TECHNICAL NOTE

CGAP

BUSINESS INTELLIGENCE: A BEDROCK OF SUCCESSFUL DIGITIZATION IN MICROFINANCE

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DISCLOSURE

The dashboard graphics displayed throughout this publication are illustrative and do not refer to any particular institution.

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RIGHTS AND PERMISSIONS

CONTENTS

Introduction

In 2021, a series of CGAP publications featured success stories from microfinance institutions (MFIs) implementing digital products and channels, along with the common challenges they experienced.[1] One publication, "Digitization in Microfinance: Case Studies of Pathways to Success" (Flaming and Jeník 2021), showcases how the most advanced MFIs generate value through digital implementation. These MFIs leverage their own data sources both for automated loan decisioning and for generating performance reports. The reports translate into the ability to measure customer and business value creation—a core capability of successful digital implementation. However, many MFIs are still in the very early stages of putting their data to use.

This body of work inspired a subsequent CGAP initiative to pilot an approach to data analytics in several MFIs that focuses on business intelligence, primarily monitoring customer adoption of new channels and services. This Technical Note presents an overview of the approach and initial observations on what it reveals for MFIs implementing new digital products and channels. It explains the assumptions about why it is important to measure customer behavior, which customer behavior is relevant to measure, and how to build a business intelligence practice that supports this competency.

Why is it important to measure customer behavior?

The way customers adopt new products and channels drives the creation of both customer value and business value, as illustrated in the following three areas: (i) product development, (ii) return on investment, and (iii) change management.

In the first area, product development, building products and channels that customers adopt requires timely insight into what they need and how their behavior changes when they engage with a new product or channel. Learning from customers and understanding them well are key pillars of customer-centric product development meant to ensure high customer uptake and sustained usage, as the CGAP Customer-Centric Guide illustrates.[2] This is particularly important in any digital implementation that introduces clients to products and channels that significantly change the way customers interact with a financial institution.

The second area relates to measuring the creation of business value, which provides a more accurate perspective on the value of digital implementation than other approaches that guide investment in technology. Return on investment (ROI) in technology can be difficult to measure unless the institution has a complete understanding of how the investment impacts revenue and expenses. An incomplete understanding can lead to suboptimal investment decisions. For example, MFIs commonly expect fee income from agent channels to cover operating costs, which often leads to high fees that discourage customer adoption. However, the MFI may realize additional revenue from transactions customers conduct in the channel. For example, customers may reduce their branch and ATM transactions as they shift to agents. They could increase their deposit balances, which would supply the MFI with low-cost funding. Customers may also renew their loans more frequently because they find disbursement and repayment more convenient in the agent network. All of these behaviors change the composition of MFI expenses and revenues in ways that traditional financial reporting is rarely designed to capture.

The third area concerns change management, where timely indicators of customer adoption trends help leaders manage the change process. Digital implementation often takes significant time and investment before it generates results that can be measured by existing financial indicators. Resistance to change can easily grow in this early phase unless MFI staff, management, and the board see customer behavior trends that are easily projected into indicators of better performance and future financial success.

1 All CGAP publications on the topic of MFI digitization can be found at: www.cgap.org/microfinance.

2 See the CGAP Customer-Centric Guide at: https://customersguide.cgap.org.

Which customer behavior should be measured?

Customer behavior analysis is a search for patterns in customer behavior over time. MFIs routinely report on product performance, service volume, and number of customers. But business owners need more granular information to build products and channels and to monitor customer adoption. For example, it is common to see reports with statistics like "X percent of transactions are now made in our agent network." However, business owners need to know which customers are—or are not—making those transactions (e.g., segmented by age, gender, income level, location), which transactions they perform, whether they are saving more, or whether they use more services than branch customers.

A combination of data analytics and qualitative research can answer such questions. MFIs can analyze their data to segment their customers by behavioral patterns, then use qualitative research methods to understand which parts of the customer experience drive a behavior.

CGAP uses a core library of dashboards to segment customers by whether they use digital products and channels or traditional branch-based channels, then compare their basic transaction, deposit, and borrowing behavior over time. Each MFI's dashboard library typically grows proportionally to its business intelligence maturity. The business owner or the practice team's data analyst sees patterns and analyzes them in greater depth. Once a trend emerges, it is often useful to conduct qualitative research to understand more about the customer perspective. The findings typically provoke further analysis and the process becomes iterative and perpetual.

An MFI's dashboard library is built to compare the changes that occur in customer behavior as it introduces digital products and channels. Comparison requires a definition of the actions that qualify a customer as "digital." While this may seem obvious at the beginning of an exercise, the dashboards themselves will show whether segmentation reveals significant behavioral differences between traditional and digital customers. The business intelligence team may need to experiment with different criteria for a digital segmentation to identify which customer segments exhibit unique behavioral patterns.

The dashboards in the next section illustrate the discovery process, starting with a *customer acquisition trend dashboard* that introduces a segmentation between traditional customers and customers adopting digital channels and services. Three activity dashboards are used next: *a customer transaction activity dashboard* to segment customers by activity level, comparing activity levels of traditional and digital customers over time; a *customer transaction profile dashboard* that shows which transactions active customers perform monthly; and a *customer transaction journey dashboard* that shows the average number of transactions each customer performs in their first 24 months with a company.

Next, a *customer deposit behavior dashboard* segments customers into low, medium, and high deposit balance customers. A *customer deposit journey dashboard* also shows the average growth in deposit balances during the first 24 months of a customer's engagement with a financial institution. Finally, a *loan renewal rate dashboard* shows how many customers renew loans within six months of paying one off.

CUSTOMER ACQUISITION TREND

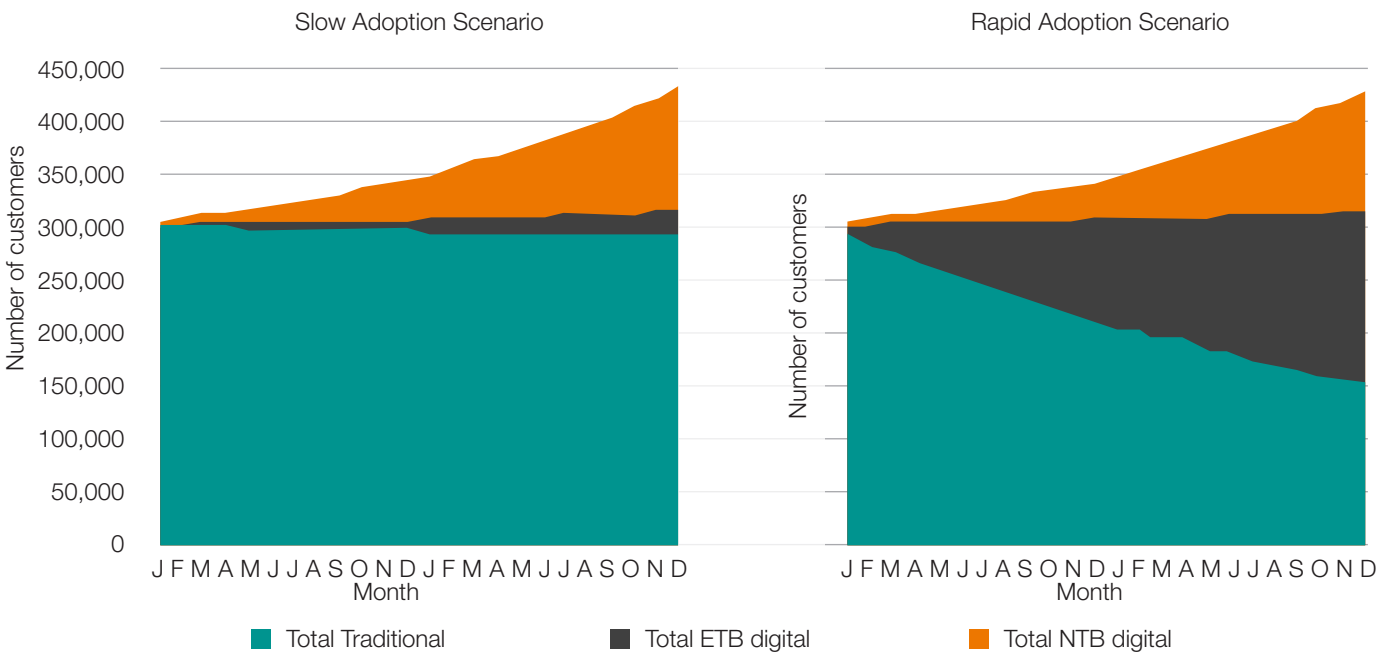
The customer acquisition trend dashboard anchors an analysis with an overview of customer growth that shows which customers are adopting newly introduced digital products and channels. This dashboard shows how fast customers are adopting traditional and digital products and channels. For this purpose, a base customer segmentation is necessary, dividing customers into three groups:

1. **Traditional customers** who continue to use physical branch-based channels and do not adopt any digital products or channels
2. **Existing to bank (ETB)** customers who adopt new digital products and channels
3. **New to bank (NTB)** customers who join a bank and immediately adopt new products and channels

The two versions of the dashboard shown in Figure 1 illustrate the different patterns CGAP sees in its research.

The dashboard on the left illustrates an MFI that launches new digital channels and products and attracts new customers but sees limited adoption among its traditional customers. This can occur, for example, when a bank

FIGURE 1. Customer acquisition trend dashboards



partners with a mobile money operator (MMO) that generates new credit clients for the bank in a partnership arrangement. It can also occur when an MFI launches an aggressive customer acquisition campaign through a digital channel (e.g., remote sign up).

The dashboard on the right shows a situation in which a significant number of ETB customers adopt new channels and services at the same time that NTB customers join the bank as digital users. This scenario seems to indicate a successful digital implementation that is attractive to both mature and new customers. This interpretation rests on whether the MFI's definition of "digital customer" represents meaningful customer behavior. CGAP has seen MFIs classify their clients as digital simply because they signed up remotely or because customers involuntarily receive their loan disbursement in a linked mobile money account. More detailed analysis may reveal that these customers do not behave any differently than traditional customers. In general, CGAP finds that customers who *voluntarily* adopt a new digital product and channel are more likely to use it in ways that are different from traditional customers.

In either scenario, the dashboard reveals how fast the MFI is growing and how both mature and new customers are adopting digital products and channels. It presents useful information about customer acquisition performance and creates a baseline to observe changes over time.

CUSTOMER TRANSACTION ACTIVITY

Customer transaction behavior is a primary indicator of whether digital implementation is driving changes in transactions.

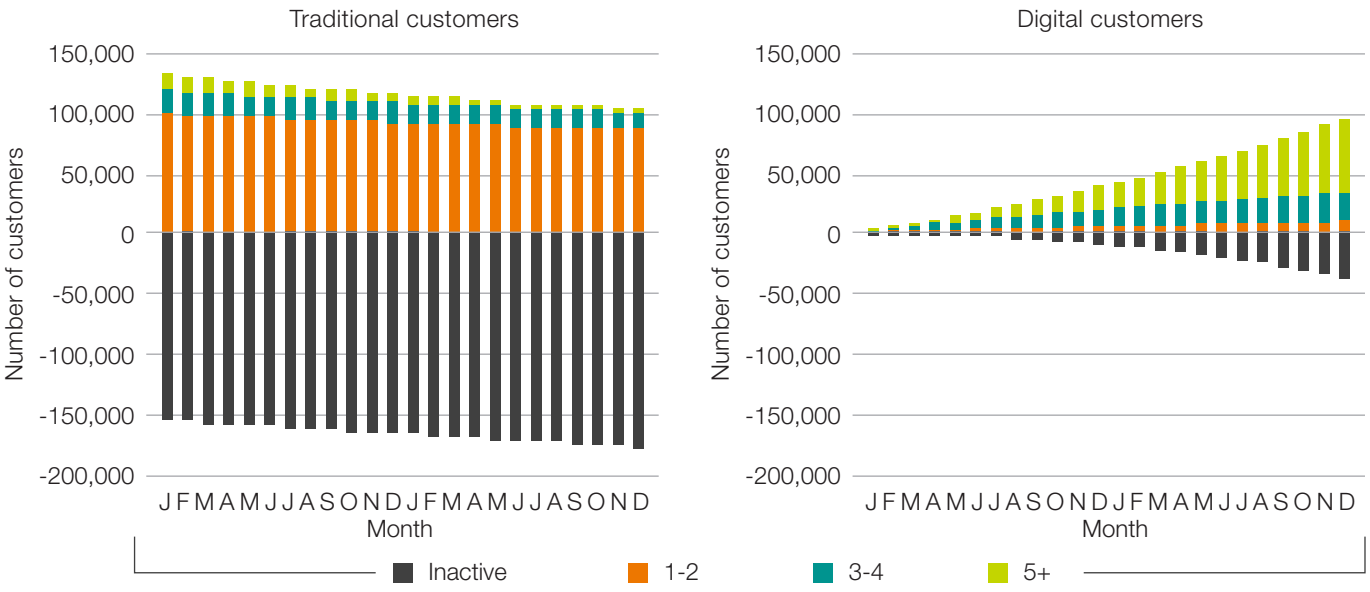
The dashboards in Figure 2 show customer transaction behavior for two customer segments: traditional customers and digital customers. They provide a high-level overview of trends in inactive and active customers. Customers in these dashboards are segmented by level of transaction activity:

- Black bars with negative values[3] represent the number of customers who do not perform a monetary transaction in the month.
- Stacked bars with positive values indicate the number of customers who perform 1–2, 3–4, or 5+ transactions in the month.

The dashboard on the left (traditional customers) shows a common scenario. A very high percentage of traditional clients do not conduct a single monetary transaction each

3 Negative values are used in the figures because they create a visual clarity that makes it easier to see the evolution of active and inactive categories.

FIGURE 2. **Customer transaction activity dashboards (number of transactions/month)**



month. Most active traditional clients only perform one or two transactions per month, for several reasons:

- It is common for an MFI to accumulate inactive customers over time if it does not close inactive accounts.
- Many active customers become digital customers as they adopt new digital products or channels. This leaves inactive clients in the traditional category.
- Traditional products and channels are difficult for many customers to use and the MFI has a long history of clients abandoning its services.

The dashboard on the right (digital customers) shows that this type of customer is growing and more active, with less inactive customers and more customers in the 3–4 and 5+ transactions per month categories. However, even this overall positive scenario reveals some trends that are important for ongoing product development efforts:

- It is common to see a growing segment of inactive digital customers as well—an indication that customers try out then abandon new services.
- In some cases an MFI's total number of digital transactions grows while the number of active digital customers decreases. This happens when a small number of super-users adopt new products and channels while a large and increasing number of clients abandon services.

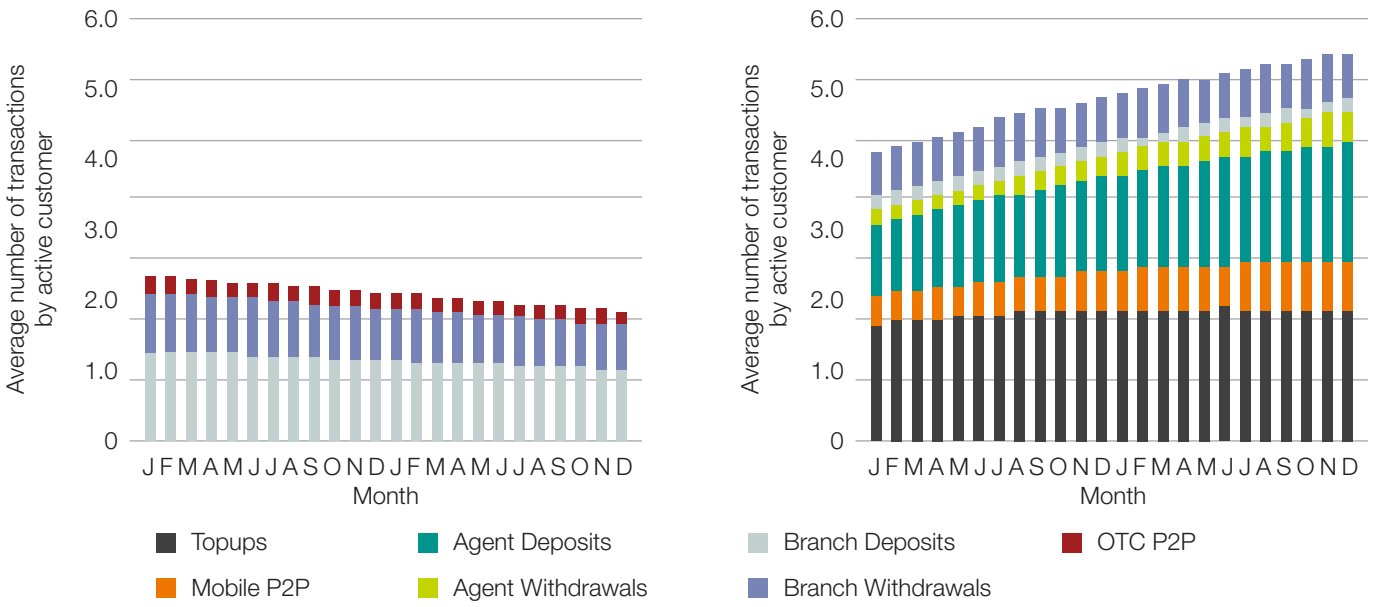
Even at a high level, the customer transaction activity dashboard is quite revealing about the long-term trends in customer acquisition and retention. For many MFIs, it reveals a significant number of inactive clients and shows that MFIs are operating with a much smaller active customer base than the total number of customers reported. The dashboard also segments customers by the metric of transactions performed per month, which provokes a question about what kinds of transactions customers are performing. The next dashboard analyzes that issue.

CUSTOMER TRANSACTION PROFILE

The dashboards in Figure 3 show the average number of transactions conducted by active customers each month, broken down by transaction type. They reveal which services customers use, and how often. This type of dashboard is often useful for tracking changes in a transaction profile as a financial institution adds new products and services.

The dashboard on the left shows a distribution of relatively homogenous use cases that do not significantly change over time. This is frequently seen in the traditional customer segment. The consistent pattern over time seems logical, given that these customers have not adopted new digital products and channels and continue to transact as they have in the past. The distribution of transaction types

FIGURE 3. Customer transaction profile dashboards



often reveals that traditional customers use the MFI for a modest number of use cases, typically a loan repayment or perhaps infrequent deposit activity.

The dashboard on the right shows a wider array of transaction types that change over time. This scenario is more common in MFIs that introduce new products and channels which inspire customers to adopt and transact more frequently.

The customer transaction profile dashboard can launch a rigorous assessment of customer adoption of different products and channels. MFIs commonly find that most active customers repay their loans while a relatively modest percentage actively use deposit and payment services.

CUSTOMER TRANSACTION JOURNEY

The customer transaction journey shows how activity levels change during a customer's first 24 months with an MFI. This can be an important indicator of whether a company is successful at encouraging customers to increase their use of its services.

While the dashboards in Figures 1, 2, and 3 segment digital and traditional clients, they present *average results* for each customer segment. The transaction activity dashboard shows that customers significantly vary in the number of transactions they perform per month. However, when an MFI reports that "our average customer performs three transactions per month," the behavioral differences between segments are lost. Even with better segmentation, average monthly behavior does not reveal how individual customers change their behavior over time.

The customer transaction journey shows how a customer's behavior changes from their first month with an MFI. In this dashboard, the horizontal axis is a timeline that starts the same month the customer joins the MFI and extends through the next 24 months of their customer journey.

The orange line in Figure 4 shows that on average, traditional active clients do not significantly change their transaction behavior over time. This behavioral pattern is typically associated with modest transaction behavior and simple use cases, like repaying a loan or modest deposit behavior. The blue line shows more dynamic behavior as digitally active clients join the MFI then increase their transaction frequency over time.

This dashboard provides a more dynamic view of individual customer behavior. However, it is still an average of all clients. The MFI can decide to run a customer journey profile on more granular customer

FIGURE 4. Customer transaction journey dashboard

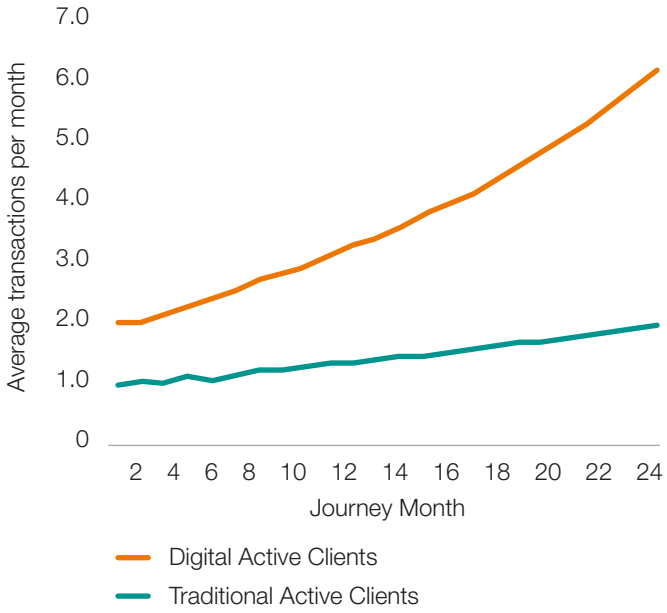
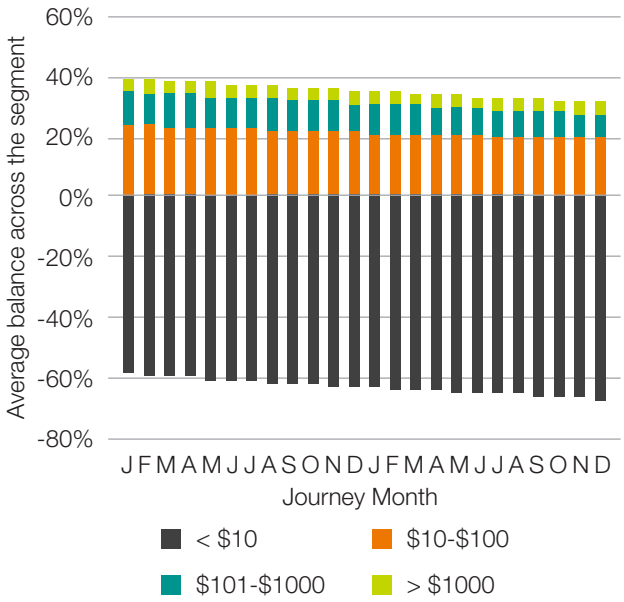


FIGURE 5. Traditional clients by deposit balance segment



segments to get a precise look at the behavior of low and high transacting clients over time.

CUSTOMER DEPOSIT BEHAVIOR[4]

Customer deposit behavior dashboards (Figures 5, 6, 7, and 8) show whether customers are low, medium, or high balance savers and whether that changes over time as the financial institution introduces new products and channels.

These dashboards segment customers by deposit activity levels in a similar fashion to the transaction dashboard. Zero balance customers are represented by the black bars with negative values and positive balance customers are segmented into low, medium, and high balance categories.

The dashboard in Figure 5 shows a common scenario, with large numbers of dormant deposit accounts. With an MFI that has recently launched digital channels, many of its more active customers will adopt the new channels and therefore migrate from the traditional to the ETB digital segment. This explains the decline in total number of traditional clients.

Segmenting active savers can also reveal important trends. Some MFIs heavily rely on high value deposit customers while others have a broader base of mass market customers with more modest balances. Each represents very different customer segments and different deposit mobilization strategies.

The dashboard in Figure 6 shows the ETB digital segment, which is typically populated by active clients who are first adopters of new channels and services. This often more active deposit base trends toward more medium and high balance accounts.

The dashboard in Figure 7 shows the behavior of NTB digital clients. Here, growth can be seen in higher value accounts. The percentage of active savers remains high even as the MFI adds clients. The black bars indicate a persistent level of dormancy, which can be explored through qualitative research with that segment.

CUSTOMER DEPOSIT JOURNEY

When an MFI rapidly adds new clients, these dashboards can obscure important differences between mature and new clients. Here again, the customer journey dashboard can be used to track the evolution of customer behavior over time for different segments.

4 Some MFIs may not take deposits due to regulatory limits.

FIGURE 6. ETB clients by deposit balance segment

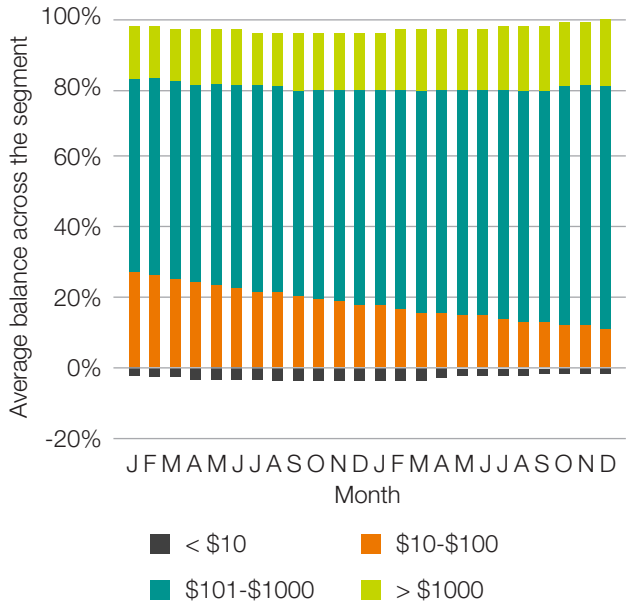
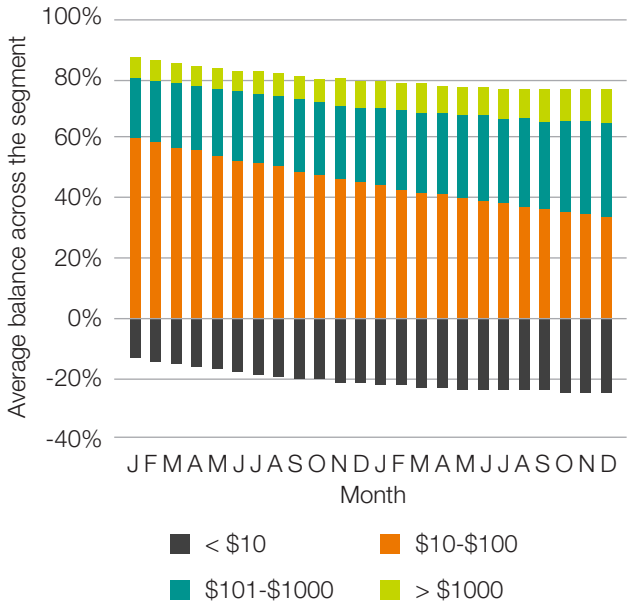
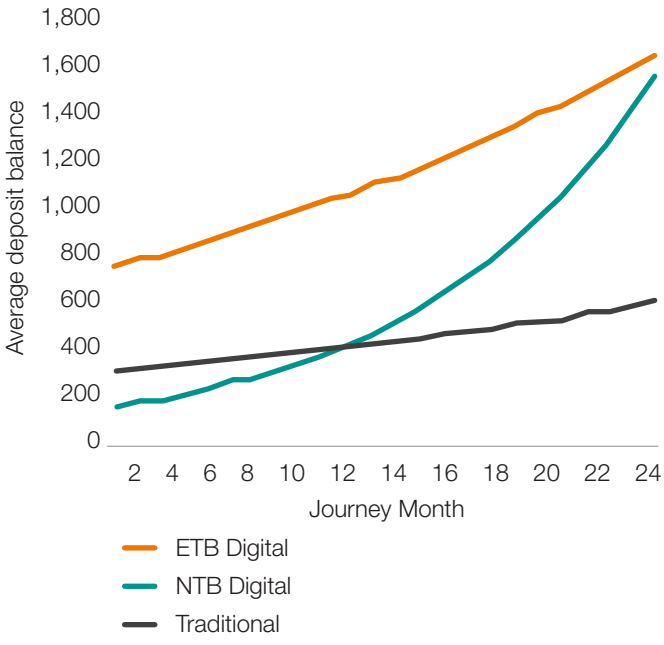


FIGURE 7. NTB clients by deposit balance segment



The example in Figure 8 shows ETB digital customers as high value customers who adopt digital products and channels. NTB digital customers start with a modest balance but quickly grow. Traditional customers show only modest growth over time. This type of analysis can be run on different segments for a more granular view. For example, one MFI that segmented deposit customers into low, medium, and high value categories then ran the customer deposit journey dashboard to compare how digital and traditional customers in each category evolved over their first 24 months with the MFI. The MFI discovered significant differences between value segments. Importantly, segmentation revealed that customers in the low value segment rapidly increased their balances. This insight changed the company's view on the long-term value of that segment.

FIGURE 8. Customer deposit journey dashboard

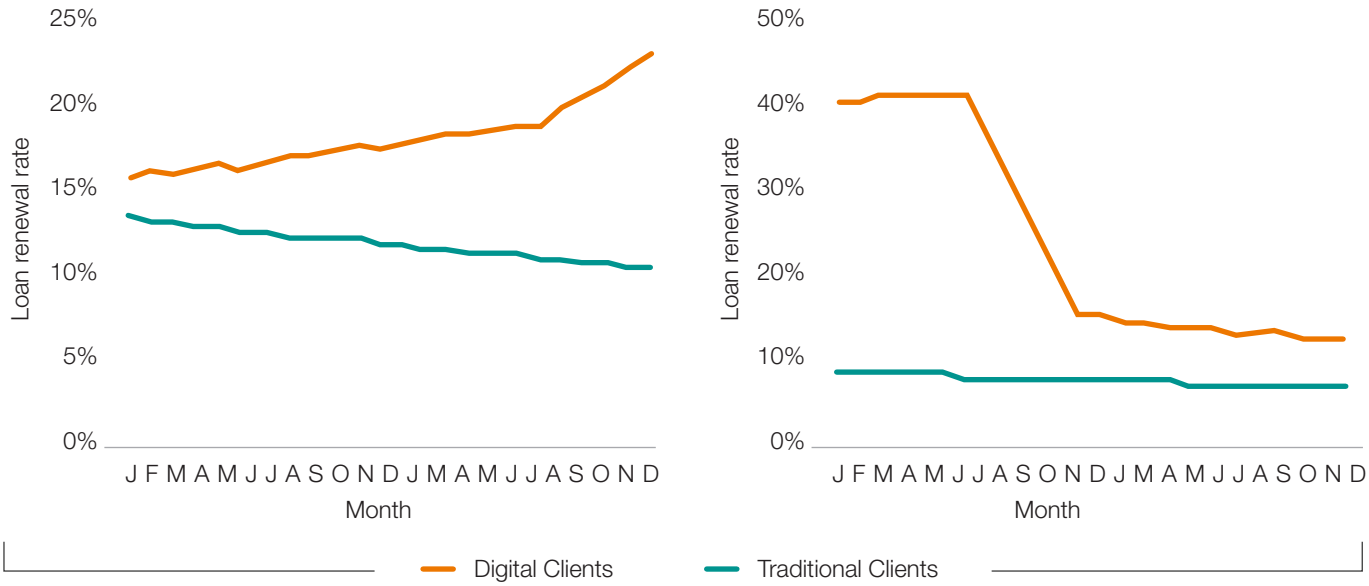


LOAN RENEWAL RATE

Credit is the primary business line for most MFIs, with over half of monthly disbursements going to repeat borrowers. This means that credit customer retention—customers who return for follow-up loans—is vital to MFI financial performance. This kind of performance can be measured by calculating the percentage of clients who repaid their loan in the previous six months and have a new loan in the current month.

The dashboard on the left in Figure 9 compares the loan renewal rate for digital and traditional customers. It shows a healthy increase in the digital segment and a slight decline in the traditional segment. These shifts can happen, for example, when an MFI automates its loan

FIGURE 9. Loan renewal rate dashboards



renewal underwriting and disbursement procedure and creates a better customer experience for repeat clients.

The dashboard on the right shows a trend with a sharp decline in a once healthy renewal rate. This type of trend appeared, for example, in 2020–2021 during the COVID-19 pandemic when some MFIs significantly cut back on lending.

Transforming data analytics into business intelligence

The previous examples demonstrate focused exercises in data analytics. To generate actionable insights for the business owner, results must be pieced together, enhanced with additional segmentation, and supplemented with qualitative research. Every MFI must develop this type of practice. It requires competencies in data management, data analysis, and business/product ownership.

DATA MANAGEMENT

Most MFIs have a rich data set in their core banking system and associated modules. However, the core banking system reporting module likely will not provide the flexibility required for this level of data analytics. The data engineering team will need to extract and store the data in a data warehouse (DWH) where the analytics team can access it.

Most MFIs are already familiar with data extraction and warehousing. However, in CGAP's experience, most MFIs would need to dedicate time and resources to extract the data tables required for the dashboards, validate the data to ensure consistency between the DWH and their core banking system, then establish a routine of periodic updates. The process is iterative. It is common to find data anomalies during early validation checks. For example, duplication or similar problems with unique customer identification are common. Data analytics teams periodically ask for new data as their analytics practice evolves. All of this is manageable if the MFI has a data engineering team with the right skills, but typically this competency must be developed.

The MFI must also make choices about where to warehouse the data. It needs an on-premises server platform or cloud account that facilitates access for all users. The data engineering team needs to identify which platform meets all use case requirements. In its work, CGAP has noticed significant advantages to cloud-based options. A complete DWH requires millions of records and the cost of setting up a local platform with future capacity is very expensive. By comparison, cloud-based options are inexpensive and can be scaled as the MFI grows.

DATA ANALYSIS

Data analytics and visualization tools are now readily available. The data analyst will likely need to master a combination of SQL, Python, and R, as well as a visualization tool like Microsoft Excel, Tableau, or Microsoft Power BI.

The data analyst also plays a key role as liaison between the business team and the data engineering team. The business intelligence practice evolves as the business owner and data analyst explore ways to analyze customer behavior. New products also create new opportunities for analysis. The data analyst must communicate data requirements back to the engineering team and work with the business owner to adapt to the data's limitations. The role of data analyst is key to the success of the business intelligence practice. Over time, the data analyst increases their knowledge of data engineering and the business and develops the necessary analytics and visualization skills.

BUSINESS OWNERSHIP AND BUSINESS INTELLIGENCE

Business owners also play a core role in this approach to business intelligence. Ultimately, they are the ones who transform analytic insights into business strategy and implementation (e.g., tracking performance indicators such as renewal rate, revenue, unit cost across product lines and customer segments). They guide the analytics practice to the analysis and visualization that generates insights which are meaningful to the business line. MFIs can develop this competency through several actions.

Business intelligence should be developed as a business practice. Business owners should be tasked and resourced to produce business intelligence on their business lines, especially intelligence related to customer behavior. Therefore, it is often helpful for the data analyst to report to the business owner. While they may also report to the head of data, it is important to establish a clear line of accountability to the business owner. Accountability is conducive to the close teamwork the business owner and data analyst need to develop in their practice.

It is common for the data unit to sit in the IT department. That may also be the best place for the data engineering team. However, it is common to see suboptimal coordination between business units and data analysts placed in other departments. In that situation, the business owner often makes data requests that are not informed by the best way to approach a problem and can be uninformed about data limitations. As a result, the data team often simply responds that the data is not available. The process can become much more agile when business and data functions merge into a single team that works together to optimize data resources and build business insights.

Conclusion

This note demonstrates the importance of business intelligence and data analytics as a key component for successful digital implementation. It can help MFIs build the feedback loops they need to understand customers and how they respond to different digital products and channels. Business intelligence is also a basic tool of MFI financial management. When management is able to link customer behavior to specific income and expenses, it is better equipped to maximize business value creation.

The specific examples from the CGAP dashboard library showed the value of data and explained the importance of measuring customer behavior, which customer behavior is relevant to monitor, and how to build a business intelligence practice. More details on how to technically implement the dashboards can be found in the CGAP Microfinance Digitization Knowledge Hub.[5]

As with other digitization efforts, building robust business intelligence is an incremental process and MFIs can add more sophisticated analysis over time. This is also likely to happen since insights often trigger curiosity that leads to further inquiries and new types of dashboards, as mentioned in the CGAP Data Analytics Journey tutorial.[6]

5 See: www.cgap.org/microfinance

6 The video tutorial can be viewed at: https://youtu.be/9-VHCpJ0VGI

References and Resources

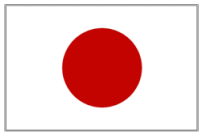
Flaming, Mark, and Ivo Jeník. 2021. "Digitization in Microfinance: Case Studies of Pathways to Success." Working Paper. Washington, D.C.: CGAP, October. https://www.cgap.org/sites/default/files/publications/2021_10_Working_Paper_Digitization_in_Microfinance.pdf

CGAP Customer-Centric Guide: https://customersguide.cgap.org

CGAP Data Analytics Journey video tutorial: https://youtu.be/9-VHCpJ0VGI

CGAP Dashboard library

CGAP Microfinance collection: www.cgap.org/microfinance



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