OPERATIONAL RISK MANAGEMENT TOOL 03

A GUIDE FOR FINANCIAL SERVICE PROVIDERS

Credit Scoring

ACCION

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Contents

1 What is a Credit Score?

- Scoring is a method of assigning a numerical value (the “score”) to a client in order to predict how likely he or she is relative to others to experience some event or perform some action in the future. This is predicated on the notion that past behavior is indicative of future behavior for populations with similar characteristics.

- By analyzing a sample of historical client and business data, trends are deduced to better understand (potential) clients and predict future events such as credit repayment.

Learn from the past | Understand the present | Anticipate the future

- This tool guide focuses on credit scores – a number that represents an assessment of the creditworthiness of a person, or the likelihood that the person will repay a loan. Financial institutions use scoring models to assess the credit risk of a borrower and aid in the credit evaluation processes.

- A score can be applied along the steps of the microfinance lending methodology, providing objective inputs to make the process more effective and enhance standards and controls. Credit scoring models are not intended to replace loan officers and other commercial staff, but rather to complement and facilitate their work by supporting assessment of willingness to pay.

2 Score inputs

Scoring modules analyze client data to identify trends that can help predict future behavior. There are many data sources which a score can use as input:

- **Socio-demographic data** such as client gender, age, civil status, business experience, time residing at current residence, type of residence, etc.
- **Behavioral data** which reflects the history of a client with an institution and may include variables such as: number of days past due at last month end, maximum number of days a client was delinquent, average number of days a client was delinquent, number of times client was more than 30 days delinquent; number of times client was more than one day delinquent, etc.
- **Credit Bureau data** which is collected by a third party and includes personal credit history with financial institutions (and sometimes phone/utility companies).

In recent years, microfinance institutions in collaboration with third parties have also been exploring newer, additional data sources to include in risk management tools like scoring models:

- **Psychometric data** comes from specifically designed questionnaires to determine a person's knowledge, abilities, attitudes, and personality traits. In microfinance, these principles can be used for credit scoring as well as to assess entrepreneurial aptitudes.
- **Big data** includes data from various sources outside of the institution, such as phone companies, utilities, retailers or social networks (e.g. Facebook, Twitter, LinkedIn).

3 Types of scores

Scores are characterized by the data source as well as the stage in the credit process to which they are applied, the degree of tailoring to an institution, and the technique used to generate the score.

Stage in the credit process (see also Applying Scores in the Credit Process):

- **Selection Score** is used by microfinance institutions (MFIs) to aid in the promotion to and evaluation of new credit clients, and often uses socio-demographic or psychometric data. Once new client data has been collected by the loan officer, a Selection Score can be generated in order to obtain the client credit risk level (e.g., high, medium or low risk). Depending on the client risk level, the MFI can choose appropriate client strategies such as more or less intensive credit evaluation procedures or approval conditions.

- **Collection Score** is used to establish the probability that an existing client will repay his/her credit and can be used to tailor overdue collection tactics. Based on the Collection Score result, an MFI can group their clients by repayment willingness and then generate focused overdue collection strategies. For example, a client with a high likelihood of repayment may receive a reminder phone call if one day past due on a payment whereas a client with a low repayment probability may require an in-person visit. A Collection Score provides MFI staff responsible for recoveries with a clear focus and direction for their efforts, leading to increased efficiency and reduced expenses.

- **Renewal Score** is used to optimize the client credit renewal process and is based on the client’s previous payment behavior with the MFI. Renewal strategies can be tailored according to the client risk level, ranging from simple and streamlined approvals for low-risk clients to more complex evaluations and approval processes for high-risk clients. Furthermore, an MFI can use Renewal Scores to segment clients by risk levels and develop targeted strategies to promote client loyalty and retention – for example, a low-risk client may receive preferential pricing when renewing a loan.

3 Types of scores

Degree of tailoring to an institution

A score can be considered generic or tailored depending on whether it is adapted to a particular institution:

- **Generic score** refers to a score developed for a particular product, client segment, or region, but not based on specific institutional data. Generic scores are typically used for new institutions or new products, before enough information is available to develop a tailored score.

- **Tailored score** refers to a score which has been constructed using the specific data of the institution to which it is applied. It is recommended to have at least two years of historical information to create a tailored score.

Scoring technique

There are two main techniques for generating a score:

- **Statistical Score** uses mathematical models and statistical software (e.g., SPSS) to identify patterns in the data. The methods used most frequently are logistic regression, decision trees and neural networks.

- **Expert Score** utilizes the knowledge and past experience of "experts" to predict future client performance.

4 Applying scores in the credit process

In a competitive and changing environment, MFIs need to be efficient in all processes, reduce costs, and manage credit risk if they want to survive and thrive in the long term. Research in relatively mature microfinance markets like Bolivia and Colombia has shown that the use of credit scores can significantly reduce an MFI's operational costs.

There are many different applications for credit scores and complementary tools along the stages of the credit process as illustrated in Figure 1 (the scores are shown in orange boxes):

- **Promotion**: A Selection Score is used to aid in the selection of new loan clients.
- **Credit Bureau Checking**: A Bureau Score is applied based on borrower data available in the credit bureau.
- **Approval**: Findings from the Selection and Bureau Scores provide valuable inputs into the credit approval decision.
- **Collection**: Collection Scores can be used to improve processes related to existing client collections.
- **Renewal**: Renewal Scores can be used to improve processes related to existing client loan renewals.

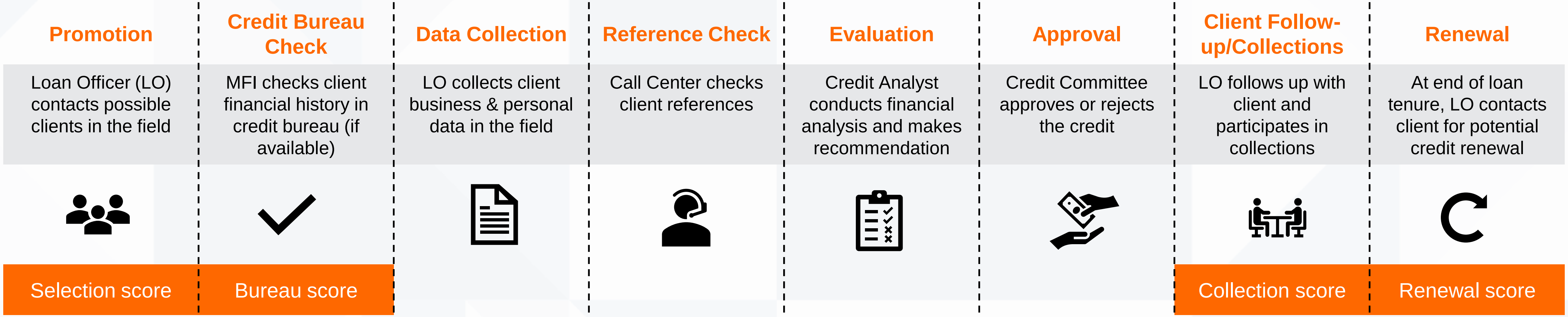


Figure 1: Credit scores in the credit process

5 Tool benefits

An MFI can gain multiple benefits from implementing a credit score. Most important among them:

- **Quality control:** Scores assess client quality factors and provide alerts for those clients who don't fall within expected norms.

- **Consistency in decision-making:** When using scores, an MFI doesn't need to depend exclusively on loan officer's perception when evaluating a potential client. Decisions are made within a standard framework or parameters set by the institution, increasing consistency.

- **Process optimization and control:** Greater transparency in the credit evaluation and overdue collections processes as a result of score usage makes it easier for the institution to oversee and manage the actions of the loan officers.

- **Regular follow-up and client satisfaction:** Client segmentation via scores allows for ongoing client follow-up, leading to better customer service and reduction in client desertion.

- **Improvement of MFI performance:** The use of scores facilitates the improvement of key processes and is expected to result in better overall performance, including:
    - Reduction in the portfolio at risk (PAR)
    - Reduction in the turnaround time for credit delivery
    - Increase in loan officer productivity (new and renewal credits disbursed per loan officer per month)
    - Improved overdue collections results (focused efforts allowing for greater staff efficiency and capacity)
    - Increased client retention as result of better client service and tailored strategies to reward good clients

6 Using the tool

When to use Credit Scoring

Usually an MFI will decide to use scoring techniques by developing a business case and comparing the potential benefits (e.g. efficiency improvement in a particular process) with the required effort and cost for implementation.

The MFI will also need to verify that the requirements for implementing a score are in place. The type of score selected and timing of implementation will depend on institutional required process improvements, available data, and available resources.

Many times, MFIs will begin with a renewal score (which leverages existing client data), and then implement a collection and selection score.

To maximize the investment, scores are best applied to products that comprise a large portion of the institution's client base or portfolio.

Who can use these reports?

- The **Chief Risk Officer** (or risk manager) is the owner of the score and uses it for credit risk monitoring and management.
- **Loan officers and/or branch managers** use client score results as input for strategies to work with (potential) clients and assist in the various steps of the credit process.
- **Senior management** (MD/CEO, Chief Commercial, Operations, and Financial Officers, heads of departments) can use scoring tools to better understand the institution's client profile and to optimize the MFI's processes. For example, for strategic reasons senior management may decide they are willing to take on additional risk to increase client approval rates by adjusting cut off rates for the score parameters.

Given the complexity of scoring, development and implementation is often handled by a specialized external consulting group in close collaboration with the senior management team and the risk department.

5 Using the tool

What is required to implement Credit Scoring?

Implementing credit scoring in a microfinance institution is complex and challenging. Success depends as much on effective score implementation and monitoring, as it does on the correct development of the score.

If these requirements are in place, a score can be developed in a few months. Pilot testing, score refinement, and full roll-out can take up to a year or more. Once implemented, the process of score monitoring and refinement is ongoing.

- ☑ **Strong willingness of senior management** to implement this tool including commitment of the necessary resources and attention
- ☑ **Implementation team and plan for score rollout**, starting with a pilot in select branches and then expanding to the whole institution
- ☑ **Strong and transparent credit processes** for client selection, evaluation, approval, disbursement, overdue collections, and renewal
- ☑ **Access to sufficient data** for the score – either socio-demographic, behavioral, or credit bureau
- ☑ **Technology unit with the capacity** to add and modify the score in the core banking system without disrupting the functioning of the system and the institution
- ☑ **Accurate portfolio database** with historical information about each client
- ☑ **Score monitoring and tracking tool** to assess whether the score is working correctly or not (proper monitoring will also require regular follow-up and analysis by a scoring expert).

7 Tool results

The following examples illustrate some typical credit score results:

Selection Score

- Figure 2 shows a selection score for a new client. The score is calculated in the system for each new client individually, once the client data has been entered on the system. The score can be retrieved by 1. Entering the client ID, 2. Requesting the score to be calculated, 3. Retrieving the score from the system. In the example, the resulting score is classified as low risk (‘Risco Baixo’).

- Figure 3 illustrates client segmentation by risk level. In this example, new clients are assigned a particular level of risk and segmented into risk categories: A+ (best clients, lowest risk) to F (worst clients, highest risk).

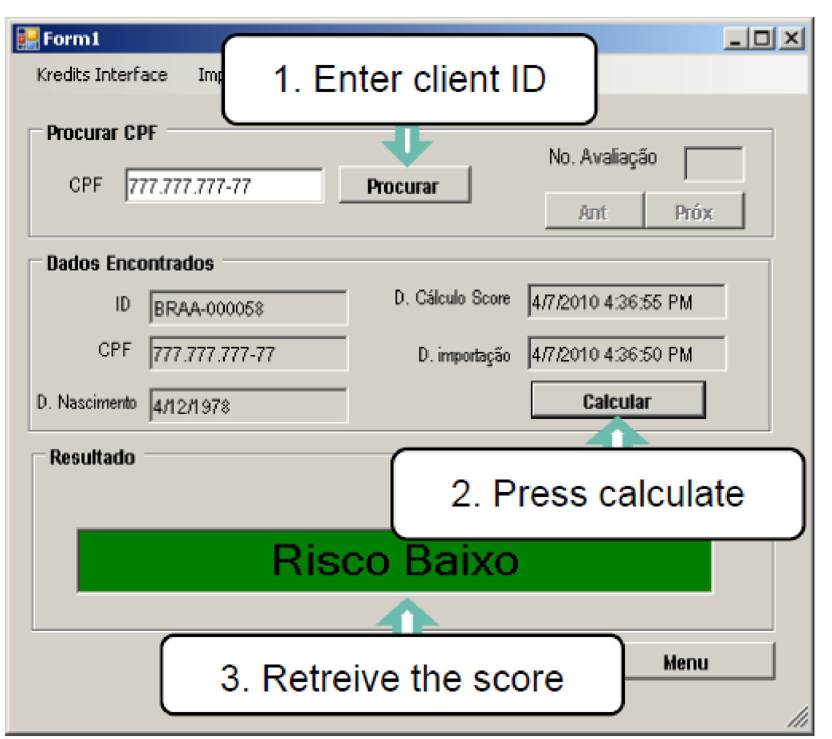


Figure 2: Selection score for a new client

SELECTION SCORE	Jan/14	Feb/14	Mar/14	TOTAL
Score for New Clients	664	761	658	2,083
Score A+	31	38	30	99
Score A	50	55	39	144
Score B+	77	90	68	235
Score B	83	103	92	378
Score B-	168	188	160	516
Score C+	71	70	65	206
Score C	133	153	143	429
Score C-	51	64	61	176
Score F				--

Figure 3: Client segmentation by risk level

7 Tool results

Renewal Score

- Figure 4 illustrates clients with loans that are soon to mature listed with client ID, information on their previous credit history with the institution and a recommended renewal evaluation classification, process and loan amount. This list can be used to prioritize clients for renewals and ensure a suitable evaluation process for the client risk level is applied:

Client ID	Previous loan amount ($)	Loan #	Loan Closure Date	Classification	Recommended Process	Recommended Loan Amount as % of Previous Loan Amount	Maximum Recommended Loan Amount	LO Name
15	10,000	8	13-Sep	Detailed	Business visit, update client information	90%	9,000	Joe
83	5,000	3	3-Sep	Pre-approved	Automatic approval, no need to update client information	150%	7,500	Paula
98	8,000	9	13-Sep	Reject	Reject the client	-	-	Brad
138	8,000	8	18-Sep	Reject	Reject the client	-	-	Tom
155	7,000	10	2-Sep	Full	Business and home visit, update client information	75%	5,250	Angie
158	5,000	3	10-Sep	Pre-approved	Automatic approval, no need to update client information	150%	7,500	Jackie

Figure 4: Clients with loans maturing

7 Tool results

Collection Score

- Figure 5 illustrates existing clients (identified by client ID) listed along with information on their past due payment(s) and a corresponding recommended overdue collection strategy (e.g. no action, phone call, staff visits with notification letters type A, B or C). Loan officers (and other commercial staff) use this list to prioritize their collection efforts and apply the appropriate overdue collection strategy.

Date of Execution	Client ID	Loan No.	Days Past Due	Overdue Collection Strategy*	Loan Officer
31-Aug	22	XY5672	18	LO, BM visit (Notification C)	Kwame
31-Aug	88	XY8760	20	LO, BM visit (Notification C)	Kwame
31-Aug	45	XY3642	11	LO, BM visit (Notification B)	Kwame
31-Aug	90	XY5153	7	Phone call	Kwame
31-Aug	44	XY2945	3	No action	Kwame
31-Aug	67	XY1639	7	LO, BM visit (Notification A)	Kwame

** BM = Branch Manager, LO = Loan Officer*

Figure 5: Clients with past due payments

8 Scoring examples for financial inclusion

As alternative data sources and underwriting methodologies become more and more prominent, the importance of credit risk tools like scoring is expected to become more widespread. A few examples are outlined below:

- **Scores based on online/social media data:** Some companies are using social networks like Facebook, LinkedIn, and Twitter to estimate creditworthiness. These companies look at a number of data points – where you're located, who you're connected to, and how transparent you are – to build a 'credit score.'

- **Scores based on cell phone usage:** Other companies combine financial and mobile data to reliably predict credit risk for borrowers in informal markets. Cell phone records are analyzed to assess demographic information, geographic information, strength of social network, and financial information, all of which can be considered a part of client evaluation.

- **Scores based on psychometric testing:** Psychometric tests include questions relating to a person's character, abilities, and attitude. These tests scores, combined with analytics and modeling techniques, can deliver a credit score identifying high-potential, low-risk entrepreneurs.

9 Key considerations

Tool variations

Different types of scores can be implemented in a MFI according to its maturity, number of products, geographic diversity and other specific characteristics.

MFIs may start with an expert or generic score and then transition towards a statistical or tailored score.

Complementary tools

The following additional tools can be used to complement scores in the credit process:

- **Economic activity alerts**: compare the economic activity and sales volume of the client business with reference parameters and provides alerts about whether a microenterprise’s values are outside of the normal parameters.

- **Smart evaluation tool**: performs an automated analysis of the microenterprise and the micro-entrepreneur. It performs part of the analysis that the credit analyst typically carries out in the credit process, using scores and the economic activity alerts as inputs.

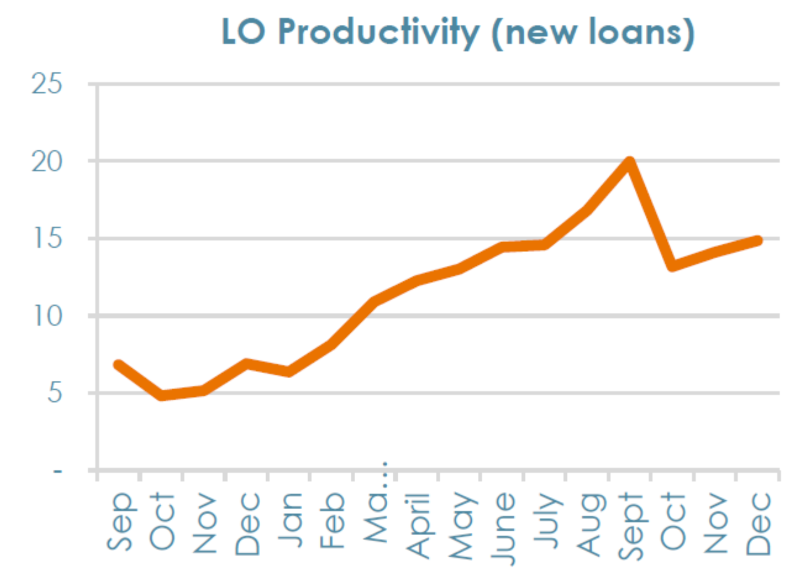
10 Case study 1: Use of a client selection score to increase loan officer productivity for small working capital loans

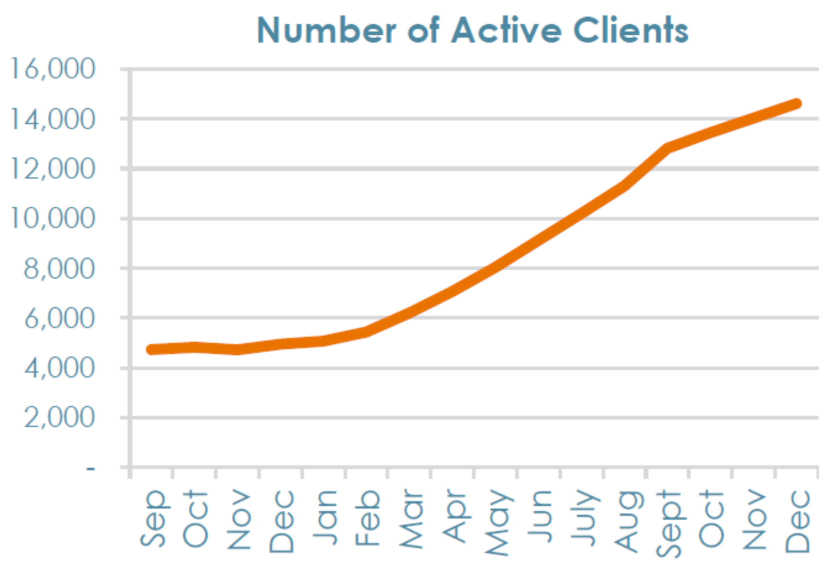
Institution	First Caribbean MFI is a leading microfinance institution in the Caribbean that has been in existence for more than 10 years. It has a regional branch network in all major urban and peri-urban areas, a portfolio of approximately $10 million and over 10,000 clients. Its main loan product is working capital loans for micro and small businesses (average loan size $950).
The problem	First Caribbean MFI was facing the following challenges: • Low loan officer productivity • Stagnant portfolio growth with disbursements only sufficiently compensating for loans closed • Small loan amounts ($400-$500 on average) at low productivity were not enough to compensate for the operational cost of the underwriting process
Solution/score used	To address these challenges, First Caribbean MFI introduced a Client Selection Score to segment and predict the best potential clients for their small working capital loan product. The score is based on socio-demographic characteristics (e.g. client age, time spent in the business, marital status, level of education, house ownership, business location stability). The best potential clients as determined by the Client Selection Score are eligible for a streamlined, faster process for credit evaluation and loan approval, increasing loan officer productivity and promoting growth.

10

Case study 1: Use of a client selection score to increase loan officer productivity for small working capital loans

Results





11 Case study 2: Use of a renewal score to evaluate client loan renewals

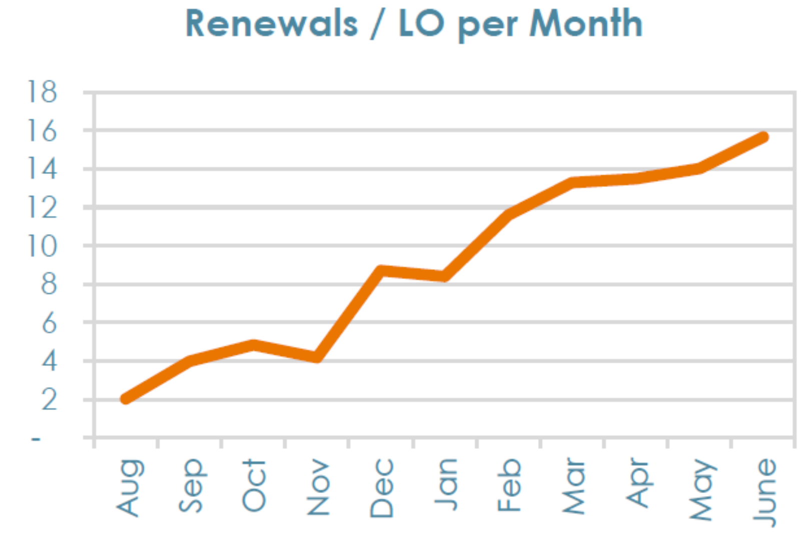
Institution	Peace Microfinance Bank is a small bank offering microfinance products (savings and loans) in Africa. After two years of operations, Peace had reached a loan portfolio of 8,500 clients and more than $5 million. The main loan product is a working capital loan for small businesses (loan size $700-1,200).
The problem	Peace Microfinance Bank was facing the following challenges: • Complex underwriting process for existing clients that required more resources than for new clients • Low new loan productivity due to excessive dedication to renewals (only five new loans/LO per month) Renewal ratio low (at 71%when business plans required at least 75%) • High PAR 30+ (at 14% and increasing) • High renewal loan PAR 30+ (at 16%)
Solution/score used	To address these challenges, the institution introduced a behavioral Renewal Score, allowing automated segmentation of the current portfolio by client risk level according to historical client behavioral data. Main data used in the score included variables such as average number of delinquency days during the last quarter, number of days late in last loan term, number of months as client of the bank, maximum number of delinquency days in last quarter, etc. The tool is used to identify good clients and provide them with enhanced services – for example, an offer of new products or the same product with better conditions.

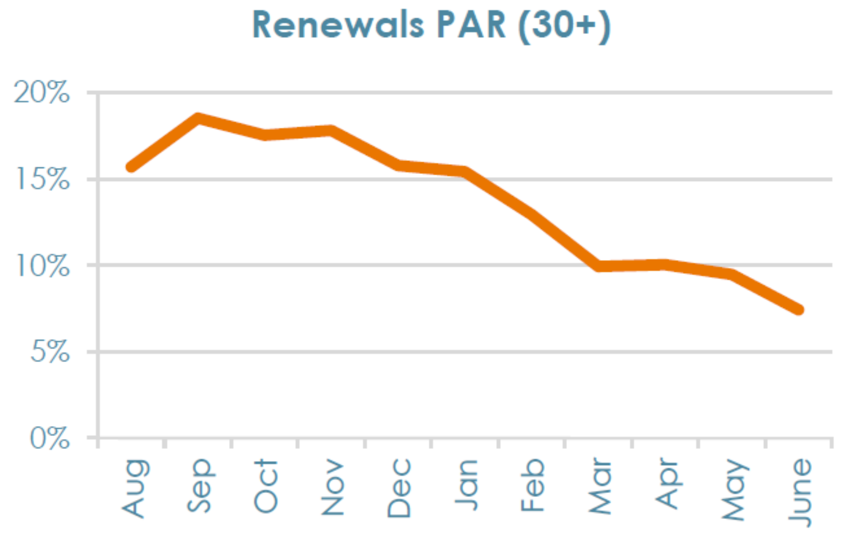
11 Case study 2: Use of a renewal score to evaluate client loan renewals

Results

As a result of introducing the Renewal Score, Peace Microfinance Bank obtained the following benefits six months after score implementation:

- Renewal productivity (number of renewed accounts per loan officer per month) more than doubled – grew to an average of 14 per LO per month
- Portfolio at risk (PAR 30+) for the renewal portfolio came down from 17% on average to 9%





The Credit Scoring tool guide is one of a four-part series including guides on Detailed Risk and Controls Assessment (DRACA), Branch Transaction Risk Reports, and Portfolio Quality Analysis (PQA).

Learn how to implement these tools and how we can help manage operational risks.

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