LEARNING BRIEF 1

The MasterCard Foundation | Rural & Agricultural Finance LEARNING LAB

THE BUSINESS CASE FOR DIGITALLY-ENABLED SMALLHOLDER FINANCE

INTRODUCTION & HIGHLIGHTED FINDINGS

New digital technologies and innovative business models are making it possible to provide credit to smallholder farmers (SHFs)[1] in Africa — a sizable, growing, but largely overlooked population. As a host of digital technologies emerge along the lending value chain, a new generation of technology-enabled business approaches is bringing large segments of the population into the addressable market and doing so cost-efficiently.

This brief looks at where and how innovations in digital technology are enabling—or will soon enable—financial service providers (FSPs)[2] to serve smallholders at scale. The goals of the brief are to 1) increase transparency concerning the viability of digitally-enabled models for financing smallholders and 2) to lay the groundwork for further research and data gathering from FSPs using digital technology; all for the purpose of equipping practitioners — including providers of financial services, TA and capital, and B2B digital service providers (DSPs) — with insights that can guide their efforts to design and scale credit solutions for SHFs.

The findings in this brief draw on a survey of selected FSPs, as well as extensive desk research and interviews with a cross-section of digital smallholder finance sector donors, implementers, and entrepreneurs.[3] The 23 survey participants were consumer-focused FSP partners and sub-partners of The MasterCard Foundation, who serve smallholder farmers through credit or credit-bundled solutions and have used digital tools at some point in their lending value chain. **Digitalization is defined here broadly** to include the use of digital tools and channels for (1) customer relationship management, (2) customer registration, (3) loan analysis, (4) disbursement and repayment cash flows, and (5) delivery of support services alongside core financial products (e.g., providing agricultural advice to farmers via mobile phones). While the sample is small and not intended to be representative, it lays groundwork for hypotheses about the current and projected use of digital tools and the impact of digitalization on the performance of financial service providers. Further details on the research methodology appear in the Appendix.

This brief focuses on the value of digitalization for FSPs rather than their funders, vendors, and clients. The client perspective on digitalization, while touched on lightly based on insights from third party research, is a particularly important and distinct topic that warrants separate investigation. While the Learning Lab intended the FSP survey as a starting point on a longer learning journey, a number of interesting findings have emerged and are worth reporting:

AUTHORSHIP

Dalberg Global Development Advisors (Dalberg) led this research under guidance of the Rural and Agricultural Finance Learning Lab (the Lab), an initiative jointly implemented by the Global Development Incubator (GDI) and Dalberg. The authors would like to acknowledge and thank the sponsor of this work — The MasterCard Foundation — for providing significant and substantive input, guidance, and leadership for this project.

1 Smallholder farmers are defined as those that have less than two hectares of land.

2 For the purposes of this brief, financial service providers include both financial institutions and value chain actors providing credit solutions to smallholder farmers, including in-kind inputs on credit.

3 Including, for example, the Gates Foundation, CGAP, World Bank SME Forum, Esoko, nFortics, FarmDrive, and Lenddo

TAXONOMY FOR LEVELS OF DIGITALIZATION

The level of integration of digital tools across the value chain and the degree of product bundling allows for the definition of four discrete digitalization approaches or "profiles," each with distinct features in terms of digitalization approach and results sought from digitalization. Ranging from less to more digital integration, this taxonomy includes:

1. **Traditional microfinance institutions (MFIs) leveraging digital** primarily for analyzing and offering bundled credit solutions
2. **Agribusinesses with some digital integration,** primarily for collection data and payments, and providing inputs on credit
3. **Commercial banks / innovative MFIs in the process of fully digitizing** all functions along the lending value chain and providing more complete financial solutions
4. **High tech banks/ niche NBFIs that are highly digitalized along the value chain,** including pure-play digital fin tech players, who typically provide narrow (e.g., credit) financial solutions

High tech banks, mobile network operators (MNOs), and niche non-bank financial institutions (NBFIs) have digitalized most functions along the lending value chain, while Commercial banks and innovative MFIs are still in process of digitalizing lending functions but often have parallel legacy systems in place. Traditional MFIs and Agribusinesses have made more modest progress on digitalization, but are rapidly increasing investment when they have the resources to do so.

DIGITALIZING LOAN ANALYSES

In our survey, almost all organizations (91%), regardless of taxonomy, have digitalized loan analysis to some extent, as that step is often the starting point for digitalization.

Additional key insights include:

- 39% continue to use traditional data only (e.g. farmer income) but have upgraded to digital tools for data collection and analysis
- 52% of respondents use alternative data for credit scoring, but most of these players rely primarily on airtime data (which may be less useful in the agricultural context) and believe that significant value is not yet being captured by integrating other types of digital data (e.g., weather, remote and in-situ sensing data, farmer or extension agent generated) into their credit processes.

TRANSITIONING TO CASHLESS OPERATIONS

In terms of digital cash flows, a majority of the organizations operating on favorable mobile money ecosystems, have transitioned to cashless operations (50%) or are in the process of doing so (43%). While organizations operating in countries with low uptake of mobile money continue to operate entirely in cash (44%), most (56%) are incorporating digital cash flow in their operations.

THIRD PARTY SERVICE PROVIDERS

Over a third of firms partner with third party digital service providers (DSPs) — i.e., specialized digitalization vendors — to facilitate digitalization of their processes, with around 26% of the participants using an "integrator" third party vendor to digitalize multiple steps of their lending value chain.

The remaining two thirds digitalize functions internally, with 17% developing their own proprietary systems and 48% adopting pre-existing apps and software, such as Salesforce.com, to digitalize existing systems.

MOTIVATIONS FOR DIGITALIZATION

The business case for digitalization is early but promising: the more digitally integrated the taxonomies are, the more profitable FSPs can be. In fact, respondents indicate that the main motivation for investing in digital tools in the past has been reducing cost to serve and / or increasing portfolio quality.

However, the few that have started to measure the impact of their investments see more value from growing the total addressable market (and increasing access to financial services for SHFs) than from reducing operating and non-operating costs. Digital tools deliver additional revenue by enabling customer-centric products that increase usage and loyalty and, furthermore, are seen as reducing overall operational risks.

BARRIERS TO DIGITALIZATION

The great majority of organizations (>70%) surveyed cite the initial investment cost as a barrier, and about half cited transaction fees as too high. Additionally, a significant number (>40%) also struggle to understand the value of digital tools, lack knowledge on what the best tools and digitalization vendors are, and claim they lack adequate internal capabilities to fully take advantage of digitalization.

Finally, over a third of surveyed firms feel constrained by the rural mobile ecosystem they operate in, noting that they were limited by the digital and financial literacy of the end customer as well as the general underdevelopment of mobile ecosystems in rural areas.

OPPORTUNITIES FOR DIGITALIZATION IDENTIFIED BY THE RESEARCH FINDINGS

Going forward, there are a number of opportunities to accelerate or capture more value from digitalization. For example, FSPs can partner with owners or collectors of non-traditional data on farmers to underwrite loans to a larger addressable market. A partnership such as this will require some facilitation to address uncertainty about the value or ownership of data in order to make sharing possible. Digital service providers can explore risk-sharing approaches, invest in making the business case, and generally work to improve their offering to FSPs. Donors and other sector supporters can work to increase understanding about the costs and benefits of digitalization. They can also invest in new technologies and capacity building to encourage experimentation and institutional uptake respectively.

SECTION 1: THE DIGITALIZATION OPPORTUNITY FOR SMALLHOLDER FARMER FINANCE

Smallholders face multiple challenges to mobilize working capital. In the case of Michael Waweru, an aspiring poultry farmer in Muranga County, Kenya, finding a loan that would support his business was a constant struggle. Additionally, he experienced significant delays in accessing financial services making it difficult for him to expand and diversify.

However, in late 2014 Michael registered with Musoni and received a loan of KES 150,000 (~USD 1,500) to purchase an incubator and build a second chicken house to expand his operations. Now, Michael rears over 1,500 layers. Within a year of his first loan, Michael had doubled his business and applied for a new loan of KES 300,000. The new facility has increased his income, enabling him to grow other farming activities, increasing his number of pigs 12 to 24 and procuring a dairy cow.

Over the past two years the level of egg production on the poultry farm has increased from 50 to 150 trays a day and milk production has grown by 50%. With the increased income from the farm, Michael helped his wife open a fruit and juices business in Thika town. He has been pleased to be able to apply for and receive a loan within 72 hours, and appreciates the mobile and digital field application solutions that enable him to access Musoni services without leaving his farm.

Clients like Michael are now reachable by institutions like Musoni in part due to the ease and efficiency of using digital technology for the entire loan transaction. In the Musoni model, field applications replace paper forms and mobile payments replace cash disbursement and collections. Musoni was established in 2009 as the first cashless and paperless MFI in the world — the company conducts 100% of its transactions through mobile payments and equips field officers with tablets to enable electronic loan applications and digital data capture. Since its founding, Musoni, a financial service provider in Kenya targeting bottom-of-the pyramid clients primarily in urban and peri-urban areas has over 15,000 active borrowers, constituting a loan portfolio size of USD 2–8 million. Since it's inception seven years ago, the institution has disbursed more than 110,000 loans (totaling over USD 25 million). Recently, the company has expanded to rural areas of Kenya with the goal of increasing financial inclusion for SHFs, thereby providing opportunities for farmers to augment their incomes, improve resilience, and lift up rural communities across Kenya.

The path taken by Musoni is part of a broader trend as FSPs in sub-Saharan Africa increasingly recognize the magnitude of the opportunity to serve SHFs. Sub-saharan Africa's 48 million[4] smallholder farms represent a massive and largely untapped market. The need for credit within this population segment is enormous and is anticipated to remain so in the coming years. Credit disbursed in the region by formal and informal financial institu-

4 Rural and Agricultural Finance Learning Lab and The Initiative for Smallholder Finance (2016) Inflection Point: Unlocking Growth in the Era of Farmer Finance.

tions totals just USD 7 billion (~20%) of the over USD 33 billion required to meet both the agricultural and non-agricultural credit needs of smallholders.[5] The current growth trajectory in the supply of formal credit available to smallholders will not significantly close this credit gap. Currently, the credit supply offered by formal financial institutions and agricultural value chain actors is projected to grow by 7% annually.[6] By 2020, even assuming that demand from smallholders stays constant, formal financial institutions and value chain actors would meet less than 20% of smallholder credit needs in sub-Saharan Africa. Given the size of the need and the nature of the challenges, serving SHFs requires innovation and creativity on the part of FSPs.

FSPs already providing credit to smallholders face challenges to scaling up at multiple points in the lending delivery process. The cost of acquiring and serving smallholder customers is high given the lack of product awareness among SHFs, poorly designed products (by the FSPs and third party DSPs) and the barriers presented by rural geography. Particularly, rural geographies present a myriad of challenges including poor road networks, poor cell phone connectivity, long distances between various points and sub-scale markets due to low population densities, especially compared to urban areas. At the same time, FSPs have limited understanding of SHF customer segments, making it difficult to reach informed lending decisions. FSPs often find it difficult and costly to collect new data on farmers in rural areas, data that is necessary given the specific challenges of agricultural finance (e.g., understanding of agronomic context, fit with seasonal crop patterns generating seasonal financing needs and risks). Even when data is available, it is often widely distributed among a number of stakeholders and not easily shared due to (1) perverse institutional incentives, (2) lack of enabling regulation and IP rights, or (3) simply an absence of well-established business models for data sharing and monetization.

In this context, digital innovations have emerged as a key enabler of effective business models for addressing the barriers to serving rural populations. At least five categories of digital innovations help FSPs overcome the physical constraints and high costs to serve that have traditionally limited credit providers' addressable market, reach, and flexibility:

- **Data dissemination platforms** can facilitate mass marketing and upselling / cross-selling notifications to borrowers, increasing the potential value of each customer.

  Esoko, a communication platform that is currently transitioning to more directly link SHFs to financial services and markets, allows financial service providers to provide tailored agronomic advice to SHF clients. Vendors like ***Clickatell***, ***VotoMobile***, and EngageSpark are helping African FSPs deploy bulk SMS or IVR campaigns to engage clients. Innovative USSD platforms like ***nFrnds*** are allowing African FSPs to interact with clients who lack strong connectivity and higher end connectivity devices like smartphones.

- **Data collection and management tools** are replacing traditional paper forms that were completed and then manually entered in the institution back-end core banking system, enabling improved data capture and facilitate loan application and loan monitoring.

  Opportunity Bank in Tanzania and Mozambique has developed its own data collection application, reducing the average time spent by loan officer per customer and enabling faster loan analysis. Mobile field force management platforms like ***TaroWorks*** provide FSPs with customizable, off-the-shelf solutions for managing field agents and workflow.

- **Alternative data credit scoring platforms** (one of the broader set of digital decision-making tools) allow credit providers to increase their portfolio and reach scale by serving customers that would otherwise remain inaccessible due to the lack of information.[7] Alternative data and digital analytics also enable improved lending decisions, reducing the rate of nonperforming loans.

  Fintech players like ***Cignifi*** and ***First Access*** provides risk-scoring technology that leverages non-traditional customer behavior data (such as airtime data or utility bill data) to help financial institutions reach customers with no credit history.

- **Mobile money and digital payment platforms** allow for cashless loan disbursements and repayments, greatly reducing or even eliminating the need for collecting agents and the risks associated with holding and transporting cash.

5 Learning Lab and ISF (2016) Inflection Point

6 Ibid.

7 See e.g., Initiative for Smallholder Finance (ISF), Briefing 11: How Big Data and Data Science Are Changing Smallholder Finance (2016), (available at http://www.initiativeforsmallholderfinance.org/s/The-Rise-of-the-Data-Scientist-ISF.pdf)

Opportunity Bank Tanzania has a branchless model that operates exclusively via mobile money loan disbursement and repayment. ***Musoni*** and other pure digital SHF finance players rely on digital money infrastructure for payments. Players like ***Cellulant*** are digitalizing agricultural value chains and extending e-wallet functionality to farmers (e.g., for distribution of government ag subsidies).

- **E-learning platforms** enable delivery of financial literacy and agronomic training anywhere there is mobile connectivity and a phone.[8]

  Services like ***Arifu*** utilize a series of interactive SMS scripts that let farmers guide their own learning on their phones by providing content based on their interests, farmers are enabled to access financial literacy knowledge in a timely and convenient fashion. For example, farmers interested in loans get content on how to check their loan limits and balances as well as how to use a cost calculator tool.

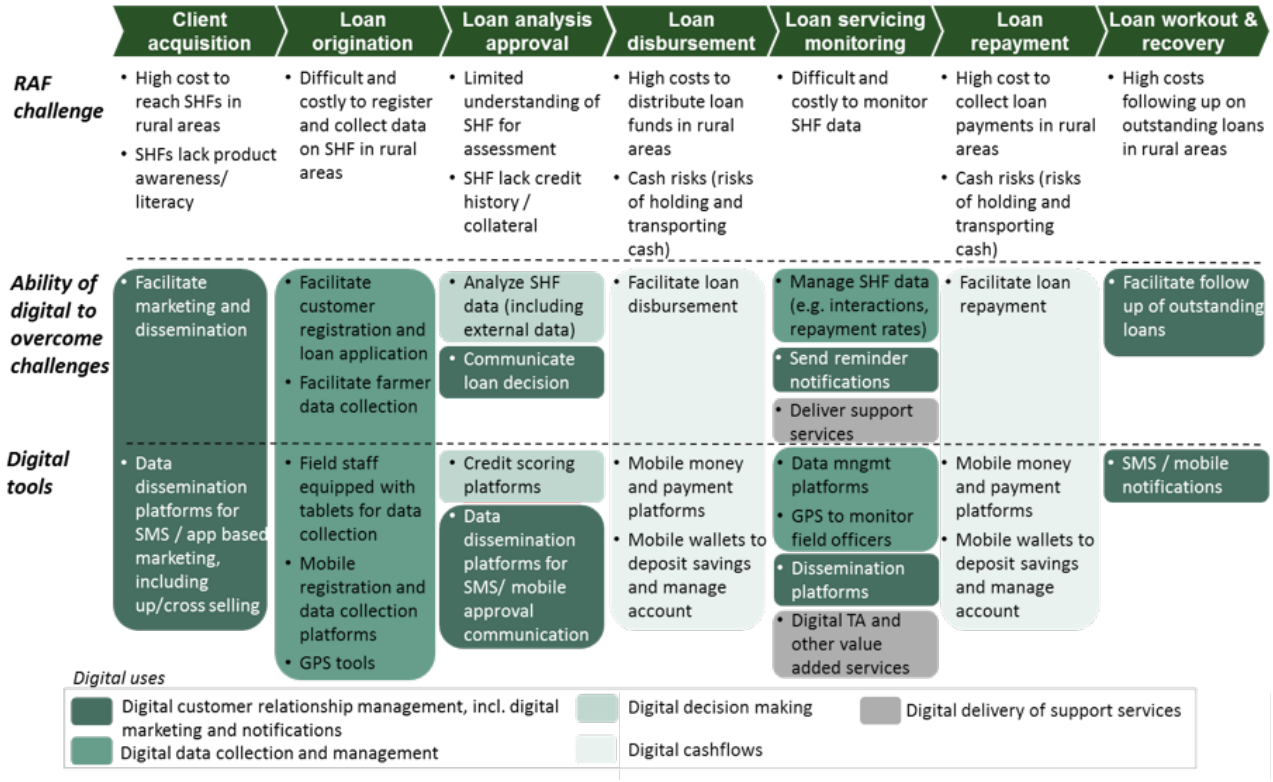
Figure 1 below illustrates the various points in which digitalization is entering the SHF lending process, starting with client acquisition and through loan workout and recovery, and including digital value added services provision at different points in the value chain.

SECTION 2: TYPOLOGY OF DIGITALLY-ENABLED CREDIT PROVIDERS

An increasing number of actors have recognized the potential of digital tools to make FSP business models viable for engaging with SHFs. Many players have begun experimenting with technology-enabled credit solutions. In the context of developing countries — and particularly in rural areas, where the relevance of face-to-face interaction remains high — credit providers are integrating digital technology selectively along the value chain, balancing the potential benefits of digital tools with: customer needs and preferences, the company's product portfolio, profitability, internal capabilities to integrate digital solutions, and the capabilities of the digital ecosystem capabilities and outreach

8 mAgri (ICT4ag) business models were recently analyzed by AGRA's financial inclusion team in its 2016 Digital Harvest study: https://www.raflearning.org/post/understanding-business-model-review-how-sustain-and-grow-digital-harvest. See also, e.g., http://www.cgap.org/blog/interactive-sms-drives-digital-savings-and-borrowing-tanzania#.V6xxD-2Q4iDU.linkedin

FIGURE 1: POTENTIAL USES FOR DIGITAL TOOLS ALONG THE LENDING VALUE CHAIN



Source: Dalberg analysis.

Figure 2 below maps market actors that participated in The MasterCard Foundation Business Case Survey[9] according to a) the extent to which an actor is digitally integrated along the value chain and b) the extent to which an actor offers bundled financial products.[10]

Considered together, these two factors allow for the clear definition of four approaches or "profiles." From least to most digital integration, they are:

- **Traditional MFIs** leveraging digital technology primarily for loan analysis, and offering bundled credit solutions.
- **Agribusinesses** with some digital integration, primarily for data collection and payments, and providing inputs on credit.
- **Commercial banks and innovative MFIs** in the process of fully digitalizing all functions along the lending value chain and providing more complete financial solutions.
- **High-tech banks / MNOs / NBFIs** fully digitalized along the lending value chain and providing limited bundled solutions.

Figure 3 on the following page breaks down specific functions along the lending value chain, indicating which ones have been digitalized for survey respondents in our research.

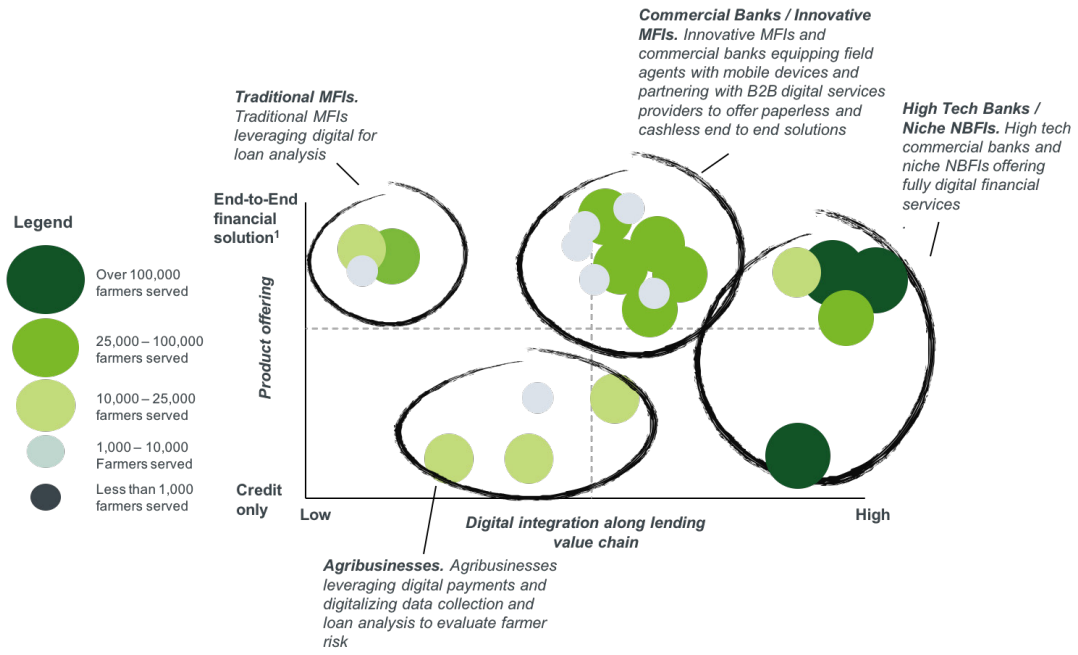
High-tech banks, MNOs, and niche NBFIs have digitalized all functions along the lending value chain, while commercial banks and innovative MFIs are in the process of digitalizing all lending functions but often have parallel legacy systems in place.

Almost all organizations (91%), regardless of which of the four digitalization profiles they represent, use digitalized loan analyses. However, the majority continue to rely on traditional data or use a limited number of non-traditional data sources. Over a third continue to use traditional data (e.g., farmer income) exclusively but have upgraded to some form of digital tools for data collection and loan analysis/decision making. In addition, while an impressive half (52%) of respondents use alternative data for credit scoring, over 80% of these rely on airtime data only rather than the panoply of other digital data sources that could be integrated into credit decisions and ongoing portfolio monitoring (e.g., weather, in situ and remote sensing data, farmer and extension agent generated data).

9 Refer to "Appendix: FSP Survey Methodology" section for details on survey participants.

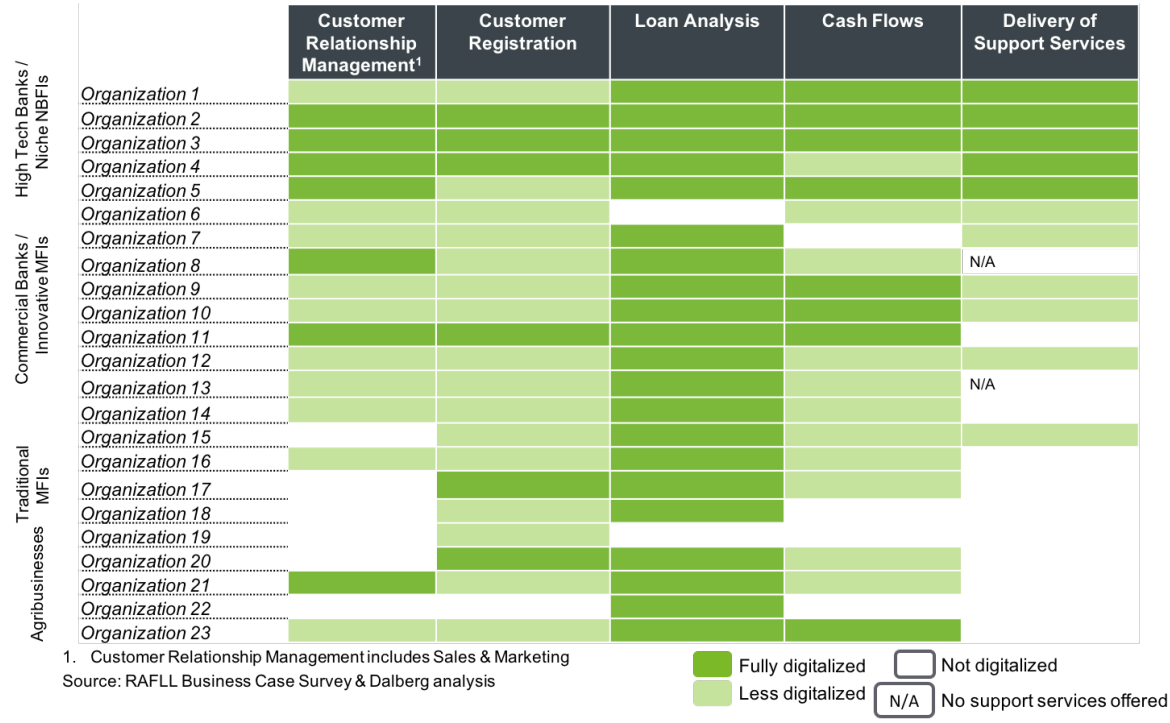
10 Digital integration indicates the number of functions along the value chain for which an actor is using digital technologies. Extent of bundling indicates the completeness of the financial product, ranging from credit-only offerings to end-to-end credit bundled financial solutions that provide credit, savings, insurance, and payments solutions.

FIGURE 2: MAPPING OF SURVEY RESPONDENTS BY PRODUCT OFFERING AND DIGITAL INTEGRATION ALONG THE LENDING VALUE CHAIN



Source: RAFLL Business Case Survey & Dalberg analysis.

FIGURE 3: DIGITALIZATION OF FUNCTIONS ALONG THE LENDING VALUE CHAIN BY RESPONDENT AND MODEL TYPE



When it comes to loan analyses, anecdotal evidence from interviews suggests that for those players that have already engaged in digitalization, an alternative data push rather than further general process digitalization is likely the greatest source of value. Determining what data types are the most useful for evaluating smallholder creditworthiness, and how different data sources can be integrated into the lending process to facilitate SHF credit extension, will be key in increasing credit extension to SHF.

Customer registration, including loan application, is also being digitalized across all organization types. However, the majority of actors continue to rely on some human interaction, and only thirty percent (30%) of respondents offer fully digital customer registration. Thirty-nine percent (39%) rely on a field officer equipped with a tablet to complete loan applications, or else use a mix of digital and non-digital tools that enable customer to request credit digitally but require in-person registration and loan application at the local branch.

Unsurprisingly, digitalization of cash flows is largely determined by the mobile money ecosystem in which a player operates. A majority of those organizations operating within favorable mobile money ecosystems have either transitioned to cashless operations (50%) or are in the process of doing so (43%).[11] Organizations operating in countries with low uptake of mobile money, however, continue to do business exclusively in cash (44%) or use a mix of cash and digital payments (56%).

Finally, value added support services costs appear to be the hardest to digitalize despite representing the second largest cost burden to FSPs (behind cost of funds). Just ~17% of organizations use e-learning platforms exclusively, and do so primarily for information services, while almost 50% of organizations use exclusively non-digitalized support/value added services for their clients.

When it comes to technology deployment methods, over a third of respondents partner with intermediaries to digitalize lending functions. Most of these use the same providers, or "integrators," to digitalize multiple steps of the value chain. These include partnerships with providers such CAGECFI, Taroworks, and ADfinance. The remaining two-thirds of respondents digitalize functions internally — 17% have developed their own proprietary systems and 48% have either adopted off-the-shelf platforms, such

11 Penetration of mobile money in rural areas is used as a proxy for ecosystem maturity, with countries with >25% penetration ranked as more mature (Cote D'Ivoire, Tanzania, Uganda, and Kenya – 14 organizations in survey sample) (less mature: Ethiopia, Ghana, Rwanda, and Nigeria – 9 organizations in survey sample).

as Salesforce, to digitalize existing systems or else use an MNO service to, for example, deliver SMS notifications.

SECTION 3: IS DIGITALIZATION PROFITABLE AND WHERE DOES VALUE COME FROM?

While it's too early to be certain, the business case for digitalization looks promising. Among our survey respondents, the more digitally integrated the approach, the more profitable the organization. More highly digitalized organizations in our typology are more likely to cover associated program costs with loan repayment and fee revenue — or are expected to do so in the next two years. For the less digitally integrated models in the typology — agribusiness and traditional MFIs — loan repayment and fee revenues do not cover all program-associated costs, and are not expected to do so in the short term.

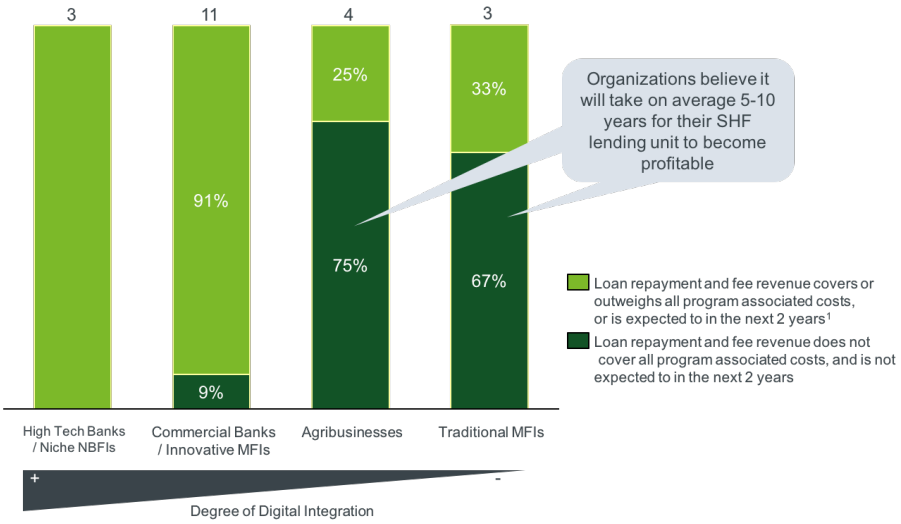
Figure 5 on the following page shows this positive correlation between digitalization and self-reported profitability for survey participants, but of course this does not necessarily imply causation (perhaps more profitable providers can more easily invest in digitalization). Further analysis is needed, particularly because the different digitalization profiles represent providers with very different business models, which includes target customer segments.

Caveats notwithstanding, while almost no organization tracks the impact of digital investment systematically, the vast majority of survey respondents (>95%) reported that integrating digital tools will eventually increase their profitability (see Figure 5 on the following page).

Given this optimism about digitalization, not surprisingly, most surveyed players intend to increase digital use across their lending value chain. The vast majority are in particular interested in digitalizing cash flows/payments with consumers (>90%) and digitalization of loan analysis (>85%), with a particular focus on the integration of additional sources of alternative digital data in credit decisions. Nearly eighty percent (78%) plan to make further investments into digital customer acquisition channels and ongoing digital customer management (e.g., via SMS/IVR communications). A smaller number of organizations (60%) are considering additional investments into digital support / value added services from third party providers to be delivered to SHFs alongside their financial products. Almost half of the players surveyed expect to recoup their investment into digitalization in less than two years.

For most respondents (83%), the main initial motivations for investing in digital tools in the past have been to reduce cost to serve and / or to improve portfolio quality. For example, one successful NBFI in East Africa claimed, that their experience

FIGURE 4: PROFITABILITY BY ORGANIZATION TYPE AS DEFINED BY COSTS COVERED VIA LOAN REPAYMENTS AND FEES



1. Program associated costs refers to cost of funds, direct field operation costs, direct costs of nonfinancial support services, direct marketing and sales costs, and all other overhead and allocated program support

Source: RAFLL Business Case Survey & Dalberg analysis

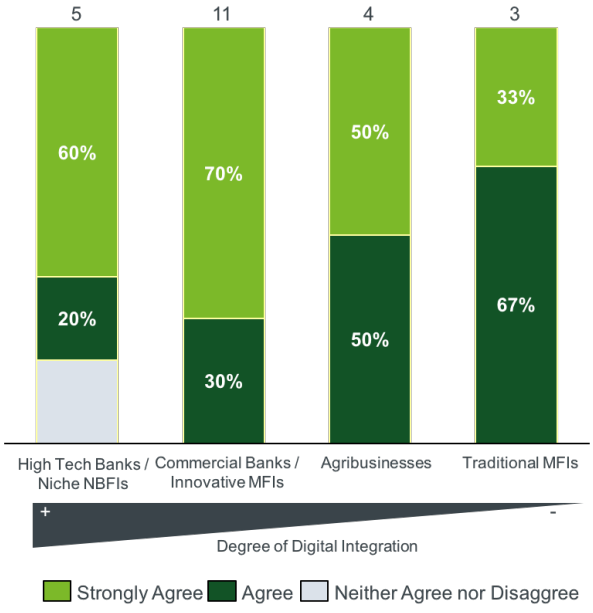
shows that "digital tools have the potential to greatly improve the efficiency of running a finance business operating in deep rural areas." Similarly, an African commercial bank highlighted the ability to automate activities that currently are performed manually, and expressed the hope that this would fundamentally reduce the bank's cost to serve. Other respondents focused on the ability of digital tools to reduce farmer risk and thus improve portfolio quality by refining the organization's assessment of customer creditworthiness. Only 17% of surveyed organizations mentioned revenue-related benefits as the motivation to invest in digital tools.

Organizations that have embarked on digitalization and have tried to measure digitalization impact, however, report seeing more value from digitalization for topline growth and improved portfolio quality rather than cost reduction. Six out of seven who measured the impact of digital tools cited an increase in revenue. Customer portfolio grew between 25–50%, depending on the organization, while loan officer's caseloads increased between 30-60%.[12] This is consistent with the analysis of experts and the experiences of B2B digital service providers currently partnering with FSPs serving SHFs.

12 While increased caseload does reflect lower cost per borrower, the FSPs see this as part of broader topline growth benefits. Loan officer productivity is only one of the three key ways that digital increases growth. While increased caseload does reflect lower cost per borrower, the FSPs see this as part of broader topline growth benefits. Loan officer productivity is only one of the three key ways that digital increases growth.

FIGURE 5: EXPECTATIONS FOR DIGITALIZATION IMPACT ON PROFITABILITY BY PLAYER TYPE

Statement: Increasing digitalization will improve profitability for your organization



1. Respondent who already has a fully digitalized lending value chain
Source: RAFLL Business Case Survey & Dalberg analysis

While not all DSPs supporting smallholder FSPs are at this stage able to fully quantify the business case for their services, they suggest that *portfolio growth* is the key value driver behind digital investments. This is particularly true for commercial banks and MNOs, which have tighter investment horizons and lower-touch models that allow for greater scale once digitalization is in place. For instance, nFortics, a platform providing a suite of digital services including digital payments and digital field applications to FSPs, reports that "most of the benefits [to their partner FSPs] come from increasing customer deposits" and attracting new customers via digital channels. As an example, one of nFortics's rural bank partners in Ghana was able to quadruple its portfolio over a period of 18 months.

Digital uses can increase portfolio growth and expand an organization's market through three different pathways:

1. **By increasing field officer productivity** so the use of digital field applications and business processes automation reduces the average time spent by loan officer per farmer and, therefore, enables increased loan officer caseload;
2. **By acting as a distribution (and marketing) channel** for the use of digital devices and applications to reach and market products in remote areas that were previously considered too expensive to serve;
3. **By bringing new segments of the rural population into the addressable market** for the use of digital to collect and collate alternative data sources (and data analytics to mine that data) to unlock information on SHF borrowers that would otherwise be too risky to serve.

While experts agree that data can open up complete new markets the challenge, however, is to use the appropriate data for SHF lending. As noted earlier, the majority of actors using alternative data to evaluate SHF borrowers rely on airtime data. The FarmDrive team, a data analytics platform, for instance, points out that, "for a segment severely exposed to market and natural risks, airtime data is just not enough." A farmer's ability to pay is driven by production and price risks. To evaluate farmer creditworthiness business models can benefit from the incorporation of

data on weather, soil, input quality, and market linkages. Business models that are able to own (or effectively access) the relevant data to make SHF credit solutions viable will go on to capture the most value. The relative value of specific data sources, however, is at this stage not yet clear given the early stage of alternative data use in the SHF financing market.

In addition to portfolio growth, digital tools deliver per customer revenue benefits in the form of increased usage and loyalty. By enabling customer-centric products, digital tools allow FSPs to meet customer needs effectively and improve the customer experience, for instance, via curated information services or faster loan approval. "Financial products, if done right, can be extremely sticky," affirms the CEO of Lenddo, a credit scoring platform. This product "stickiness", though hard to quantify by isolating the digitalization effect, drives loan repayment rates, repeat borrowing, upselling / cross-selling, and ultimately increased customer lifetime value. In another example, Esoko, the value added agricultural information and communication platform, has recently partnered with one of their FSP clients, Juhudi Kilimo, to measure the impact of their value added services for SHFs on Juhudi Kilimo's portfolio quality, customer churn / retention, and — ultimately — return on digital value added service investment. The early results of Esoko's research comparing control and treatment groups of Juhudi Kilimo clients, suggest that the impact of such digital value added services on customer stickiness is substantial.

This is not to say that digital tools do not improve customer cost to serve. By going cashless, some survey respondents claim to have slashed acquisition costs by up to 40% and the cost of disbursing funds and collecting payments by up to 80%. The DSPs interviewed as part of our research self-report cost-to-serve improvements of 20-50% on a per customer basis, though these claims have not been independently validated in most cases and are difficult to compare on an apples-to-apples basis due to the wide range of DSP B2B business models and varying profiles of FSPs being served (e.g., larger FSP clients with more complex non-digital business models could be expected to see greater returns from digitalization given their larger operating cost bases). The greatest reported cost savings, based on both FSP and DSP feedback, derive from reduced customer acquisition costs, primarily from time saved in registering customers and analyzing loan applications. Managing costs and risk through digital tools is particularly significant for higher-touch institutions operating with tight margins or serving higher-risk farmers — and therefore facing greater challenges to scale.

Digitalization also affects operational risk that links indirectly to FSP profitability. While not captured in our survey, alongside cost to serve and portfolio quality, a number of organizations interviewed for this report have reported operational risk management as another important motivation for digitalization. For example, Opportunity International sees operational risk management — e.g., ensuring the ability to disburse loans in time for planting seasons – as a major driver for its digitalization investments. Opportunity believes that this is an important, though hard to quantify, contributor to overall lending profitability due to the greater transparency of internal processes and functions in a digitalized lending value chain and, thus, the improved ability to identify fraud, inefficiency, and more internally-focused compliance risks.

SECTION 4: THE CLIENT VIEW – BENEFITS OF FSP DIGITALIZATION FOR SMALLHOLDER FARMERS

The benefits from digitalization listed above reflect a distinctly supply-side, FSP-focused view; the story from the smallholder (client) perspective is more nuanced. This research note has focused on the FSP as the primary unit of analysis for the value of digitalization, but naturally, along with FSP economics, digitalization affects the clients' experience.[13] Some of these impacts are direct as they affect the primary interface between the FSP and the farmer (e.g., digital acquisition and servicing channels), some of the impact on SHFs is less direct, such as the digitalization of internal FSP processes that may manifest itself in more efficient and more responsive client service but clients may not associate such efficiency gains with digitalization, and some digitalization impacts (e.g., use of alternative digital data for credit scoring) is almost by definition not visible to farmers even if it ultimately allows FSPs to service customers who were previously not bankable.

The impact of FSP business model digitalization on SHFs, while positive overall, is not completely understood. Our desk research and feedback from

13 The Learning Lab has looked into the topic of client impact of and client perspectives on SHF financial services before, see the Lab's Briefing Note 2: Understanding the impact of rural and agricultural finance on clients (2015), tough this report does not explicitly look at client perspectives on digital financial products and services: https://www.raflearning.org/sites/default/files/learning_lab_understanding_impact_of_raf_dec_2015_vf.pdf,

sector stakeholders in interviews and workshops suggests that the impact on farmers from digitalization is indeed positive, but not yet well documented. Most existing "client voice" research on the impact of digitalization on SHFs focuses either on farmer perspectives on non-financial digital value added services for smallholder farmers (e.g., mobile based agri data extension services)[14] or on the impacts of payment digitalization on farmers.[15] The latter, as shown in this briefing note, is just one aspect among many of SHF lending value chain digitalization. Research by CGAP has looked more broadly at consumer centered lessons for SHF digital financial services (DFS) design,[16] but much of the information on client perspectives on SHF digitalization currently sits with smallholder DFS practitioners in the trenches (e.g., CGAP DFS partners in Africa, GSMA mAgri partners, and MercyCorps via their AgriFin Accelerate program, in partnership with The MasterCard Foundation) and has yet to be fully documented.

In the case of farmer perspectives on the value of digital ("mAgri") support services (though not necessarily when they are combined with DFS), the evidence is on the whole, highly positive. Naturally, SHF feedback on mAgri services varies widely based on the quality of the specific service,[17] but for those mAgri information services that are widely seen in the sector as being effective (e.g., Esoko, Digital Green, FarmerLine), both customer feedback and client outcomes are highly positive as demonstrated in multiple sector evaluations and the recent AGRA ICT4Ag case studies that collected SHF client feedback.[18]

The one common refrain of complaint for some mAgri providers, particularly the less tailored MNO VAS agricultural information services, is that many mAgri information solutions offer overly generic and non-interactive content, whereas farmers often desire more personalized and responsive information. For example, in a CGAP study, an SHF client of EcoFarmer, an agricultural information service deployed by Econet in Zimbabwe, reported that while "[EcoFarmer information services are] helpful, I want to be able to text back. I want to be able to ask my questions and get the most up-to-date information…I want an extension officer in my pocket."[19] While this specific example is a more general one for mAgri services, it is likely that this is also an issue when mAgri's digital support services are provided by FSPs via third party partners to SHFs alongside their core financial product offering.

In the case of digital payments for farmers, the evidence of impact is likewise positive, largely due to the time and money savings from reduced travel and wait time for digital cash disbursements and/or loan repayments vis-à-vis non-digitalized alternatives.[20] For example, in Niger, researchers from Tufts University found that administering mobile transfers reduced overall travel and wait time to a quarter of that required to collect manual cash transfers, and the time savings from the digital transfer channel contributed to greater household diet diversity and children consuming more meals per day.[21] In Kenya, research suggests that farmers who used mobile money to save and perform transactions had a 35% higher profit per acre than their counterparts who didn't use mobile money as digital payments lowered transaction costs between value chain actors, gave farmers more money through remittances, and encouraged savings all leading to more money to procure inputs, realize better yields, and increase household income.[22] Likewise, Dalberg's assessment of digital financial services in Zambia for MercyCorps showed that farmers in Zambia consistently preferred digitally-delivered input subsidies, via e-vouchers, because they arrived quicker, went to the intended farmer (with less room for corruption), and gave farmer access to procure inputs from more agro-dealers. In Malawi, direct digital deposit of cash crop revenue into a savings account helped improve productivity. Farmers invested 13% more in farm inputs and saw a 21% increase in yield.[23]

14 See, for instance, AGRA (2016) Digital Harvest studies of 15 ICT4Ag business models in Africa, which includes client perspectives on these solutions.

15 See, e.g., WBDRG, BCTA, and BMGF, The Opportunities of Digitizing Payments How digitization of payments, transfers, and remittances contributes to the G20 goals of broad-based economic growth, financial inclusion, and women's economic empowerment (2014), available at http://siteresources.worldbank.org/EXTGLOBALFIN/Resources/8519638-1332259343991/G20_Report_Final_Digital_payments.pdf

16 See CGAP, Perspectives on designing DFS for SHF families (2015), available at https://www.cgap.org/sites/default/files/Perspectives-Designing-Digital-Financial-Services-for-Smallholder-Families-Oct-2015.pdf

17 Among the 150+ mAgri deployments globally tracked by GSMA, relatively few are sustainable or have independently validated evidence of impact.

18 Alongside the new AGRA research referenced above, see e.g., GSMA mAgri case studies and academic overviews of evidence on these solutions like, Nakasone E., Torero M., and Minton B., "The Power of Information: The ICT Revolution in Agricultural Development", Annual Review of Resource Economics 6:533-550 (2014).

19 See footnote 16.

20 See WBDR, BCTA & BMGF (2014) and recent overview of impact evidence by RAF Learning Lab (2015) Evidence on the Impact of Rural and Agricultural Finance in Sub-Saharan Africa: a Literature Review, available at: https://www.raflearning.org/post/literature-review-raf-impact-africa

21 J.R. Aker, A. Boumnijel, A. McClelland, and N. Tierney, How Do Electronic Transfers Compare? Evidence from a Mobile Money Cash Transfer Experiment in Niger (2013), available at http://sites.tufts.edu/jennyaker/files/2010/02/Zap_-26aug2014.pdf

22 E.M. Kikulwe, E Fischer, and M. Qaim, "Mobile Money, Smallholder Farmers, and Household Welfare in Kenya", Plos One (2014), available at http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0109804

23 See note 15.

While evidence is still scarce, there are strong positive indications for SHF client experience with DFS solutions beyond digital payments. There is little independent documentation on farmer perspectives on digital finance models for delivering credit and even less evidence on the shifts in SHF clients' experience when their particular FSP digitalizes it's lending value chain. Anecdotally, however, there is evidence that DFS credits solutions resonate with clients, beyond the obvious point that some purely DFS solutions like Musoni have achieved significant scale and success. For instance, from Dalberg's recently published work with the Gates Foundation on customizing digital credit products in Tanzania,[24] women farmer clients expressed strong interest in and support for DFS solutions as they saw them as a path to more financial freedom: their phones were their personal possession and they had more control over their mobile wallet, including digital savings, credit and transaction capabilities than they would with a traditional FSP account.

At the same time, it is clear that digital financial product delivery can have several downsides from the perspective of a smallholder farmer. DFS are plagued with a higher level of mistrust than conventional financial services and this is particularly true in the SHF financing context. This is due to, among other reasons, the perceived impermanence of DFS infrastructure (contrast mobile money agent kiosks to more permanent bank branches), low digital literacy of farmers and the perceived difficulty of using digital technologies, poor mobile connectivity, and bad precedents set by failed DFS providers. Mobile service affordability or perceived affordability may be an issue; recent AGRA research, for instance, shows that farmers mistrust or resist innovation and technology if they feel that automated payments and push messaging are using their airtime.[25] More broadly, replacing humans with digital tools can become an obstacle for SHF to use financial services delivered digitally if they prefer human touch points. In places like Zambia, Pakistan, India, and Cambodia, for example, CGAP research shows that farmers are often more comfortable with over-the-counter transactions than conducting digital transactions on their own phones.[26] Of course, these issues are not insurmountable, and DFS solutions and products that address these issues are better received, particularly, in the words of the CGAP research, if they "(i) address mistrust of formal financial services, (ii) more effectively communicate product features and benefits, and (iii) minimize the perceived risk of trying a new service."[27]

SECTION 5: WHAT IS CONSTRAINING DIGITALIZATION OF SMALLHOLDER FINANCING MODELS?

Despite the potential benefits, the question remains — what binding constrains do FSPs face to increasing digitalization and capturing its value? Our survey and workshop findings suggested several major challenges to the ability of FSPs to incorporate digital technology into their SHF financing business models: high upfront costs, lack of internal capabilities, limited knowledge about DSPs (and their relative quality), often perverse internal incentives and organizational change management barriers, lack of proof of value, regulatory barriers (e.g., KYC), and lagging mobile ecosystems, particularly in rural areas. Some of these challenges are more generally a feature of all developing world financial service providers that stand on the path to digitalization, but many are unique to the SHF finance context with its more rural and harder to access consumers, thin margin economics, unique lending process and data requirements, and broader array of potential value added services (e.g., agri information extension) that can be delivered alongside financial services and products.

The most notable barrier is cost — high upfront costs of digitalization act as an important barrier for the majority of FSPs serving SHFs. Nearly three quarters of respondents felt the initial investment was too high. The initial shift to digitalization eventually lowers operational costs, but it also immediately raises the CAPEX significantly (through acquisition of digital equipment, training etc.). Digitalization becomes an expensive undertaking overall, particularly for lower-volume players and those that do not already have digital processes in place. Not surprisingly, the cost barrier represents a significant challenge for DSPs trying to partner with FSPs. Several of the interviewed DSPs have highlighted cost to be a critical problem to scaling their businesses given the resource constraints faced by their FSP clients.

24 See Initiatve for Smallholder finance (ISF), Financial inclusion fit to size: Customizing digital credit for smallholder farmers in Tanzania (2016). Available at https://www.raflearning.org/post/financial-inclusion-fit-size-customizing-digital-credit-for-smallholder-farmers-tanzania

25 See note 14.

26 See note 15.

27 Ibid.

Lack of internal capabilities to implement, integrate, and manage digital tools is another significant barrier for less tech-savvy organizations. When it comes to traditional MFIs and smaller scale organizations the binding constraints revolve around skills and talent. Senior and middle management lack familiarity with what digitalization entails, what the best way to digitalize is, and how to prioritize investment. Most FSPs engaged in smallholder finance also lack experienced technical staff that can interface effectively with DSPs. As an executive at FarmDrive, a data analytics platform, explained for example: "most of the MFIs with whom we interface are open to using technology and digital data because they want to reduce costs, but they lack the capabilities to make the digital transition." Beyond technical expertise, companies often lack an understanding of the DSP vendor landsape and have no easy way to assess relative DSP quality when they consider digitalization.

For Lenddo, another digital analytics platform, digital underwriting cannot happen until "the whole digital lending stack is in place". Smaller scale organization require integrated offerings and services capable of working hand-in-hand with them to first digitalize their core banking systems and then digitalize other functions along the lending value chain. This presents an opportunity for donors and market platforms to broker more comprehensive partnerships between FSPs and B2B digital service providers.

Sometimes grouped with capacity challenges, there is also the distinct issue of staff resistance to digitalization. Digitalization brings in efficiency and transparency, exposing FSP staff to additional operational scrutiny and, in some cases, restraining poor compliance, unsanctioned activity, or even fraud. As a result, some staff have strong incentives to resist any effort to digitalize while others are afraid of change due to perceived threats to their jobs. The recent AGRA survey of ICT4Ag models, has noted for instance that: "extension workers and traders, who are the potential promoters of the solutions, might fear for their job or income when trading is automated, prices become transparent, or extension messages are digitized; the need for change management at that level is often not recognized."[28] This change management challenge was likewise highlighted by many FSPs and DSPs as a major barrier during the September 2016 Learning Lab workshop on the digitalization business case.

Some players, particularly commercial banks, tend to require more proof to be convinced of the value of digital tools. Commercial banks tend to be more risk-averse when it comes to exploring new digital tools and often require proof of the impact of digital uses on their bottom line before making the investment. However, the business case for digitalizing smallholder finance processes and products is still under-developed and difficult to prove given the early stage of most DFS players and product offerings. "[Banks] want to see a tested model," affirms FarmDrive. "At the end of the day, banks want to know the ROI for digitalization investments" says the CEO of Esoko, a communications platform, "but the challenge is that building that ROI case takes investment and time, possibly years, for any DSP exploring new business models."

In addition, a significant number of actors are constrained by a less-developed rural mobile ecosystem, including limited access to reliable mobile connectivity and insufficient coverage of mobile money agent networks (often tied with low user digital literacy.) Many digital solutions cannot thrive in such environments. For example, Opportunity International, which has been able to roll out fully cashless operations in Tanzania, continues to operate in cash in Ghana due to the limited uptake of mobile money and digital transactions in that nation.

Underdeveloped regulatory environments also play a major role in delaying the digitalization process while also making it costlier. Low interoperability between mobile money operators makes it more difficult and costly for end users to transact digitally. Moreover, policy makers and regulators do not understand digitalization or its benefits and are unable to set up favorable policies that support digitalization. For instance, they may impose know your customer (KYC) requirements and other bureaucratic hurdles that are anchored in the traditional pre-DFS financial services context (e.g., require the generation and retention of large amounts of paper records).

Low digital literacy on the part of end clients constrains FSP digitalization, particularly of customer acquisition channels, support services, and cash flows. "Customers are much more comfortable giving cash to agents than using mobile money," an executive at nFortics relates. Changing this will require a lot of "customer training that is expensive and takes a lot of time." Similarly, digitalization of support services is particularly limited with less tech-savvy

28 See note 14.

customers. “Digitalizing everything is unrealistic given our target customer,” according to the Esoko team, “we assume that for some segments there has to be a human component somewhere.”

Lack of clarity on intellectual property and data privacy rights limits innovation and speed of digitalization. When it comes to accessing and integrating new data sources, for example, using alternative data to refine credit underwriting or improve loan monitoring, FSPs claim to face particularly unique challenges. Digital tools are developing at a faster rate than the regulatory environment for data. In the majority of countries, regulation on data ownership, access and use is limited or non-existent.

As a result, FSPs are frequently skeptical of sharing their customer data with DSPs (and therefore of closing the much needed partnerships to digitalize their value chain) claiming the risk in offering unlimited and free access to their customer base is too high. In addition, FSPs frequently raise concerns over customer privacy and the underdeveloped regulation on data protection. Many institutions take a relatively cautious approach to data privacy and, as a result, fail to capture the full value of their data sets. Beyond regulation, service providers tend to err on the side of caution with respect to their data, claiming their data is too valuable to share, but without actually being able to price it given the early stage of development of SHF credit scoring models enriched with alternative digital data.

SECTION 6: WHERE DO WE GO FROM HERE – HOW TO MOVE DIGITALIZATION FORWARD?

The evidence on the positive impact of digitalization for FSP financial performance is promising, albeit new and still developing. While the expected increase in penetration of smartphones in rural areas will naturally facilitate digitalization of business processes and client facing activities, practitioners and market actors have the opportunity to further accelerate digitalization and capture digital value today. The findings from this research outline specific areas of opportunity to accelerate digital integration and ultimately unlock access to SHF credit.

FINANCIAL SERVICE PROVIDERS

Partner with non-traditional actors to incorporate additional sources of alternative data in credit underwriting. Given the limited ability, and to some extent availability, of mobile data to evaluate farmer creditworthiness, FSPs serving smallholders need to more aggressively explore what types of data are more valuable for assessing farmer risk and how different sources of alternative data (e.g. POS data, market linkages data, soil health data, weather data from providers like aWhere, or satellite imaging data from players like Planet Labs) can be integrated into underwriting processes to assess farmer risk. Partnerships with either owners (e.g. technical assistance providers) or collectors of non-traditional data sources (e.g. third party independent data analytics vendors) will be fundamental in helping FSPs access new data that can expand their addressable market while improving portfolio quality and mitigating risks.[29]

Design customer centric products that can reduce human interaction effectively. In addition, FSPs will need to identify in what contexts and for what specific functions technology can be further deployed to reduce human interaction, particularly for digitalization of support services (e.g. e-literacy through IVR with call center support). Customer-centric product design that incorporates the farmer perspective and that addresses farmer needs will be fundamental to ensure positive impact on both the financial performance of the FSPs and the well-being of the farmer. The development of customer-centric design, mAgri and DFS toolkits by players like CGAP and GSMA, and the growing cadre of HCD specialists with the focus on the agricultural DFS market means that the cost of integrating consumer perspectives is often lower than FSPs believe. In many instances it just requires more concerted management attention and in-house training rather than major outlays.

DIGITAL SERVICE PROVIDERS

Find innovative ways of sharing risk with FSPs. DSPs should experiment with new models to help mitigate the high up-front investment and perceived high risk that prevent FSPs from digitalizing. This could be through a different cost/payment structure (e.g., performance based instead of up-front) or innovative

29 Note that the challenge of data valuation mentioned earlier is pertinent here. In separate studies, the Learning Lab is currently exploring the dynamics of business partnerships between some owners of farmer data/relationships and banks; and AGRA’s Financial Inclusion team is looking at the value to financial institutions of data from agriculture management information systems for the purpose of lending.

ways of engaging with FSPs (e.g., seconding DSP staff to build internal capacity at FSPs).

Invest in making the case for digital services to FSPs. While the nascent nature of SHF finance digitalization constrains the ability of DSPs to quantify the value of their services, they should find creative ways to demonstrate how and when their products are effective. Case studies, for example, could help build the evidence base and make the case until DSPs can show more statistically significant results. Furthermore, even at early stages of the digitalization market, as demonstrated by the example of Esoko and Juhudi Kilimo mentioned earlier in this report, DSPs can start to invest in mini-RCTs and other low-cost, but statistically robust exercises to clarify the value of their services rather than relying on more anecdotal claims on the ROI of digitalization investments.

Create customized yet flexible products. Given the diversity of FSPs and the rapidly changing market, DSPs should design products that are customized to the needs and preference of individual players, but still adaptable to different players and market conditions over time. An overly bespoke approach will prevent the digitalization vendor market from scaling where the smallholder financing opportunity is concerned.

Partner with other DSPs to provide integrated digital offerings across the value chain. Smaller, less tech-savvy organizations in particular need DSPs who can work closely with them to digitalize their core banking systems before building in other digital tools. Since FSPs generally prefer to work with the same partner ("integrators") to digitalize across functions, DSPs may need to partner to offer end-to-end solutions: facilitating the digitalization process via turn-key solutions rather than one-step-at-a-time models.

DONORS, INVESTORS, AND OTHER SECTOR BUILDERS

Support the "digitizers." Given the increasing importance of intermediaries — both B2B digital integrators and B2B digital service providers — donors should explore increasing their exposure to these "digitizers" to increase the catalytic potential of their capital. This could be done by investing directly in the firms that are digitalizing FSPs or, alternatively, by brokering and supporting partnerships between the DSPs and FSPs serving smallholders. A way to promote these partnerships could be by supporting innovative mechanisms that mitigate the upfront costs and risks of digitalizing by advancing success fee revenue to DSPs. Other more basic support could entail targeted convenings to introduce FSPs engaged in smallholder finance to DSPs, as the current links between these communities are tenuous.

Support benchmarking and assessment of the digitalization vendor landscape. FSPs lack knowledge of what the most effective digital tools are, how to integrate them into their current business processes, which vendors to use, and many other questions related to digitalization. DSPs, for their part, would like to benchmark pricing and develop pricing models that suit FSP business models and ability to pay. Donors are in a unique position to drive studies and knowledge products (e.g., DSP catalogue) that can bring the much-needed information to these service providers.

Build the business case for digitalization. The business case for digitalization today is still under-developed and, mostly, anecdotal. This lack of a strong business case slows business adoption of digital tools. Sector builders can support efforts to develop a more quantitative and robust business case, with better guidance for where and how digitalization investments create benefits and more clarity on what impact FSPs should expect and within what time frame. This could be achieved by, among other initiatives, (i) creating comprehensive ROI profiles that, for example, benchmark CAPEX requirements for digitalization, (ii) developing "do it yourself" models / toolkits for FSPs to measure the impact of their digital investments, (iii) defining KPIs for digitalization to help standardize assessments of cost and digitalization impact on profitability, and (iv) developing business case studies of both successes and failures in digitalization. Building a business case should include assessing the impact of digitalization on financial performance across different stages of the value chain as well as impact on the end user.

Consider investing in the digitalization of low tech models, particularly those reaching a much larger segment of farmers than formal FSPs (e.g. VSLAs, SACCOs, smaller scale agribusinesses). Except for a few players, the vast majority of community-based financial institutions and local agribusiness continue to operate manually and with paper-based processes. Together these players are estimated to

serve over half of the credit disbursed to SHFs today,[30] focusing particularly on the most vulnerable segments who are unable to access financing from formal financial service providers. Given their size and potential for impact, sector builders should understand how such players can take advantage of digitalization (e.g., digital platforms custom-designed for SACCOs), what is required to digitalize such models, and which functions should be prioritized for digitalization to generate the most value. Access to Finance Rwanda, which works extensively with SACCOs and has a mandate to support digital financial services across the country, may be well-positioned for this type of intervention. An alternative to direct investment could be strengthening linkages and supporting partnerships between formal and informal or community-based institutions. Mercy Corps, for example, is already supporting a leading commercial bank in Kenya in extending its digital platform to Kenyan SACCOs.

Build the sector's institutional capacity for digitalization and nurture digital talent. Increasing FSP capabilities to integrate and manage digital tools will be key to accelerating digitalization, particularly for more traditional and smaller scale organizations. These institutions frequently lack the skills and knowledge to understand what are the most effective digital tools and how those can be integrated into their current business processes. Donors have an opportunity to either support FSPs directly by for example, training the next generation of Chief Data and Technology Officers, or to support supply side technical assistance providers and DSPs that can partner with FSPs. Moreover, regulators and policy makers need to understand digitalization and have the capacity to draft policies that support digitalization. Once again, donors have an opportunity to invest in building public sector capacity on this issue.

Support SHF value chain digitalization, particularly for application of digital support services and digital repayments in lagging rural ecosystems. Evidence suggests the value of digitalization is highly correlated with the digital access and literacy of the end customer, but the high cost of training to increase digital literacy severely constrains the efforts of many FSPs to scale. Donors can help FSPs bypass these constraints by supporting demand side technical assistance (delivered directly by FSPs or by specialized technical assistance providers); by investing in the scale of players that are trying to bypass lagging ecosystems and can facilitate credit extension to SHFs; or by supporting larger institutional value chain digitalization initiatives (e.g., government e-registration initiatives of the type being pursued by players like Cellulant and Vodacom Mezannine across Africa.)

SECTION 7: OPPORTUNITIES FOR FURTHER RESEARCH ON THE BUSINESS CASE FOR DIGITALIZATION

This report is just the start of a longer learning journey to understand how digitalization impacts the performance of FSPs serving smallholders. Naturally, there are many open research questions not addressed by this note, that are wirth the attention of researchers going forward. For instance:

- **How do loan recovery rates compare between digitalized and non-digitalized financial services for smallholders,** as there is little evidence today on precisely how digitalization affects loan portfolio performance and credit risk?
- **What digital investments have the highest impact on financial performance and for which players?** There is a need to more carefully understand the digitalization journey and to help FSPs prioritize digitalization investments.
- **How and to what extent does digitalization benefit the end customer?** While this note provided an overview of the (sparse) evidence to data based on stakeholder interviews and desk research, there is a need to incorporate the farmer's voice much more prominently into the FSP digitalization conversation, understanding the extent to which their user experience is improved and what does that mean for increased usage of financial services and, ultimately, the farmer's wellbeing.
- **What challenges and opportunities exist for DSPs to accelerate the digitalization of financial service delivery to farmer?** While partially addressed in this briefing note, current research tends to focus on the perspective of FSPs. The DSP perspective is needed to better understand the needs and the dynamics of the digitalization vendor marketplace.
- **What is the value of alternative digital data for FSPs serving SHFs?** As noted in this report, the current uses of alternative data in this sector are

30 Inflection Point.

very narrow and there is little evidence on the value of individual "precision agriculture" data sources beyond airtime (e.g., farmer or extension agent generated data, market pricing and value chain logistics data, soil sensor data, satellite imaging, UAV, weather).[31]

- **How can we enable greater data sharing among FSPs and DSPs?** The case for data sharing has yet to be elaborated. More research around pricing of data, data sharing and monetization models, data privacy considerations, and other enabling regulation (e.g., data IP rights) is needed to unlock the digital data opportunity for smallholder finance.

31 As mentioned, the Lab's separate study of business partnerships and AGRA's upcoming study of MIS data will touch on these themes.

APPENDIX – FSP SURVEY METHODOLOGY

Research for this brief included a survey with 23 financial service providers — as a sample of the broader ecosystem — to build on the insights from desk research and interviews with sector experts and digital service providers. The selection of the survey participants was restricted to:

- FSPs that were either a partner of The MasterCard Foundation or a partner of one of the Foundation's partners (i.e. "sub-partner").
- FSPs that have started their digitalization journey. That is, Financial service providers that are using digital tools at some point in the lending value chain.
- FSPs providing credit, including both standalone credit solutions and credit bundled solutions.
- FSPs operating in East and West Africa.

The intention of the sample was to focus on the experience of those financial institutions who have already begun the digitalization process for their lending value chains as part of their work in serving smallholder farmers. The survey sample represents roughly 80% of such institutions in the Foundation's portfolio. Based on consultations with sector experts and in discussions in convenings related to this research, the research team believes that this sample accurately reflects the experience of the vanguard of FSPs that have engaged in the digitalization process.

It is important to note however, that the sample was drawn from a much larger (N=150+) universe of financial institutions that are the partners or sub-partners of The MasterCard Foundation, but the majority of such organizations have not yet commenced their "digital journeys." Anecdotal evidence from interviews suggests that the primary constraints to digitalization for most of these excluded institutions have been lack of internal capacity and, even more important, lack of financial resources to launch on digitalization given the small scale and often non-commercial nature of many such organizations.

Furthermore, the sample did not include informal financial institutions (e.g., SACCOs, VSLAs) that are not currently represented in the Foundation portfolio, but constitute a large share of SHF financing at this date. The digitalization experience of the informal SHF financing sector is a topic for separate future research.

The emerging research findings have been shared with a number of sector experts and donors and have been further validated and enriched via an in-depth workshop convened with Dalberg's support by the Learning Lab and The MasterCard Foundation for over thirty sector stakeholders in September 2016 in Nairobi. Materials from this workshop are available on the Learning Lab's website.[32]

ABOUT THE RURAL AND AGRICULTURAL FINANCE LEARNING LAB

The Rural and Agricultural Finance Learning Lab — an intiative of The MasterCard Foundation jointly implemented by Dalberg Global Developent Advisors and the Global Development Incubator — is committed to actionable and collaborative learning that leads to better financial solutions provided to more smallholder farmers and other rural clients.

We invite the engagement of our readers, including feedback on this report, contributions of additional data, or input on future areas of study. At our website, **www.raflearning.org**, users can contact the Lab directly or comment on this or any other publication. **We are on Twitter @raflearning, or the Rural and Agricultural Finance professional group on LinkedIn.**

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32 See full compilation of workshop materials at the Learning Lab site available here https://www.raflearning.org/post/how-does-digital-technology-make-lending-farmers-more-viable-early-findings