Competitive advantage and sustainability in Ghanaian microfinance institutions: the mediating role of strategic capabilities

Mensah Marfo[1*] , Abiel Ashitey ARMAH[2] , Eleazer Fianko Ofei[3] , Isaac Sewornu Coffie[4] , Linda Adadevoh[5] , Sanjeet Kumar Pattnaik[6], Carl Asante Reindoph[7] and Edward Annan[8]

Abstract

This study explores the effect of competitive advantage on sustainability within Ghanaian microfinance institutions (MFIs), emphasizing the mediating role of strategic capabilities. We conducted a quantitative analysis using survey data from 500 managers representing 150 MFIs in Ghana, analyzed through structural equation modeling. Our findings indicate that competitive advantages and strategic capabilities have a positive significant influence on MFI sustainability. Additionally, strategic capabilities were found to mediate the relationship between competitive advantage and sustainability within Ghanaian MFIs. This study expands the theoretical framework by incorporating cost differentiation, pricing strategy, focus strategy, market strategy, efficient operations and risk management, innovation in product offerings, target market considerations, and client relationship management. We highlight how MFIs can maintain competitiveness through technology, partnerships, training, career development, and knowledge transfer. This mediated relationship underscores the crucial role of strategic capabilities in achieving sustainable operations. The study provides a conceptual framework for understanding MFI sustainability and offers a roadmap to enhance competitive advantage. By integrating elements from the competitive advantage theory and extending the resource-based view theory, this research contributes to the existing knowledge by clarifying the connections between competitive advantage and sustainability in the context of MFIs. Furthermore, the study addresses the dynamics of competitive advantage, strategic capabilities, and sustainability in a context with limited research. It offers practical implications for policymakers and practitioners, providing insights that can inform targeted interventions to enhance capacities and foster sustainability in the microfinance sector.

Keywords Competitive advantage, Competitive advantage theory, Resource-based view theory, Strategic capabilities, Sustainability of microfinance institutions

*Correspondence:
Mensah Marfo
marfo@ait.edu.gh
Full list of author information is available at the end of the article

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Introduction

Microfinance institutions (MFIs) are essential for advancing financial inclusion, economic empowerment, and alleviating poverty in many nations [39]. It is a long-term process that enables low-income individuals to improve their living standards effectively (Khursheed et al., [41]. However, Ghanaian MFIs face increasing pressure to maintain sustainability and competitiveness amid shifting client expectations, socioeconomic inequality, and regulatory changes. In this dynamic landscape, pursuing competitive advantage while ensuring sustainability is paramount (Asante, [9], Anaman & Pobbi, [7], [11]).

Competitive advantage, derived from unique skills, resources, competencies, business strategies, and information technology, is crucial for MFIs to differentiate themselves and excel in a competitive market (Lee, [45]). Strategic capabilities, encompassing an organization's core resources and competencies, are vital for gaining a competitive edge in the industry [36]. For MFIs, strategic capabilities, including training and development, knowledge transfer, and operational and technological capabilities, are central to sustaining competitive advantage and ensuring long-term sustainability [6].

Previous studies have established that competitive advantage significantly affects the sustainability of MFIs (Bii et al., [15, 15], Mutamimah et al., [51]). However, Schicks and Rosenberg [67] offer a contrasting perspective, suggesting that competition can adversely affect MFIs' outreach and loan portfolio performance. Our study highlights the necessity of proactive measures to balance competitive advantage and protect clients from excessive debt and cycles of indebtedness. Hossain et al. [39] also argue that competition negatively impacts MFI operating expenses and profit margins, threatening profitability. This implies that competitive advantage alone does not automatically ensure sustainability and that findings may not be universally applicable. Therefore, further research is needed in the Ghanaian context to validate or challenge findings observed in other countries.

While competitive advantage is essential, it must be complemented by developing and utilizing strategic capabilities to ensure sustainability. Previous scholars have shown that competitive advantage significantly affects MFI sustainability (Bii et al., [15, 15],Mutamimah et al., [51]). Similarly, research has demonstrated that strategic capabilities significantly affect MFI sustainability [6, 30, 50]. However, these studies have yet to consider the mediating role of strategic capabilities in the relationship between competitive advantage and MFI sustainability. Moreover, many studies have yet to comprehensively examine competitive advantage, MFI sustainability, and strategic capabilities in single

research, especially in Ghanaian settings. This research aims to fill these gaps and provide valuable theoretical contributions to the literature on competitive advantage and MFI sustainability.

To explore the dynamics of competitive advantage, strategic capabilities, and sustainability in Ghanaian MFIs, our study addresses four key research questions:

RQ1: How does competitive advantage influence MFI sustainability in Ghana?

RQ2: How does competitive advantage affect strategic capabilities?

RQ3: What is the impact of strategic capabilities on MFI sustainability?

RQ4: How do strategic capabilities mediate the relationship between competitive advantage and sustainability in Ghanaian MFIs?

We employed a quantitative approach, analyzing survey data from MFI managers in Ghana using structural equation modeling (SmartPLS 3.0). This study addresses an empirical gap in understanding the role of strategic capabilities as a mediator between competitive advantage and MFI sustainability in Ghana. This area has yet to be explored comprehensively within the context of sub-Saharan Africa. By focusing on Ghana, we provide insights that not only contribute to the national discourse but also offer potential implications for the broader region.

The research makes the following theoretical contributions:

This study investigates the mediating effects of strategic capabilities on the relationship between competitive advantage and MFI sustainability in Ghana.

Addressing a significant gap in the literature, we focus on how competitive advantages—such as cost differentiation, pricing strategy, focus market, market strategy, target market, innovation in product offerings, effective operations, risk management, and customer relationship building influence MFI sustainability.

Extending the resource-based view (RBV) theory, we employ strategic capabilities as a mediator to establish an empirical connection between competitive advantage and MFI sustainability.

Our findings provide practical insights for MFIs in Ghana, helping them enhance their competitive edge and sustainability practices. This study contributes to understanding the underexplored link between competitive advantages, strategic capabilities, and the sustainability of MFIs.

This introduction sets the stage for a critical analysis of our study, which includes a literature review, discussion on the methodology, results, and discussions. It concludes with limitations, implications, and recommendations for future research.

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Literature review

Resource-based view (RBV) theory in MFI

The RBV theory emphasizes the importance of strategic capabilities and competencies for achieving sustainable competitive advantage. In MFIs, RBV concepts have led to frameworks focusing on core competencies, risk management, product innovation, and client acquisition. Research by Purkayastha et al. [61] indicates that MFIs with a robust resource base outperform their competitors. RBV principles enhance internal processes, human resources, and technology, making them highly relevant to MFIs, where unique capabilities are essential for success. In Ghana, MFIs often face resource constraints. However, their unique assets, such as local expertise and access to underserved areas, provide a competitive edge. MFIs can develop customized financial products tailored to local market demands, which are difficult for competitors to replicate. RBV theory highlights the importance of distinctive assets and strategic competencies in giving MFIs a competitive advantage.

Competitive advantage theory

Michael Porter's competitive advantage theory 60 is pivotal for understanding how organizations achieve and sustain a competitive edge through cost leadership and differentiation strategies. These strategies involve innovation, customer service, and brand recognition (Porter, 60). Scholars have extended Porter's work to include elements like lean inventory management and strategic supplier partnerships, which are crucial for MFIs to offer affordable services [2]. Differentiation, as demonstrated by Dzogbenuku [22], involves aspects like brand reputation and customer experience. Innovation plays a crucial role, as seen in case studies by Trombetta et al. [71], highlighting the success of tailored services such as microinsurance and agricultural loans in Ghana. The practical applications of these concepts in the Ghanaian context are illustrated by Atiase and Dzansi [12]. Porter's theory provides a framework for improving the performance of Ghanaian MFIs by managing costs, innovating, and building a reputable brand, thereby serving a diverse clientele effectively.

Competitive advantage elements

Competitive advantage elements are key factors that give a company an edge over its competitors. This study examines cost differentiation, pricing strategy, market strategy, focus strategy, efficient operations, target market, risk management, innovative product offerings, and client relationships.

Cost differentiation

Cost differentiation involves adjusting prices based on attributes such as quality and brand to attract various customer segments [20]. For instance, MFIs in Ghana, like Sinapi Aba Trust, use cost differentiation to offer diverse loan products at varying rates, making financial services accessible to clients with different affordability levels [25]. Bii and Mwasiaji [15] also note that strategies like product diversification and excellent customer service contribute significantly to MFI sustainability in Kenya.

Pricing strategy

Pricing strategies impact consumer behavior and firm profitability (Nagle et al., 52). Dynamic pricing, which adjusts prices in real time, allows firms to respond to market dynamics (Chen et al., 17). In Ghana, MFIs employ pricing techniques aligned with promoting financial inclusion by offering competitive interest rates [3]. Chubaka Mushagalusa et al. [19] highlight that perceived pricing fairness positively impacts the sustainability of microfinance firms in the Democratic Republic of Congo.

Risk management

Risk management involves identifying, assessing, reducing, and monitoring risks to protect client investments (Frempong et al.,[29]). The Ghana Microfinance Institutions Network (GHAMFIN) collaborates with MFIs to set industry-wide risk management standards [4]. Effective risk management techniques have positively impacted MFI sustainability (Mutamimah et al.,[51]).

Innovation in product offerings

Customer feedback in product development helps businesses maintain a competitive edge [15]. MFIs in Ghana actively seek customer input to introduce new and customer-focused financial products [55]. Bii and Mwasiaji [15] found that employing innovative product offerings enhances the sustainability of microfinance banks in Kenya.

Market strategy

Effective market strategies are built on comprehensive market research, which enhances business performance [43]. In Ghana, most MFIs use market research to tailor their financial offerings to specific client groups, ensuring they meet the precise needs of their target customers (Sangwan et al. [64]). Successful product creation

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requires understanding customer expectations and market trends.

Focus strategy
Focusing on a niche market allows firms to differentiate themselves, build customer loyalty, and allocate resources efficiently [32]. This specialization caters to unique market needs and aims to outperform competitors. Bii et al. 15 reveal that microfinance banks in Kenya use various strategies, such as innovative products and excellent customer service, to remain competitive and sustainable. MFIs use focus strategies in Ghana to provide customized financial services to underserved populations [28].

Efficient operations
Streamlining operations and leveraging technology are crucial for improving efficiency [35]. Businesses can enhance efficiency by reducing waste and optimizing resources (Gomes and Romão, 31). Ghanaian MFIs utilize technology to cut operating costs while offering effective services [73].

Target market
Identifying and targeting specific customer segments allow efficient resource allocation [43]. A thorough understanding of the target market enables organizations to adjust their marketing strategies to reach their clients effectively.

Client relationships
Building and maintaining strong client relationships are essential for customer loyalty. Excellent service, appreciation, and loyalty programs help develop and sustain these relationships [57]. MFIs focus on efficient client engagement to retain and reward customers [58].

Sustainability of MFIs
The sustainability of MFIs is a multifaceted concept encompassing various dimensions. MFI's sustainability depends on its ability to raise adequate funds to cover service requests and operating expenses and sustain microfinance programs beyond project completion [62]. MFIs must pay all costs and lessen dependency on outside financing sources to continue operating and assisting people experiencing poverty [49]. Financial, institutional, market, legal, and regulatory issues are some of the factors that influence MFIs sustainability. Lending volume, average loan size as a ratio of the poverty line, loan portfolio, and savings services are common performance indicators of MFI sustainability (Maîtrot, 46). The dimensions of MFIs' sustainability used in this study include financial, operational, social, environmental, regulatory, expansion, and growth sustainability.

Dimensions of MFIs' sustainability
Financial sustainability　Financial sustainability is crucial for achieving organizational goals by managing debt, maintaining cash flow, and making strategic investments [72]. Key indicators include debt-to-equity ratio, profitability, and loan portfolio quality. For example, Advans Ghana Savings and Loans has achieved sustainability through effective financial management and reduced reliance on external funding.

Operational sustainability　Operational sustainability ensures businesses operate efficiently while benefiting society and the environment [49]. This includes integrating social responsibility into strategies to enhance customer satisfaction and profitability. Sinapi Aba Trust in Ghana demonstrates operational sustainability with practices that improve community reputation and customer satisfaction.

Social sustainability　Social sustainability focuses on creating equitable and inclusive societies (Eizenberg & Jabareen, 23). For MFIs, this involves improving clients' social welfare and living standards. Opportunity International in Ghana supports social sustainability through community development and empowerment initiatives.

Environmental and regulatory sustainability
Environmental sustainability encompasses the impact of regulations on social and economic advancement, ethical practices, and environmental protection [13]. Nyanzu et al. [54] provide detailed recommendations for achieving environmental sustainability and meeting regulatory standards. Adams and Datt Tewari 1 emphasize the importance of public education and stakeholder involvement in implementing sustainability programs. Fidelity Bank Ghana exemplifies this approach by adhering to legal requirements and adopting eco-friendly practices, which enhances its reputation and social responsibility while ensuring regulatory compliance.

Expansion and growth sustainability
Expansion sustainability pertains to scaling operations without compromising financial and operational performance. Indicators include outreach expansion and loan portfolio growth. Effective planning and risk management are critical for success, as Khan et al. [40] and Robinson [63] highlighted. Ghanaian MFIs balance environmental, social, and financial considerations to achieve sustainable growth.

Strategic capabilities
Strategic capabilities are essential assets and proficiencies that provide a competitive advantage [36]. According to

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the resource-based view (RBV), competitive advantage stems from diverse internal capabilities rather than external market factors (Chatterjee et al., 18). Organizations must continuously enhance these capabilities through research, development, intellectual property, and strategic partnerships [36]. Key strategic capabilities discussed in this study include:

Knowledge–sharing platform
Knowledge–sharing platforms are crucial for disseminating expertise and enhancing decision-making by providing centralized access to information (Fauzi et al., 27). Mtawali [50] found that such platforms positively impact MFI efficiency in Kenya.

Training and development capabilities
Practical training and development are vital for MFI sustainability. They involve hiring skilled employees, offering development opportunities, and fostering a collaborative work environment [56]. Shabani and Chamshama 68 emphasized that training significantly contributes to MFI sustainability in Tanzania.

Technological capabilities advancement
Technological capabilities enhance MFI operations, risk management, and service delivery [5]. Technological advancements, such as digital tools and mobile banking, improve efficiency and service access [8]. Ghani et al. [30] highlighted that technology use in MFIs promotes financial inclusion and reduces transaction costs in Pakistan.

Strategic partnerships
Strategic partnerships involve collaborations that pool resources and expertise to achieve mutual goals [16]. MFIs benefit from alliances with institutions and agencies, gaining access to capital and support [6]. These partnerships are crucial for advancing socioeconomic justice and maintaining a competitive edge [36].

Influence of competitive advantage on MFI sustainability
Bii and Mwasiaji [15] found that microfinance banks in Kenya maintained competitiveness and sustainability through strategies such as product diversification, excellent customer service, and cost reduction. Similarly, Bii et al. 15 highlighted that innovative products, excellent customer service, and a strong brand presence were crucial for sustaining competitiveness. Mutamimah et al. [51] demonstrated that effective risk management significantly enhanced the sustainability of Islamic MFIs in Indonesia using a sample of 30 and multiple regression analysis. Chubaka Mushagalusa et al. [19] explored how perceptions of pricing fairness affected microfinance

firms in the Democratic Republic of Congo using a sample of 300 and structural equation modeling. These findings suggest that competitive advantage positively and significantly impacts the sustainability of microfinance institutions (MFIs). Thus, we hypothesize that:

H1: Competitive advantage positively and significantly influences MFIs' sustainability.

Competitive advantage and strategic capabilities
Ngeche [53] identified that knowledge management, organizational innovation, social capital integration, and organizational agility are crucial sources of sustainable competitive advantage in a dynamic business environment. Bari et al. [14] found that developing dynamic capabilities is driven by strategic routines, integrated value chains, sustainability-oriented transformations, and strategic organizational developments. Fabrizio et al. [26] conducted a systematic literature review of 70 articles and concluded that dynamic capabilities positively influence competitive advantage in small- and medium-sized enterprises. Building on these findings, we hypothesize that:

H2: Competitive advantage positively and significantly influences strategic capabilities.

Strategic capabilities and MFIs sustainability
Mtawali [50] found that knowledge–sharing platforms enhanced the efficiency of Uwezo Microfinance Bank in Kenya. Shabani and Chamshama 68 showed that employee training and financial regulations positively impacted the financial sustainability of Tanzanian MFIs, using a sample of 30 and multiple regression analysis. Amalia and Rahmatullah [6] highlighted that strategic partnerships, especially with financial technology, can promote socioeconomic justice by providing services to underserved communities. Ghani et al. [30] discovered that technology adoption in Pakistani MFIs improved financial inclusion and service access and reduced transaction costs based on a descriptive survey of 30 MFIs. Building on these findings, we hypothesize that:

H3: Strategic capabilities positively and significantly influence MFIs' sustainability.

Competitive advantage, strategic capabilities, and MFIs sustainability
This study constructs a theoretical framework based on competitive advantage (CA) theory and resource-based view (RBV) theory to understand the sustainability of MFIs in Ghana. CA theory posits that sustained competitive advantage arises from possessing and effectively deploying unique resources and capabilities. RBV theory (Barney, 1991; Wernerfelt, 1984) extends this by emphasizing that these resources must be valuable, rare,

inimitable, and non-substitutable. Prior research has established that competitive advantage positively impacts the sustainability of MFIs (Bii et al., [15, 15],[19]). Additionally, RBV theory suggests that strategic capabilities such as knowledge, training, technological advancement, and other organizational competencies enhance competitive advantage and thereby influence sustainability [6, 30, 50], Shabani & Chamshama, 68.

Despite recognizing these individual impacts, the literature must thoroughly examine the combined influence of competitive advantage and strategic capabilities on MFIs' sustainability. These studies have yet to consider the mediating role of strategic capabilities in the relationship between competitive advantage and MFI sustainability. Our research addresses this gap by hypothesizing that strategic capabilities mediate the relationship between competitive advantage and sustainability in Ghanaian MFIs. Specifically, strategic capabilities are viewed as the mechanism through which competitive advantage translates into long-term sustainable outcomes. Thus, we propose the following hypothesis:

H4: Strategic capabilities mediate the relationship between competitive advantage and sustainability in Ghanaian MFIs.

Conceptual framework
The study's conceptual framework (Fig. 1) centers around three elements: competitive advantage (independent variable), strategic capabilities (mediating variable), and MFI sustainability (dependent variable).

Operationalization of constructs variables
Competitive advantage measurement
Competitive advantage is assessed through cost differentiation, pricing strategy, target market, focus strategy, efficient operations, effective risk management, market strategy, innovation in product offerings, and client relationships. A closed-ended questionnaire with a 5-point Likert scale was utilized to gather data. Competitive advantage was measured using a 9-item scale with anchors ranging from "strongly disagree" (1) to "strongly agree" (5), adapted from Bii and Mwasiaji [15].

Strategic capabilities measurement
Strategic capabilities were measured using a 4-item scale covering knowledge and sharing platforms, training and development programs, alliance partnerships, and technological advancement. A 5-point Likert scale was used, with anchors ranging from "strongly disagree" (1) to "strongly agree" (5), as adapted from Maîtrot [46] and Shrivastava & Vidhi [69].

MFIs sustainability measurement
MFI sustainability (dependent variable) was assessed across financial, social, environmental, regulatory compliance, expansion, and operational dimensions. A 5-item scale was used to measure these aspects, with a
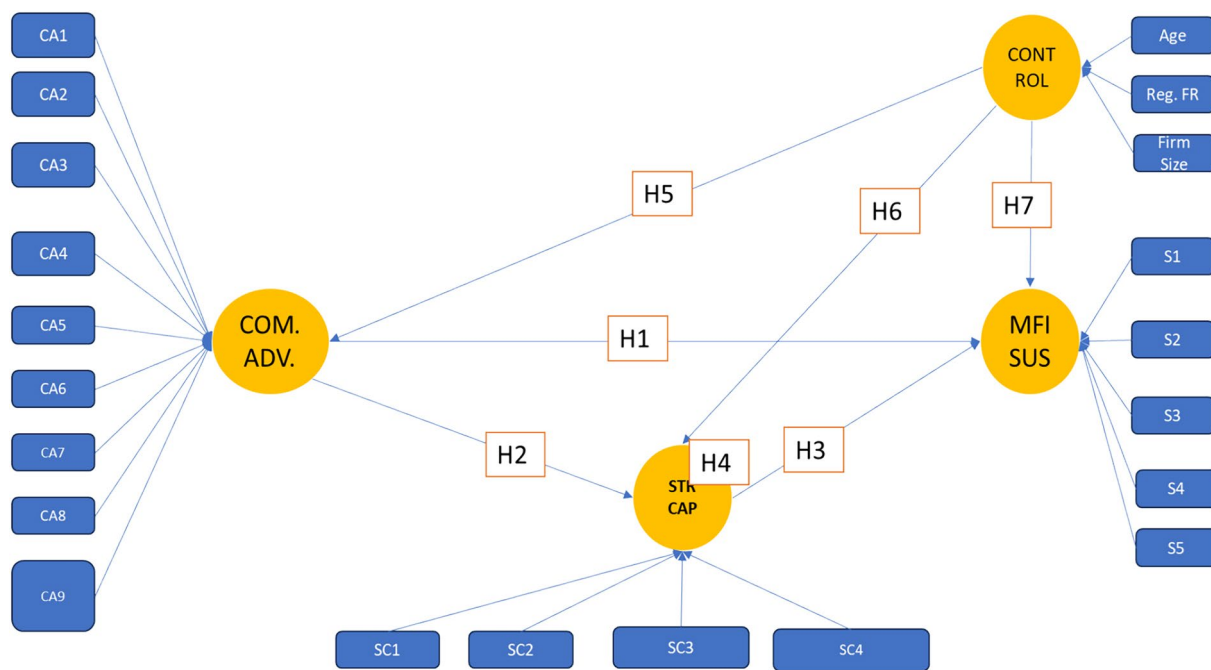

Fig. 1 Conceptual framework. *Source* Authors own (2023)

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5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5), as adapted from Maîtrot 46, , and Shrivastava & Vidhi [69].

Confounding variables

This study controlled for variables such as age, regulatory compliance, and firm size, following methodologies by Kipesha [42], Adams & Tewari [1], Nyanzu et al. [54], and Li et al. [44]:

Age: Measured as a continuous variable representing operational years, it is categorized as 1—Less than 1 year; 2—1–3 years; 3—4–6 years; 4—7–10 years.

Regulatory Compliance: A binary variable indicating regulatory penalties, categorized as 1—Applied (penalties imposed) and 2—Not Applied (no penalties).

Firm Size is quantified by employee numbers and categorized as 1—Low (less than 10 employees), 2—Medium (11–20 employees), or 3—High (more than 20 employees).

These measurement procedures are detailed in Table 1: Measurement of Variable.

Theoretical underpinnings conceptual framework

This study's conceptual framework is anchored in two prominent theoretical perspectives: the resource-based view (RBV) and Michael Porter's competitive advantage theory. Integrating these theories offers a comprehensive understanding of the interplay among competitive advantage, strategic capabilities, and sustainability within microfinance institutions (MFIs).

The RBV is the foundational theory, emphasizing strategic capabilities as core assets for achieving competitive advantage. In the microfinance sector, RBV concepts such as core competencies, innovation, risk management, and unique resources are crucial in shaping the strategic landscape. The RBV perspective highlights that competitive advantage arises from possessing and effectively leveraging distinctive, valuable, and difficult-to-replicate resources and capabilities.

Complementing the RBV, Michael Porter's competitive advantage theory enriches the framework by detailing how organizations can achieve and sustain a competitive edge. Porter's differentiation strategies, including brand reputation, customer experience, and sustainability practices, contribute to a unique value proposition in the microfinance context.

The conceptual framework hypothesizes the relationships among competitive advantage, strategic capabilities, and sustainability in MFIs. These hypotheses guide the study in exploring how strategic capabilities impact competitive advantage and, in turn, influence the sustainability of MFIs.

Research methodology

Research approach

This study utilized a quantitative research approach, chosen for its ability to collect and statistically analyze numerical data to identify variables and test hypotheses (Sturmberg & Marcum, [70]). Given the focus on assessing the relationship between variables and examining mediating effects, a quantitative approach is particularly suitable for this study.

Research design

This investigation employed a cross-sectional and explanatory design. Cross-sectional research involves collecting data from multiple subjects simultaneously, providing a snapshot of the study variables [47]. The explanatory design was used to analyze data patterns and test research hypotheses [59]. This design is particularly relevant for understanding how the mediating role of strategic capabilities influences the relationship between competitive advantage and MFI sustainability.

Population of the study, sampling methods, and sample size.

This study focuses on microfinance institutions (MFIs) employees in Ghana, explicitly targeting 600 leaders, managers, and owners/CEOs. We employed a purposive sampling technique to select 150 licensed MFIs from the Greater Accra region. Purposive sampling was used to identify well-performing MFIs with a competitive edge, in line with Saunders et al. [66], who note that this method helps researchers select respondents with rich information.

After identifying the 150 purposively selected MFIs, we conducted on-site visits and used simple random sampling to select four managers, leaders, or executives from each MFI, resulting in an initial sample size of 600 individuals. Simple random sampling was employed to ensure equal selection chances for all participants.

While we did not use power analysis or compute the sample size based on effect size and statistical power due to a lack of relevant studies, recent research in microfinance has used sample sizes ranging from 50 to 400 [10], Elsahory et al., 24. Consequently, a final sample size of 500 was deemed appropriate, considering feasibility, resource availability, and practicality. Hair et al. [34] recommend a sample size of 200 to 500 for structural equation modeling (SEM) studies. During data screening, some responses were excluded due to incomplete answers, including multiple managers, leaders, and executives aimed to capture diverse perspectives within the MFIs.

Unit of analysis

In this study, the unit of analysis is the MFI at the firm level. Instead of treating individual managers, leaders, and executives as separate units, these individuals are viewed as representatives of their respective MFIs. This approach captures diverse perspectives within each MFI and provides insights into organizational dynamics and relationships. Data from individuals serve as proxies for firm-level characteristics, enabling the examination of competitive advantage, strategic capabilities, and sustainability at the MFI level.

Research instrumentation

We administered the questionnaire to top leaders, managers, and executives involved in microfinance institutions' decision-making processes. A total of 600 questionnaires were distributed to these participants. The survey employed a Likert scale with five response options, ranging from "strongly disagree (1)" to "strongly agree (5)," to capture respondents' opinions. Before distribution, the questionnaires underwent validity testing to ensure their appropriateness and relevance. Data collection occurred between May and July 2023 with the assistance of research assistants. Table 1 presents measurement of study variables.

Data collection procedure and response rate

Data collection procedure

Primary data for this study was gathered through completed questionnaires. Ethical approval was obtained, and participants gave informed consent after being briefed on the study's objectives. Engagement with key representatives of selected MFIs, including CEOs, ensured their understanding and willingness to participate. We guarantee the confidentiality and anonymity of the data collected.

Surveys were systematically distributed to licensed MFIs in Ghana. A list of these MFIs was compiled from regulatory sources and industry databases. Initial contact was made with key representatives to explain the study and seek their participation. Surveys were administered through face-to-face visits, with assistance from human resource officers, and responses were collected directly from the human resource departments. This approach aimed to ensure accessibility and accommodate the preferences of diverse MFIs. Clear instructions were provided to respondents, and potential barriers to participation were addressed.

Response rate

The response rate, an indicator of survey completion relative to distribution, was calculated as follows: Response Rate (%) = (Number of Completed Surveys / Number of Surveys Distributed) × 100. The response rate for this study was 83%. Participation was encouraged through follow-up reminders and personalized communication, fostering a collaborative environment between researchers and MFIs.

Steps for ensuring accuracy and reliability

To ensure accuracy and reliability, the survey instrument underwent a pilot testing phase with 50 MFIs not included in the main study. Feedback from this pilot phase was used to refine the survey, enhancing its clarity and relevance. Detailed instructions accompanied the survey to guide respondents in accurately completing the questions. Upon receiving the survey responses, rigorous validation checks were conducted to identify and address any inconsistencies. Researchers remained accessible throughout the data collection period to address queries, provide additional context, and offer support, ensuring respondents felt confident in their submissions.

Measurement instrument development and validation

We developed our measurement instruments based on theoretical frameworks for competitive advantage, strategic capabilities, and MFI sustainability. Confirmatory factor analysis (CFA) validated our measurement model, with factor loadings exceeding recommended thresholds, as shown in supplementary Tables 2 and supplementary 4. Cronbach alpha coefficients exceeding 0.70 confirmed our scales' internal consistency and reliability. Expert reviews ensured content validity, refining the survey design and enhancing validity.

Data statistical analysis

We used structural equation modeling (SEM) with SmartPLS to examine the relationships among competitive advantage, strategic capabilities, MFI sustainability, and control variables (age, regulatory factors, and firm size). The SEM model included reflective and formative measurement approaches to capture the complex interactions. The structural model specified direct and indirect paths among the constructs, offering a comprehensive framework for understanding their interrelationships.

Model fit assessment indices

We assessed model fit using the standardized root mean square residual (SRMR), unweighted least-squares discrepancy (d_ULS), and geodesic discrepancy (GD). The SRMR value of 0.016 indicates a good fit, with lower values of 0.08 preferable [38]. For d_ULS and GD, values above 0.05 suggest a robust model fit [21]. Our d_ULS is 1.612, and GD is 0.667, demonstrating adequate fit and confirming the model's accuracy in representing the relationships among constructs.

Mediation analysis

We performed a mediation analysis to explore how strategic capabilities mediate the relationship between competitive advantage and MFI sustainability. Strategic capabilities act as a mediator, with competitive advantage as the independent variable and MFI sustainability as the dependent variable. Using 5,000 bootstrap resampling procedures, we estimated the distribution of indirect effects, calculated confidence intervals, and assessed statistical significance to determine the mediating role of strategic capabilities.

Results and discussion

This section presents the results of our analysis using structural equation modeling (SEM) with SmartPLS 3.0. We employed this method to rigorously test our hypotheses and examine the relationships among competitive advantage, strategic capabilities, and MFI sustainability. The analysis encompasses measurement and structural models, providing a detailed evaluation of how these variables interact.

We first report the results from the measurement model, which assesses the validity and reliability of the constructs. Following this, we discuss the structural model results, highlighting the direct and indirect relationships between competitive advantage, strategic capabilities, and MFI sustainability. Each hypothesis is examined in terms of statistical significance and practical implications.

The findings are interpreted in the context of the theoretical framework, offering insights into how strategic capabilities mediate the relationship between competitive advantage and sustainability within MFIs. This discussion aims to elucidate the pathways through which competitive advantage influences MFI sustainability, addressing the theoretical and practical implications of the results.

Measurement model (first-order construct—reflective)

In evaluating our measurement model, we focused on key statistical measures to ensure reliability and validity, including factor loadings (FL), Cronbach alpha (CA), composite reliability (CR), and average variance extracted (AVE). Factor loadings (FL) exceeding 0.7 signify a strong connection between observed variables and the latent construct, indicating reliable representation. CA surpassing 0.7 assures internal consistency among scale items, validating their collective measurement. CR exceeding 0.7 reinforces the dependability of all indicators in capturing the construct (Sarstedt et al. [65]. AVE values above 0.5 indicate substantial variance capture, affirming construct validity [33]. Comparing these values to established thresholds confirms the robustness and validity of our measurement model.

Factor loading

Factor loading represents the correlation between each component of the correlation matrix and the selected principal component. In supplementary Table 2, the factor loadings are displayed. According to Marklinder et al. [48], a factor loading of 0.5 or higher is considered sufficient for forming the structure of a factor. As a result, items such as strategic partnership (SC 4), operational efficiency (SUSTI 4), and expansion and growth (SUSTI 5) were removed from the analysis because their factor loadings fell below the threshold of 0.5.

Reliability analysis

Supplementary Table 2 presents reliability analysis results for CA and CR. Both CA and CR values surpass the recommended threshold of 0.7 (Sarstedt et al., [65]), affirming the validity and reliability of the measurement items.

Convergent validity

Convergent validity and reliability were assessed using the average variance extracted (AVE), as recommended by Hair 33. According to Hair, AVE values exceeding the suggested cutoff point of 0.5 indicate satisfactory convergent validity and reliability of the measurement items. As shown in supplementary Table 2, the AVE findings confirm the accuracy of the instruments, with values for all measurement items surpassing the 0.5 threshold.

Indicator multicollinearity
Indicator multicollinearity

We assessed multicollinearity among the indicators using the variance inflation factor (VIF) statistic recommended by Fornell (1981). [33] suggest that VIF values below 5 indicate the absence of significant multicollinearity issues. As shown in supplementary Table 3, all VIF values are below this threshold, confirming that multicollinearity is not a problem in our analysis.

Discriminant Validity—Fornell–Larcker Criterion

The results indicate satisfactory discriminant validity, as the constructs show relationships with other constructs lower than their respective square roots of the average variance extracted (AVE), as shown in bold italics in supplementary Table 4. This confirms that each construct is distinct and correlates more with its indicators than other constructs.

Model fit analysis (reflective)

The standardized root mean square (SRMR) method for model fit analysis is used in this current study [37, 38]. The ideal SRMR value for fitting the data is between 0 and 1, with a value close to 0. In supplementary Table 5, the model fit summary shows that the SRMR is 0.016,

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more closely associated with 0. According to Dijkstra and Henseler [21], if the values of unweighted least-squares discrepancy (d_ULS) and geodesic discrepancy (GD) are more than 0.05, then d_ULS and GD values are significant to show robust model fit.

Lower-level confidence interval (LLCI) and upper-level confidence interval (ULCI)

The study assessed the precision of estimates using LLCI and ULCI, which are crucial for evaluating accuracy. Supplementary Table 6 shows LLCI and ULCI under "5.0%" and "95.0%" columns, respectively. For instance, the 90% confidence interval for the path coefficient from competitive advantage (CA) to MFI sustainability (SUSTI) is between 0.850 and 0.885, with a coefficient estimate of 0.868. For the strategic capabilities (SC) to SUSTI path, the sample mean is 0.072, and the 90% confidence interval ranges from 0.015 to 0.133. These intervals are vital for understanding the study's outcomes and the relationships examined.

MV prediction summary results (reflective)

Supplementary Table 7 presents the PLS-Predict results, which assess the model's predictive accuracy using RMSE, MAE, and MAPE metrics. Lower values for these metrics indicate better prediction accuracy. For competitive advantage (CA) variables (CA3, CA4, CA2, CA7, CA5, CA6, CA1, CA9, CA8), RMSE ranges from 0.424 to 0.737, MAE ranges from 0.307 to 0.585, and MAPE ranges from 8.029 to 15.657%. For strategic capabilities (SC) and MFI sustainability (SUSTI) variables (SC1, SC2, SC3, SUSTI1, SUSTI3, SUSTI2), RMSE ranges from 0.145 to 0.698, MAE ranges from 0.116 to 0.547, and MAPE ranges from 3.103 to 14.876%. Additionally, $Q^2\_$predict values, which measure the proportion of variance captured by the model, range from 0.023 to 0.650 for CA variables and from 0.144 to 0.964 for SC and SUSTI variables. Lower RMSE, MAE, and MAPE values, alongside higher $Q^2\_$predict values, reflect the model's robust predictive performance.

LM prediction summary results

Supplementary Table 8 outlines the performance metrics for the LM model. For RMSE, CA8 achieves the lowest value of 0.409, indicating high accuracy. CA8 also shows the lowest MAE of 0.250, reflecting precise predictions. CA8 has the lowest MAPE at 6.566%, demonstrating a minimal percentage difference. Among the strategic capabilities (SC) and MFI sustainability (SUSTI) variables, SC1 exhibits the lowest RMSE (0.566), MAE (0.433), and MAPE (11.057%), indicating superior predictive accuracy. For $Q^2\_$predict, CA1 achieves the highest value of 0.638, suggesting excellent prediction capability.

Overall, the LM model performs strongly across various variables, with CA8 and CA1 particularly notable for their exceptional accuracy and predictive performance.

LV prediction summary

Supplementary Table 9 presents the RMSE, MAE, and $Q^2\_$predict values for each latent variable (LV), providing insights into the model's predictive performance. Competitive advantage (CA) demonstrates the lowest RMSE (0.601) and MAE (0.480), indicating relatively accurate predictions. Strategic capabilities (SC) exhibit higher RMSE (0.840) and MAE (0.675), suggesting less precision in predictions. Conversely, sustainability (SUSTI) shows low RMSE (0.430) and MAE (0.311), reflecting effective predictive performance. The $Q^2\_$predict values support these findings, with CA and SUSTI showing higher predictive relevance than SC.

Measurement model—formative (second-order construct)

We assessed the multicollinearity of indicators using the variance inflation factor (VIF) statistic, as recommended by Fornell (1981). According to Hair et al. [33], VIF values below 5 indicate the absence of significant multicollinearity issues. The VIF values for all indicators, presented in supplementary Table 10, are below this threshold, confirming that multicollinearity is not a concern in our analysis.

Discriminant validity—Fornell–Larcker criterion (formative)

The Fornell–Larcker criterion was utilized to assess discriminant validity among the constructs. This criterion indicates that the correlations between constructs are lower than the square root of each construct's average variance extracted (AVE), as shown in bold italics in supplementary Table 11. These results confirm that the constructs exhibit good discriminant validity, ensuring that each construct is distinct.

Table 11 presents the outcomes.

Model fit indices (formative)

We evaluated the model fit for formative constructs using several indices. The standardized root mean square residual (SRMR) was 0.013, as reported in supplementary Table 12. While this value is not ideal, it is relatively close to the acceptable range of 0–1, suggesting an adequate fit. The unweighted least-squares discrepancy (d_ULS) was 1.531, and the geodesic discrepancy (d_G) was 0.647. According to Dijkstra and Henseler [21], values exceeding 0.05 for these indices indicate a robust model fit. These results confirm that the model competes for the formative constructs.

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MV prediction summary

Supplementary Table 13 presents critical metrics for evaluating the predictive performance of the partial least-squares (PLS) model, including RMSE, MAE, MAPE, and Q^2_predict. For example, CA3 shows a root mean square error (RMSE) of 0.570, reflecting moderate predictive accuracy. CA1 has a mean absolute error (MAE) of 0.333, indicating relatively small prediction errors. The mean absolute percentage error (MAPE) for SUSTI1 is 3.126%, demonstrating a low average percentage difference between observed and predicted values. Furthermore, SUSTI1's Q^2_predict of 0.964 highlights a strong predictive fit, indicating that the model performs well in forecasting this variable.

LM predict

Supplementary Table 14 details the LM model's predictive performance. For RMSE, CA8 achieves the lowest value of 0.408, indicating high prediction accuracy. The MAE for CA8 is also the lowest at 0.250, reflecting precise predictions. Regarding MAPE, SUSTI1 demonstrates the lowest value of 3.226%, signifying a minimal percentage difference between observed and predicted values. Additionally, SUSTI1's Q^2_predict of 0.987 represents a nearly perfect fit, suggesting exceptional prediction accuracy.

LV prediction summary

Supplementary Table 15 presents the metrics for evaluating the predictive performance of the partial least-squares (PLS) model across latent variables.

RMSE measures the average magnitude of prediction errors. For competitive advantage (CA), the RMSE is 0.599, indicating moderate predictive accuracy.

MAE assesses the average absolute difference between observed and predicted values. Strategic capabilities (SC) have an MAE of 0.643, reflecting relatively small prediction errors. Q^2_predict evaluates the model's fit for predictions. Sustainability (SUSTI) shows a Q^2_predict of 0.816, suggesting a solid fit for this variable.

Structural model

The structural model assesses the hypotheses concerning the relationships among predictors and outcomes, including both direct and mediating effects. It provides insights into how various variables are interconnected, evaluates the strength and direction of these relationships, and examines the overall model fit. This model helps understand how predictors influence outcomes directly and indirectly through mediating variables, offering a comprehensive view of the underlying mechanisms in the study.

Direct structural hypothesis testing results

Hypothesis 1   H1: Competitive advantage positively and significantly influences MFIs' sustainability.

The analysis reveals that competitive advantage has a positive and statistically significant impact on MFI sustainability ($\beta = 0.822$, $t = 31.471$, $p < 0.005$), supporting hypothesis 1. This finding aligns with the studies by Bill & Mwasiaji 15, Mutamimah et al. [51], and [19]. For example, [15] reported that microfinance banks in Kenya maintained competitiveness and sustainability through strategies such as product diversification, excellent customer service, and cost reduction. Similarly, Bii et al. 15 emphasized the importance of innovative products, excellent customer service, and a strong brand presence for sustaining competitiveness. However, this contrasts with Schicks and Rosenberg [67], who found that competition adversely affected MFIs' outreach and loan performance.

Hypothesis 2   H2: Competitive advantage has a positive and significant influence on strategic capabilities.

The results indicate that competitive advantage positively and significantly influences strategic capabilities ($\beta = 0.635$, $t = 21.860$, $p < 0.005$), supporting hypothesis 2 (H2). This finding is consistent with Ngeche [53] and Fabrizio et al. [26], who demonstrate that competitive advantage significantly enhances strategic capabilities. Fabrizio et al. [26] found that dynamic capabilities positively influence competitive advantage in small- and medium-sized enterprises.

Hypothesis 3   H3: Strategic capabilities positively and significantly influence MFIs' sustainability.

The results indicate that strategic capabilities positively and significantly influence MFIs' sustainability ($\beta = 0.072$, $t = 2.021$, $p < 0.005$), thus supporting hypothesis 3. This finding aligns with studies by [6, 30, 50], and Shabani and Chamshama 68. For example, [50] found that knowledge–sharing platforms enhanced the efficiency of Uwezo Microfinance Bank in Kenya. Similarly, Shabani and Chamshama 68 demonstrated that employee training and financial regulations positively impacted the financial sustainability of Tanzanian MFIs. Ghani et al. [30] discovered that technology adoption in Pakistani MFIs improved financial inclusion.

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Mediating structural hypothesis testing results

We used SEM (SmartPLS 3.0) to analyze how strategic capabilities mediate competitive advantage and MFI sustainability. The results are presented in supplementary Table 16.

Hypothesis 4   H4: Strategic capabilities mediate the relationship between competitive advantage and sustainability in Ghanaian microfinance institutions.

The results indicate that strategic capabilities mediate the relationship between competitive advantage and sustainability in Ghanaian MFIs ($\beta = 0.046$, $t = 2.104$, $p < 0.005$), thus supporting hypothesis 4. This finding contributes new insights into the literature, as no existing research directly supports or contradicts this result. It underscores the unique role of strategic capabilities in enhancing the impact of competitive advantage on MFI sustainability.

Control variable structural results—age, regulatory, and firm size

Control variables such as age, regulatory factors, and firm size were included to determine their influence on strategic capabilities, competitive advantage, and sustainability in Ghanaian MFIs while holding other factors constant.

Hypothesis 5   H5: Control variables influence competitive advantage.

The results show that control variables such as age, regulatory factors, and firm size positively and significantly influence competitive advantage ($\beta = 0.804$, $t = 35.994$, $p < 0.005$). Hence, hypothesis 5 (H5) is supported.

Hypothesis 6   H6: Control variables influence strategic capabilities.

The results indicate that control variables such as age, regulatory factors, and firm size positively and significantly influence strategic capabilities ($\beta = 0.117$, $t = 2.786$, $p < 0.005$). Thus, hypothesis 6 (H6) is supported.

Hypothesis 7   H7: Control variables influence sustainability in Ghanaian MFIs.

The results reveal that control variables such as age, regulatory factors, and firm size positively and
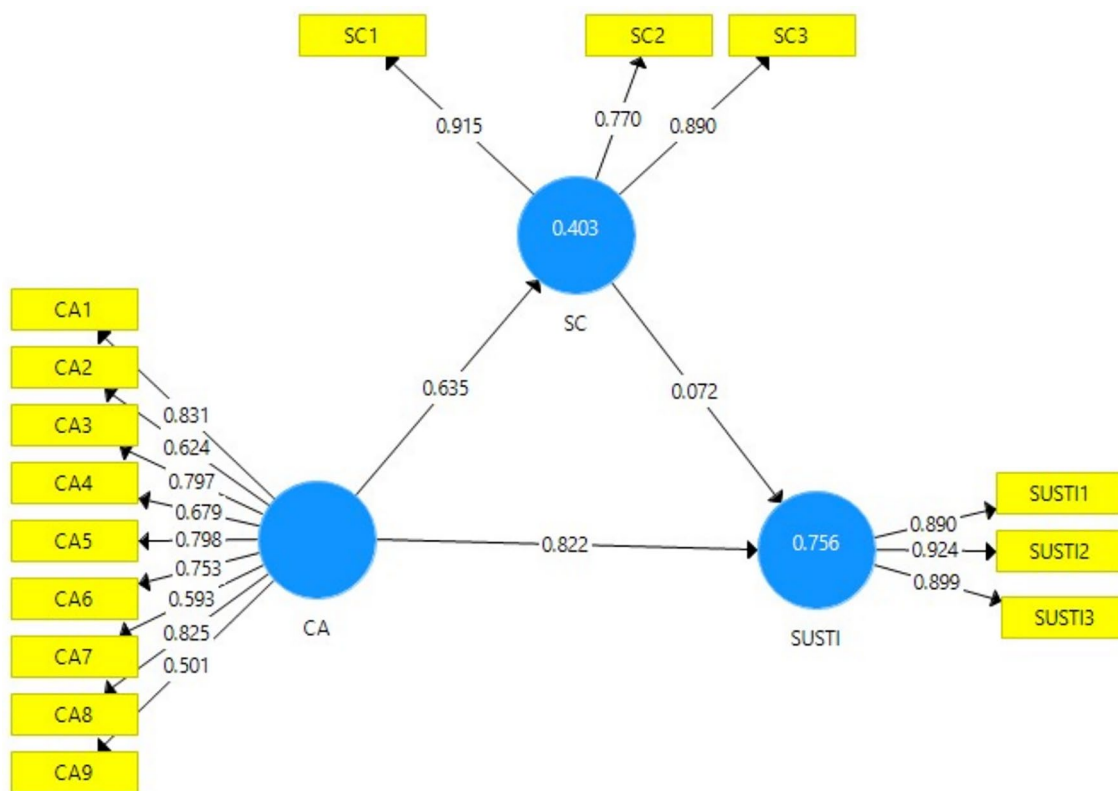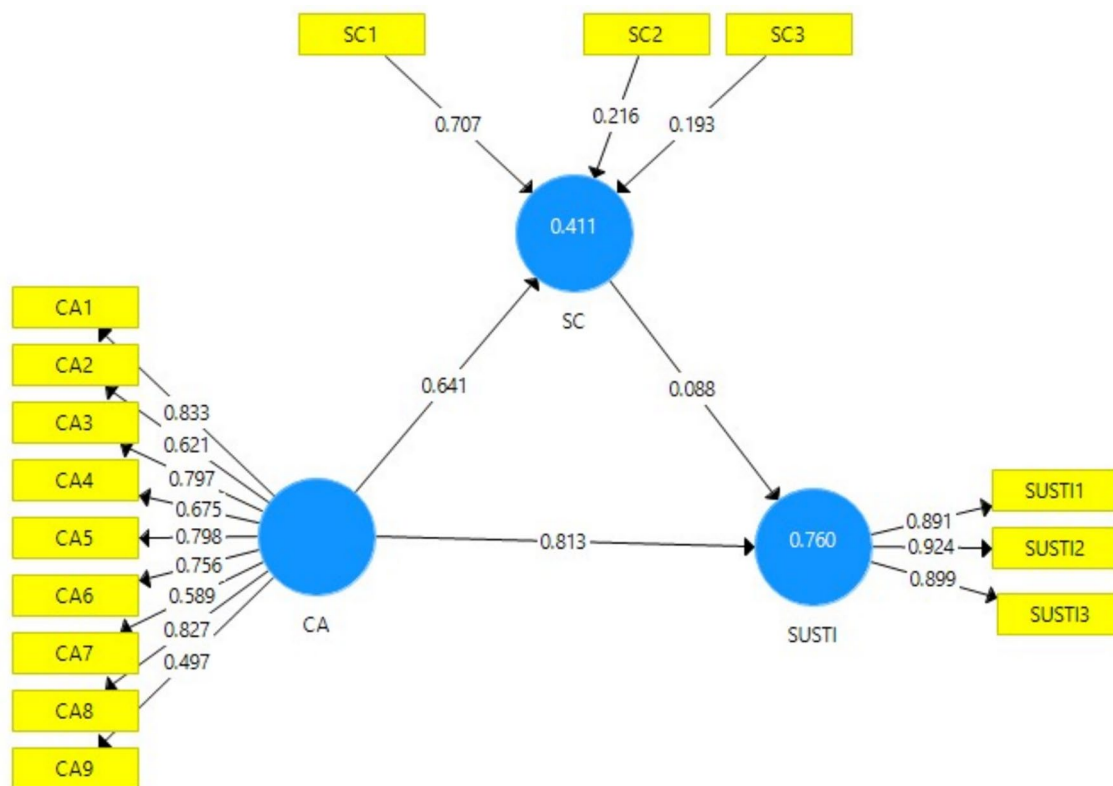

Fig. 2 Measurement model

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Fig. 3 Measurement model—formative diagram

significantly influence MFI sustainability ($\beta = 0.573$, $t = 16.733$, $p < 0.005$). Hence, hypothesis 7 (H7) is supported.

These findings suggest that age, regulatory factors, and firm size significantly influence competitive advantage, strategic capabilities, and sustainability in Ghanaian MFIs.

Supplementary Table 19 provides confidence intervals that aid in assessing the precision and reliability of the coefficients. The confidence interval suggests the following:

For CV on CA: We can be 90% confident that the actual effect lies between 0.766 and 0.837. The narrow range indicates high precision in this estimate.

For CV on SC: We can be 90% confident that the actual effect lies between 0.007 and 0.227, indicating lower precision and more significant variability.

For CV on SUSTI: We can be 90% confident that the actual effect lies between 0.512 and 0.624, with a narrow range indicating moderate precision in this estimate (Figs. 2, 3, 4, 5, 6).

Conclusions and recommendations

This study examines the relationship between competitive advantage and sustainability within Ghanaian microfinance institutions (MFIs), emphasizing the mediating role of strategic capabilities.

Competitive advantage significantly impacts MFI sustainability. Achieving sustainability requires effectively channeling competitive advantage through strategic capabilities.

Strategic capabilities significantly influence MFI sustainability and mediate the relationship between competitive advantage and sustainability. Investing in technology, training, information–sharing platforms, and strategic alliances is essential for maintaining a competitive edge and achieving long-term success.

Control variables such as age, regulatory compliance, and firm size positively influence competitive advantage, strategic capabilities, and MFI sustainability, underscoring their importance in MFI operations.

The study enriches the literature by revealing the mediating role of strategic capabilities, providing new insights into the interplay between competitive advantage and sustainability.
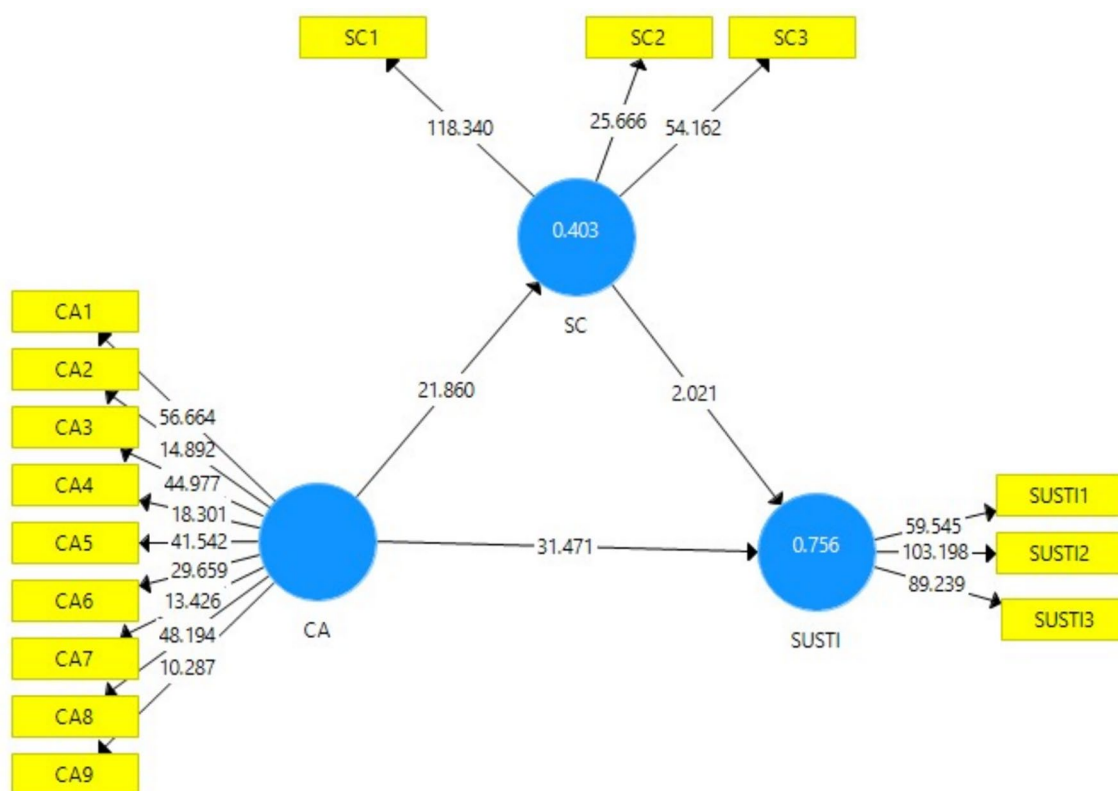
Fig. 4 Structural model diagram

It affirms the relevance of competitive advantage theory and the resource-based view (RBV) theory in MFIs, highlighting the importance of unique resources and capabilities for sustained competitive advantage.

Practitioners should focus on strategic investments and proactive capability cultivation. They should invest in technology, employee training, and knowledge–sharing platforms tailored to MFIs' needs. Leveraging competitive advantages can enhance sustainability through effective pricing, operational efficiency, risk management, and innovation.

Policymakers should create supportive environments through regulations, knowledge–sharing platforms, and financial incentives for digital solutions. It is crucial to establish laws that foster responsible business practices and facilitate collaboration among MFIs.

The study demonstrates how MFIs can leverage distinct resources and capabilities, contributing to a broader understanding of microfinance, policy management, and sustainability. It provides empirical evidence that strategic capabilities are critical for sustained competitive advantage within microfinance.

The study has several limitations. The cross-sectional design limits causal inferences and long-term observations. The reliance on survey or quantitative responses may introduce bias; combining these with qualitative methods could provide deeper insights. Additionally, the findings are specific to Ghana and may not be generalized to other regions or sectors.

Future research should explore the temporal dynamics of competitive advantage, strategic capabilities, and sustainability through longitudinal studies.

It should investigate specific strategic capabilities, such as technological advancements or human resource development, to understand their impact in greater detail.

Additionally, future research should conduct comparative analyses across different cultural and economic contexts and employ qualitative methods like in-depth interviews or focus groups for richer insights.
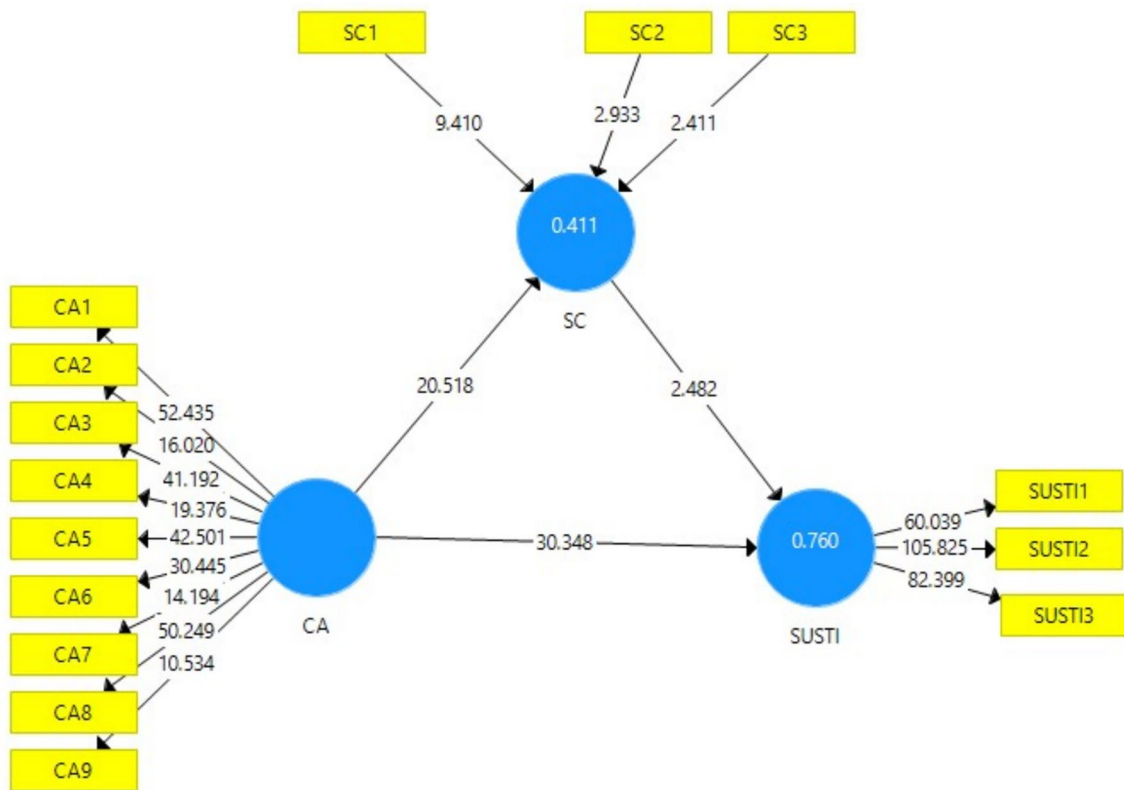
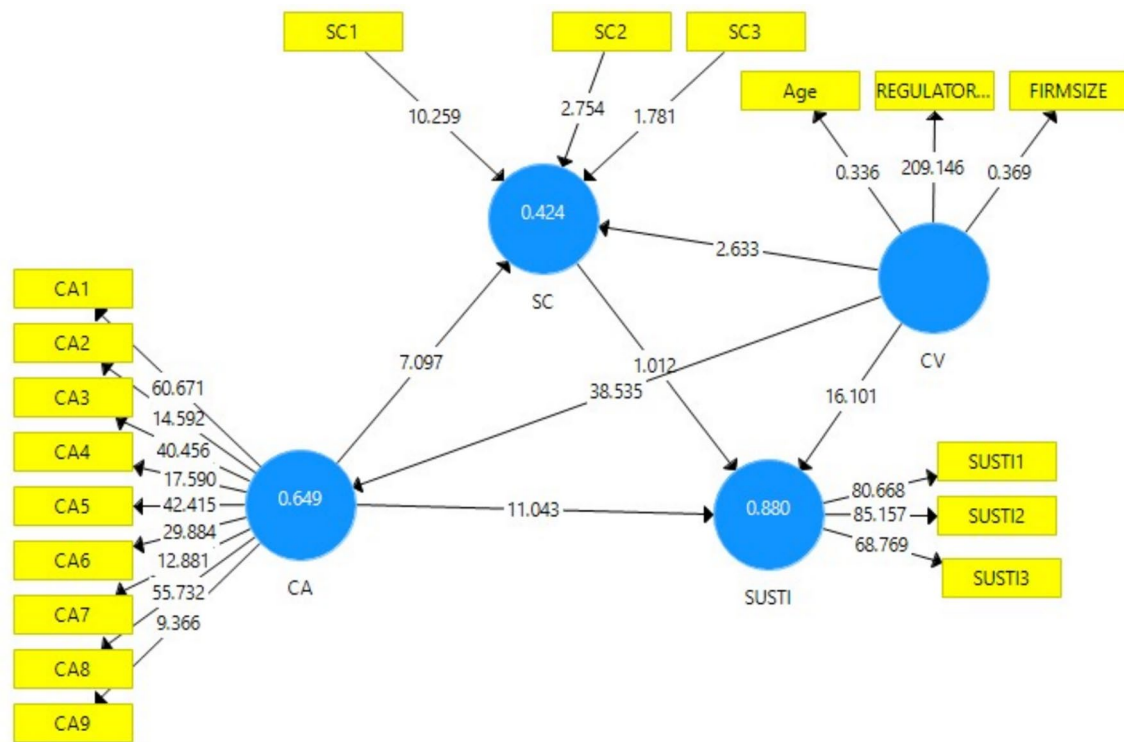**Fig. 5** Structural model diagram—formative

Fig. 6 Control variables diagram. *Source* Authors own (2023)

Abbreviations

CA	Cronbach alpha
CR	Composite reliability
FL	Factor loadings
AVE	Average variance extracted
CEO	Chief executive officer
d_ULS	Unweighted least-squares discrepancy
EGS	Expansion and growth sustainability
GD	Geodesic discrepancy
GHAMFIN	Ghana Microfinance Institutions Network
LLCI	Lower-level confidence intervals
MFIs	Microfinance institutions
O E	Operational efficient
RBV	Resource-based view
SEM	Structural equation modeling
SP	Strategic partnership
SRMR	Standardized root mean square
ULCI	Upper-level confidence intervals
VIF	Variance inflation factor

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43093-024-00390-w.

> Additional file 1.

Availability of data and materials

Upon request from the authors, the supporting data for this study are publicly available. The researchers want to assure you that the data we used for the analysis can be made available at any time requested.

Declarations

Ethics approval and consent to participate

Throughout our research journey, from conducting the study to preparing this manuscript for publication, we have been unwavering in upholding the highest ethical standards. Our commitment to ethical conduct extends to ensuring the rights and well-being of the individuals who participated in our research. We approached the research process with a deep sense of responsibility, respecting the personal rights of our respondents. Every step of the way, from obtaining informed consent to understanding participants' willingness to engage and determining the extent of information sharing, we maintained a keen focus on upholding their rights. Our survey was conducted with utmost care and attention to ethical considerations, prioritizing the privacy and autonomy of our valued participants.

Consent for publication

All authors have agreed to publish the manuscript.

Competing interests

No competing interests have been declared by the authors.

Author details

[1]Department of Business, Accra Institute of Technology (AIT), Accra, Ghana. [2]Department of Business, ARMAH Accra Institute of Technology (AIT), Accra, Ghana. [3]Department of Accounting, Accra Institute of Technology (AIT), Accra, Ghana. [4]Department of Marketing, Accra Institute of Technology (AIT), Accra, Ghana. [5]Department of Business, Nobel International Business School (NIBS), Accra, Ghana. [6]Department of Management, Management University of Africa (MUA), Nairobi, Kenya. [7]Department of Accounting and Finance, Accra Institute of Technology (AIT), Accra, Ghana. [8]Department of Business, Accra Institute of Technology (AIT), Accra, Ghana.

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