance systems[1] need a convenient method to frequently convert cash and e-value. Therefore, banks and telecoms build national networks of thousands of agents to provide these exchange services.

The GSMA *2017 State of the Industry Report* estimates that there are 2.9 million agents active globally.[2] Research by the Helix Institute suggests that active agent outlets[3] account for about a quarter of overall tills, or approximately 1.325 million active agent outlets.[4]

These agents are generally small retail shops with high customer traffic. While some agents are managed by banks or third-party providers, the majority are run by mobile network operators (MNOs) offering mobile money services.

We can expect agent networks to continue to grow because the need to exchange digital and physical cash across the developing world will continue to grow as more people use digital finance systems. Further, there are currently no viable alternatives to using agents in countries where significant portions of the population do not use banks or have regular access to the internet (or tablets/smartphones to use it).

While vast agent networks will remain a requirement for successful digital finance providers, they will also likely continue to be a common source of operational headaches. Scaling an agent network is sufficiently difficult that the vast majority of providers struggle to grow them to even a few thousand operational outlets. Those that are able to grow their networks dedicate 40-80% of their annual revenues from digital finance to maintaining them and must constantly manage liquidity, agent churn, fraud, competitive pricing, and quality of service.[5]

Generally, providers that can sustain agent networks use them to distribute proprietary products. This can give the provider a distinct competitive advantage over those without agent networks, but it also results in competitors building their own agent networks, which they each limit to distributing their own products. These providers basically all offer the same products and target the same areas of economic activity. According to the *2016 GSMA State of the Industry Report*, 97% of the volume and 90.7% of the value of mobile money transactions is limited to three usages: airtime top-ups, P2P transfers and bill payments. As such, these agent networks become redundant and imply a dramatic waste of resources.

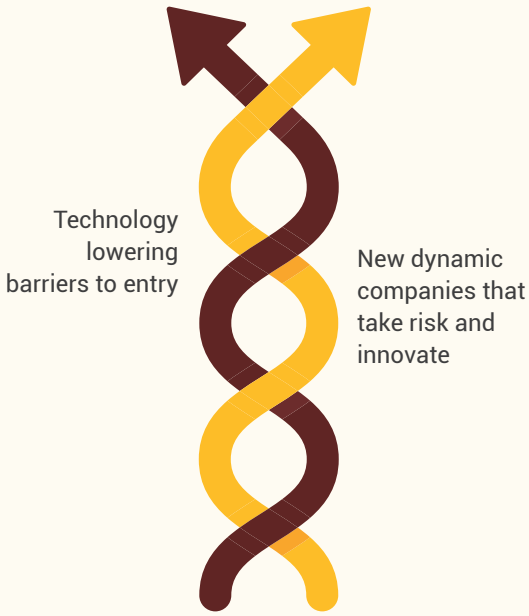
While the competition to reach and maintain scale has led to diverse operational models for

agent network management, it has not led to the development of powerful agent management technologies. Some blame mobile money platforms and core banking systems for not including an agent network management component, but there has been ample time for providers to develop their own solutions, and cases where they have done so are still rare.

Growing and administering a large agent network without proper management tools makes it quite expensive and generally limits the endeavor to the large corporations that can afford it. However, new technologies like chatbots that improve communications, smartphone apps that monitor agent performance and big data algorithms that predict liquidity problems can help solve these issues.

The next generation of innovation in agent network management will be using these tech tools to drastically reduce the time and cost it takes to set up agent networks, improve the efficiency with which they can be managed, and improve the level of service customers can expect from them. If we can lower the cost of building networks, we lower the barrier to entry for an array of new players entering the space.

We hope this will entice specialized distribution companies open to offering products from all providers to enter the market. Agents offering everyone's products will generate more revenue per channel, and having a single company monitor them will limit redundant costs. Therefore, the efficiencies that technology brings may enable new players to use improved business models that generate more revenue and have lower costs.



Potential for new technologies for agent network management

In this scenario, companies that are better designed for innovation would have access to a channel to distribute their products without having to develop an agent network themselves. Dynamic companies that are small enough to take risks, invest in research and have the ability to build technology solutions are best positioned to develop the next generation of financial products the market desperately needs. This is what excites us most about the potential for new technologies for agent network management -- they could revolutionize the entire digital finance industry with new classes of players and products.

A Framework for Technology-Enabled Strategic Operations

Given the list of problems that agent networks have and the exciting technologies that are now available, we need a framework to understand which technologies can help improve which components of an agent network. This section borrows the framework for analyzing the strategic operations of an agent network from *Designing Successful Distribution Networks for Digital Money* by Ignacio Mas and Mike McCaffrey 2015.[6] It describes the six components of strategic operations for agent network managers and identifies areas for improvement in each. Then, it briefly describes the technological solutions that are currently being developed to address the major pain points.

Many aspects of agent network management have changed very little since they were introduced a decade ago, meaning upgrading them would fundamentally change the industry. About half of agents are inactive, mostly because agent selection is done poorly. If selection were more targeted, there would be huge cost savings from avoiding the recruitment, training, branding and monitoring of agents who do not generate revenue.

Similarly, if liquidity management were improved so that fewer agents could serve the same number of customers, it would also greatly reduce the investment needed to build an agent network. It is difficult to estimate by how much the cost of agent network management could be reduced, but we are betting it would be enough to open the industry to a diversity of smaller players.

Further, constantly having to deal with these problems limits the bandwidth for longer-term planning to improve agent network management. Approaches like more sophisticated agent segmentation and dynamic performance-based incentive schemes are still a long way off for most.[7] The potential gains in efficiency and the prospects for network evolution mean the opportunity to improve agent networks is enormous.

Agent network management can be thought of in six parts:

Six Components of Strategic Operations for Agent Networks

Framework adapted from Mas, I. & McCaffrey, M. (2015).[8]

1. Agent Selection & Contracting

This is the process by which potential agents are identified, vetted (initial screening and subsequent due diligence) and signed up (including the collection of the necessary documentation and legal contracting). With a new service, this typically involves staff traveling through the business districts of cities and towns, convincing small retail stores to become agents. As the service starts to scale, master agents may be brought in to take over this task, and retail partnerships might be explored to onboard chains of stores in single deals.

There are usually some general analytics done to develop networks. For example, there are often targets for the number of agents in a given region, or the desired growth rate for a particular period. However, these numbers are often generated by feel rather than through data. It is common for network managers to believe in the "survival of the fittest". When there is no benchmark for the optimum density of agents in an area, they saturate a geography with agents, causing the weak ones to fail and the stronger ones to become more efficient. However, the chaos created as agents rise and fall is also a good way to devastate a brand if it is not closely managed.

As the service grows, a network effect starts to propel it and the provider begins to receive applications from retailers who want to become agents. Prospective agents have to submit a stack of documents (as required by the country's regulation), which is almost always done on paper, so it is common for managers of big agent networks to have stacks of agent applications piled up in their offices awaiting review. Sometimes a master agent or provider will visit the premises to verify the documentation. Paper contracts are then signed with the agent and either the master agent or provider, and in some cases with both.

Areas for Improvement

1. Gauging the number of agents needed in an area and where to place them (network reach and scale), and therefore estimating the overall cost of the deployment.
2. Identifying the correct demographic for agents (e.g., gender, age, store type, etc.), given the product(s) they will deliver and the level of sales and/or customer registrations they will have to execute.
3. Streamlining the application and vetting process to use less paper and save more time, preparing regulators to move towards paperless ledgers and digital identity.
4. Identifying the most effective digital channels for finding and screening new agents and understanding how digital channels perform differently according to desired agent demographics.
5. Improving the precision of agent targeting to significantly reduce agent dormancy.

Technology Interventions

For agent density and placement, a few technologies are currently being trialed. The GSMA Mobile Money for the Unbanked (MMU) program hired Altai Consulting in 2015 to use provider Call Detail Records (CDR) to determine agent densities and locations. They reported some success with this approach.[9]

Similarly, CGAP partnered with Flowminder to stitch population and infrastructure databases together to answer questions about agent viability in rural and other hard-to-service areas. IBM Research Labs has created a tool for banks to tell them where to place their next ATM and think that, given the right data, they could do the same with agents as well.

In terms of creating digital demographic profiles for agents, Zoona is working with Ripple Works to figure out what behavioral traits make an agent successful. They then develop systems to train existing agents to develop those traits, as well as to figure out how to most efficiently recruit people with those traits. They are also using chatbots to onboard new agents.

Progress can be made on agent applications by digitizing supporting documents, verifying them immediately and storing them securely. Such systems would save managers time and vastly reduce the amount of time it takes to approve new agents, which would fuel the rate at which the network could expand.

2. Training & Business Advice

Training agents involves ensuring that agents and their staff are fully capable of running an agency business and are informed about business optimization and fraud mitigation practices. This includes initial training and regular refreshers for all staff in an agent outlet that will be involved in making transactions and answering customer queries.

Providers generally wait until there is a critical mass of new agents and then gather them in an urban center to attend a one- to three-day training in an auditorium. There is little to no measurement of the quality of the knowledge transfer, and often the wrong person attends the training as it is seen as a paid vacation to the city.

It is generally accepted that refresher trainings are needed, especially as operations change and new products are launched, but these subsequent trainings are infrequent and unsystematic. Further, these trainings are not customized, so agents are given the same session regardless of the problems they are facing or the levels of business they are conducting.

Bulk SMS texts and in-person visits are really the only mechanism used for regular updates. Some providers send SMS alerts when a specific type of fraud is taking

place, while others send individuals to regularly check on quality and compliance. These individuals may also provide some training (especially on new products) or give some business advice, but the latter is extremely rare.

Areas for Improvement

1. Enabling trainings to be done anytime, anywhere.
2. Drastically reducing the cost of initial agent trainings and designing a cost-effective method for continued training as the network and the products it offers matures.
3. Agents need two types of knowledge. The first is procedural, in terms of how the system works and the relevant agent responsibilities, while the second is less tangible in terms of having the right attitude and behavior. Developing appropriate technologies to teach each of these types of knowledge, such as short videos and multiple-choice questions, or rating systems for customers to provide feedback.
4. A system that analyses the agent's understanding of key information, evaluates their performance and then sends them personalized learning modules that they have to complete to keep them trained on the job.

Technology Interventions

Interactive learning platforms are receiving a lot of attention for their potential to help educate large groups spread over great distances. In Kenya, Arifu has developed an Adaptive Learning Platform to train members of agricultural value chains and banking clients via a SMS or application-based chatbot. They have also worked with CGAP on a pilot in Tanzania to improve customer savings behaviors through mobile money systems. Juntos Global has an interactive platform that allows companies to select KPIs and then creates a program to help train staff to achieve those KPIs.

Further, there has been some experimentation with peer-to-peer learning. Some providers facilitate WhatsApp groups for agents to keep them connected to what is going on in their area and to encourage them to work together and share information (especially on issues like sharing the latest fraudster tricks in the area). Similarly, in Kenya, farmers have created Facebook groups to connect with each other, exchange advice, and find markets for their products. Some groups, like Digital Farmers Kenya, have over 100,000 members.

Finally, Massive Open Online Courses (MOOCs) are improving their interfaces and pedagogy, and are becoming easier to customize. Platforms like Memrise are popular globally, and the Digital Frontiers Institute has also designed the first platform specifically for digital finance. When these programs are well designed, they are automated to learn what information users are struggling with and adapt to focus on those areas of learning.

3. Liquidity Management

Agents try to maintain adequate amounts of e-float and cash and rebalance when they do not have enough of one or the other. This is one of the more complicated aspects of network management. Even agents working for leading networks around the world report frequently running out of cash/e-value.

Rebalancing systems are designed such that the agent must travel somewhere to exchange e-value and cash, or someone comes to them to do so. When agents have to travel, it is most likely to a bank branch, but it can also be to a retail shop or to another agent who can help them rebalance. In some cases, agents also have overdraft facilities or access to small loans.

Providers may do some simple predictive analytics on transaction volatility and help agents on weekends and holidays when they know that they will have demand and have trouble rebalancing. However, for the most part, liquidity problems are addressed only after they have occurred, and much more can be done to identify when they are likely to occur and take preventative action.

Areas for Improvement

1. Dashboards can only see how much float an agent has and usually only for a particular provider (if they are non-exclusive), so platforms are needed to measure how much cash and total e-value they have at any given time in a cost-effective way.
2. Using the retail ecosystem around agents to help them exchange cash and e-value so that if they run out of one or the other, they send a mass message to the retailers around them asking if anyone wants to exchange.
3. Developing predictive analytics that tell agents how much cash and e-float to start out with each day based on established wisdom on predictable events.[10]
4. Collecting enough analytics to offer a short-term loan facility or line of credit to help agents through volatile transaction periods.

Technology Interventions

Liquidity management is very similar to stock management for Fast-Moving Consumer Goods (FMCGs), and solutions for this much bigger market could be adapted for digital finance. For example, FIBR partner Sokowatch, which does inventory management for FMCG distributors in East Africa, has a platform that interacts with either a call center, SMS or a mobile app to do on-demand delivery within two hours. Sokowatch can also open a line of credit with small shops to purchase stock. TiendaPago works with small stores to lend working capital as a line of credit, collecting and making payments through a mobile phone.

There are myriad companies (Juvo, Jumo, Lenddo, Tala, Branch, FirstAccess) analyzing mobile data to give small loans that might make good partners for a product to improve liquidity management. Some already have products on the market for agent networks. Companies could access agents' transactional data to design liquidity loan products, while other providers have connected agents over various platforms to lend and trade float with each other.

FIBR and Nomanini have developed an airtime lending ladder for inCharge's banking agents in Ghana. Agents access a 1-day or 7-day short-term airtime loan at 0% interest when they run out of balance. During a FIBR pilot with Nomanini, 50 agents in Accra participated in a liquidity program and gained between $1 and $4 in additional monthly income.

However, liquidity management is not just about quicker rebalancing, it is also about preventing the need to rebalance before it occurs. In circumstances where the magnitude of transactional volatility is low enough for the agent to cover with their float, they need to be better informed about when that volatility will occur. Progress has already been made on this front as an algorithm to predict daily cash and e-float needs for agents developed by researchers at Harvard University was recently piloted in Tanzania.

4. Branding & Service Monitoring

This part of agent management includes monitoring the financial performance of agents, ensuring that agents comply with all relevant brand and customer service guidelines issued by the provider, collecting business intelligence on what the competition is doing, and monitoring how products are being received by different market segments.

Depending on the network model selected, this monitoring is done through regular visits from a provider area manager, a master agent, a third-party monitoring firm, or a combination of these players. In urban areas, agents are usually visited once a week, while in rural areas it can be anything, from once every two weeks to effectively never.

The manager or master agent will usually have a look around to see if there is anything

obviously wrong. They may ask how many transactions the agent is doing and, if it is a third-party agency, they will likely have a list of things to check (e.g., have the new promotional fliers been posted?).

The best monitors will strike up conversations about how products are faring or what the competition is doing in the area. However, there is often no systematic way to log this data and move it into a larger trends analysis. These systems are labor-intensive, very analog and inefficient.

Areas for Improvement

1. Eliminating many compliance/monitoring visits in favor of shorter, more useful and more enjoyable visits.
2. Automating decisions for a monitoring officer, e.g., the route to walk every day, what outstanding issues to raise with specific agents, which branding materials to bring.
3. Developing an interactive bot to monitor the outlet for compliance and systematically capture relevant business intelligence (what do we want to know about our competition, product uptake in this geography).
4. Analyzing the data captured and syncing it with other data about agent performance.

Technology Interventions

Optimetriks has developed a mobile-based platform to carry out quality control in the field by documenting compliance, digitizing intelligence, better understanding individual agents, and analyzing it all in a dashboard. Having this information in a digital platform greatly facilitates the speed with which it can be analyzed and used by decision-makers.

Some leading providers now have field monitors using smartphones and systems like GPS tracking to analyze the routes they use. Smartphones can be used to account for shift changes among agents and/or new agent additions to the network and give monitors new routes to walk. Other providers are starting to use a scan/tap system at agent outlets to monitor when, where and for how long the monitors visit.

5. Commissions & Reconciliations

These processes include paying commissions to agents and other individuals in the channel such as super agents and master agents, as well as ensuring that accounts are settled in a timely and accurate manner.

Agents earn commissions for registering customers as well as for cash-in and cash-out transactions. However, many agents do not understand commission structures and are not really sure what they earn per transaction. Sometimes, there will be a way for them to find out what their commissions

are, but the process may not be real-time or easy to access.

Some providers send agents regular SMS messages at the end of the day or the week, noting their earnings. Commissions are usually paid on a monthly or weekly basis via mobile money. In master agent models, master agents usually earn about 20-30% of the commissions their agents earn.

There has not been a lot of work to figure out best practices for structuring incentives. Some leading providers offer bonuses if an agent can do 10% more transactions than they did the month before, but systems are not smart enough to gauge if 10% is the optimal challenge for the agent, or to determine how communications with that agent might increase their chances of achieving their goal.

Areas for Improvement

1. Developing a dynamic incentive system for setting goals for individual agents that automatically adjust rewards.
2. Optimizing motivational communication with agents to increase the probability that they reach their goal.
3. Creating other non-monetary incentives to motivate agents (e.g., float on demand, insurance, a smartphone upgrade, some type of asset).

Technology Interventions

Agent network managers who have been experimenting with new commission structures have been using manual workarounds since their platforms do not allow for multiple commission schemes to be run simultaneously. Some are trying to use different incentive schemes in rural areas where overall volumes are lower and float is harder to rebalance. Others are segmenting their networks by volume of transactions to provide more targeted goals to different tiers of agent activity.

FIBR is working with PEG Africa, a PAYGo solar company with operations in West Africa, to pilot an application which provides visibility into sales agent commissions, along with customer prospects and payment performance in real time. The objective of this intervention is to motivate sales agents to be more engaged and productive as a result of these deeper insights into sales performance and remuneration.

This is certainly a growth area where more powerful technology is needed, which could be borrowed from the FMCG sector. Enhancesys has a product called S-NOC, which is a distribution management tool that allows the provider to create dynamic incentive schemes for agents.

6. Customer Care

Customer care includes answering customer and agent queries and handling the financial reconciliation issues that arise from transaction reversals, incomplete transactions and other exceptions. Agents note that dealing with a customer when something goes wrong is one of their biggest problems. Customers often go to agents first when they have an issue and the agent does not always know how to handle the problem, or even if they do, they might not have the ability to resolve the issue.

Top providers have a dedicated line that agents can call (different from the customer service line) to resolve issues. Agents are typically aware of the line, but have varied experiences using it. Agents call for a number of issues; they call when the service goes down to see how long it will be down for, and they call to reset their PIN, to deal with fraud, or to resolve operational questions, for example, about their commissions.

Areas for Improvement

1. Reducing the number of calls to the call center by giving agents and customers automated answers through a chatbot or similar technology.
2. Networking agents so they can answer each other's questions.
3. Predicting agent and customer questions based on their actions and proactively contacting them with solutions.

Technology Interventions

Many technological solutions are similar to concepts from other strategic operations in that they involve automated education and more efficient communication channels. In this regard, services like Arifu and Juntos Global could be useful. Further, Teller is building chatbots for financial institutions to improve their customer service, which could be used to assist agents as well.

Other helpful technologies related to better storage and tagging will make it easier to find information when it is needed. Enhancesys has a product called S-ECE that helps organize information by customer (in our case, agent) to make it easier to find and solve the problems more efficiently.

Starting Point: Architecture for Disruption or Corporate Streamlining?

We have discussed the strategic operations of agent network management, noting common practices, outstanding areas for improving them, and technologies that might already offer answers. Using this lens for analyzing agent networks, it is evident there are many opportunities to significantly improve them with technologies that already exist.

The logical question is where to start. Should we focus on helping dynamic technology-based companies build comprehensive new agent management systems, or is it imperative to help the large corporate networks already serving the most people improve their existing systems?

Of course, the answer is that both are worthy goals as they would increase customer choice and improve the quality of the services. The first approach may increase competition on the industry level more quickly, while the latter could improve services offered today.

However, both approaches have challenges that might make them indistinguishable in the long run, depending on how agent network management evolves. The second approach, which focuses on solving the most pressing issues of a large agent network manager, will likely unravel various operational issues as it becomes evident how interconnected all the processes are. For example, we might find that implementing better communication systems for agents will reveal urgent training needs.

Similarly, once agent rebalancing systems are upgraded, it may become clear that their geographical densities are too high and that a system to monitor overcrowding is needed. Finding solutions for one problem will uncover others, until all the major systems on the management platform are upgraded.

This drift is common when tinkering with one component of a dynamic system. It is not necessarily a problem as long as the piecemeal interventions are designed with this understanding from the beginning, so that engineers do not have to keep revisiting work to ensure it syncs with the next component they are building.

That said, others might prefer to start with an overall governing architecture to ensure that systems operate optimally together rather than address elements in a piecemeal fashion. In this case, designing a complete agent network management system from scratch using the ten years of experience we have in combination with today's powerful technologies.

Approaching the system as a whole is a compelling vision, but two factors make it a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difficult reality. The first factor is that a generic agent management system will probably not be that useful. There are many models for building agent networks, and a myriad of components that could be built into any of them as market dynamics require.

For example, a management system that allows providers to manage agent float from a dashboard would not be of much use if the network model uses master agents to manage float. Similarly, a training platform discouraging over-the-counter (OTC) transactions would be useless for agents offering banking products, which have always operated OTC.

To address the first factor, solutions should be developed with existing companies, and not as generic enablers for future ones. Since agent networks evolve over time, system components must constantly be tailored to the operations of the particular agent network as it adapts to new products, customers and competition. The sequential work on specific operational issues will likely resemble the piecemeal approach described in the first approach, solving pressing issues for an existing corporate provider in iterative cycles.

The second factor that makes this approach difficult is that regulations in many countries are prohibitive for ***independent*** agent network managers. For example, in many countries agent networks must be licensed through a bank or e-money issuer, and the license holder often pressures the agent network manager (i.e., master agent) not to work with its competitors.[11] This restricts their potential revenue streams.

Lower revenues limit the number of companies that want to manage agents, and therefore the potential customers for a management system. It also makes it harder for them to scale, which limits their market power, and their ability to generate enough revenue to evolve. Independent agent network managers need enough market power to convince providers to license them even though they are serving their competitors. However, managers need agreements with multiple providers to grow big. This is something of a catch-22 for independent agent network managers.

In summary, there are pros and cons to each of these approaches to infusing technology into agent network management. Neither will be quick wins, but both could produce important lessons and advances for the industry. Deciding how to proceed will depend on which problems decision-makers prefer to solve first. It may be that a liquidity solution for a high-profile corporation spreads quickly to other organizations, or that a complete network management system allows many small companies to bloom in permissive jurisdictions with similar market dynamics,[12] or both simultaneously.

The other factor that will determine the paths and rates at which these solutions spread is the evolutionary path of the industry. There are currently a lot of large external forces influencing the industry, and it is still unclear how they will combine or counteract to produce the next generation of agent network management solutions. We discuss these factors in the next section.

Three Future Dynamics for Agent Networks

While it is helpful to think systematically about which technologies to pursue and where to insert them, it is also important to understand that agent network management will undergo significant change in the next few years due to shifting industry dynamics. Understanding these dynamics will help us monitor them as they develop and to continually adapt strategies for investing in agent network management technologies in a changing world.

The first dynamic is **increasing competition in digital finance markets**. Many markets now have multiple digital finance services operators. This has put pressure on agents that have to manage multiple tills in the same outlet[13] and allowed agent network managers to earn multiple revenue streams from the same agent outlet.

Master agents who garner enough market power or who are simply clever enough to be licensed by multiple providers are now growing and becoming more powerful in some markets.[14] Those with enough capital and expertise are investing in technology solutions and could become an independent force in agent network management as they garner more market power. They certainly deserve support.

The second dynamic is the combination of **entrepreneurial technology firms and demand from social enterprises**. As discussed, social enterprises selling cookstoves, solar lights, medicines and agricultural supplies are scaling up and trying to figure out cost-effective ways to continually grow the distribution of their products and collect payments from them. In some cases, these

companies are building their own distribution networks and, in others, new technology companies are growing to provide this service to them.

In both cases, firms are trying to move quickly without investing large amounts of capital, which means they are relying on technology. However, in many cases, social enterprises are not moving enough product to sustain agent revenues. Further, the agent network needs to have a payment mechanism, which means these social enterprises are trying to find synergies with digital finance. Some want existing digital finance agents to distribute their products, while others, especially those doing sales in rural areas where there are not a lot of digital finance agents already, are exploring becoming master agents themselves.

The third dynamic is that unstable politics, weak currencies, and fragile economies in Africa are combining with an **inflection point for the telecommunications sector** to create a lot of change in the region, which has defined the industry for its first decade. Overall, telecoms shareholders' returns have declined by 60% in the last four years, and the growth rate of revenue is declining, making it very hard to get new capital expenditures approved.[15] Telecoms have been reducing costs and selling towers, and some major regional players, such as Airtel and Tigo, have started reducing investments in selected countries in the region.[16]

It is unclear what will happen as the dust settles around these giant shifts. Mobile money is a business that brings a lot of headaches and not a lot of revenue for providers. Therefore, it is potentially a business that will be sold off. This could come to bear as internet commerce players expand through the developing world, and vast distribution networks for payments and products will be an extremely valuable asset to control.

These three forces come from very different places but are united in that each of them could generate the independent agent networks that the industry needs. Master agents could become powerful enough to dictate which licensed financial service providers they choose to partner with. New technology-based players that figure out how to scale cost-effectively could prove a new model and start influencing regulation. The big corporates could sell their agent networks to companies that use them to distribute a wide array of services.

All of these outcomes would be welcome, as would be a plethora of other outcomes that are all possible as the industry advances. For now, any investment in technology for agent network management has great potential, but we need to monitor evolutionary dynamics to hedge our bets as these pathways become more or less probable.

The Role of Technology-Enabled Retail Points

Technology for agent network management is different from but closely related to the technology used by agents in their outlets. Given the large overlap in the concepts, it is worth discussing the latter briefly as well. In most countries, agents will be early adopters of technologies like smartphones and tablets. These devices open a world of possibilities in terms of data collection, intuitive interfaces, digital identity verification and low-cost communication channels.

Some providers have already realized the usefulness of devices to agent network management. In cases where agents already have smart devices, providers have enabled platforms such as chat groups, while others have given them devices to enable tasks like route optimization for quality monitors. Selcom in Tanzania offers either hardware or an app to agents, which allows them to manage one pool of e-float even as they are serving multiple providers.

Similarly, in July 2017, Safaricom distributed 25,000 smartphones to its agents with an app for customer registration and transactions preloaded onto the phone.[17] PesaKit is using machine learning to analyze agent transactions and provide them with advice on transaction volatility and small loans for liquidity when needed.

Not only can smart devices improve the back-end of service delivery, they can also improve actual interactions with customers. Agents have never been very good at sales. They are generally selected based on their ability to conduct a lot of small transactions very fast, not because they have an aptitude for sales. Copia Global is trying to change that by putting tablets at agent locations with preloaded advertisement videos for goods. Customers can watch the ads, click on the ones they like, pay with mobile money, and have the product delivered to the agent location at a selected date.

Merchant payments will be a focus for technologies for agents. China managed to shift to digital retail payments using QR codes, while other providers are investing in "tap and go" technologies. However, in many developing countries, people do not have bank cards, and USSD-based mobile money transactions are still more burdensome than cash.[18] Technology at the agent point will likely change this reality, as it has done in China.

Finally, it is worth discussing OTC and agent-assisted transactions, where agents conduct transactions on behalf of the customer. In markets across Asia and Africa, agents provide a more hands-on service than had originally been envisioned, especially in low-income and rural areas.[19] More intuitive interfaces at agent points can help customers interact directly with


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the systems, as many customers are not comfortable with the USSD interface. Better interfaces could be a powerful tool for helping people become more comfortable with these digital systems.

Conclusion

Discussions about the convergence of technology and finance most often focus on a new class of products for customers. However, in the developing world fintech companies still need access to agent channels to distribute these new products, which would not make it very far on analog agent networks. If we are serious about innovation in digital finance products, we need to invest in agent networks.

This paper argues that technology can greatly reduce the time and money needed to build agent networks, especially since most managers are not currently using much technology. After systematically analyzing the strategic operations of agent networks, it is clear that most operations could benefit from technologies that are already on the market but are not being implemented widely.

Successful investments in these technologies could bring a new class of independent agent networks that would further increase agent revenues, lower management costs and embrace innovation. Therefore, investing in better digital tools for agent networks is a crucial step towards getting new financial products to market, while also improving the quality of service that agent networks offer.

While this vision is exciting, it is unclear where to focus efforts right now as the industry is in a period of flux. New technology-based agent network managers, powerful master agents and even the corporate agent networks of today could all potentially lead to large, independently managed networks. The path forward is to invest opportunistically for now, while monitoring industry developments moving forward.

Notes

1. In this paper, the term digital finance refers to both mobile money and agent banking.

2. GSMA. (2017). State of the Industry Report. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/02/GSMA_State_Industry_Report_2018_FINAL_WEBv4.pdf

3. An agent outlet is the physical location (usually a small retail shop), where a person conducts cash-in and cash-out (CICO) for customers. In many countries, it is common to find multiple agent tills for different providers in the same agent outlet. The Helix Institute uses a 30-day activity rate for this calculation.

4. Bersudskaya, V. & McCaffrey, M. (2017). Agents Count: The True Size of Agent Networks in Leading Digital Finance Countries. The Helix Institute of Digital Finance. Available at: http://www.microsave.net/resource/agents_count_the_true_size_of_agent_networks_in_leading_digital_finance_countries

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6. Mas, I. & McCaffrey, M. (2015). Designing Successful Distribution Networks for Digital Money. The Helix Institute of Digital Finance. Available at: http://www.microsave.net/resource/designing_successful_distribution_strategies_for_digital_money#.Vs2hqvl97IU

7. The Helix Institute consistently noted the need for this even in leading ecosystems like Kenya, see: Khan, S. et al. Agent Network Accelerator Kenya Country Report 2014. Helix Institute of Digital Finance. Available at: http://www.helix-institute.com/sites/default/files/Publications/161101%20ANA%20Kenya%20II%20Country%20Report%202014%20FINAL-REV.pdf

8. Mas, I. & McCaffrey, M. (2015). Designing Successful Distribution Networks for Digital Money. The Helix Institute of Digital Finance. Available at: http://www.microsave.net/resource/designing_successful_distribution_strategies_for_digital_money#.Vs2hqvl97IU

9. Using Big Data to Expand Mobile Money Services. (2015). Altai Consulting. Available at: https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/10/Altai-M360-presentation-2015-10-07.pdf

10. McCaffrey, M. & Ogwal, I. H. (2014). The Ebbs and Flows of Liquidity Management. The Helix Institute of Digital Finance. Available at: http://www.helix-institute.com/blog/ebbs-flows-liquidity-management-0

11. Mas, I. (2015). Shifting Branchless Banking Regulation from Enabling to Fostering Competition. Banking and Finance Law Review. Vol. 30, No. 2. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1692164

12. There has been no systematic analysis of which regulatory regimes are conducive to independent agent network managers. A survey should be conducted to provide further guidance on this.

13. The real trouble is each till is connected to an e-float account, and the e-floats are not easy to exchange. Thus, an agent's capital becomes separated into more pools.

14. There are different market dynamics that allowed each of the following organizations to grow, but in loose terms Pesa Point in Kenya, Eko in India, Zoona in Zambia and Malawi, can all be thought of as examples of this.

15. Mckinsey & Company. (2016). Middle East and Africa Telecommunications industry at cliff's edge Time for bold decisions. Available at: https://www.mckinsey.com/~/media/mckinsey/industries/telecommunications/our%20insights/winning%20the%20rush%20for%20data%20services%20in%20the%20middle%20east%20and%20africa/telecommunications%20industry%20at%20cliffs%20edge%20time%20for%20bold%20decisions_june2016.ashx

16. GSMA. (2016). The Mobile Economy: Africa 2016. Available at: https://www.gsmaintelligence.com/research/?file=3bc21ea879a5b217b64d62fa24c55bdf&download#page=23

17. Mutegi, Mugambi. (2017). Safaricom goes for photo IDs to block M-Pesa fraud. Business Daily Africa. Available at: http://www.businessdailyafrica.com/corporate/companies/Safaricom-photo-ID-agents-M-Pesa-fraud/4003102-4008158-1sep6kz/index.html

18. Schiff, A. & McCaffrey, M. (2017). Redesigning Digital Finance for Big Data. The Helix Institute of Digital Finance. Available at: http://www.microsave.net/resource/redesigning_dfs_for_big_data

19. McCaffrey, M., Wright, G., & Singh, A. (2016). OTC: A Digital Stepping Stone or a Dead-end Path? The Helix Institute of Digital Finance. Available at: http://www.microsave.net/resource/otc_a_digital_stepping_stone_or_a_dead_end_path#.V3uX4fl97IU

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