Digital Field Applications:
Case Study

Channels & Technology, Accion

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Acknowledgments

The team would like to thank the management of Ujjivan Financial Services, Musoni Kenya, and Opportunity Bank Serbia for their partnership and contributions to this case study and business model. Additional thanks to the solution providers, Artoo and Musoni Services, for their technical contributions.

About Channels & Technology

Accion is a global nonprofit dedicated to building a financially inclusive world with economic opportunity for all, by giving people the financial tools they need to improve their lives. Accion's Channels & Technology team is an experienced group of professionals who have worked with a variety of financial institutions and FinTech companies to plan, test and implement innovative technologies and methods to reduce the bottlenecks for achieving financial inclusion growth and scale.

About Software Group

Software Group is a technology company focused on providing products and services to the financial inclusion sector. With global operations, Software Group has a wealth of experience in deploying complex technology solutions for its clients. In addition to designing and deploying solutions, Software Group provides consulting services, with a particular focus on assignments that, as with this case study, help share lessons learned from the sector.

1 Executive Summary

Photo courtesy of Musoni:
Musoni loan officer meets with client in the field

Bringing financial services in the field to the client has historically been a costly manual process, which has limited the ability for scaling up and created vulnerability to sub-optimal service, errors and fraud.

Despite these challenges, microfinance institutions have provided access to finance to many people who were previously excluded, offering a range of quality, affordable services. Nevertheless, there is much room for improvement.

Additionally, with new players such as Telco operators and FinTech companies disrupting distribution mechanisms and financial product offerings, microfinance banks (MFBs)[1] need to remain competitive by exploring innovative ways to deliver their services. To remain competitive and respond to the challenge of balancing outreach with costs when providing financial services to the underserved, we have seen a rise in recent years in the use of tablets, smartphones, and other devices that digitize microfinance field operations for the sake of realizing much needed efficiencies. For example, loan officers equipped with these devices can process loan applications and answer client inquiries in the field, eliminating paper forms, digitizing data, and saving time and money for organizations and their clients.

The use of these tools in the microfinance sector, which we call Digital Field Applications (DFAs), is still at a relatively nascent stage, limited to early adopters or new market players, most of whom incorporate the technology into their initial process and market offering. The slow adoption of DFAs has in part been attributed to the providers' lack of understanding of the impact DFAs have on the business models of MFBs, for clients, and most importantly for the staff using DFAs in the field. The business case remains unclear and implementation, daunting. Additionally, for those already using DFAs, a lack of understanding of best practices has in some cases led to low impact and poor adoption.

The objective of this study is to address these issues by providing clarity on the impact of DFAs by examining the business case, implementation process and effects for three MFBs around the world. Additionally, we provide lessons learned from the DFAs reviewed which could serve as guiding principles for other financial institutions.

1 This paper discusses the use of DFAs that could be deployed by a host of different financial service providers, from microfinance institutions to commercial banks. While we use terminology associated with MFBs, this does not preclude other types of financial service providers who have some component of field operations that is suitable for digitization.

Another major goal of this study was to develop and analyze the business case associated with deploying a DFA. To achieve this, we reviewed implementation costs and assessed the benefits that accrued to each institution. We then created a business case which is explained in detail, and is also available as a standalone tool.

Reviewing the DFA technology solutions currently on the market was beyond the scope of this study. Instead this study evaluates the DFA implementation experiences of three representative MFBs and seeks to draw comparisons across those institutions. The institutions we partnered with for the study were Ujjivan Financial Services in Bangalore, India; Musoni Kenya in Nairobi, Kenya; and Opportunity Bank Serbia (OBS) in Novi Sad, Serbia. The findings from this review are presented both in this case study and in the accompanying Excel-based business case toolkit , which is available for MFBs to examine the prospects of DFAs for their specific business context.

Findings

The study of these three early DFA adopters revealed that although the primary motivation for implementing DFAs was to improve efficiencies and processes surrounding loan processing, the institutions also experienced a variety of benefits that went beyond their core objective. While all three MFBs recognized that DFAs can be used to support activities such as savings mobilization, social impact measurement, and insurance coverage, their initial usage focused on credit offerings. Therefore, this study reveals findings associated with the impact of DFAs on loan application processing. The study breaks down this impact across the dimensions of client and institutional benefits, and uses these as a foundation to outline the business case. Highlights of the benefits found include:

Client Benefits

- ► Lower barriers to access resulting from the digitization of processes, which also leads to personal cost savings associated with reduced Know Your Customer (KYC) documentation
- ► Faster loan disbursement

Institutional Benefits

- ► Increased revenue as a result of enhanced loan officer, field-staff, and back-office efficiencies
- ► Cost savings from the elimination of physical files and processes
- ► Adjacent benefits such as reduction in fraud and improved client service

All three institutions in this case study deemed their DFA deployments successful. Their primary objectives were met, along with several other adjacent benefits. Some important highlights included a decrease in the loan turnaround time (TAT) at Musoni Kenya from 72 to 6 hours and an increase in average loan officer caseload at Ujjivan of 134 percent.

Lessons Learned

On the basis of this review, best practices were identified, in terms of DFA implementation in general as well as lessons specific to the technology associated with DFA solutions. Highlights of these lessons included:

- ► Business process review is imperative to ensure a properly functioning DFA that can also deliver its full potential – this review is often skipped or underestimated in terms of time and effort.
- ► With the implementation of DFAs comes a shift in responsibility to field staff, requiring careful change management to ensure buy-in of the solution among all users.
- ► A plan for continuous review and improvement of DFA usage during the pilot and after full deployment will help maximize benefits for the MFB over time. This allows the MFB to learn as it goes, enhancing its system and meeting operational needs along the way.
- ► MFBs embarking on DFAs need to focus on the technology supporting front-end mobile applications (i.e., usability) as well as the back-end portals and Core Banking System (CBS) integration (i.e., data transfer, reporting). While the mobile app is an important element of a DFA solution, the back-end components tend to be more complex and the time and effort to properly configure these components should not be underestimated.

- The availability of technology partners who are intimately familiar with the MFB's processes has proven to be a critical aspect of the solution's design and was linked to the resultant success of the DFAs at each institution. Many of the DFA providers were already providing the CBS. Some providers were third-parties, offering either a bespoke app or "off the shelf" product. Irrespective of the nature of the provider, as long as an understanding of the processes existed, the DFA was successful.

Organizations that incorporate the insights from these lessons into the design and implementation of their own DFAs will increase the likelihood of a successful solution.

Combining the findings of the DFAs under review along with our experience, market research, and best-practice approaches to the development of a business case, this study identifies the key components required to analyze a DFA investment. This process is detailed in full in the accompanying Excel tool, but is also summarized in this case study, with a demonstration of how an analysis could be applied to a sample MFB.

Conclusions arising from the application of this tool show that while each MFB needs to work through its specific business case, an MFB could reasonably expect to achieve breakeven in between 12 to 24 months. The individual MFB case studies provide detailed information and results for each MFB, but we can state with confidence that when we applied the model to two of the MFBs, using actual results from their institutions, DFA implementation resulted in a positive return on investment (ROI) in just 12 months. If amortization was factored in, all three MFBs would have had a positive year-one ROI. The contributing factors to this ROI differed in each case, with some driven by large increases in productivity and others by cost savings associated with reallocation of data entry staff. The upfront investment combined with the size and scale of DFA usage are also critical influencing factors, and suggest that there are multiple ways in which an MFB can ensure a positive ROI when deploying a DFA.

All three institutions in this case study deemed their DFA deployments successful. Important highlights included a decrease in the loan turnaround time at Musoni Kenya from 72 to 6 hours and an increase in average loan officer caseload at Ujjivan of 134 percent.

"We are pleased with the DFA's proven ability to enhance our commitment to 100 percent mobile financial services, offering increased efficiency and transparency in line with our mission. The DFA supports our high standard for industry innovation." – James Onyutta, CEO, Musoni

2 Introduction

DFAs are now proven to be a key tool in optimizing efficiency when serving low-income clients.

Microfinance banks, by the nature of their services, typically cater to low-income clients with small-value loans, which historically involved high-touch, costly processing.

For MFBs to serve low-income clients in a sustainable manner, they must constantly strive to optimize the efficiency by which they can reach out to their clients, investing significant time and effort into streamlining field operations and the tasks involved in the capture and management of information. DFAs can be a key tool in that process.

For the majority of MFBs, capturing client information involves completing paper forms in the field and then entering their data into a CBS. This manual data-entry process is typically carried out at the branch location or in some cases by a centralized data entry team at the MFB head office.

The replacement of paper forms and office-based data entry with digital data-capture using phones or tablets directly in the field, namely using DFAs, represents a huge potential for MFBs to improve their data-capture, optimize processes associated with data analysis, reduce their cost of operations, and improve the efficiency of their field staff.

Figure 1 shows how the most common DFAs in the market today are designed to work. The full DFA solution comprises a mobile application, web portal and back-end database. The mobile application, most commonly built on Google Android, runs on tablets or mobile phones. Loan officers or other field staff use these applications to capture data, usually for client registration and loan application processing.

The web portal is managed by the MFB's office-based staff and enables them to review and process the data originating from the mobile application. Furthermore, the web portal enables robust planning, monitoring and reporting functions. The web portal and mobile application connect digitally to a back-end database. Ideally, the DFA back-end also communicates with the MFB's CBS through a digital integration layer.

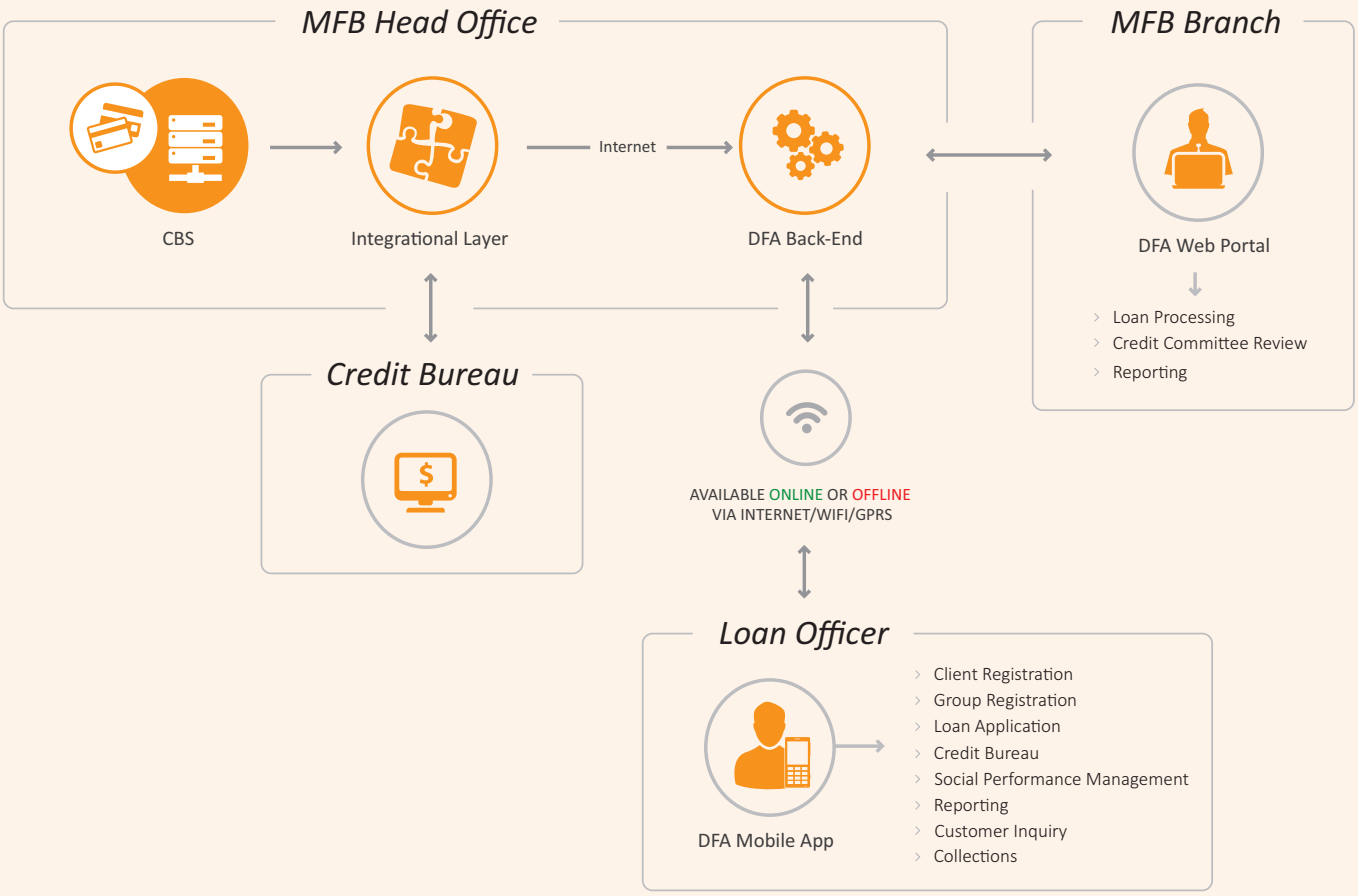
If a DFA is not integrated into the CBS, complications may arise, such as mismatches in customer data between the DFA and CBS, and security risks associated with storing data in two systems. Thus, without integration the full potential of DFAs may be compromised by lost efficiency.

The DFA should also be able to operate in offline mode, so that data can be captured in areas with no data signal, allowing staff activities and client services to continue without interruption. "Offline mode" means that the DFA must be able to store both CBS data and data captured in the field locally, a function that enables staff to use the DFA when there is no connectivity, and to synchronize data with the CBS once they are online. This

typically entails the storing of a database on the device that contains a subset of data from the CBS. For example, for DFAs focused on loans, the locally stored subset of data usually corresponds to the clients assigned to the loan officer who has logged into the DFA.

FIGURE 1

DFA Overview



Overview of the MFBs Studied

Through a due diligence process, Accion's Channels & Technology team identified three MFBs that met structured selection criteria for this case study: Ujjivan Financial Services in Bangalore, India; Musoni Kenya in Nairobi, Kenya and Opportunity Bank Serbia (OBS) in Novi Sad, Serbia. Table 1 provides an overview of these MFBs and their DFA solutions.

While these MFBs differ in size, regulatory status and target clientele, they all have DFAs focused primarily on the loan application process, which make them suitable for comparison. Moreover, their differences, outlined in Table 1, allow for a more robust understanding of the impact DFAs could have across a wider range of financial institutions. To learn more about the DFA use and observed impact at each of the MFBs, you can access the individual case studies for each of the banks here.

TABLE 1

MFB Overview & Processes Covered by DFA

Ujjivan Build a Better Life

Geographic region: South Asia

Head office: Bangalore, India

Regulatory status: Credit-only microfinance

Total clients: 2.2 million

Loan portfolio: U.S. $500 million

Target clients: Individual lending

DFA launch: May 2014

OPPORTUNITY International

Geographic region: Eastern Europe

Head office: Novi Sad, Serbia

Regulatory status: Bank

Total clients: 30,000

Loan portfolio: U.S. $68 million

Target clients: Individual lending

DFA launch: August 2014

musoni

Geographic region: East Africa

Head office: Nairobi, Kenya

Regulatory status: Credit-only microfinance

Total clients: 15,000

Loan portfolio: U.S. $23 million

Target clients: Group lending

DFA launch: October 2012

MFB Processes	Ujjivan	Opportunity Bank Serbia	Musoni Kenya
Client registration	√	√	√
Group registration			√
Loan application	√	√	√
Business analysis	√	√	
Credit bureau integration	√	√	
Social performance	√	√	√
Reporting	√		√
Loan workflow	√		√

3

DFA Objectives and Impact

Each MFB defined DFA objectives specific to its business goals. All focused on either improving loan processing turnaround time, or providing a credit decision in the field.

While all three MFBs recognized that DFAs can be used to support activities such as savings mobilization, social impact measurement and insurance coverage, their initial usage focused on credit offerings. Therefore, this study reveals findings associated with the impact of DFAs on loan application processing.

All three MFBs confirmed that their DFA deployment was successful, which was ultimately evidenced by their decision to move from pilot stage to full rollout and by the impact as reflected by key performance indicators (KPIs), noted below. Both Ujjivan and Musoni saw drastic changes in their TAT and loan officer productivity, largely attributed to DFA usage. Following the introduction of the DFA, Ujjivan reduced its TAT from 21 to 10 days for 68 percent of its loans; 38 percent of clients received their loans within 7 days. Musoni reduced its TAT by 91 percent in some scenarios. Customers greatly appreciated these impressive changes. One Musoni customer claimed she had no need to look elsewhere for financing thanks to the level of service she now received.

Furthermore, since faster TAT enabled loan officers to serve additional clients, both Ujjivan and Musoni noted an increase in the productivity of their loan officers. In Ujjivan's case, productivity increased by 134 percent over the pilot period, while Musoni saw a 68 percent increase in the average number of clients per loan officer. Increased loan officer productivity can be attributed to the following:

- ► Decreased dependency on branch visits, since client information and reports are now digitally accessible and data entry is performed in the field
- ► Elimination of repeat client visits to follow-up on missing information for loan applications
- ► Instant availability of client data, which saves loan officers time in assessing applications and enables them to address client inquiries while in the field
- ► Streamlined document processing, as digitized client information eliminates paper and simplifies document management (i.e., transporting, sharing and filing of documents)

Additionally, branch and head office staff enjoyed time-saving benefits because:

- ► Applications can be submitted immediately after data-capture in the field, allowing the approval process to begin faster
- ► Applications can also be reviewed more efficiently since all required information is stored digitally in the same system
- ► Tasks such as comparisons and validations can be automated, saving time

TABLE 2

Objectives & Impact of DFAs

Key Performance Indicators	Ujjivan	Opportunity Bank Serbia	Musoni Kenya
Objectives	Reduce TAT for new loans and improve loan officer productivity	Improve customer service and reduce costs through the use of automated credit decision-making for agriculture loans within predefined limits	Reduce TAT, increase loan officer caseload and digitize 100% of client data as input for a credit scoring database
Primary impact	– TAT reduced from 21 days to 10 days for 68% of loans; 38% of clients received loans within 7 days[2] – Loan officer productivity increased by 134%[3]	– Credit scorecard developed and accessible to loan officers via DFA – Credit decision delivered in the field for 80% of agricultural loans disbursed in pilot period	– TAT reduced from 72 to 6 hours in best case and 48 hours in worst case – Average of 68% increase in caseload per loan officer – All client data now available for digital scoring

for the credit committee
► Unqualified clients can be identified earlier in the process thanks to credit bureau look-up in the field, saving more time for the credit committee
► It is no longer necessary to scan and file client documents since KYC info is digitized

Importantly, each organization defined objectives specific to its goals in deploying a DFA, which means there is no single definition of success. For example, OBS met its primary objective, noting that 80 percent of loan applications that qualified to be processed via the DFA (i.e., fit within the loan amount thresholds) were successfully processed with credit decisions delivered in the field. The remaining 20 percent were either outside of the loan amount threshold, or perhaps involved clients who resided in areas without connectivity, making DFA usage more difficult.

Although OBS hadn't set out to reduce TAT, the MFB could still report an increase of 28 percent in the number of loans disbursed per month (on average per loan officer) when compared with the previous year's numbers. As with Ujjivan and Musoni, this productivity change could be attributed to other factors, such as OBSs' participation in a government funding scheme, but the DFA represented a partial driver of this change.

While the MFBs clearly achieved their primary objectives, as evidenced by these results, they also saw additional benefits, summarized in Table 3. These range from direct client benefits to institutional benefits which helped the MFB reduce operational costs and improve efficiency and enforcement of controls. What also emerged from these observations was the importance that this technology played for the customers, how it ensured that they received their loans faster, with reductions both in time and direct expenses associated with photos, document copies and transport.

Since the DFA was introduced, Ujjivan reduced its turnaround time from 21 to 10 days for 68 percent of its loans; 38 percent of clients received their loans within 7 days.

2 Note that to comply with regulations, all loan applications needed to be sent to the head office prior to disbursement and that task added to the total TAT.

3 Productivity was measured according to the number of loan applications processed per month per loan officer, (i.e., case load).

TABLE 3

Benefits of DFA Implementation

Client Benefits	Institutional Benefits		
	Cost Savings	Efficiency Enhancement	Adjacent Benefits
Client photographs and ID copies not required with digitized KYC	Reduction in data entry effort potentially leading to reduced staff	Reduced TAT	Digitization can lead to automated credit scorecard development[4]
Reduced loan TAT and improved customer experience	Reduced data entry hardware – PC and scanning equipment	Caseload improvement	Improved enforcement of controls and policy (reduced fraud, PAR) including regulatory compliance for KYC and credit bureau checks
Reduced risk of ghost accounts	Reduced stationery	Increased geographic coverage (loan officers can travel further due to decreased branch-visit requirements)	Options to use GPS data for both client and staff location monitoring
Fewer follow-up visits required to collect missing application documents	Reduced file storage	Potential for automated decision with credit scoring	Additional data and monitoring– i.e., social performance measurement collected at a lower cost
Faster loan approval and faster notification of loan rejection	Reduced transportation costs associated with multiple visits	Credit bureau look-up in field reduces time spent with potential borrowers who don't meet basic criteria	MFB establishes reputation as an innovator
	Reduced need for multiple credit bureau look-ups	Stronger controls at point of data capture reduces need for multiple visits to client	Support for loan officer training with tools that assist with credit analysis
			Loan officers feel technologically savvy and show pride in their work. The DFA often improves their working conditions by requiring fewer visits to the branch and less paper to carry.

4 Credit scorecards are a mathematical model built using historical data and potentially third-party data sources to support the credit-decision process. They are increasingly being used in the microfinance space, particularly for low-value loans, to speed up the credit decision and reduce the costs associated with this process.

4 Best Practices, Findings and Lessons Learned

Organizations that incorporate the insights from these findings into the design and implementation of their own DFAs will increase the likelihood of a successful solution.

Planning & Implementation

As with all projects involving information technology (IT), the approach adopted during implementation will have a critical impact on the overall success of the project. The following lessons learned from the reviewed DFAs could serve as guiding principles for other financial institutions interested in implementing a DFA:

√ Invest in Requirements Analysis

As part of the business planning and instrumental to the success of all three MFBs was a clear specification from the outset of the functional requirements for the DFA solution. The teams made a significant effort to ensure this was done properly and involved field staff, management, credit experts, and in some cases risk analysts. Where DFA objectives included credit scoring, risk analysis was required to determine acceptable credit limits and ratings to support automated decision-making, for example such as the limits and ratings developed by OBS for its DFA use with agricultural lending. OBS developed a detailed agricultural scorecard which included yield benchmarks for farmers that considered a range of factors which could influence their expected outputs. This scorecard was automatically consulted in the DFA to help the loan officer analyze the loan application data and ultimately return a credit score which indicated a credit decision.

Laying this foundation within the first stages of the project helped build staff buy-in, initiated the change management process and reduced the risk of the DFA failing.

√ Prioritize Business Process Re-engineering

While there may be temptation to overlay a DFA on top of existing processes, this will limit the benefits the solution can offer and could potentially decrease ROI. A thorough review of pre-DFA processes is required to understand how they can be improved through the use of technology. Furthermore, looking critically at the potential for improvement in processes as part of a business process re-engineering (BPR) exercise can help determine if the required efficiency gains that justify the investment are indeed feasible. For example, Ujjivan realized that its pre-DFA procedure for individual loan processing had considerable potential for improvement, given the starting TAT of 21 days. Conducting a process review to see how and where the DFA could help increase efficiency allowed Ujjivan to re-engineer this process and reduce the TAT by more than half. As a result of the BPR exercise, Ujjivan moved the credit bureau look-up from being a back-office activity to one of the initial steps performed by the loan officer in the field, which helped deliver the targets for reduced TAT. This drastic change in efficiency also resulted in loan officers handling more loans, increasing caseload, and associated revenues, which helped to justify the

investment in the DFA.

√ Develop a Clear Data Collection Plan

The introduction of a DFA generally leads to the transfer of responsibility for data entry from branch to field staff. This transition needs to be carefully managed, utilizing best-practice change management to build staff buy-in and capacity at all levels. All three MFBs had fears about this change, including concerns that loan officers would be distracted by new data entry tasks and lose focus on customer assessment, or that data entry would be too time-consuming. Fortunately, neither of these fears materialized once staff were sufficiently trained and comfortable with the technology.

Introducing the DFA provides a good opportunity to evaluate the effectiveness of data fields. While there could be a temptation to presume that the DFA makes the cost of data collection negligible and therefore leads MFBs to opt for a "more is better" approach, the truth is that each data field will cost the organization both in terms of field staff time and data management. Strict rational analysis of the collected data was done in all three cases and led to changes in the data fields. For example, Musoni chose to capture and analyze new social performance information, which improved its reporting to management and investors, demonstrating social impacts along with financial ones. On the other hand, OBS reduced the number of data fields associated with its loan application after concluding that some were not useful for the final credit decision.

√ Monitor Pilot Results before Scaling

Given that DFAs typically force changes in field staff workflow and back-office processes, a pilot of the technology is essential. While all three MFBs conducted a pilot, they differed in how they conducted a post-pilot review. Ujjivan and its supplier, Artoo, collected detailed measurements to support a decision for rollout, ensuring that they had pre- and post-DFA values for comparison. By contrast, Musoni and OBS reviewed the pilot carefully, but relied on qualitative field evidence to conclude that their primary objectives were being achieved. Ideally, an MFB would define up front the criteria for pilot success and make sure that these metrics were measured prior to as well as during the pilot.

The MFBs viewed the design and development of the DFA solution as an iterative process, with no MFB trying to get everything perfect at first launch. At Musoni, for example, phase one of the pilot included client and group registration along with reports. After gathering user feedback on those modules, Musoni refined the solution to address user feedback and then developed and deployed the next set of functionalities, which included loan application and site visits.

All three MFBs identified opportunities for further improvement; none felt that its existing DFA had finished evolving at the time this study concluded. Additional changes such as moving to the use of electronic KYC documents, employing remote loan authorizations, and integrating with a document management system, were identified as potential future enhancements.

√ Identify Key Project Champions

All three MFBs recognized the need to identify champions, or "super users," within the field staff and to work closely with these people from initiation through to the full rollout. In all three cases, the MFBs chose pilot branches based on the location of these super users, knowing full well that the commitment of these individuals would help navigate some of the initial hiccups in the early days.

For example, at OBS, the loan officers who participated in the initial pilot were selected based upon their strong performance and enthusiasm for using an innovative solution. These super users were encouraged to use and test the system and were awarded prizes, eventually becoming known as leaders that would encourage colleagues to adopt the system successfully. Loan officers at Musoni noted that the DFA enabled them to visit branch offices less frequently, which had a positive impact on their client outreach, freeing up more time for customer service. At Ujjivan, developers worked closely with field staff during the testing phase to prioritize usability and encourage adoption.

TABLE 4

Technical Overview of DFA

MFB Details	Ujjivan	Opportunity Bank Serbia	Musoni Kenya
DFA solution provider	Artoo is a specialized DFA provider. Its solution is designed to act as a financial Customer Relationship Management (CRM) tool, helping companies manage all elements of their customer interactions in the field and throughout the sales process.	OBS utilized a CBS provided by the company, Asseco, which is a leading provider of banking solutions in the region. OBSs' DFA is a combination of a custom built app and Credit Scoring solution from Asseco.	In-house IT team which later split-off to become a third party provider of both MIS and DFA solutions under the brand Musoni Services
Solution overview	Android app paired with a web portal	Android app integrated directly to the Credit Scoring module of the CBS	Android app paired with a web portal
Connectivity options	Offline & Online	Offline & Online	Offline & Online
Third-party integration	Credit Bureau CBS (Br.Net)	Credit Bureau CBS (Asseco)	CBS (Focus)

Technology

Table 4 describes the various technologies and solution providers the MFBs employed for their DFAs.

The following lessons emerged:

√ Cater for Poor Connectivity

It may be simpler to deploy a DFA that works in online-only mode, using a real-time connection to the CBS to access and save data, but this connectivity requirement may severely limit uptake. MFBs need to be realistic about how and where the DFA will be used and measure the availability and quality of data connectivity in these locations. For example, even in Serbia, which has a strong mobile data infrastructure, OBS reported that connectivity issues affected its ability to process 100 percent of its loans via the DFA, since they required connectivity for certain key functionalities such as credit bureau look-up. Fortunately, while the first generation of DFA solutions, such as those based on point-of-sale (POS) devices, worked largely in online mode only, the market is evolving to include hybrid online-offline solutions, especially for Android-based systems, which were the focus of this study.

Choosing to operate partly in offline mode, as all three of the MFBs have done, necessitates a detailed analysis of the synchronization processes, that considers technical functionality as well as security and operational procedures. For example, the MFB will need to decide what data should be visible in offline mode, how and when this data will be synchronized with the MFB's main computer systems, how conflicts should be resolved if data is changed in offline mode and in the CBS at the same time, and how the DFA can generate unique reference numbers for each transaction without a connection to the CBS.

√ Properly Plan Back-end Platform

While the front-end mobile application is perhaps the most visible component of a DFA, evidence in all three cases showed it was the back-office and integration components that were actually the most complex to implement. MFBs need to ensure that this component is analyzed, designed and tested

carefully in consultation with the CBS team, credit managers and branch users to clearly understand their needs in terms of the integration, analysis, presentation, reporting, and processing of the data that is collected in the field. Questions regarding integration protocols and methods need to be addressed for all systems, including the CBS, credit bureau, and any other third-party solution involved in the DFA. These integrations require formal documentation and agreements prior to development and typically need the MFB to facilitate the availability of each party during the testing phase.

Additionally, the design and operations of the DFA need to consider how it will interact with the CBS during routine end-of-day processing, which may complicate the synchronization process. For example, what if a user syncs data when close of business has already been run, or tries to sync during the moment when this processing makes the CBS unavailable? Musoni noted that configuring back-end components to ensure syncing functionality between online and offline modes was particularly challenging to manage workflow between device and web portals. Lastly, the MFB needs to build the DFA into all disaster recovery systems and plans to ensure continuity of service.

√ Decide Carefully Where to Store Data

In all three cases studied, the introduction of the DFA occurred simultaneously with digitizing 100 percent of the data that had previously been stored on paper forms. While this additional data provides many business and client benefits, the MFB needs to consider where and how to store this data and to bear in mind all the regulatory implications of digitizing KYC and contractual data. Data may be stored in a secondary database or in the CBS directly. This decision depends on the amount of data being collected and the CBS functionality, but MFBs need to weigh the pros and cons of both approaches, considering factors such as cost, required customization, scalability, business continuity planning, regulations, and accessibility. Any organization considering digitizing field operations will need to identify the local regulations regarding digital KYC data and the conditions surrounding its use and storage.

√ Consider Security at All Levels

Deploying a DFA requires an MFB to expose a new category of users to its CBS, namely those based in the field. Historically, these staff members likely have had very limited access to the CBS. While these users only have CBS access via the DFA, this still introduces a host of new risks that the MFB has to manage. Considering how to protect all layers of the DFA solution is essential: the physical device, the application, the communications, and the integration layer. This may include solutions such as mobile device management applications that allow MFBs not only to lock down what can be installed on a mobile phone, but also to remotely wipe all data in case the phone is lost.[5] Plans for physical security of the device must also consider the relative safety of the locations in which the DFA will be used, to see if theft is a major threat. Interestingly, only one MFB raised physical security as a real concern, and the location in question was an urban slum in Nairobi. Others noted that in the majority of cases, loan officers protected the device as their own as it was a status symbol for them and they valued it as a business tool.

√ Field Test Device & Operating System

While low-cost tablets and mobile devices are increasingly available, their suitability for a DFA solution needs to be tested carefully. What emerged in our research was the need to test various devices before settling on a single model, and where possible to compare upfront investment with a subscription model. Battery life and camera quality emerged as two important device attributes that affected the selection. Other user-issues that arose included the need to consider training on smartphone basics as well as on the DFA app itself to ensure users were fully capable. Additionally, the design and usability of the mobile app contributed to efficient data capture and field staff buy-in. Lastly, while current market trends point to Android as the most widely available operating system for smart devices, MFBs should assess this trend in their local market before deciding upon the platform for their DFA.

5 As with any computer used in a business environment, security measures need to be applied to the tablet to ensure that it adheres to the best practice standards to protect it against misuse and safeguard the data held on the device. These may include limiting installations of third party applications, restricting connectivity options or encrypting data stored on the device.

√ Work Closely with Your Solution Provider

There is not a one-size-fits-all solution in terms of the technology providers for DFAs. Three very different approaches were observed in this study, from CBS provider to bespoke app, and yet all could successfully deliver on the project objectives. However, one key similarity was that the developers either needed to have a deep understanding of the MFB's operations, or they needed the MFB to provide very detailed specifications. For example, Artoo was founded by ex-Ujjivan employees who knew the credit process extremely well. By contrast, OBS opted to play a much bigger role in the design and specification of the system and then engage an external development team that agreed to work closely under the guidance of the MFB. Additionally, it was evident from these three projects that either the DFA solution provider needed to have a deep understanding of the CBS or have the CBS provider's cooperation in ensuring seamless integration between the DFA and the CBS.

Sharing parallels with this close working relationship was a development approach – commonly adopted by the three institutions – that was based on continuous review and multiple iterations of the software. Rather than engaging the operation teams at the end of the development stage, the teams were engaged early on to monitor development as it progressed. This feedback provided valuable insight on the ongoing development and helped with the overall change-management process by building staff buy-in throughout all stages of the project.

"We can't continue to scale as we have in the past without exploring the variety of ways in which technology can advance our operations. Our DFA tool enables us to operate more efficiently than we hoped – we have made customers very satisfied with such efficient field service, and our staff feel more productive having reduced many manual steps in their daily activities. We plan to further develop our DFA solution and leverage as much as possible to digitize our processes and services in the coming year." – Slobodan Tešić, Managing Director, OBS

5

DFA Business Case

The DFA business case reviewed the capital expenditures, operational costs, and financial benefits. Two of the three institutions studied realized a positive return on investment in year one.

By reviewing the costs for implementing the DFA and assessing the benefits that accrued to each institution, we have created a business case which is explained in detail below and also available as a standalone tool. While this model is based on inputs from the three institutions for our study, it is designed to apply to any MFB, allowing users to customize it to suit their own environment.[6]

The following sections summarize the business case components and provide an explanation of a sample business case model to fully demonstrate how it can be used.

Business Case Components

Deployment Cost

The DFA Business Case considered the upfront capital expenditures (CAPEX) as well as the ongoing operational (OPEX) costs associated with introducing a DFA (see Appendix A for a detailed breakdown of cost components). The most significant costs for implementing a DFA will typically be the technical platform, the implementation effort of both internal and external human resources, and the devices. Additionally, MFBs should budget some ongoing technology costs to reflect changes in processes or improvements to the functionality of the solution over time. Other operational costs such as annual support, insurance and connectivity fees also need to be evaluated on an ongoing basis.

The above costs for the DFA solution will vary depending on the size of the institution, the complexity of the existing infrastructure, and most importantly, the objective of the DFA. For instance, not all DFAs will seek to integrate directly with a credit bureau and hence this integration cost may not be applicable. The cost will also be strongly influenced by the selected approach for sourcing a DFA solution. In cases where a CBS provider already includes a DFA as a standard part of its solution (increasingly common with smaller CBS providers), the investment cost will be less. By comparison, when a specialist DFA supplier is selected, or when a fully customized solution is built, the MFB needs to be prepared for a higher investment, but perhaps the MFB could justify this by getting a more tailored solution. Note that although DFA usage is increasing, the market is still nascent in terms of specialist providers, with only a handful available. We anticipate that this will change over time, with more providers entering the space and hence platform costs falling over time due to this competition.

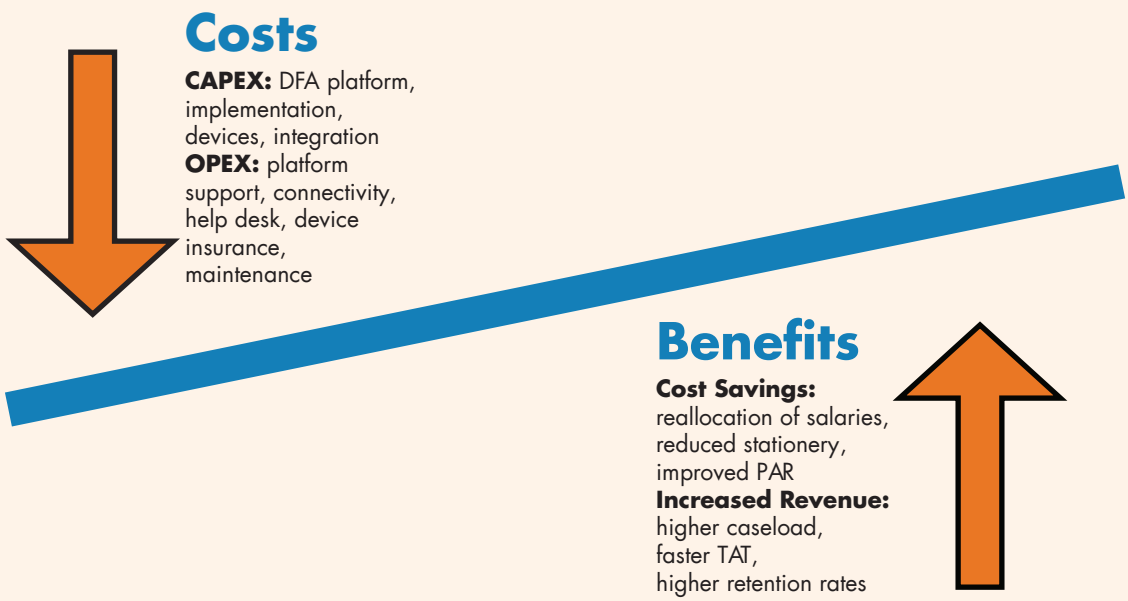
Financial Benefits

After looking at the cost of the DFA solution, the next step in building a business case is to quantify the financial benefits, a list of which is detailed in Appendix B. These are broken down into cost savings, such as those associated with eliminating or redeploying resources essential for branch-based data entry, and increased revenue, mainly resulting from the improved

6 A wide variety of options are included in the Excel tool provided, some of which may not be applicable to an institution. For example, PAR impact, credit bureau usage, etc.

FIGURE 2

DFA Business Case Components



efficiencies that lead to higher loan officer caseload.

Of all the observed cost savings, those stemming from the elimination of branch-based data entry staff were among the most significant. Not only was the back-end role eliminated; also gone were the computers and hardware required for data entry. Other cost savings were also observed, such as the reduced expenses for stationery and storage; however, these were generally relatively small by comparison. While none of the MFBs had measured a reduction in PAR directly associated with the DFA, this is included in the model given the impact a reduction in PAR could have. Reducing PAR is considered by some MFBs to be a main objective for deploying a DFA; however, it may prove difficult to attribute the precise impact of using a DFA on changes to PAR, given the multiple factors that influence repayment.

To measure revenue impact, the model compares loan officer caseload pre- and post-DFA implementation. To adjust for the fact that improvements in caseload were considered a result of multiple contributing factors, the model attributes a percentage of this increase to the DFA.[7] We then calculated increased net income as a function of increased caseloads, using average loan size and margin estimates.

Observed ancillary benefits of using DFAs, such as improved client service and market reputation, reduced churn rates and reduction in fraud, also play a role in contributing to increased revenues for the MFB. While these benefits are acknowledged, the model does not quantify them, primarily due to the challenge of attributing increases directly to the DFA.

While the case studies provide detailed information and results for each MFB, we can state with confidence that when we applied the model to two of the MFBs, using actual results from their institutions, DFA implementation resulted in a positive ROI in just 12 months, and if amortization was factored in, all three MFBs would have had a positive year-one ROI. The contributing factors to this ROI differed in each case, with some driven by large increases in productivity and others by cost savings associated with the reallocation of data entry staff. The upfront investment and the size and scale of the DFA usage are also critical influencing factors, and suggest that there are multiple ways in which an MFB can ensure a positive ROI when deploying a DFA.

7 The number of loans that a loan officer can handle at any one time is influenced by a range of factors including: maturity of the MFB, training level of the officer, market demand for the credit and MFB strategy and focus (for example, campaigns to increase individual lending will result in higher caseload.)

TABLE 5

Inputs to Business Case for ABC, a Sample MFB

Inputs			
Number of clients	50,000	**Average loan size**	U.S. $750
Number of branches	30	**Loan margin**	4%
Number of loan officers	150	**Pre-DFA caseload**	200 loans/loan officer

Sample Model on the Use of DFA

To demonstrate the business case, the team has built a sample model to outline the potential DFA impact and understand how the business case can be broken down.[8] Our case uses a hypothetical MFB, "ABC", with the attributes shown in Table 5 to investigate what ABC's DFA business case might look like. This sample model is a conservative representation of the actual figures measured and assumptions derived from the MFBs that were studied, illustrating the kind of savings that an MFB could realistically expect. This example follows the same structure as the Excel tool, summarizing the inputs and results generated.

Building the Business Case

Cost of Deploying a DFA Solution

Capital expenditure costs: Using current market estimates for the cost of implementing a DFA platform and hand-held devices, we can estimate an MFB of this size would require approximately **U.S. $180,000** in capital expense to procure and implement a DFA. As we can see in Figure 3, the platform, implementation cost (which includes internal staff time)[9] and the hardware cost to purchase devices are the three major CAPEX components.

Operational costs: The major OPEX components associated with the platform include annual maintenance and support, device insurance and data connectivity fees. The growth in OPEX is linked to the loan officer growth rate to cover additional devices and insurance. As seen in Figure 4, our case requires an OPEX of **U.S. $32,200** per year.

Another potentially large (but often ignored) cost that falls under OPEX is the cost to enhance the DFA and improve its use across other product and service lines over time. MFBs should budget additional development costs on an ongoing basis to expand and improve their DFA.

Combining the capital expense with the operational costs, the total year-one cost for **ABC Microfinance** to deploy a DFA solution is approximately **U.S. $212,200**.

Financial Benefits

Our sample model is based upon a business plan with primary objectives that include reducing operating costs and improving efficiency.[10] Upon realization of these objectives, the MFB can also expect to achieve increased revenue as a result of improved TAT and loan officer caseload.

Cost reduction: Cost reductions occur depending on which processes are eliminated as a result of digitization. For instance, in the model a reduction of

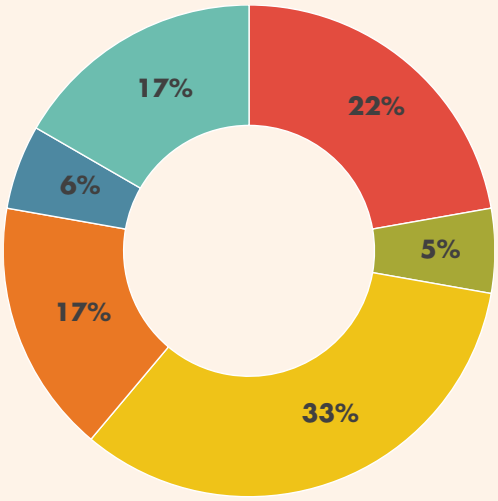
8 Note this is a hypothetical case, but it is based upon averages of the actual data of the MFBs studied.

9 Note that for this case study we included the cost of staff at the MFB who worked on the implementation of the DFA, but these are not additional costs to the MFB since they are current salary costs.

10 Note that a DFA may also provide additional financial benefits associated with improved risk management, enforcements of controls and potentially reduced risk of fraud. While each of these carry with them a financial cost for the MFB, they have not been included in this model primarily due to the limitations of the data available and the difficulty attributing changes directly to the DFA. Users of the model should therefore consider that the ROI shown by the model is conservative.

FIGURE 3

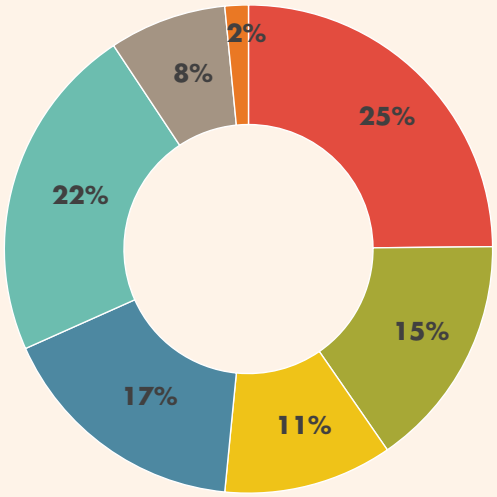
Capital Expenditure (U.S. $180,000)



See Appendix A for a detailed description of capital and operational expenditures from figures 3 and 4.

FIGURE 4

Operational Expenditure (U.S. $32,200)



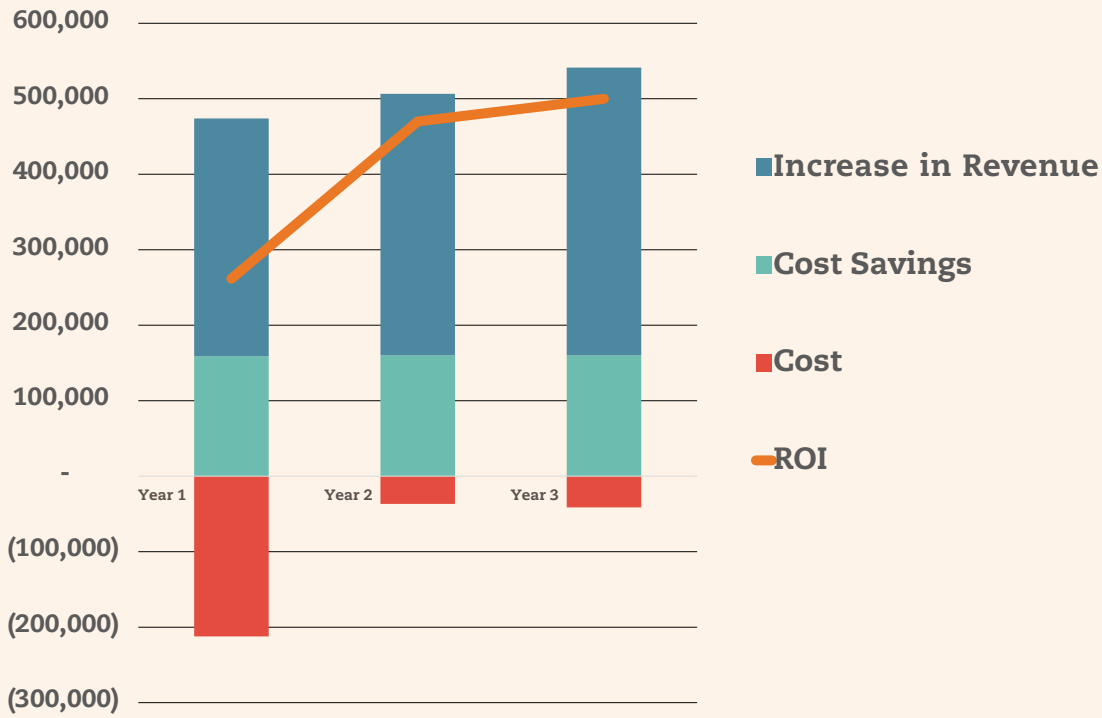
one data entry operator per branch, with the operator re- trained and deployed elsewhere, will lead to a cost saving of **U.S. $144,000** (per operator salary of $400 per month x 12 months x 30 branches). Additionally, other savings, including the savings from the reduction in paper usage and storage costs and the loan officer no longer having to make multiple visits to the client to correct data errors or to get reports from the branch, will total approximately **U.S. $158,880** per year.

Revenue increase: Assuming an initial caseload of 200 loans per loan officer, we can state with confidence that revenue can increase with the introduction of the DFA in conjunction with measures such as training, improved marketing and promotions. **ABC** expects to increase caseload by 35 percent[11] per officer as a result of introducing the DFA. Converting these additional loans to increased revenue across 150 loan officers amounts to a gain of approximately **U.S. $315,000** per year directly attributable to the DFA.

11 The model assumes 35 percent caseload increase; evidence from Musoni and Ujjivan indicate a higher improvement is feasible.

FIGURE 5

Return on Investment



Summary of Business Case

Combining these inputs, the model predicts a net positive return in year one as shown in Figure 5, suggesting breakeven for the DFA investment in 12 to 24 months.

Several factors could improve the results in a real-life scenario. For example, an earlier breakeven is possible if additional benefits such as reduced fraud, decreased PAR or increased outreach are realized. Lastly, MFBs considering DFAs should not forget that amortizing the capital expenditure could result in a positive net return as early as year one.

While the case studies provide detailed information and results for each MFB, we can state with confidence that when we applied the model to two of the MFBs, using actual results from their institutions, DFA implementation resulted in a positive ROI in just 12 months, and if amortization was factored in, all three MFBs would have had a positive year-one ROI.

6 Conclusion

Photo courtesy of OBS:
Client advisor Danka Mlinar meets with OBS client Tomislav Stankov in Kovilj, Serbia

As evidenced by the three institutions reviewed here, DFAs provide the potential for dramatic improvements in efficiency, which can benefit clients, staff and the institution in tangible ways.

While these benefits were acknowledged as some of the primary drivers of DFA adoption, all institutions appreciated the additional ways in which the technology helped them achieve their mission. Ancillary benefits ranging from building credit scoring databases to improved outreach and better risk management provided additional incentives for the MFBs to use DFAs. In fact, all three MFBs recognized that their first foray into DFAs was just the beginning, as all had plans for expansion and enhancement. Furthermore, the MFBs plan to analyze how institutional cost savings realized from the DFA could potentially translate into reduced client pricing in the future.

The findings of this study provide substantial support for the use of DFAs. Within the financial inclusion sector, many MFBs are still in an early stage of DFA usage; hence, there is a limited amount of information and quantitative data available, especially in the public domain, to understand the impact on operations. As DFAs become more widely used and the impact well measured, this knowledge will significantly support other organizations in their mission to operate more efficiently. Presently, the business model that this study provides should assist any financial institution to examine the likely costs associated with DFA usage and monitor the benefits in the form of cost savings and increased revenues. Equipped with this level of analysis, financial institutions can embark on DFA deployments well informed not only of the associated costs but also aware of the approaches, solutions, best practices and metrics they should follow to measure a return on their investment.

> "We are committed to utilizing digital technology in all aspects of our business, including training. Our experience in digitizing the loan application process for individual loans and servicing of group loans is very encouraging." – Samit Ghosh, CEO, Ujjivan

Appendix A

DFA Cost Components

Category	Type	Components
Cost: CAPEX	DFA platform	Cost associated with development, purchase or leasing of the DFA platform.
	CBS integration	In some cases an additional cost may be associated with the integration of the DFA to the CBS. This could be either a license or one-off fee.
	Implementation	Cost of implementing the platform, considering both external and internal human resources. Includes organizational restructuring, process redesign, training and system integration.
	Infrastructure	Cost of servers required to host the application (if hosted in-house and additional investment is required). Cost of devices – phones, tablets and potentially Bluetooth printers.
Cost: OPEX	Recurring DFA platform maintenance/ usage charge	Where the DFA platform requires purchase of a license, typically a recurring annual maintenance charge is applied to cover support. Alternatively, if the solution is pay per use/ SaaS based, this would be the recurring charge, which could be a flat or variable amount based on system usage. Lastly, MFBs may want to include some recurring budget for changes and further development of the DFA.
	Recurring CBS integration charge	Where an additional license is required for CBS integration, this may attract additional recurring maintenance.
	End user support	Introducing a DFA implies that the internal IT help desk will need to support a greater number of end users, which will likely result in increased costs for support services.
	Data connectivity	Mobile data charges to allow for the solution to operate in online mode or to sync data for offline systems. Typically this charge is a flat amount based on a monthly bundle of data but could vary depending on data volumes.
	Insurance	Optional insurance to cover theft or loss of the devices in the field.
	Device battery/ replacements	Cost associated with maintenance or replacement of the device and particularly the batteries, which were noted to deteriorate over time.
	Data storage	As more data is captured and stored electronically, additional storage capacity may need to be added over time.

Appendix B

DFA Benefit Components

Category	Type	Components
Benefit: Cost savings	Salary savings for positions eliminated	Where the DFA results in elimination of a role (e.g., data entry clerk), the result will be a direct savings in salary.
	Stationery production and management costs	If the DFA results in the reduction or perhaps elimination of the use of paper stationery, savings will be available.
	Storage of paper records	Physical storage of forms will be replaced with the electronic storage of DFA data, reducing costs for related budget items (e.g., storage space, paper).
	Transportation cost savings associated with one-time visits	Improved data quality and validation of data via the DFA will reduce if not eliminate the need to visit a client more than once during the loan application process. This represents a direct savings in terms of transportation to visit the client.
	Credit bureau inquiry cost reduced	In some cases a reduction will be seen in the cost of a look-up to the credit bureau since it is no longer necessary to repeat this look-up for the same customer.
	Loan loss provision expense decreased due to increased portfolio quality	Where the DFA contributes to increased portfolio quality, the PAR of the institution should go down, which has a direct impact on the provisioning expense.
Benefit: Increased revenue	Loan officer caseload improvements	The improvement in caseload per loan officer (while taking into account the impact of other factors on caseload) will lead to an increase in revenue per loan officer.
Reduction in client acquisition cost	As a result of better client retention/ reduced churn	Improved client service will lead to lower client churn and a reduction in client acquisition costs.
Reduction in write-offs and reserve requirements	The elimination/ reduction of ghost accounts and fraud in the field	The elimination/reduction of ghost accounts and fraud in the field will lead to lowering write-offs and required reserves.

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