

Credit Scoring Simplicity: De-risking the Willing-to-Pay at the Bottom of the Pyramid for Banks and Micro-Finance Institutions

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Abstract

The global population of 1.3 billion financially excluded individuals cannot obtain credit through traditional scoring methods which require both formal credit records and physical assets as security (PLOS One, 2026). The widespread problem of "credit invisibility" drives the Bottom of the Pyramid (BoP) population into dangerous cycles of informal lending which prevents their ability to start small businesses and hinders economic progress in their communities. This paper examines a major change in thinking which replaces strict "ability-to-pay" evaluation methods that depend on past financial surpluses with "willingness-to-pay" assessment methods that use current behavioral data. Banks together with Micro-Finance Institutions (MFIs) can create their own systems for customer identification verification through their use of psychometric testing and alternative data. The study investigates how machine learning (ML) using non-traditional data sources such as mobile airtime patterns and utility payment records and social network information and psychometric behavioral characteristics enables better risk assessment through its ability to detect specific risk elements. The study shows that high-tech scoring input alignment which leads to "simplified" scoring does not affect score accuracy; instead it decreases need for expensive manual assessment tasks while decreasing gaps in knowledge between parties. The study demonstrates how "mission drift" affects MFIs and shows that automated scoring systems with simplified processes enable organizations to achieve financial success while serving customers who represent greater business risk. This study introduces a method for reducing risk at the Bottom of the Pyramid (BoP) which shows digital footprints function as more than data points because they serve as indicators of personal character that enable worldwide financial access and institutional development in emerging markets.

Keywords: Financial Inclusion, Alternative Credit Scoring, Psychometric Assessment, Bottom of the Pyramid (BoP), Information Asymmetry

I. Introduction

The "Bottom of the Pyramid" (BoP) describes a large group of working people who participate in active informal markets yet remain hidden from traditional financial systems. The worldwide population of this group exceeds one billion "credit invisibles" who include both business owners and workers without the essential documentation needed for conventional banking services. Microfinance has historically closed this gap through "high-touch" models which include peer-group lending and social capital and physical monitoring but these methods have become hard to implement in the current worldwide economy. The commercial banking sector and Micro-Finance Institutions (MFIs) both classify this group as extremely dangerous because they need expensive manual testing and evaluation (PLOS One 2026).

Information asymmetry stands as the main obstacle which prevents people from entering the system. The traditional credit system uses a borrower's credit history as the main predictor for their future performance. The BoP context shatters this system because it operates differently. Lenders lack the detailed information required to differentiate between applicants who will repay their debts who possess the ability to pay their debts and applicants who present an elevated risk. The absence of data creates a "lemon market" effect which results in high interest rates for borrowers whose creditworthiness cannot be verified or which leads to rejection of these borrowers who possess good character yet lack proper documentation.

The existing divide requires a paradigm shift which requires organizations to stop using asset-based collateral and adopt data-driven models that measure customer payment readiness. The credit assessment process becomes easier for institutions when they use alternative data sources which include mobile money patterns, utility usage patterns, and psychometric data to create "digital reputation" systems that replace traditional physical collateral. The research shows that high-tech alignment of scoring inputs results in cost savings which protect businesses from risk because it transforms unrecognized customer behavior into measurable financial resources that build a more robust global economy accessible to all.

1.1 The Theoretical Framework of the "Data Vacuum"

The exclusion of BoP borrowers is not merely a byproduct of poverty because the "Data Vacuum" creates structural barriers that prevent their access to financial resources. Credit bureaus in formal markets combine various historical records to assess risk, whereas informal markets operate through temporary transactions which do not generate any permanent records. Lenders use high-collateral requirements because they need to protect against uncertain situations which result from their missing historical data. The "willing-to-pay" group faces penalties because they lack official documentation, which creates a cycle that makes their financial status hidden and drives economic decline. Institutions can use drive "shadow" transactions to create useful solutions that solve their operational gap.

1.2 The Scalability Paradox in Traditional Micro-Finance

Traditional micro-finance uses face-to-face contact with customers to evaluate their character through its "high-touch" assessment method. The Scalability Paradox emerges because an MFI needs to maintain operational expenses for its manual monitoring work at all times which leads to higher borrower interest rates or financial failure for the organization. Digital credit scoring solves this paradox by separating risk evaluation from the need for physical work. Through basic algorithms which automate the screening process MFIs achieve extended operational capacity without needing to spend more money which enables commercial banks and specialized lenders to provide services to their "Bottom of the Pyramid" customers.

1.3 From Social Capital to Digital Trust: The Evolution of Collateral

The BoP used Social Capital as its main resource to obtain informal loans because Social Capital functions through community trust and mutual obligations. Social Capital exists as a social resource which remains vulnerable to geographic distribution. The development of alternative credit scoring systems demonstrates how this system has developed into Digital Trust through its modern-day implementation. The technology "digitizes" a borrower's character by measuring their behavior through airtime top-up patterns and their payment habits for digital utilities. The new system enables trust to be transferred between financial institutions because it transforms "willingness" into an international financial asset. The evolution serves as a fundamental element which enables lenders to assess risk because it establishes a unified risk assessment system which commercial lenders can understand and depend upon.

II. The Shift from Ability to Willingness

The banking system which banks follow as its standard requires them to assess a person's creditworthiness through three fixed criteria which include Capital, Collateral, and Capacity. The system operates under the assumption that economic systems require formal asset ownership and fixed salary payments which produce permanent records that government agencies maintain in centralized locations. The three fundamental elements of development work do not exist according to standard practices which apply to Bottom of the Pyramid communities. Authenticity in their home-based work creates challenges for people in the BoP because their work depends on cash-based income and informal business activities which make it hard to show "Capacity" through standard income documentation while "Collateral" remains unavailable because legal requirements for proof do not exist. Recent studies show that "willingness-to-pay" (character) provides a more reliable payment recovery method for informal economic systems than "ability-to-pay" (Komba & Komba, 2024). Because people need to maintain their current health status throughout their lives, their capacity to pay depends on their available liquid assets which might experience sudden changes because of seasonal patterns and unexpected healthcare costs and market conditions. A BoP borrower who experiences a bad harvest will temporarily lack cash for obligations, yet their debt payment commitment remains strong, which traditional models fail to recognize, resulting in unnecessary credit limits.

2.1 Psychometric Scoring as a Proxy for Character

Financial institutions use psychometric-based credit scoring because it provides an effective way to measure their fundamental borrowing intentions. The models function according to the idea that specific personality characteristics exist as universal markers of financial responsibility across different cultures. Lenders employ structured non-intrusive questionnaires to assess three hidden psychological attributes which include conscientiousness and locus of control and integrity (MDPI 2024).

- **Case Evidence:** Psychometric assessments extend beyond standard data measurements because they deliver distinct predictive power boost. The evaluation found that psychometric tests enable microfinance institutions to reduce their portfolio risk because they identify high-risk individuals who would pass basic demographic assessment (Arráiz et al., 2015). The unbanked entrepreneurs use these tools as their main screening method which enables them to access services based on their personal reputation.

- **Predictive Power and Cognitive Bias:** The microfinance institutions (MFIs) can eliminate the "bias of poverty" when they shift their assessment methods from financial statements to evaluate the character of each individual. The traditional models of assessment treat disadvantaged individuals unfavorably because their surrounding circumstances change frequently. The psychometric scoring system detects "hidden" low-risk customers whose cognitive patterns show they possess both high self-discipline and grit which leads to productive credit usage (MDPI, 2024). The organization now implements a new method which combines human-centered design with computational techniques to handle risk assessment.

2.2 The Behavioral Economics of "Social Collateral"

The transition toward willingness-to-pay is rooted in the behavioral economic theory of social collateral. A borrower can use their community reputation as an enforcement mechanism when they lack physical assets. The traditional MFIs used group-lending circles to implement this system, while digital scoring breaks the system into smaller elements. Algorithms can use digital social connection management and small digital task completion to create a measurable form of social collateral. The behavioral data creates an ongoing assessment of how dedicated a borrower is to their financial identity, which remains intact after they run out of cash resources.

2.3 Cognitive Grit vs. Financial Volatility

The current scoring system uses "Cognitive Grit" as its primary measurement which differentiates itself from all previous scoring methods. Psychometric assessments search for signs of resilience while traditional financial analysis treats sudden income declines as default risk indicators. The ability to reorganize resources and maintain a "long-term orientation" proves more effective at predicting repayment for BoP individuals who experience high-volatility situations than their existing savings balance. Lenders can minimize portfolio risks by using cognitive markers because they protect their assets from informal economy shocks which would otherwise cause customers to lose access to financial services during their temporary financial difficulties.

III. Digital Footprints and the "Thin Stream"

Lenders are increasingly using "thin stream" data which consists of digital interactions that occur at high frequency yet hold low value according to data from telecommunications and utilities and retail loyalty programs (McKinsey 2021). The footprints serve as a financial indicator which shows economic stability of the entity.

- **Mobile Money and Telecom Metadata:** The patterns of prepaid-minute purchases together with data usage and mobile money transaction speed provide more valuable insights than account balances present. A borrower who regularly adds to their airtime balance at the same weekly time shows a pattern of cash-flow management which enables them to repay loans reliably according to McKinsey 2021.
- **Utility and Bill Payments:** Traditional scoring methods often overlook the fact that many people at the base of the pyramid (BoP) have a credit history based on their utility bill payments. The implementation of hybrid models which combine electricity and water and trash collection fees into credit algorithms has brought about significant changes. MFIs can now use Explainable AI (XAI) to achieve more than 80% accuracy in their default risk predictions according to research from MDPI conducted in 2025. The modern XAI system enables lenders to track the scoring process which leads to them understanding which factors contributed to the final score determination including the fact that regular water bill payments demonstrate a person's character in that particular area.

3.1 Algorithmic Alignment and Regulatory De-risking

The adoption of Machine Learning (ML) helps organizations to identify suitable borrowers while simultaneously providing micro-finance institutions with the ability to meet international banking requirements. Multilayer perceptrons (MLP) and gradient-boosted trees function as advanced systems that enable microfinance institutions (MFIs) to create customized pricing models based on individual customer risk profiles which exceed their existing standard pricing system. The Basel III standards demand this exact level of accuracy because they need organizations to establish capital requirements and conduct thorough risk assessments according to their operational needs (Durango-Gutiérrez et al., 2024). The algorithms produce a credit bureau alternative which enables them to conduct stress tests while analyzing loss-given-default (LGD) scenarios without real credit bureau access. The algorithmic risk management system establishes stability during ongoing economic volatility which enables microfinance institutions (MFIs) to expand their lending operations without experiencing the normal lending sector volatility that comes with serving informal borrowers (arXiv, 2026). The

data entry point becomes easier to use for institutions which enables them to reduce BoP risks while their institutional operations stay intact.

Feature	Traditional Credit Scoring (Ability-to-Pay)	Alternative Digital Scoring (Willingness-to-Pay)
Primary Data Source	Bank statements, salary slips, formal credit history.	Mobile money velocity, utility bills, psychometrics.
Assessment Focus	Capital & Capacity: Current financial liquidity.	Character & Grit: Behavioral consistency and intent.
Inclusion Barrier	High (Requires formal documentation/collateral).	Low (Uses existing "digital footprints").
Cost of Monitoring	High (Manual audits, physical field visits).	Low (Automated API-based data ingestion).
Risk Predictor	Historical financial surplus.	Psychological traits (e.g., Conscientiousness).
Scalability	Linear (Limited by human staff).	Exponential (Driven by Machine Learning/Cloud).

IV. Challenges and Institutional Barriers

The integration of alternative data together with machine learning technology establishes a groundbreaking method to achieve inclusive outcomes. The process of implementing "de-risking" for Bottom of the Pyramid markets faces challenges because these markets exist as decentralized informal economic systems.

4.1 Cultural Misalignment and High Default Rates

The first obstacle which algorithm designers must overcome involves creating solutions that bridge the existing gap between different contexts. The scoring models used in emerging markets fail to assess local credit cultures and traditional social obligations which results in digital loan default rates reaching 40% (arXiv, 2026). A model should treat a utility payment that was not paid as an indication of borrower unreliability, but it cannot identify this payment as a strategic decision made by a borrower who chooses to support his community with "merry-go-round" savings (Chama). Lenders often have high levels of Non-Performing Loans (NPLs), which is a result of using flawed economic models to assess their borrowers. This leads to credit decisions that unfairly "blacklist" all eligible customers.

4.2 The Threat of Mission Drift

The threat of mission drift becomes more pronounced when commercial banks start operating in the micro-finance sector. The institutions implement advanced scoring systems to "cream-skim" their operations because they must satisfy both shareholder demands and Basel III capital adequacy standards (PLOS One 2026). The new approach does not assist people who live in absolute poverty because they have no access to essential digital services which create a path for financial inclusion.

4.3 Macroeconomic Fragility and Data Privacy

The implementation of FinTech-based risk management systems fails to deliver complete effectiveness because their performance declines during periods of economic crises. Research shows that alternative data sources provide strong individual character prediction capabilities but they fail to handle major macroeconomic disruptions which include currency devaluation and hyperinflation (Ally et al., 2025). The process of gathering data becomes "easy" which creates major ethical problems that involve issues of data ownership rights. BoP lenders require their customers to exchange digital privacy rights which include sharing access to their contact list and SMS messages and GPS location data in exchange for minimal credit. The system creates an advantage for businesses because it forces vulnerable groups to endure constant monitoring. The main challenge for organizations to develop environmentally friendly and socially responsible credit assessment systems involves preventing "willingness-to-pay" indicators from becoming exploitative "surveillance capitalism" practices.

V. Conclusion

The process of de-risking the Bottom of the Pyramid (BoP) requires organizations to change their current practices which depend on physical assets by using modern methods that measure customer payment capacity through data analysis. The research shows that 1.3 billion people face financial exclusion because credit scoring systems fail to recognize their actual financial situations instead of blaming the individuals who need access to money. Banks and Micro-Finance Institutions (MFIs) can use mobile data collection to create an easy data collection method which uses mobile footprints and psychometric assessments to connect their high-risk assessments with sustainable financial inclusion solutions.

Organizations should adopt a "simplicity-first" scoring model which maintains its current assessment standards. The use of Machine Learning (ML) and Explainable AI (XAI) allows organizations to assess risk using advanced methods which exceed what standard balance sheets provide. The creation of fundamental

change needs institutions to establish their dedication towards the change. The MFIs must maintain their original mission while passing on all operational benefits from advanced scoring systems to customers through cheaper interest rates and simpler borrowing conditions instead of using them for business gain.

The future of BoP lending requires evaluation of digital models which must survive macroeconomic economic changes. The study shows that behavioral data functions as a strong character assessment tool, but it lacks the ability to handle unpredictable events (Ally et al., 2025). The hybrid method, which needs to use detailed psychometric information together with broad socio-economic data, should be used to maintain portfolio stability for long-term operations.

The BoP de-risking process functions as an essential ethical requirement which exists alongside its financial necessity. The global economy of the future will use digital reputation systems as new collateral, which requires us to protect data privacy rights and sovereignty rights of vulnerable groups. The development of a credit ecosystem which operates with transparency and ethical standards will enable credit invisibles to drive growth in emerging markets. The people who are willing to pay need digital channels, and therefore the formal financial sector must establish these connections to serve their needs.

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