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Forecasting Financial Resilience: An Analysis of Practices and Limitations in Predicting Trends - A Case Study of Microcredit in Tanzania

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ABSTRACT

This research paper delves into the intricate landscape of financial resilience within Tanzanian microcredit institutions, focusing on predictive methodologies and the integration of Artificial Intelligence (AI) for enhanced forecasting accuracy. Through an exhaustive exploration of traditional practices and emerging AI-driven solutions, this study examines the evolving strategies and limitations encountered in predicting financial trends within this dynamic sector. Employing a mixed-methods approach encompassing diverse case studies across key Tanzanian regions - Dar-es-Salaam, Arusha, and Kilimanjaro - the research garnered insights into localized complexities, historical evolution, and direct impact on bolstering financial resilience. Findings underscored the multifaceted objectives pursued by microcredit institutions in trend projection, emphasizing the primary goals of optimizing investment strategies, managing liquidity effectively, and planning for sustainable growth and expansion. While traditional methodologies demonstrated some efficacy, challenges in data quality, interpretation, and predictive analytics expertise emerged as impediments to accurate trend projection. Proposed AI-based solutions offered promising outcomes, with anticipated benefits including improved prediction accuracy, enhanced decision-making, and potential cost savings. However, concerns regarding data security, expertise, and implementation costs pose notable challenges to widespread AI integration. Therefore, the research advocates for the integration of AI technologies to fortify

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predictive capacities within Tanzanian microcredit institutions. It emphasizes the imperative nature of investing in resources and expertise to leverage AI potential for sustainable growth and heightened forecasting accuracy in this rapidly evolving financial landscape. This study contributes essential insights into the challenges, opportunities, and potential pathways for leveraging advanced technologies in enhancing financial resilience within microcredit institutions, fostering a more sustainable and prosperous future for Tanzania microcredit sector.

Keywords: Financial resilience; microcredit sector; SACCOS; economic growth.

1. INTRODUCTION

Microcredit institutions serve as vital conduits for providing access to financial services, empowering micro-entrepreneurs, and alleviating poverty [1]. Their financial sustainability is contingent upon their ability to anticipate and adapt to evolving financial trends, which, in turn, determines their capacity to support the economic aspirations of the marginalized population [2]. It has emerged as a transformative tool in the realm of financial inclusion, fostering economic growth, and empowering individuals in underserved communities [3]. Savings and Credit Cooperative Organizations (SACCOS) and microcredit institutions worldwide are pivotal in this endeavor [4]. As these institutions strive for financial sustainability and success, the ability to predict and adapt to financial trends becomes paramount [5].

Recent years have witnessed significant advancements in financial trend prediction, driven by technological innovations, particularly in the domains of artificial intelligence (AI) and machine learning. These technologies enable the analysis of vast datasets, offering insights that were previously unattainable [6]. Their ability to predict and adapt to financial trends has become increasingly essential for their sustainability and the well-being of their members. Accurate financial trend prediction empowers these institutions to make informed decisions, allocate resources effectively, and mitigate risks, ultimately ensuring their resilience in an ever-changing financial setting [7].

In various countries around the world, the utilization of microcredit institutions varies in response to unique socio-economic conditions and local needs. For instance, in Bangladesh, the Grameen Bank pioneered the concept of microcredit, particularly targeting rural women, which has proven to be successful in empowering women economically and socially [5]. A case of India, Self-Help Groups (SHGs) have been instrumental in promoting microcredit and women's empowerment. However, the effectiveness of these groups varies across different states, with challenges related to administrative efficiency and loan recovery [8]. In parallel to Latin American countries like Mexico, microcredit institutions often work with indigenous communities and marginalized population to stimulate local economies [9]. Yet, these initiatives face challenges in terms of scalability and sustainability [10]. However, despite its successes, challenges such as over-indebtedness have emerged as an issue, with borrowers facing difficulties in

repaying loans [11]. In contrast, in developing countries like Kenya and Uganda, mobile-based microcredit platforms such as M-Pesa, Talla have gained prominence, enabling individuals to access small loans through their mobile phones. These innovations have expanded financial inclusion but have also raised concerns about data privacy and high-interest rates [12].

In Tanzania, the microcredit sector thrives amidst a diverse and dynamic economic backdrop, underscoring the nation vibrant microfinance ecosystem [13]. Microcredit institutions operating across prominent cities like but not limited to Tanga, Mwanza, Moshi, Arusha, and Dar es Salaam form the cornerstone of financial inclusion efforts, catering to a spectrum of economic activities and community needs [14]. The mosaic of key players within Tanzania microcredit sector comprises a diverse range of financial entities. These encompass a variety of institutions, from cooperatives to specialized microfinance organizations, each with its unique approach to extending financial services. Cooperatives, often deeply rooted in communities, leverage a collective approach to serve members, whereas specialized microfinance entities might focus on specific sectors or regions, thereby fostering economic development in targeted areas [4].

The regulatory framework governing microcredit operations in Tanzania is integral to the industry functionality and growth. The oversight by regulatory bodies, such as the Bank of Tanzania (BOT) and the Tanzania Cooperative Development Commission (TCDC), plays a pivotal role in ensuring compliance, stability, and responsible lending practices within the microcredit sector. Specific regulatory aspects, including interest rate caps, loan portfolio quality standards, and guidelines for borrower protection, significantly influence the operational dynamics and lending practices of microcredit institutions across the country [15]. Moreover, the regulatory framework often acts as a catalyst for innovation and sustainability within the microcredit sector. It encourages the adoption of best practices, fosters financial transparency, and promotes the integration of technology to enhance outreach and service delivery. The dynamism within the regulatory operations reflects the government commitment to fostering a conducive environment for financial inclusion while ensuring the sector stability and integrity [10].

However, the microcredit landscape in Tanzania is not without its challenges. Despite the significant strides made in extending financial services, there remain issues related to reaching remote areas, limited financial literacy, and ensuring equitable access to credit for marginalized groups [13]. Moreover, external factors such as economic fluctuations, agricultural seasonality, and climate change impacts pose additional challenges, influencing borrower behavior and repayment patterns [16]. The diverse economic tapestry, coupled with regulatory intricacies and unique challenges, makes Tanzania microcredit landscape a compelling field for exploration. The intersection of regulatory oversight, institutional diversity, and socio-economic realities presents an intricate environment ripe for understanding the subtleties of microfinance operations, financial inclusion strategies, and the impact of microcredit on socio-economic development within Tanzania [2].

This research paper aims to shed light on the practices and limitations surrounding the prediction of financial trends in microcredit institutions, with a specific focus on

the Tanzanian microcredit sector. Tanzania presents a compelling case study due to its diverse economic landscape, the presence of a vibrant microcredit industry, and the growing importance of financial resilience in the face of economic uncertainties [17]. The primary objective of this study is to analyze the existing practices and methodologies employed by microcredit institutions in Tanzania for predicting financial trends. Furthermore, the study aims to identify and assess the limitations faced by these institutions in their pursuit of financial resilience through accurate trend prediction. By conducting a thorough examination of these practices and challenges, the study aspires to contribute to the enhancement of decision-making capabilities within the Tanzanian microcredit sector and offer valuable insights that may have broader implications for similar institutions globally.

In the subsequent sections; section 2 delves into the literature on microcredit institutions, financial trend prediction, and the role of AI and machine learning, section 3 discuss the specific research questions and methodology employed in this study. Finally, section 4 present findings, analyze their implications, and offer recommendations for microcredit institutions in Tanzania and beyond. This study endeavors to not only advance our understanding of financial trend prediction in microcredit institutions but also provide actionable insights for practitioners and policymakers seeking to bolster the financial resilience and sustainability of such institutions in the face of a dynamic financial landscape.

2. LITERATURE REVIEW

Forecasting financial resilience, particularly within microcredit sectors in developing economies like Tanzania, poses significant challenges due to the complex nature of economic variables, social dynamics, and the limitations of traditional predictive methods [4]. This literature review aims to elucidate the existing practices, limitations, and the potential advancements offered by computerized AI-driven methodologies in forecasting financial trends, focusing on the microcredit sector in Tanzania.

Traditional Methods and Their Limitations: In developed economies like the United States and Europe, the reliance on statistical models and historical data analysis has been fundamental in financial prediction methodologies. However, the limitations in adapting to dynamic socio-economic factors and providing real-time insights have become apparent. For instance, in the aftermath of the 2008 financial crisis, traditional models struggled to forecast the cascading effects due to interconnected global financial systems [7].

The economic aspect in Africa, especially in countries like Kenya and Nigeria, poses distinctive challenges for financial prediction. The diverse markets and varying socio-economic conditions encountered present significant hurdles for traditional methodologies. These conventional approaches often fall short in accommodating the complexities inherent in local markets, thereby limiting their effectiveness, particularly within the microcredit sectors of these nations [18].

Similarly, in diverse microcredit ecosystems such as those found in Bangladesh and India, a reliance on traditional predictive methodologies is apparent. However,

these methods frequently overlook the multitude of difficulties specific to localized economies. For instance, within Bangladesh's Grameen Bank, traditional methods struggle to encompass the multifaceted socio-economic variables that define rural micro-entrepreneurs, impacting the accuracy of financial predictions [19].

Within Tanzania microcredit domain, there persists a reliance on conventional predictive methodologies. Studies conducted by [4] shed light on critical deficiencies within these approaches. Notably, the absence of tailored predictive models overlooks the distinctive peculiarities present in borrower behaviors, market dynamics, and socio-economic variables unique to Tanzanian microcredit operations. This lack of granularity impedes the precision and contextual relevance of financial predictions, thus limiting the sector potential for sustainable growth.

Integration of AI in Financial Forecasting: Recent advancements in Artificial Intelligence (AI) and machine learning have opened up a promising path in financial forecasting. Within developed economies like the United States and Europe, while statistical models have been the norm, the integration of AI technologies, exemplified by platforms like QuantConnect, signifies a shift towards adapting to dynamic socio-economic factors. These platforms employ AI-driven algorithms to develop and test quantitative trading strategies. They not only analyze historical data but crucially adapt to real-time market conditions. This adaptability proved vital, notably during economic crises such as the aftermath of the 2008 financial downturn [20].

Conversely, within the financial sectors of African nations like Kenya, Nigeria, Bangladesh, India, and Tanzania, the integration of AI presents unique opportunities. Notably, platforms such as Branch in Kenya and Nigeria leverage AI technologies, employing machine learning algorithms to assess creditworthiness using mobile data. This streamlined approach enables faster and more precise lending decisions, broadening microcredit accessibility to individuals and small businesses by harnessing alternative data sources [21].

Similarly, platforms like Tala in Bangladesh and India leverage AI algorithms to assess creditworthiness by analyzing smartphone data. This approach enables access to microloans for individuals lacking traditional credit histories. In Tanzania, platforms like JUMO utilize AI-powered predictive models to gauge risks and determine creditworthiness, facilitating tailored financial products for local needs [22].

Despite these advancements, challenges persist. Access to quality data remains a significant hurdle, particularly in regions lacking robust data collection infrastructure. Additionally, the scarcity of skilled professionals capable of developing, implementing, and maintaining AI systems poses a challenge, especially in regions with limited technical expertise [23].

The integration of predictive analytics and machine learning models in financial forecasting holds immense promise. These AI-driven algorithms possess the capability to analyze extensive datasets, uncover intricate patterns, and swiftly

adapt to evolving trends. This presents a transformative trajectory in enhancing the accuracy and timeliness of financial predictions, indicating a promising avenue for future research aiming to overcome the existing challenges and leverage AI's potential in diverse financial landscapes [20].

Conclusion: The convergence of traditional financial prediction methods and AI-driven computational techniques underscores the critical need to bridge the existing research gap. Establishing tailored AI models for predicting financial trends within Tanzania microcredit sector holds immense promise in fortifying financial resilience, empowering stakeholders, and nurturing sustainable economic growth [24].

Despite the potential offered by AI and ML technologies, a significant portion of microcredit institutions still rely on traditional statistical models and analysis methods. These conventional approaches often struggle to effectively handle the complex and voluminous financial data encountered by microcredit institutions. This underscores the persistent reliance on traditional methods and the challenges they pose in adequately meeting the unique data demands of microcredit institutions, which this research endeavors aim to explore and address [25].

3. METHODOLOGY

This study employed a mixed-methods approach to comprehensively investigate the factors influencing financial resilience and the challenges in predicting trends within Tanzania microcredit sector. This approach facilitated an in-depth exploration of quantitative aspect impacting microcredit practices. To achieve this, a deliberate case study methodology was employed, focusing on distinct regions across Tanzania known for their diverse microcredit landscapes. Through this approach, the study garnered valuable insights into the localized complexities of microcredit operations, their historical evolution, and their direct impact on bolstering financial resilience.

The primary case study areas selected were Dar-es-Salaam, Arusha, and Kilimanjaro Region, chosen purposefully due to their rich presence of microcredit institutions and entrenched historical ties to cooperative societies. The selection of these regions aimed to scrutinize the dynamics, challenges, and successes of microcredit initiatives across varied settings, encompassing grassroots community levels and institutional frameworks.

Specifically, Arusha was selected due to the presence of the Arusha Women SACCOS, focusing on the financial activities involving women. Wazalendo SACCOS in the Kilimanjaro Region was chosen for its affiliation with the Moshi Cooperative University, providing insights into specialized cooperative-based microcredit operations. The ELCT ND SACCOS in Moshi, Kilimanjaro, was included for its religious aspect within microcredit operations. Moreover, the TRA and Tanesco SACCOS in Dar-es-Salaam were selected to represent government-affiliated microcredit institutions. This diverse selection ensured representation

from private, government, religious, and specialized groups, enriching the sample with a range of perspectives and operational modalities within the microcredit sector.

The sampling strategy encompassed 69 leaders and staff directly involved in financial management across various selected microcredit institutions. The distribution was as follows: Wazalendo (8), Tanesco (15), TRA (15), Arusha Women SACCOS (8), Bandari (15), and ELCT ND (8). These participants were selected based on their roles in financial management within their respective institutions, ensuring a representation of key decision-makers and staff directly handling financial aspects.

The study was conducted over a period of 8 months, ensuring a comprehensive and contextual understanding of the microcredit sector within the selected regions. This timeline allowed for thorough data collection and analysis, providing a robust foundation for the study findings. This meticulous selection of case study areas and a diverse participant sampling strategy enabled a holistic exploration of microcredit dynamics, ensuring a nuanced understanding of factors influencing financial resilience within Tanzania microcredit sector.

The data collection process was meticulously structured across a five-week timeline, ensuring a systematic and comprehensive approach to gather information from diverse groups within the microcredit institutions. The delineated timeline aimed to accommodate the intricacies of data collection while maximizing efficiency and ensuring thoroughness. To facilitate the data collection process, Open Data Kit (ODK) emerged as a crucial tool due to its adaptable features, particularly suited for the geographical nature of the institutions under study. ODK capability to handle diverse data types and its user-friendly interface enabled efficient and standardized data gathering across the selected institutions. Moreover, its versatility in exporting results in various formats eased the subsequent data analysis phase by providing outputs readily adaptable for analysis in different analytical tools and software.

The collected data from the surveys underwent a rigorous quantitative analysis to extract meaningful insights and patterns relevant to the assessment of forecasting practices and limitations prevalent in the microcredit sector. Python software was employed as the primary analytical tool due to its robust capabilities in handling quantitative data. This choice was made considering Python adeptness in statistical analysis, facilitating the evaluation of trends, correlations, and the identification of influential factors shaping financial resilience within the microcredit operations. The presentation of findings centered on the quantitative analysis, primarily represented through graphical depictions such as charts, tables, and statistical summaries. These visual aids were instrumental in offering a clear and concise illustration of the quantitative insights obtained, allowing for an easily understandable presentation of the quantitative findings related to microcredit practices and financial resilience.

4. RESULTS AND DISCUSSION

This study aimed to delve into the intricate landscape of microcredit practices within the Tanzanian context. Through comprehensive analysis and observation, this study navigated the diverse strategies, challenges, and outcomes associated with forecasting financial resilience within microcredit frameworks. This section presents a detailed exposition of the results obtained through empirical investigation, followed by an in-depth discussion that scrutinizes these findings in the context of current practices and limitations in the Tanzanian microcredit sector.

4.1 Selected Microcredit Category

This study focuses on Savings and Credit Cooperative Societies (SACCOS), encompassing a diverse array of organizations operating across several Tanzanian cities, including Moshi, Arusha, and Dar es Salaam. With a collective operational history of over 10 years, these SACCOS demonstrate their established presence and extensive experience within the financial sector. Notably, the total membership size varies across the SACCOS as indicated in Table 1, indicating the diverse scales and sizes of the organizations involved. Moreover, these SACCOS exhibit a commitment to serving specific demographic groups, such as youth, women, disabilities, and rural communities, emphasizing their dedication to promoting financial inclusion and empowering marginalized segments of society. A multi-faceted perspective from SACCOS located in different cities and targeting diverse demographics allows for valuable insights and establishes a foundational understanding of the potential benefits and challenges associated financial trend prediction methodologies within the broader SACCOS landscape in Tanzania.

Table 1. Saccos location and members

Name	Location	Total Members
Arusha Women SACCOS	Arusha	1017
Bandarini SACCOS	Dar-es-Salaam	Above 1500
ELCT ND MOSHI SACCOS	Moshi, Kilimanjaro	14900
TRA SACCOS	Dar-es-Salaam	Above 1000
Tanesco SACCOS	Dar-es-Salaam	Above 7000
WAZALENDO SACCOS	Moshi, Kilimanjaro	352

4.2 Goals and Objectives of Financial Trend Projection

The study findings reveal a diverse range of goals and objectives associated with financial trend projection in microcredits. These objectives include planning for growth and expansion 5(100%), ensuring sustainability and stability 1(20%), optimizing investment strategies 4(80%), and managing liquidity effectively 2(40%) as shown on Fig. 1. Generally, analysis of the survey data shows that 50% of the respondents prioritize optimizing investment strategies, 25% managing liquidity effectively, identifying potential risks, and planning for growth and expansion. An additional 25% emphasize the importance of sustainability and having a roadmap for future actions.

Fig. 1. Present goals and objectives of financial trend projection

This aligns with prior research [1] suggesting a multifaceted approach to financial trend projection in microcredit settings. Similar to prior studies, the current findings underscore the prevalent emphasis on optimizing investment strategies and effectively managing liquidity as primary objectives. Moreover, the acknowledgment of sustainability concerns echoes the growing literature emphasizing the importance of long-term viability and resilience in microcredit operations [26]. However, a notable deviation from some prior research is the emphasis placed on planning for growth and expansion. This stands in contrast to studies that primarily focused on risk mitigation or stability [27]. This divergence highlights an evolving perspective within microcredit institutions, signaling a potential shift towards proactive strategies for growth and scalability.

In essence, the study findings not only corroborate established goals seen in prior research but also unveil nuanced shifts in priorities within the microcredit sector. These nuances suggest a dynamic landscape where institutions are increasingly balancing immediate concerns like risk management with long-term strategic planning for growth and sustainability.

Therefore, Accurate financial trend projection plays a crucial role in enabling microcredits to achieve these objectives. By accurately forecasting financial trends, microcredits can chart a clear path for future actions, make well-informed decisions on resource allocation, and identify potential risks. This empowers them to optimize their investment strategies, maximize returns on investments, and maintain optimal levels of liquidity. Furthermore, aligning financial strategies with projected trends allows microcredits to proactively address challenges and capitalize on opportunities, contributing to their long-term success and financial health.

4.3 Traditional Approaches for Assessing Profitability, Asset Utilization, Efficiency, Risk Management, and Overall Financial Health

Based on the survey data, the analysis reveals the frequency of usage for different documents and reports in the daily operations of microcredits. Financial performance reports are regularly used or produced by all respondents, indicating

their significance in monitoring and assessing the financial status of microcredits. Customer/Member portfolios and operational reports are also commonly used, highlighting their role in tracking customer details and providing operational summaries at the branch level. The percentages for these documents are as follows: Financial performance reports (100%), Customer/Member portfolios (80%), Operational reports (40%), Balance sheets 5(83.3%), Income statements 5(83.3%), Cash flow statements 3(50%) as indicated on Fig 2.

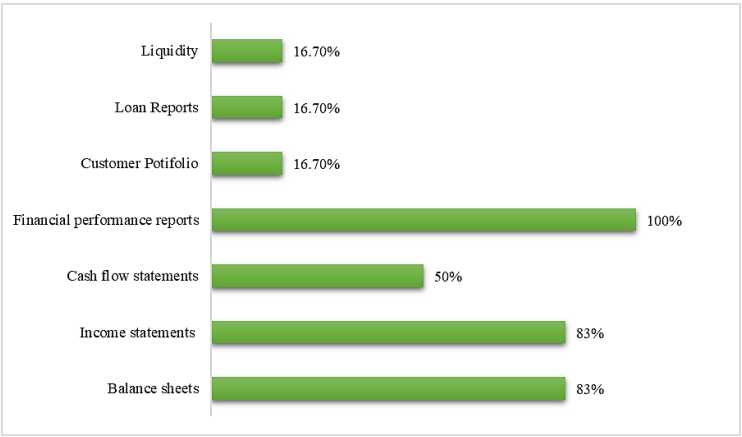

Fig. 2. Usage frequency of diverse documents and reports in daily operations

These observations align with established practices identified in prior research [28]. Consistent with earlier studies, financial performance reports and operational summaries maintain their prominence in the microcredit landscape. This alignment emphasizes the enduring significance of these tools in maintaining financial oversight and operational efficiency within microcredit institutions.

In terms of financial indicators or metrics considered crucial for assessing financial performance and trends, there is a consistent focus on Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), and Loan-to-Deposit Ratio (LDR) across all respondents. These metrics serve as key benchmarks for evaluating profitability, asset utilization, and risk management. The percentages for these financial indicators are as follows: ROA (83.3%), ROE (83.3%), NIM (83.3%), and LDR (83.3%). Additionally, some respondents also prioritize metrics such as growth or decrease rate, strategic plans, and annual business plans, indicating a forward-looking approach to financial trend analysis as shown in Fig. 3. This underscores the importance of these tools in assessing and monitoring the financial health and performance of microcredits.

This resonance with established metrics and tools echoes findings from prior studies [14] emphasizing the enduring relevance of these financial indicators in assessing the health and performance of microcredit institutions.

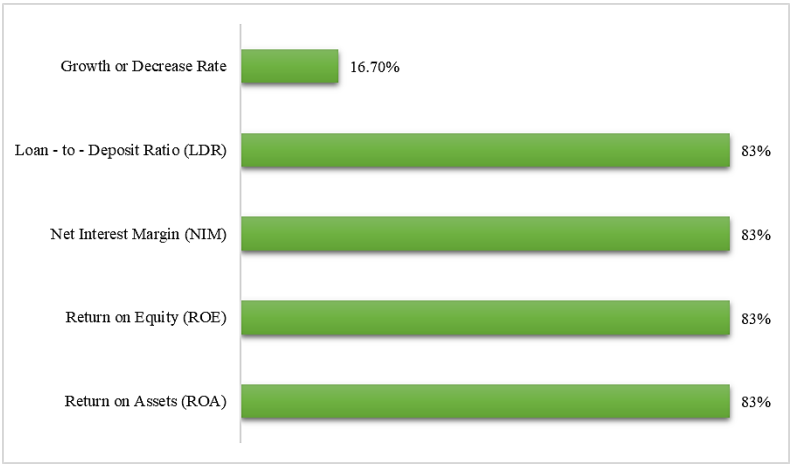

Fig. 3. Key financial indicators and metrics

In addition to these established metrics, the study reveals a forward-looking perspective among respondents, evident in the prioritization of growth or decrease rates, strategic plans, and annual business plans. This forward-thinking approach resonates with contemporary discussions in the literature, emphasizing the significance of strategic foresight in assessing and guiding the financial trajectory of microcredit institutions [29]. This underscores the evolving landscape within microcredit, where institutions balance established financial metrics with forward-looking indicators to ensure comprehensive assessments of their financial health and future prospects.

4.4 Current Practices and Limitations in Financial Trend Prediction in Microcredits

The surveyed microcredits employ various methods and techniques, such as formulas and systems like the APEX system, to project their financial future trends. These traditional methods have been rated on a scale of 1 to 5, with effectiveness ranging from somewhat effective to very effective, with ratings between 3 and 5 as illustrated in Fig. 4. However, these methods come with specific challenges and limitations. Challenges include difficulties in data interpretation, limited data availability, lack of accuracy, time-consuming processes, and the tendency for over-expectation, over-budgeting, and under-budgeting. The identified challenges resonate with earlier research [30] highlighting challenges in data accuracy, interpretation, and the inherent limitations of traditional forecasting methods within financial institutions.

Additionally, "ELCT ND SACCOS" highlights the use of a formula and system combination, which they find accurate and quick for decision-making. However, a concern arises regarding the system limitation in predicting financial trends beyond

the current financial year. It is noted that the system can only forecast the current financial year and cannot project trends for the upcoming 2 to 3 years. Furthermore, the system has limitations in predicting parameters such as income tax and other factors. This limitation in long-term forecasting aligns with discussions in the literature [28], emphasizing the challenges of long-term prediction and the complexities involved in forecasting multifaceted financial parameters.

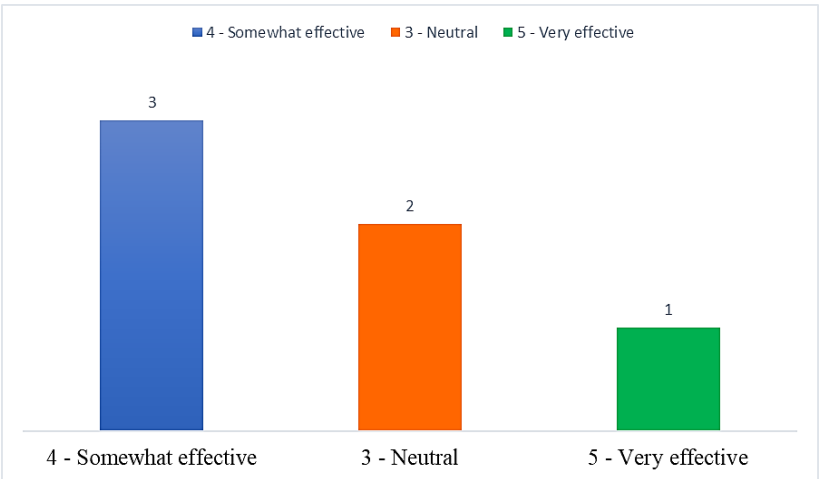

Fig. 4. Effectiveness of traditional projection methods

The findings suggest that while the current methods used by the microcredits exhibit some level of effectiveness, some significant challenges and limitations hinder their accuracy and efficiency in predicting financial trends. Data-related issues, interpretation difficulties, and time-consuming processes are among the key limitations identified, see Fig. 5. The microcredits acknowledge the need for more advanced and efficient techniques to overcome these challenges and improve the accuracy and reliability of their financial trend projections.

The survey findings highlight several significant challenges and difficulties faced by microcredits when it comes to predicting and adapting to financial trends. Limited data quality emerges as a recurring issue, mentioned in 40% of the responses, indicating that many microcredits struggle with incomplete, inaccurate, or inconsistent data. This poses a significant obstacle to the accuracy and reliability of their trend predictions. Without high-quality data, it becomes challenging for microcredits to make informed decisions and effectively anticipate future financial trends. Such data deficiencies align with recognized concerns in literature [4], emphasizing the critical role of high-quality data in enabling informed decision-making and reliable trend anticipation.

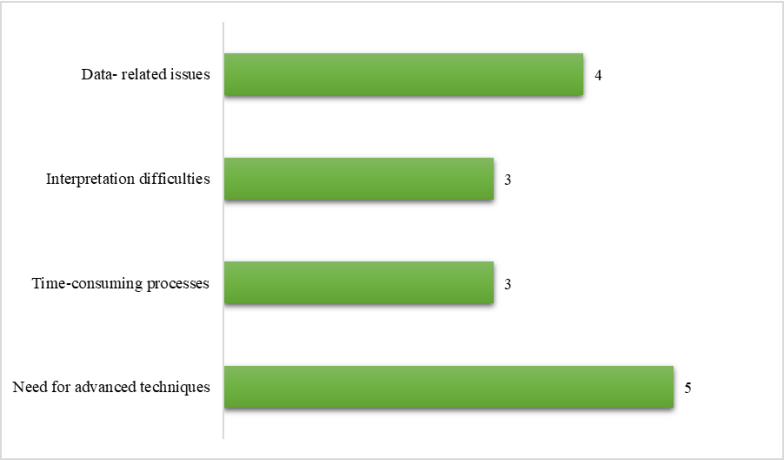

Fig. 5. Challenges and limitations in financial trend projection

4.5 Unveiling Major Challenges and Difficulties in Predicting and Adapting to Financial Trends in SACCOS through Conventional Approaches

Another prominent challenge highlighted in 40% of the responses is the lack of predictive analytics expertise within microcredits. This suggests that many organizations lack the necessary skills and knowledge to effectively utilize advanced analytical techniques for trend projection. Without expertise in predictive analytics, microcredits may face difficulties in extracting meaningful insights from their data and making accurate predictions. This emphasizes the importance of investing in training and resources to develop the required expertise in predictive analytics and ensure that microcredits can leverage data effectively for trend analysis. This resonates with discussions in academic literature, stressing the importance of investing in training and resources to cultivate expertise in predictive analytics, enabling microcredit institutions to leverage data effectively for trend analysis [4].

Inadequate technology infrastructure is also identified as a challenge, receiving 40% of the responses. This implies that a significant portion of microcredits may lack the necessary technological tools and systems to support their financial trend prediction efforts. Insufficient technology infrastructure can hinder data processing, analysis, and reporting, limiting the organization ability to adapt to evolving trends on time. To address this challenge, microcredits should consider investing in robust technology solutions that enable efficient data management and analysis, enhancing their overall prediction capabilities. This aligns with existing discussions advocating for investments in robust technology solutions to bolster data management and analysis capabilities, thereby enhancing the predictive capacities of microcredit institutions [16].

The identified challenges corroborate the prevailing discourse in academia, emphasizing the critical need for improved data quality, enhanced expertise in predictive analytics, and robust technology infrastructure within microcredit institutions. Addressing these challenges is imperative for enabling more accurate and reliable predictions, ultimately fortifying the adaptive capabilities of microcredit institutions in navigating the dynamic financial landscape.

Lastly, 20% of the responses indicate that high market volatility poses a challenge for microcredits in predicting financial trends as illustrated in Fig. 6. This highlights the dynamic nature of the market and the uncertainties associated with sudden shifts and fluctuations. The volatile market conditions make it more difficult for microcredits to accurately forecast trends and plan for the future. To navigate such challenges, microcredits should adopt strategies to manage market volatility, such as diversifying their investment portfolios, conducting regular risk assessments, and staying updated on market trends.

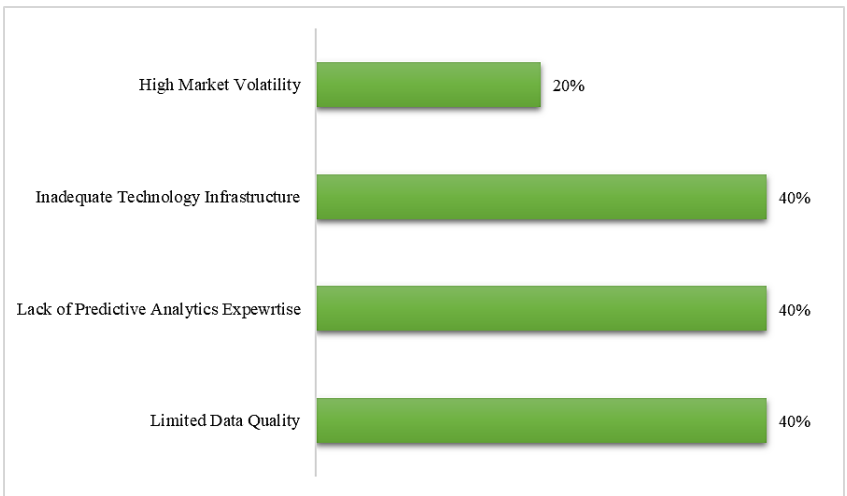

Fig. 6. Challenges faced by microcredits in predicting financial trends

4.6 Proposed AI Solution for Financial Trend Prediction: Benefits and Adoption Challenges

Within the surveyed microcredits, respondents exhibited varying familiarity with machine learning and its applications in financial trend prediction. A significant portion of respondents, around 48%, indicated being "somewhat familiar" with this concept, whereas a higher percentage, approximately 52%, claimed to be "very familiar" These findings indicate the high level of awareness within microcredits regarding the advantages of machine learning in predicting financial trends.

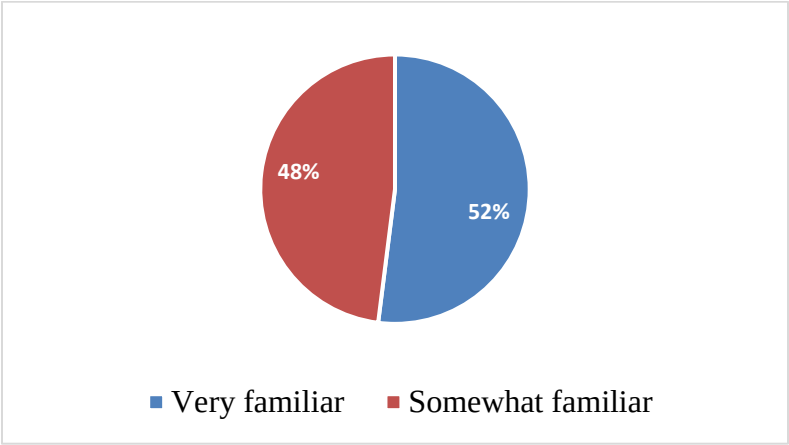

Fig. 7. Familiarity levels with machine learning and its benefits among microcredits

The proposed implementation of AI-based solutions within microcredits holds several expectations for beneficial outcomes. Around 12% of respondents foresee improved prediction accuracy as a primary outcome, followed by 48% who anticipate enhanced decision-making capabilities. Moreover, 15% anticipate greater efficiency in financial analysis, while 25% predict cost savings through AI implementation. These anticipated outcomes signify the expectations of microcredits in leveraging advanced technologies to optimize their financial trend prediction processes and overall operational performance.

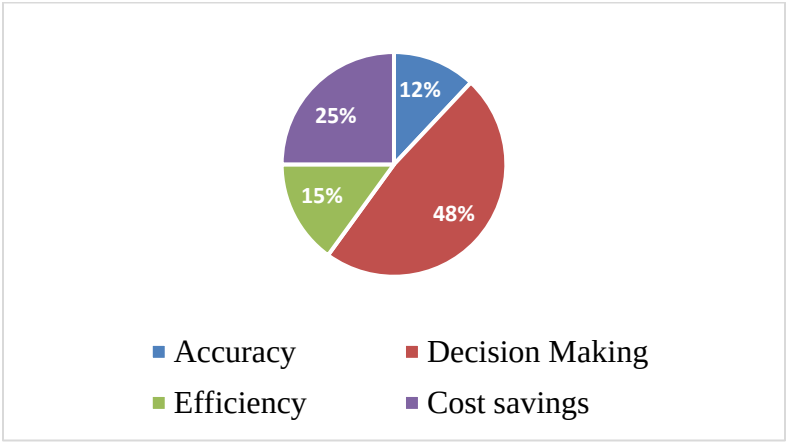

Fig. 8. Anticipated outcomes from the proposed AI-based solutions in microcredits

The study identified several challenges and concerns related to the prospective implementation of AI-based solutions in financial trend prediction within microcredits. Notably, 45% of respondents perceived resistance to change from stakeholders as a substantial challenge, followed by concerns about data security and privacy at 10%, lack of internal expertise at 20%, and the cost of implementation at 25%. Addressing these concerns is crucial to surmount organizational and technical barriers and ensure successful implementation and adoption of AI-based solutions.

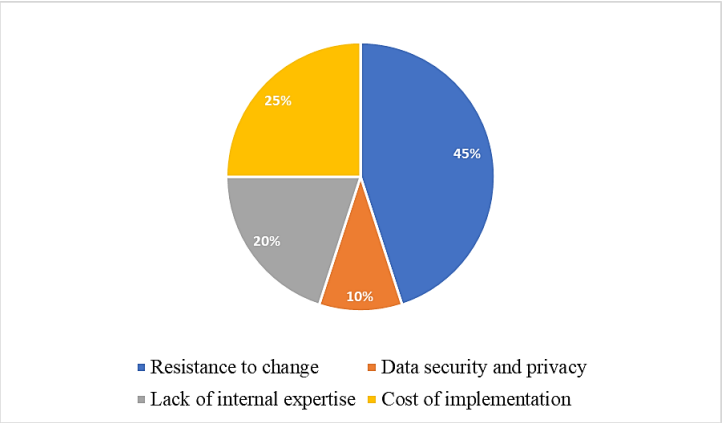

Fig. 9. Challenges in AI implementation for financial trend prediction in microcredits

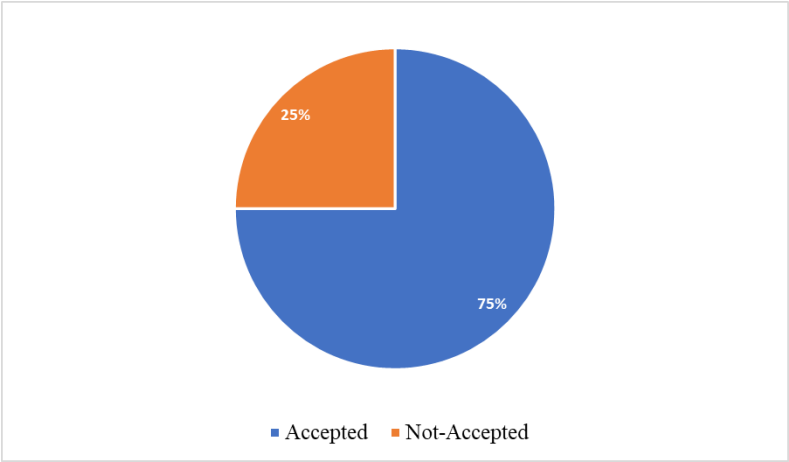

Fig. 10. Adoption consideration of AI technologies for financial trend prediction among microcredits

Remarkably, a significant majority of respondents, approximately 75%, have either considered implementing AI (machine learning) technologies for financial trend prediction within their microcredits. This positive inclination toward adopting new technologies demonstrates a collective effort among microcredits to harness the potential benefits of AI in enhancing their prediction capabilities, driving informed decisions, and ultimately improving their overall financial performance.

These insights resonate with existing literature highlighting the potential advantages of AI adoption in financial prediction while also acknowledging the challenges associated with technological adoption and organizational change management within financial institutions [31]. This alignment underlines the pressing need for addressing concerns and fostering an environment conducive to successful AI integration within microcredit institutions for sustainable growth and improved predictive capabilities.

5. CONCLUSION AND RECOMMENDATION

Generally, the study findings suggest that implementing AI tools offers a promising solution for microcredits, particularly SACCOS, to address prevailing challenges. Embracing AI technologies can significantly enhance forecasting capabilities, decision-making processes, and financial outcomes for microcredits. It is imperative for microcredits to recognize the potential of AI, invest in requisite resources, and cultivate expertise to effectively implement these tools, thereby advancing their financial trend prediction efforts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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