



Case Study:

Adoption of Mifos® at Grameen Koota
& Enda Inter-Arabe

About Grameen Foundation

Grameen Foundation empowers the world's poorest people, especially women, to escape poverty through access to financial services, information, and viable business opportunities. Founded in 1997 by a group of friends who were inspired by the work of Muhammad Yunus and the Grameen Bank in Bangladesh, our innovations, programs, and resources have helped millions of people in Africa, Asia, the Americas, and Middle East North Africa begin their journey out of poverty.

With microfinance and technology as our foundation, we connect people and local institutions across the globe that share our vision of shattering the barriers for the one billion people trying to live on less than a dollar a day.

About The MasterCard Foundation

The MasterCard Foundation advances microfinance and youth learning to promote financial inclusion and prosperity. Through collaboration with committed partners in 42 countries, The MasterCard Foundation is helping people living in poverty to access opportunities to learn and prosper.

An independent, private foundation based in Toronto, Canada, The MasterCard Foundation was established through the generosity of MasterCard Worldwide at the time of the company's initial public offering in 2006. For more information, please visit www.mastercardfdn.org.

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EXECUTIVE SUMMARY

Two microfinance institutions, Grameen Koota (GK) and enda inter-arabe (enda), were the first customers to acquire the Mifos™ technology platform. One year after they deployed the technology, the Mifos team returned to evaluate the impact of the software on each customer. Both institutions reported that Mifos has given them the technology platform they needed to grow their business and accelerate their outreach to the poor. However, while Mifos fueled the business objectives of each institution in a similar way, the observed financial impacts were quite different at each institution. GK showed financial returns of over 5 million USD from its investment in Mifos, while the financial returns at enda were more modest, at 1.3 million USD.



Moving to an automated system helps microfinance institutions process and disburse loans more efficiently.

The return-on-investment (ROI) model used to measure these impacts is very sensitive to an institution's overall growth. Financial returns are heavily influenced both by the institution's underlying business model and by the ways its leadership uses the gains in efficiency and real-time information that Mifos makes possible. At GK, group lending and an aggressive growth strategy made it possible to use Mifos' efficiency improvements to grow the institution's client base, and this led to strong financial returns. By contrast, enda purposely limited its growth during the period under consideration in order to rapidly and safely transition to an individual lending model. Enda chose to utilize the efficiency gains from Mifos to give its loan officers more time with each individual client, which is what successful individual lending methodology dictates.

Since enda's transition to individual lending was motivated by a desire to better serve customers rather than an effort to increase profits, the lower immediate returns from its investment in Mifos certainly do not undermine enda's business objectives. In fact, installing Mifos provided the platform necessary for both GK and enda to achieve their core business objectives, even though each institution had different overarching goals. Nonetheless, the results show that overall ROI results do depend on the business and institutional context in which Mifos is introduced.

Results from these case studies have already been used to improve Mifos itself, as well as to improve methods for future case studies and the ROI analysis. Improvements to certain Mifos features, particularly its reporting features, should increase staff efficiency and financial returns. Major improvements have been made to Mifos' deployment, most importantly the addition of a package of consulting services to ensure better integration of the technology into customer business processes. Finally, improvements have been made to the case study framework and ROI model to better measure the impacts of Mifos adoption. Examples of future improvements include the capture and analysis of Mifos' impact on portfolio-at-risk, routine branch maintenance, and the cycle time for loan disbursement.

INTRODUCTION

Conceived in 2004, the Mifos project began in earnest in 2005. Its goal is to provide the microfinance industry with a robust, centralized, scalable, and affordable technology for managing loan and savings portfolios. Moreover, this technology platform was to be open-source¹ and free of license fees, allowing users to modify it to suit local needs. The first release of Mifos occurred in 2006.

When Mifos was first released, the project team looked for initial customers to adopt the software and serve as important sources of learning for future releases. Two microfinance institutions (MFIs) were selected: *Grameen Koota* in Bangalore, India, and *enda inter-arabe* in Tunis, Tunisia. These two institutions were chosen because both of them were well run, had shown strong growth, and were ambitious to grow further, and at the same time both were experiencing acute problems with their existing information systems. The Grameen Foundation's work with *enda inter-arabe* (hereafter *enda*) was made possible through its relationship with Grameen-Jameel Pan Arab Microfinance Ltd. (Grameen-Jameel), a joint venture company that operates in the Middle East and North Africa on the foundation's behalf. Grameen-Jameel formed a partnership with *enda* in the fall of 2006 and since then has provided a number of products and services to *enda*, including Mifos.

Although the first installations of Mifos were more complicated and time-consuming than expected, by the end of 2008 the technology was fully deployed at both institutions. Now that they have operated Mifos for more than a year, their experiences offer an important opportunity for comparative analysis. This case study looks at the different outcomes experienced by GK and *enda*



Enda clients meet monthly with their loan officer to repay and apply for loans.

to gain a deeper understanding of the factors that add or detract from the value any MFI might gain from using Mifos. Learning from the experience of these two initial customers, the Mifos team has already drawn important lessons that have resulted in changes to the way Mifos is presented and the way deployments are managed.

In the following pages, after a brief profile of each institution and a review of the way each engaged to deploy Mifos, we present a detailed return-on-investment (ROI) analysis. The data used in this case study was gathered through interviews with MFI and Grameen Foundation staff, combined with historical data obtained from the Microfinance Information Exchange (MIX).²

¹ Source code for Mifos is freely available for download at www.mifos.org.

² www.themix.org

MIFOS DEPLOYMENT

TWO DIFFERENT MICROFINANCE INSTITUTIONS

GK was founded in Bangalore, India, in 1997.

It describes its mission as one

*to transform and uplift the lives of poor and low-income families with microcredit and other development finance; to be a sustainable, friendly and trusted provider of affordable and need-based services.*³

Based on the Grameen group lending model, GK experienced steady growth from the start. As illustrated in Figure 1 below, GK's growth has accelerated rapidly since Mifos was fully deployed in November 2007, when the institution had 50 branches and 106,000 customers. As of March 2010, GK was serving more than 400,000 borrowers through a network of more than 100 branches.

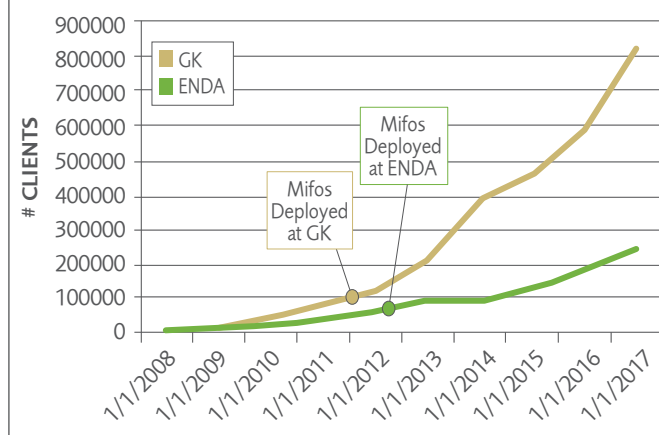
Founded in 1990 as a social assistance organization, enda started working in microfinance in 1995. It describes its mission as one to

*contribute to the improvement of living conditions for low-income Tunisians, through a leading institution that is socially responsible and committed to the environment.*⁴

When Mifos deployment was completed in March 2009, enda was serving more than 103,000 customers from 52 branches, and as of March 2010 it was serving more than 135,000 borrowers through a network of 57 branches.

Like GK, enda entered the microcredit business using the Grameen group lending model. In this model, individual borrowers join together in groups that then share collective responsibility for the shared debt of the entire group. At the time, the model was well proven and was endorsed and supported by the Grameen network,

FIGURE 1: GROWTH PROFILES FOR GK & ENDA



and it therefore offered the lowest-risk business strategy for enda as the institution embarked on a new venture. Over time, however, enda concluded that this model was not appropriate for the Tunisian market. Ultimately, enda decided to change its business to follow an individual lending model, the kind of business lending one finds in any developed economy. This change was not made to pursue greater profits but rather in an effort to better meet the needs of the local market. Recruiting and sustaining borrower groups was much more challenging, and less consistent with local traditions, in North Africa than it was in rural South Asia, where the model originated. In addition, the group lending model limited enda's flexibility to tailor loan products to the widely differing needs of individual borrowers across a wide range of urban and rural environments.

Enda's transition to an individual lending model began in 2007 and accelerated rapidly in 2008 during the adoption of Mifos. By the end of 2009, when our post-Mifos data sample was taken, 84 percent of enda's loans were individual loans. As will be further explained below, this very rapid transition of enda's loan portfolio from group to individual loans had a profound effect on the financial impact of Mifos.

³ Grameen Koota 2009-2010 Annual Report.

⁴ From the enda-interarabe website at <http://www.endarabe.org>.

DEPLOYING MIFOS AT GK AND ENDA

When they first engaged with Mifos, both GK and enda faced some business challenges that are common among microfinance institutions. Both relied on prior systems that were decentralized, not sufficiently scalable, inflexible, and poorly supported. In particular, GK needed greater scalability to keep pace with its rapid growth and enda needed greater flexibility to support its transition to individual lending.

Mifos is a technology platform for MFIs which, if adopted, becomes critical to an MFI's basic mission. Adopting Mifos involves much more than installing the software. The new application must initially be configured properly, legacy data from previous systems must be moved into it, and the new system must be tested to ensure that it is working properly. Staff must then be trained to use it. Only after all this is done can it be launched and used across the organization. In addition, because Mifos is open-source, those adopting it might want to customize it to meet their special needs. Doing so requires both assistance from local software developers and the project-management skill to oversee the customization.

Knowing all this, the Mifos team encouraged and supported both GK and enda when they contracted with local companies to provide software development

and assistance with the deployment of Mifos. As part of the open-source strategy, it was assumed that users who downloaded the software would be responsible for managing their own deployments, receiving only limited technical support from the Mifos team (e.g., to fix bugs and address usability issues). However, the deployment did not unfold as expected with either GK or enda.

GK's local vendor started working in November 2006 with the goal of developing a reporting module for Mifos and managing the deployment, including the migration of GK's data. However, by May 2007 the vendor still had not performed, and the project was stalled. The Mifos team in Seattle intervened, appointing a project manager to oversee the deployment and recruiting volunteer IBM consultants to complete the project. Ultimately, the deployment was completed and all 44 branches were operating on Mifos by November 2007.

Enda followed a similar path. A local vendor was hired in January 2007 to do custom development and manage the deployment, including data migration. But the vendor had underestimated the extent and cost of the work, and more than a year later the development work was incomplete and deployment had not started. The Mifos team again intervened. The team assigned a full-time project manager, who moved to Tunis in August 2008. At the same time, the team replaced the local vendor with an established global software development firm, ThoughtWorks. Development work then proceeded quickly and deployment moved forward. By December 2008 a successful pilot of Mifos had been completed, and several months later the entire branch network was operating on Mifos.

Although the deployment of Mifos was slowed by false starts and long delays, the application has performed well and continuously ever since.



Enda staff worked alongside the Mifos team to facilitate the transition to the new platform.

OUTCOMES AND ROI ANALYSIS

RATIONALE AND METHODOLOGY

Adopting a system like Mifos brings an MFI many benefits. Not all the benefits are financial returns that can be directly or easily measured. With proper planning and integration into the full business process, a management information system (MIS) that provides more complete, accurate and timely business information will produce many benefits that are difficult to quantify, including these:

- Better products, based on accurate product performance data
- Increased access to financing and lower financing costs due to increased transparency
- Reduced portfolio-at-risk (PAR), since loan officers have more time to follow up with clients and better information about arrears
- More robust social programs, since loan officers have more time to use group meetings as a platform for education
- Better customer service in the form of faster loan application and disbursement
- Easier integration of loan portfolio information with other systems such as accounting, business intelligence, and human resources, and
- Better monitoring of social performance (measurement of impact on poverty).

All these benefits are real, though they are not necessarily inevitable. Both GK and enda obtained many of these benefits as a result of adopting Mifos. In particular, GK was able to meet the challenge of its own rapid growth with a system that scaled reliably as it grew. Enda was able to meet the challenge of transitioning its lending model from group to individual lending, since the new system was flexible enough to smoothly accommodate both group and individual loans.

Nevertheless, if MFIs are to adopt systems like Mifos on a broad scale it is also important for them to identify direct financial returns wherever possible and to measure their impact on the financial performance of the business. The ROI analysis undertaken at GK and enda focused on such measurable impacts, that is, on impacts that resulted in either increased revenue or lower costs or both. These impacts include the following:

- **Loan officer efficiency.** An MIS that reduces the time loan officers must spend on bookkeeping tasks enables them to spend more time supporting clients. This can have either of two financial impacts. An MFI can either increase the number of clients supported by each loan officer, or it can increase the average amount of loans to clients and allocate more time to individual clients to mitigate risk. Either change produces additional interest income.
- **Better cash management.** MFIs must maintain adequate cash reserves to fund loans. Holding more cash than necessary means making fewer loans and earning less interest income. Holding less cash than necessary means unnecessary short-term borrowing and added interest expense. Because Mifos provides real-time data on the loan portfolio, it allows better cash management, indicated by actual cash reserves that move closer to reserve targets.
- **Lower cost of MIS system maintenance.** In a decentralized system, any software installation or update requires staff from the head office to visit each branch and update each computer individually. This consumes employee time and travel costs and delays the rollout of new products. With a centralized, web-based system, configuration and updates are applied to a single server at the home office. No travel to any branch is required, eliminating this expense entirely.
- **Reduced time and expense of reporting.** In a decentralized system, data from individual machines in branches must be manually consolidated at the branch

level, and it must then be transmitted to the home office where it is recompiled to create a consolidated report for the entire loan portfolio. A real-time centralized system such as Mifos eliminates the need for manual data consolidation and lowers the costs of preparing monthly reports.

■ **Faster launch of new products and services.**

When new products are launched, they must be delivered through the branch network. A centralized system allows products to be rolled out to all branches simultaneously without the need to visit branches to update software. This produces additional incremental revenue.

To make a realistic estimate of the ROI from using Mifos, we must examine results over a reasonable payback period. In this case, a period of five years is examined, following common industry convention. Because the GK and enda deployments are recent, however, available data on actual results is limited to one year. We therefore model results for future years based, where appropriate, on several possible scenarios. Furthermore, because the ROI analysis looks at overall efficiency gains, the model is very sensitive to growth in the number of borrowers, loan officers, and branches. Generally, we have relied on estimates of future growth provided to us in interviews with MFI management. In some cases we model alternative growth patterns to illustrate the impact of changes in business practices or simply to be more conservative in the interest of greater credibility.

To get a picture of the impact of Mifos deployment, our analysis compares two alternate scenarios. First, we consider what the future would have been if the MFI had continued to use a decentralized system like the one used before Mifos, projecting into the future operational results observed from the year before Mifos was deployed. Second, we look at the different results obtained under Mifos, projecting results observed during the year following Mifos deployment.

Intuitively, one would expect a strong link between MFI growth and Mifos, since the system offers flexible products, scalable systems, and operational efficiency. However, that link is usually indirect and partial. Although a good MIS may be a necessary condition of growth, it is



Poor women are able to diversify and expand their business offerings with loans from Grameen Koota.

not alone sufficient for growth. Growth clearly requires other factors, including at least a management and business plan focused on growth and innovations in products and processes that follow. Accordingly, the analysis here takes a conservative approach, attributing only a fraction of any observed improvements to Mifos.

As with any ROI analysis, some assumptions are required. Primarily to keep the model simple, we make the following assumptions throughout:

1. Average yield on loans, average cost of capital, interest rate on short-term borrowing, and applicable currency exchange rates all remain constant throughout.
2. Only 10 percent of any incremental loan officer efficiency occurring after Mifos is deployed can be attributed to Mifos.
3. Requirements for available cash (as a percentage of total assets), as well as the spread between actual and targeted cash amounts, are adjusted in the first year after deployment of Mifos but remain constant after that.
4. The impact of inflation on staff salaries and expenses is ignored.

Certainly, if these amounts were adjusted for possible fluctuations the model would be more accurate. But since the current analysis is only intended to suggest the potential returns to an investment in Mifos, adding complexity by modeling changes in the surrounding financial environment does not seem justified.

Throughout the presentation that follows, "Year 0" refers to the calendar year immediately preceding full deployment of Mifos. This is our base year. "Year 1" is the calendar year immediately following full deployment (when all branches are using Mifos). Data for Years 0 and 1 are actual data, drawn from the MIX or from interviews with MFI management. Data for Years 2 through 5 are projections based on estimates provided by MFI management.

SUMMARY OF FINANCIAL RESULTS

Tables 1 and 2 summarize the financial returns on Mifos deployments at GK and enda. It is immediately clear from the results shown that GK and enda experienced different financial returns. While this difference is significant and requires explanation, it does not contradict the fact that both organizations successfully addressed their most critical and immediate needs by adopting Mifos. Namely, they obtained a highly scalable, flexible, and robust system that has grown as they have grown while providing uninterrupted service and continuous real-time data. Without adopting Mifos, neither organization would have been able to achieve its business and social goals. Each organization simply had a different set of goals.

Operating in a fast developing South Indian market, GK has been strongly committed to an aggressive growth strategy for the last several years and projects that it will

continue to grow aggressively into the future. Without implementing Mifos, GK's growth would have slowed significantly, since the staff time required to manually track and monitor its growing number of transactions would have prevented staff from increasing their caseloads. Due to the loan officer efficiency that Mifos afforded, GK's growth has accelerated, and this growth in turn has boosted the financial returns from Mifos.

By contrast, enda's key business goals were based not on client growth but on transitioning to an individual lending model. Without implementing Mifos, enda would have been unable to achieve this goal. Any successful transition to individual lending requires a basic shift in risk mitigation; loan officers and branch management must practice stricter credit controls to minimize the risk associated with a portfolio consisting of fewer but larger loans. The efficiencies which Mifos afforded enda's staff allowed extra time for this risk mitigation. However, the benefit of avoiding risk is extremely difficult to quantify, and the changes to enda's operations, which deliberately limited growth, actually diminished the quantifiable financial results from Mifos.

(Note that in Tables 1 and 2, all amounts are converted to U.S. dollars for comparison. ROI is calculated as net present value (NPR) of returns over five years, using a discount rate equal to the average loan yield at each MFI.)

TABLE 1. ROI SUMMARY: GK (AMOUNTS IN USD)

PROJECT REVENUES / SAVINGS	FY09	FY10	FY11	FY12	FY13	
	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	
Increased Revenue						
Increase in Interest Income due to LO Efficiency	-	934,332	1,546,295	2,475,259	4,490,854	
Better Cash Management	297,716	489,825	810,972	1,289,429	2,334,804	
New products (faster TTM - incremental income)	-	689,065	-	1,413,825	2,290,397	
Cost Savings						
Decreased Time for Manual Reporting	7,012	15,071	27,427	41,529	55,631	
Cost Savings in Branch Maintenance	72	1,749	946	2,849	2,849	
Reduction in MIS License Costs	4,200	36,000	55,200	63,000	63,000	
	309,000	2,166,041	2,440,840	5,285,892	9,237,535	
PROJECT EXPENSES	UPFRONT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Data Management / Hosting	65,200	13,086	13,086	13,086	13,086	13,086
Hardware	55,352	8,806	75,480	115,736	132,090	132,090
Software	2,273	14,773	14,773	14,773	14,773	14,773
Connectivity Costs	28,368	29,543	59,076	102,340	150,753	198,633
Data Migration	-	-	-	-	-	-
Customizations/Enhancements	50,500	-	100,000	100,000	100,000	100,000
Training	7,733	493	1,200	1,627	1,800	1,800
Staff Time for encoding (Encoder)	88,000	14,000	120,000	184,000	210,000	210,000
Staff Time for maintenance	21,600	30,100	35,025	116,483	137,501	161,559
	319,026	110,801	418,640	648,044	760,003	831,940
Net Cash Flows	(319,026)	198,199	1,747,401	1,792,796	4,525,889	8,405,595
NPV AFTER 5 YEARS: \$5,110,135						

TABLE 2. ROI SUMMARY: ENDA (AMOUNTS IN USD)

PROJECT REVENUES / SAVINGS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
<i>Increased Revenue</i>					
Increase in Interest Income due to LO Efficiency	-	-	-	-	-
Increase in Interest Income due to less PAR	-	-	-	-	-
Increase in Interest Income due to Increase in Loan Size	-	931,049	1,090,340	1,298,338	1,538,608
New products (faster TTM - incremental income)	-	-	-	-	-
Faster loan disbursement	-	-	-	-	-
<i>Cost Savings</i>					
Decreased Time for Manual Reporting	(87,347)	(107,487)	(75)	49,256	55,969
Cost Savings in Branch Maintenance	-	-	-	-	-
Better Internal Controls --> Less Fraud	-	-	-	-	-
Better Arrears Management --> Less PAR	-	-	-	-	-
Reduction in MIS License Costs	-	-	-	-	-
	(87,347)	823,562	1,090,265	,347,593	1,594,576

PROJECT EXPENSES	UPFRONT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Hosting	18,881	18,392	18,392	18,392	18,392	18,392
Hardware	18,881	4,196	5,245	5,245	5,245	5,245
Software	-	-	-	-	-	-
Connectivity Costs	-	-	-	-	-	-
Data Migration	35,000	-	-	-	-	-
Customizations/Enhancements	75,524	-	160,000	100,000	100,000	100,000
Training	5,594	-	-	-	-	-
Staff Time for encoding (Encoder)	-	-	-	-	-	-
Staff Time for maintenance	11,748	11,748	11,748	11,748	11,748	11,748
	165,629	34,336	195,385	135,385	135,385	135,385
<i>Net Cash Flows</i>	(165,629)	(121,683)	628,178	954,880	1,212,209	1,459,192
						NPV AFTER 5 YEARS: \$1,280,015

TABLE 3. LOAN OFFICER EFFICIENCY: GK

		YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
1	Loan Officers (GK projection)	264	380	720	1,322	2,009	2,696
2	Loan Officers (GF adjusted projection)	264	380	570	855	1,283	1,924
3	Caseload (GK projection)	414	366	446	554	699	699
4	Caseload (GF adjusted projection)	414	366	395	427	461	498

LOAN OFFICER EFFICIENCY — IMPACT ON CASELOAD AND LOAN SIZE

To evaluate returns from increased efficiency among loan officers, we look at loan officer caseload (the average number of borrowers each loan officer supports) and at overall growth in the number of loan officers. Table 3 summarizes projected growth in loan officers and caseload over time. The amounts in row 1 show that GK projects an average year-over-year growth in the number of loan officers of more than 60 percent, reflecting its very aggressive growth plan. In our ROI calculation (row 2) we use a more conservative estimate of 50 percent. Similarly, GK predicts an average of 12 percent annual growth in the number of borrowers per loan officer (row 3), while our calculation relies on a much more conservative estimate of 8 percent (row 4).

The increases in loan officer caseload represent incremental interest income through more loans. Of course, we cannot attribute all improvement in loan officer caseload to Mifos. Better training and other business

process improvements also play a large role. Accordingly, in calculating the ROI on greater loan officer efficiency, we attribute only 10 percent of the incremental interest income to Mifos. This still results in 9.44 million USD of incremental interest income over five years.

Parallel ROI calculations for results at enda offer a notable contrast, summarized in Table 4.

At enda, the anticipated annual growth in loan officers is a more modest but still significant average of 31 percent. However, no increase in caseload is anticipated, reflecting enda's business decision to limit caseload in the interest of better customer service. With the recent shift to an individual lending model, the role of enda loan officers is changing, and caseload limitations are one consequence. With Mifos, loan officers now have more time available to spend with clients, whom they must meet individually. To control the added risk associated with individual lending, loan officers must monitor individual borrowers and must address past-due accounts one at a time. They are able to

TABLE 4. LOAN OFFICER EFFICIENCY: ENDA

		YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
1	Loan Officers (enda projection)	257	342	474	632	789	1,050
2	Caseload (enda projection)	430	397	350	350	350	350

TABLE 5. AVERAGE LOAN SIZE: ENDA

		YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
1	Average Loan Size Before Mifos (enda projection)	446	476	552	606	624	666
2	Average Loan Size After Mifos (GF projection)	446	476	1,000	1,000	1,000	1,000

do this without significant reduction in caseload because Mifos reduces transaction administration and thus makes more time available for clients.

If nothing else changed, the change to individual lending model would result in lower revenue. But that is not the case, because when an MFI assumes greater responsibility for assessing the creditworthiness of borrowers, loans under individual lending are typically larger than those made under group lending. Enda's pre-Mifos projections for growth in loan size growth can be seen in row 1 of Table 5. However, those projections do not consider that nearly all of enda's portfolio would be converted to individual loans by the time Mifos was fully functioning. To account for this change in portfolio mix, we have created alternate assumptions for our projections. In row 2, we assume that as enda gains experience with the individual lending model, average loan size will increase. We estimate that it will rise from 446 USD under group lending (before Mifos) in Year 0 to 1,000 USD under individual lending (after Mifos) in Year 2 and after. Since enda plans to introduce individual loans up to 1,300 USD in value, we have selected 1,000 USD to ensure a conservative calculation.

Increases in loan size represent incremental interest. Of course, we cannot attribute enda's successful transition to individual lending to Mifos alone. Enda has invested significantly in this transition by training loan officers in the new methodology, revising products, changing its credit risk assessment, and so on. However, the efficiencies that Mifos provides to enda's loan officers allow them to put into action the new risk mitigation processes. Accordingly, in calculating the ROI on greater loan size, we attribute 5 percent of incremental interest income to Mifos. This still results in \$4.8 million USD of incremental interest income over five years.

CASH MANAGEMENT

As mentioned above, a spread between cash targets and actual cash needs means an MFI is either losing incremental income or paying unnecessary interest expense (through short-term borrowing). Because cash requirements vary each day, the accurate real-time information provided by Mifos should allow MFIs to better forecast their cash needs, resulting in more accurate matching of cash targets to actual needs.

To establish a baseline, we start by measuring cash holdings as a percentage of total assets for Year 0—again, the period immediately before Mifos' deployment. We then identify past targets for cash holdings, based on interviews with finance staff, to determine the average spread between the target and the actual cash held for Year 0. We express that spread as a percentage of total assets. If the spread is positive, the MFI is holding more cash than needed, and there is foregone revenue. If the spread is negative, there must be short-term borrowing to cover the difference. We convert the spread into actual monetary values by assuming that 60 percent of newly available cash would be mobilized as loans at the prevailing yield and that any shortfall would be covered by borrowing at the assumed interest rate.

For simplicity, we assume that cash requirements (as a percentage of assets) will remain the same over time and so will the yield on new loans or the cost of short-term borrowing. Next we compare the spreads for the period immediately before Mifos with the spreads observed in the period immediately following deployment. Then we project the results into the future based on the assumption that the spread observed after Mifos deployment will be maintained consistently over time. In other words, we compare the

impact over time of a one-time improvement in cash management to the results we would have observed over the same period without that improvement. And again, we conservatively assume that only 60 percent of any cash saved is mobilized as new loans.

The data in Table 6 below illustrate the impact of improved cash management at GK. Scenario 1 shows the calculated amount of foregone revenue each year due to holding 11.41 percent more cash than actually needed. Scenario 2 shows the very significant reduction in the amount of foregone revenue when Mifos helped GK to better predict its cash needs, lowering the spread between target and

actual to a much better 1.13 percent of total assets. The difference between these two amounts is the amount of new incremental revenue available as a result of this improvement.

Scenario 1 assumes no change in cash management at GK. Scenario 2 projects the results of actual improvement in cash management observed in Year 1 which are assumed to continue in the following years. As Table 6 illustrates, GK will enjoy significant additional top-line revenue due to better cash management made possible with accurate real-time data from Mifos.

TABLE 6. CASH MANAGEMENT PROJECTIONS FOR GK

IMPACT OF BETTER CASH MANAGEMENT (IN USD)						
	YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
SCENARIO 1: Without Mifos GK holds 11.41% more cash than needed, resulting in loss of revenue.	-149,602	-330,339	-543,499	-899,836	-1,430,721	-2,590,645
Scenario 2: After Mifos GK reduces spread, holds only 1.13% more cash than needed, reducing amount of lost revenue.		-32,623	-53,764	-88,864	-141,292	-255,841
Net new revenue from cash available through better management now mobilized as loans.		297,716	489,735	810,972	1,289,429	2,334,804

TABLE 7. CASH MANAGEMENT PROJECTIONS FOR ENDA

IMPACT OF BETTER CASH MANAGEMENT (IN USD)						
	YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
SCENARIO 1: Without Mifos enda holds too little cash and incurs costs for borrowing.	14,153	22,294	33,514	48,575	61,796	97,344
Scenario 2: After Mifos The spread increases and enda must borrow even more.	143,315	225,756	339,367	491,876	625,753	985,713
Total cost of additional borrowing to meet cash needs.		(203,461)	(305,853)	(433,300)	(563,956)	(888,369)

Once again, enda provides a very interesting (and initially puzzling) contrast. The unexpected deterioration in enda's cash management after Mifos is summarized in Table 7.

For Year 0, enda reported that cash holdings were only 0.42 percent less than the target. But in Year 1, the spread jumped to 3.83 percent. Given the very small spread before Mifos, enda's cash management was clearly very good and little could be expected in the way of improvement. But to see spreads increase after Mifos was deployed was the opposite of what our hypothesis had predicted. Upon investigating further, we found that this too was a direct consequence of the transition to an individual lending model and was not related to any shortcoming in Mifos.

In enda's group lending model, borrowers make regular monthly visits to a branch. Loan disbursements and payments occurring at these scheduled visits are predictable. In the individual lending model, the timing of disbursements and payments is much more irregular,

since individual clients will borrow when they need to and often repay early. Given the rapid transition to the new lending model, enda did not have any historical experience on which to base its prediction for cash needs. Enda therefore faced increased liquidity risk. In response to this uncertainty, it raised its targets for cash holdings and spreads have increased.

Of course, with more experience enda's cash management will improve over time. In the case of GK, there was no other obvious explanation for the improvement in cash spreads that occurred at the time of Mifos' deployment, that is, there was no other change in business process, products, or business model. So it makes sense to attribute the improvement to Mifos. By contrast, at enda there is clearly an explanation for the poorer cash management experienced after Mifos was deployed, an explanation that has nothing to do with Mifos itself. We therefore exclude the resulting increase in borrowing costs from our ROI analysis.

SYSTEM MAINTENANCE

With the kind of decentralized systems used at both GK and enda before Mifos, a technical support person must visit each new branch to set up the MIS. In addition, at GK it was necessary to visit each branch to configure the MIS each time a new product was introduced. Also, earlier systems would normally require a separate license for each desktop, so license fees had to be paid when setting up each new branch. All these costs are eliminated with Mifos. There are no license fees. Every new branch has access to the MIS as soon as the computers are plugged in. And new products are immediately available at all branches as soon as they are added to Mifos at the home office. No travel or special installation is required.⁵

To estimate the resulting cost savings in staff time and travel expense, we assume that technical support staff would normally have to make one initial visit to each new branch solely for the purpose of updating the MIS. (Staff might also have to make additional visits for other reasons, but we ignore them in this estimate.) Using estimates from MFI staff of the number of person-days required to visit all branches, we calculate the total cost of staff time, adjusted for growth in the branch network over time. In addition, we calculate a software license fee for each new branch opened (if applicable). The savings attributable to Mifos is the total of all these costs, which are eliminated with a centralized system.

In the case of GK, we see the full impact of a move to Mifos. At enda, however, the picture is different. Before Mifos, the technical staff at enda was able to create a mechanism that enabled branch offices to download patches for their local computers from the home office. These patches were configured to update the local MIS with new product information. So, although it was running a decentralized system, enda was able to distribute product updates to branches without in-person visits, although this was at the cost of creating special downloads for the branches each time updates were required. While enda's experience demonstrates that a clever and experienced technical staff can sometimes craft work-arounds for less capable systems, this practice imposes other costs on the MFI (for software development expertise) that Mifos avoids.

Savings reflected here are notably modest because they reflect only costs associated with opening new branches. In reality, maintaining a decentralized system requires an in-person visit to every branch each time there is an update to the MIS software, something that would occur at least once a year. Future versions of the ROI model will be modified to reflect this more accurately. (See more on this under "Case Study Improvements" at the end of this report.)

TABLE 8. BRANCH MAINTENANCE: GK

CASH IMPACT						
	YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
Number of new branches each year		7	60	92	105	105
Total person-days to configure MIS at new branch		1	1	1	1	1
Cost savings from elimination of need to configure MIS at branches		72 USD	749 USD ⁶	946 USD	2,849 USD	2,849 USD

⁵ Hardware costs are ignored here, since it is assumed that the requirement of having a PC at the branch is independent of particular software, and even a decentralized system requires a server for data consolidation.

⁶ Amounts increase in Years 2, 3, and 5 because new products are introduced in these years that would otherwise have required visits to all branches for installation.

REPORTING

Like any financial institution, an MFI must routinely consolidate information and close its books to obtain a picture of the current state of the business. Because MFIs largely operate through branch networks, results from each branch must be calculated, and then results from all branches are consolidated at the head office. This can require significant time each month for branch employees, time that could otherwise be spent recruiting new customers or working with existing ones. To assess the impact of Mifos in this area, we evaluate the average number of person-days required to prepare monthly reports at the branches and to consolidate them at the home office. We then compare the total person-days spent annually on this task across the institution before and after Mifos. We expect to see a reduction, as Mifos automates and simplifies reporting and eliminates manual data consolidation. Any reduction is reflected in our financial analysis as saved labor cost.

Because reporting requirements evolve over time, we simplify the analysis by assuming (unless interviews indicated otherwise) that reporting requirements immediately following Mifos deployment are the same as they were before, ignoring changes that might be introduced later. Table 9 shows the changes in reporting effort reported by GK and enda, respectively.

The great reduction in time spent preparing reports at the branch level at GK is consistent with our hypothesis, and given the rapid expansion of GK's branch network the returns represent a very significant annual savings. The smaller savings realized at the head office suggest that further investigation is needed. It is known that some reports required by management at the time of our assessment were not supported by the existing reporting capabilities in Mifos. These capabilities have since been

significantly enhanced by the adoption of a more robust reporting engine, which is now a standard feature of all Mifos deployments. Accordingly, we expect to see more improvement in future case studies.

The very different results at enda, however, were unexpected. Upon further investigation, the problem here does appear to be related to Mifos. After deployment, enda experienced problems with reporting, because Mifos allowed errors in data entry that later had to be corrected manually, consuming additional staff time preparing and verifying reports. After consultation with enda, solutions for these issues were identified and have been scheduled as part of an upcoming release of Mifos. In addition to these changes, the Mifos team has introduced JasperReports, a new and much better reporting engine, as part of the Mifos offering. This will add flexibility, speed, and power to the reporting services provided by Mifos. Although these improvements did not occur early enough to be reflected in this case study, we anticipate that future evaluations will confirm a dramatic improvement in reporting times for Mifos. Accordingly, we assume that, by Year 3, when all updates will be fully deployed at enda, reporting times will again be what they were before Mifos, and that in Years 4 and 5 they will decrease by 30 percent as the full benefits of these changes are realized.

PRODUCT DEVELOPMENT

It is essential to an MFI's success that it be able to evolve its product line over time. The ability to roll out new products and do so quickly not only means good customer service but also creates an opportunity to capture incremental revenue. As noted above, in a decentralized system, each time a new product is rolled out staff from the home office must visit each and every branch to update local computers with the new product offering. This takes time. During that time, no new revenue from those products is being

TABLE 9. STAFF TIME FOR MONTHLY REPORTING (IN TOTAL ANNUAL PERSON-DAYS)(AMOUNTS IN USD)

		YEAR 0	YEAR 1
GK	Total annual person-days to compile monthly reports (per branch)	15	4
	Total annual person-days to compile consolidated monthly reports at head office	84	60
ENDA	Total annual person-days to compile monthly reports (per branch)	6	12
	Total annual person-days to compile consolidated monthly reports at head office	72	144

TABLE 10. NEW PRODUCTS' TIME-TO-MARKET: GK

	YEAR 0 (ACTUAL)	YEAR 1 (ACTUAL)	YEAR 2 (PROJECTED)	YEAR 3 (PROJECTED)	YEAR 4 (PROJECTED)	YEAR 5 (PROJECTED)
Number of new products to be introduced.			1		1	1
Total days' delay in product availability when having to visit all branches to configure new products in MIS.			110		172	172
Total incremental revenue from faster time-to-market for new products.			689,065 USD		1,413,825 USD	2,290,397 USD

produced. With Mifos, on the other hand, the rollout is immediate and new products begin to generate revenue right away.

We capture the value of this incremental revenue using projections of the number and timing of new products to be introduced (provided by the MFI) and an estimate of the number of days required to complete the configuration of each new product at all branches.⁷ Because new products are not adopted by all customers, we make an assumption about the number of customers who would typically adopt a new product in the first year (again based on the past experience reported by the MFI). Using these data, we can calculate the number of days it takes for a new product to actually reach customers under the old decentralized system. Under Mifos, because new products are available immediately upon release, those days are now days that the product is generating incremental revenue. Table 10 illustrates the impact of this acceleration at GK.

In our interviews, GK reported that it assigned only one person to visit branches to provide technical support. This naturally leads to the conclusion that there would be long delays in product availability while that person visited all branches. In reality, we recognize that it is unlikely that an MFI would accept a delay of many months in making new products available, and in future applications of this analysis we will adjust the model to account for increased

staffing that would almost certainly occur as the branch network grows.

As noted above, technical staff at enda had devised a work-around enabling them to configure new products in their previous system without having to visit branches in person. For this reason, Mifos had no noticeable impact on the time-to-market for new products.

PROJECT EXPENSES

Although there is no software license fee, Mifos is not free. Mifos certainly helps an MFI reduce costs and increase revenue, but adopting Mifos costs money. To accurately reflect the real financial benefits of Mifos, these costs must be accounted for. The summary financial analyses above itemize all routine expenses, such as hardware, connectivity, technical support staff, and training for end users. Throughout, we included only expenses incremental to Mifos adoption. So, for example, if the MFI already had Internet connectivity at all branches, we excluded that, but if connectivity had to be installed as a condition of supporting Mifos, we included it. In addition, we have included a somewhat generous budget for continued feature improvements to Mifos. These may not be necessary, but it is an important premise of the open-source model that an MFI can make these improvements if it wishes to, and we assume that providing for that possibility will be a part of any Mifos customer's budgeting.

⁷ Since the development of this case study, in April 2010 enda made plans to introduce an agricultural loan functionality that will be enabled by Mifos. However, since that product will be introduced after the date of this particular case study, we have not incorporated the value of the agricultural loans into the impact assessment.

KEY LEARNING FROM THE CASE STUDY

The genesis of this case study was as an effort to better understand the value Mifos can provide to MFIs in order to improve their products and increase the value they deliver. The effort has been well rewarded, leading to important insights about Mifos and its customers. At the same time, much has been learned about the case study process itself. This case study is the first in a series, and just as we expect improvements in the product and associated services to result, we look forward to improvements in the preparation of future case studies as well. Key insights and proposed improvements are summarized below.

ROI ANALYSIS IN PERSPECTIVE

As noted above, direct financial returns from an investment in Mifos are not the only, or necessarily even the most important, benefits that result. Both GK and enda benefited significantly from their respective investments, despite differing levels of financial return. Nevertheless, it is an important goal of these case studies to refine and improve the ROI model with each successive application to a new institution. The experience of these first two applications leads us to several important conclusions about the ROI approach in general.

- **It matters what kind of MIS, if any, is in place when Mifos is introduced.** Moving from a decentralized to a centralized system has very significant benefits. Moving from a manual (paper-based or spreadsheet-based) system directly to a centralized system like Mifos would, we must assume, have even greater benefits. Moreover, certain system features, including the reporting function, affect staff time much more directly than many other features do.
- **ROI is very sensitive to overall growth in clients, branches, staff, and new loan products.** An MIS is a necessary, but not sufficient, condition of growth. It enables but does not guarantee growth. MFI management must balance different considerations in their business planning, and there are many good reasons why an MFI might want to halt growth, at least

temporarily, in order to better address other operations issues. Mifos gives management the capacity to grow when they seek to, but it is not a reflection on Mifos that growth does not automatically accelerate at the time it is introduced at the MFI.

- **The financial returns introduced by Mifos are clearly related to the core business model of an MFI, although it is not yet clear exactly how.** Most importantly, there are significant differences associated with the choice of a group lending model versus an individual lending model, especially because the role of loan officers is quite different in each case. Loan officers are the front-line customer interface for MFIs, and therefore they are the primary engines of both new business and customer loyalty. They also constitute an MFI's single largest operating expenses. For these reasons, the differences between individual and group lending models will always be consequential for the ROI from any MIS.
- **Financial returns and other benefits of Mifos are not automatic.** An MFI must take steps to integrate Mifos into its business operations and must exploit Mifos to advantage by adjusting its business goals and processes. For example, Mifos might free loan officers from reporting tasks, but this will not translate into solid ROI unless the time saved is effectively converted into increased caseloads, a change that might require other process adjustments or better training.

IMPROVING MFI RESULTS

When Mifos was first delivered to GK and enda, it was expected that these two institutions would be able to successfully align their business processes with the capabilities of the software in order to exploit it to maximum advantage. This expectation was unfounded. To varying degrees, each institution made the best attempt it could to use the software effectively, but neither made

a systematic effort to evaluate business processes and identify ways to effectively integrate the software.

Expectations concerning local vendors of technical assistance also proved to be mistaken. Mifos is enterprise software. As such, setting up an MFI, migrating data, customizing the application, and training users are all tasks requiring technical expertise. It was expected that MFIs adopting Mifos would use local resources for these support services, relying on the core development team in Seattle only for limited back-up support. However, early efforts by local companies to manage Mifos deployments ended poorly, and the core team had to intervene, sending skilled staff to Bangalore and Tunis to manage the deployments, including the recruitment and supervision of replacement vendors.

As a result of these experiences, the Mifos team now takes a modified approach to Mifos deployment. Key changes include these:

1. Development of a standardized package of consulting services to accompany each deployment. These services include:

- A workshop for MFI staff on mapping business processes, followed by a mapping of core business processes by MFI staff
- A review of business processes and ways to optimize them, in collaboration with MFI staff
- Documentation of key business goals and an assessment of technology needs, leading to a written organization-wide technology plan delivered to MFI executives
- Documentation of requirements for additional software and hardware (beyond Mifos) and, where requested, evaluation and recommendations of specific products, and
- Development of a human resource plan and a budget for appropriate management of technology systems on an ongoing basis.

2. Development of a standardized deployment plan and methodology, including the following essential steps:

- **Assessment and planning.** Includes a gap analysis for product features, resource inventory, project team identification, and briefing.
- **Review of technology infrastructure and Mifos configuration and setup.** After assessing connectivity, power, server hardware, and so on, a plan for remedying deficiencies is put into action before Mifos configuration begins.
- **Development of reports.** Any required special reports are defined, and report development begins.
- **Data migration.** Source data is analyzed, cleaned, and transferred to Mifos.
- **User acceptance testing, training, and live test rollout.** Completion of any customizations is verified with the customer, and a small-scale pilot test is performed to confirm that Mifos is properly configured and operating as expected.
- **Pilot rollout.** An initial controlled rollout to a small number of branches is initiated by Mifos personnel while MFI staff observes and receives training on completing the rollout to all branches.

The steps described above are not unique to Mifos. In rough outline, they are typical of any enterprise software deployment. Yet these steps, and the project management skills to execute them successfully, were largely lacking in the partners initially selected to assist both GK and enda. When it became clear that appropriate skills were unlikely to be available locally, the Mifos team moved aggressively to define and document the deployment process with the expectation that it would later provide training and support to a network of local support providers. The Mifos team continues to test local deployment partners around the globe, but to date has experienced inconsistent success working with regional IT service providers. The challenges faced by third parties trying to customize Mifos have led

to a reassessment of the application code and additional investment in the creation of deployment tools and documentation. The Mifos team recognizes that success as an open-source platform ultimately requires that end users be able to customize the application successfully themselves. While possible, customizing Mifos remains too difficult for all but a handful of experienced software engineers who have extensive exposure to the code base. In response to the experiences with GK and enda, a concerted effort is now underway to make the overall application much easier for third parties to modify.

CASE STUDY IMPROVEMENTS

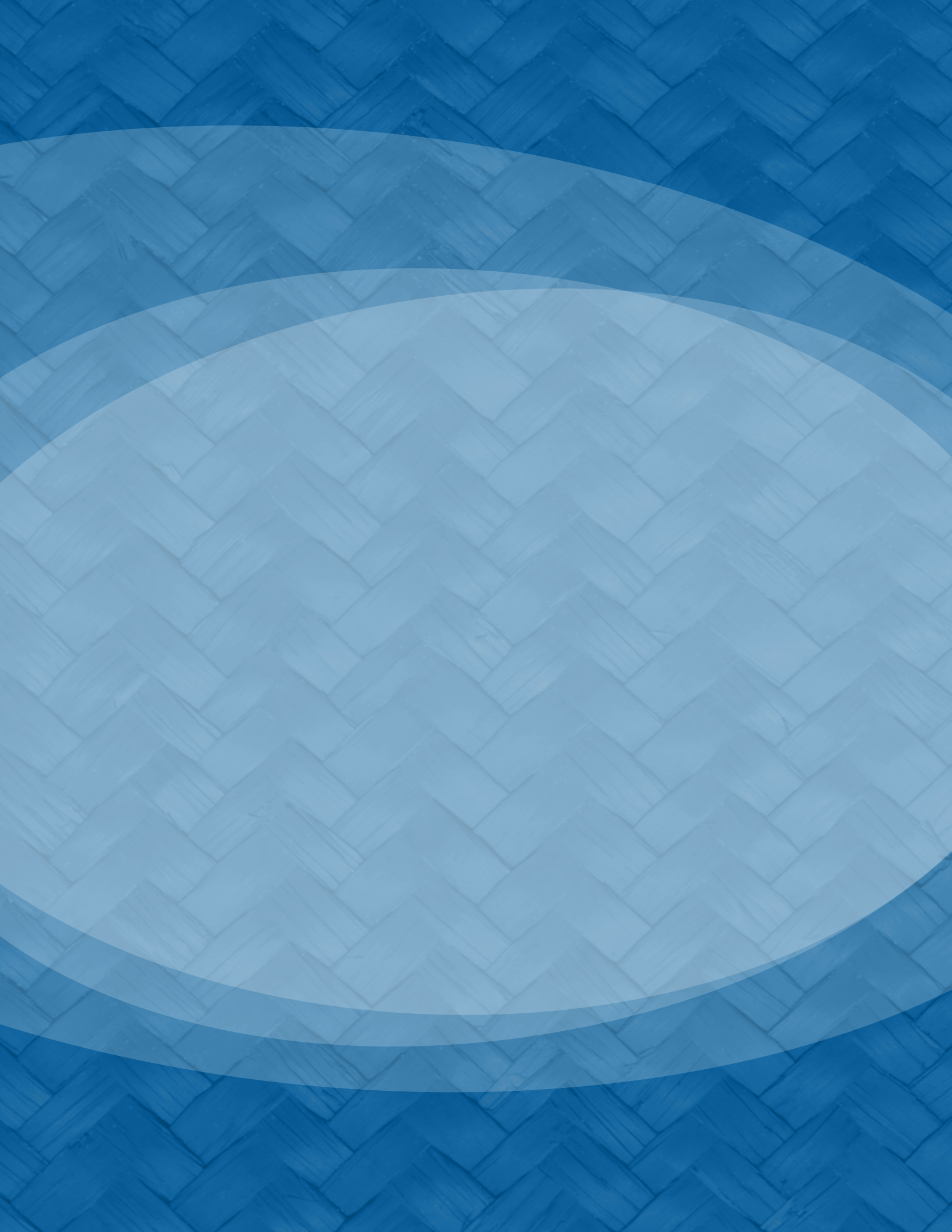
As noted earlier, these case studies are the first of their kind for the Mifos team. They were initially conceived as part of an effort to document the value of Mifos for potential customers. The initial focus was on financial returns only, but the case studies have expanded to include a review of other aspects of these engagements.

The team gained valuable experience from these two cases and has made significant changes in its approach to future case studies. Those changes include the following:

- **Improved baseline data.** The present case studies were initiated long after the deployments were complete. This meant that critical baseline data was not collected in real time and there was little opportunity to confirm reports that depended on individual memories. In addition, there are opportunities to improve data collection techniques and instruments, giving greater structure to data. Data collection for future case studies has been integrated into the deployment process, assuring more complete and accurate baseline information.
- **Corrected system maintenance.** The initial ROI analysis took into account only the cost of opening new branches and overlooked the potentially much greater cost of routine software updates to existing branches. This has been corrected in the latest revision of the model.
- **Product development.** The method used to calculate the time-to-market for new products (under a decentralized MIS) has been changed to improve accuracy.
- **Loan processing time.** The length of time it takes from a loan application to loan disbursement has an impact on both customer satisfaction and potential increased revenue. No data on this was collected at GK or enda, but it has now been added to the model.
- **Arrears. Past-due loans** (also known as 'PAR' or 'Portfolio at Risk') are a key measure of the financial health of an MFI. Better tracking should reduce this. Omitted earlier, this has now been included in the model.



Clients in Bangalore gather for a borrower meeting, a critical aspect of Grameen Koota's group lending model.





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