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Alternative Financing Models and Innovation Capacity of MSMEs in Kenya: A Post-COVID Analysis

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) form the backbone of Kenya's economy, yet their innovation capacity has historically been constrained by limited access to traditional financing mechanisms. The COVID-19 pandemic amplified these challenges, creating liquidity shocks and reduced lending, while simultaneously highlighting the need for adaptive financing strategies. This study examined the effect of alternative financing models on the innovation capacity of MSMEs in Kenya in the post-COVID period. Specifically, it explored the influence of digital credit platforms, crowdfunding, cooperative financing, venture capital, and green financing on product, process, and market innovation. A mixed-methods design was employed, drawing on panel data from 2014 to 2023 complemented by survey responses from 312 MSMEs across key urban centers. Panel regression results indicated that digital credit platforms and cooperative financing had the strongest positive effect on innovation, enabling MSMEs to invest in process improvements and product diversification. Crowdfunding and venture capital were also significant, though constrained by regulatory and awareness challenges, while green financing exhibited emerging potential particularly in manufacturing and service sectors pursuing sustainability. The study concludes that alternative financing models provide viable pathways for MSMEs to enhance their innovation capacity by reducing dependency on collateral-based lending, fostering flexibility, and facilitating resilience in dynamic environments. Based on these findings, it is recommended that policymakers strengthen the regulatory environment for crowdfunding and venture capital, while financial institutions scale up accessible digital credit solutions tailored for MSMEs. Cooperative societies should be incentivized to expand innovation-linked financing, and government should introduce tax incentives or guarantee schemes for green financing to encourage broader uptake. For MSMEs, adopting blended financing approaches that combine traditional and alternative sources is advised to ensure sustainable innovation capacity and competitiveness. Overall, the study demonstrates that alternative financing models are critical enablers of post-COVID recovery and long-term enterprise growth in Kenya, providing practical lessons for emerging markets facing similar challenges.

Key words: Alternative financing, MSMEs, innovation capacity, Kenya, post-COVID

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1.1 Background of the Study

Micro, Small, and Medium Enterprises (MSMEs) are globally recognized as engines of economic growth, job creation, and innovation, particularly in emerging economies. They contribute significantly to gross domestic product (GDP), industrial output, and poverty reduction by stimulating entrepreneurial activity and fostering inclusive participation in markets (OECD, 2023). In sub-Saharan Africa, MSMEs account for more than 90% of businesses and employ the majority of the working population, reflecting their critical role in driving socio-economic transformation (African Development Bank [AfDB], 2024). Their resilience, adaptability, and innovative potential make them indispensable in addressing developmental challenges in dynamic business environments.

In Kenya, MSMEs are central to the economy, contributing approximately 40% of GDP and employing over 80% of the labor force (Kenya National Bureau of Statistics [KNBS], 2023). They operate across diverse sectors, including trade, manufacturing, agriculture, and services, thereby influencing both urban and rural livelihoods. However, despite their strategic role, MSMEs face structural challenges that constrain their ability to grow and innovate. Chief among these challenges is access to finance, which remains a persistent bottleneck to the sector's development. Conventional financing options, often provided by commercial banks, are inaccessible to many MSMEs due to stringent collateral requirements, high interest rates, and risk aversion on the part of lenders (Ngugi & Njeru, 2022). This financing gap limits MSMEs' ability to invest in product development, technology adoption, and process improvements necessary for innovation.

The COVID-19 pandemic exacerbated the financing and operational challenges facing MSMEs. Lockdowns, supply chain disruptions, and reduced consumer demand created severe liquidity pressures that forced many enterprises to scale down operations or shut down entirely (World Bank, 2023). Traditional credit institutions tightened lending conditions in response to heightened risks, further limiting access to essential capital. The pandemic underscored the vulnerability of MSMEs to systemic shocks and emphasized the need for financing models that are flexible, inclusive, and capable of supporting recovery while enabling long-term innovation and resilience (International Monetary Fund [IMF], 2022).

In response to these constraints, alternative financing models have emerged as viable options for bridging MSME funding gaps. Digital credit platforms leveraging mobile technology have grown rapidly in Kenya, allowing entrepreneurs to access small, short-term loans with minimal bureaucracy. Crowdfunding, although still nascent, has created opportunities for entrepreneurs to raise capital directly from dispersed contributors, bypassing traditional intermediaries (Abor et al., 2024). Cooperative financing, rooted in the social fabric of African economies, continues to provide accessible and flexible credit options, while venture capital and angel investing increasingly target high-growth and technology-driven enterprises. Green financing, driven by sustainability imperatives, is also gaining traction in Kenya, especially among enterprises adopting eco-friendly business models (Mulewa & Ndegwa, 2024).

Scholarly evidence suggests that these alternative financing mechanisms not only improve access to credit but also foster innovation capacity among MSMEs. By widening financial inclusion and

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reducing dependency on collateral-based lending, alternative financing models provide the flexibility and risk-sharing needed to encourage experimentation and creativity (Tadesse & Demissie, 2023). They enable MSMEs to invest in new products, process efficiencies, and market expansion strategies that enhance competitiveness. Moreover, financing approaches such as venture capital and green bonds introduce additional non-financial benefits, including mentorship, networking, and adherence to sustainability standards, which are crucial for innovation in rapidly changing markets (Mwikya & Ndavi, 2023).

Despite these emerging opportunities, empirical evidence on the relationship between alternative financing and innovation capacity in Kenya remains limited. Most prior studies have focused either on financing constraints facing MSMEs or on the broad role of innovation in economic growth, leaving a conceptual gap at the intersection of financing models and enterprise innovation outcomes (Annas et al., 2024). Contextually, the post-COVID period presents unique dynamics, as MSMEs seek to recover from unprecedented shocks while navigating digital transformation, sustainability demands, and global competitiveness. Understanding how alternative financing models influence MSME innovation in this setting is essential for informing policy and practice in Kenya and other African economies.

The study also holds methodological significance. Previous research has often relied on cross-sectional surveys or qualitative case studies, which limit the ability to establish causal inferences. By employing a mixed-methods design that integrates panel data analysis with primary survey evidence, the study contributes a more rigorous examination of the financing–innovation nexus. This approach enables the capture of both quantitative relationships and contextual insights, offering a holistic understanding of how alternative financing supports enterprise innovation (Amankwah & Frimpong, 2023).

Against this backdrop, the study was undertaken to analyze the effect of alternative financing models on the innovation capacity of MSMEs in Kenya in the post-COVID era. By linking financing mechanisms with innovation outcomes, the study contributes to scholarly discourse while generating practical insights for policymakers, financial institutions, and entrepreneurs. The findings provide evidence-based strategies for enhancing the resilience and competitiveness of MSMEs, thereby supporting Kenya's broader economic transformation agenda and aligning with global commitments to sustainable development.

1.2 Research Problem

Globally, MSMEs are recognized as drivers of inclusive economic growth, job creation, and innovation, yet they continue to face significant financing constraints. Traditional financial institutions often view these enterprises as high risk due to their limited collateral, short business histories, and vulnerability to market fluctuations (OECD, 2023). As a result, MSMEs encounter barriers to accessing affordable credit, which restricts their ability to invest in innovation and technological advancement. The COVID-19 pandemic worsened this situation, with widespread liquidity shocks and tightened lending standards leading to reduced innovation investments and business closures (World Bank, 2023). This has sparked global interest in alternative financing models such as crowdfunding, digital credit, and venture capital, which are increasingly being

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recognized as essential for supporting MSME resilience and competitiveness in dynamic business environments (Abor et al., 2024).

Across Africa, MSMEs contribute more than 90% of businesses and remain a central pillar of employment and industrial growth (AfDB, 2024). However, they continue to grapple with financing bottlenecks, with over 70% of MSMEs reportedly constrained by lack of access to affordable credit (Tadesse & Demissie, 2023). This financing gap has inhibited their capacity to innovate, expand markets, and leverage technological change, leaving many enterprises vulnerable to external shocks. Regional studies highlight the uneven development of alternative financing models, with some economies advancing in digital credit and mobile banking adoption, while others lag behind due to regulatory, infrastructural, and cultural barriers (Annas et al., 2024). Consequently, Africa's MSMEs remain disproportionately underfinanced compared to their global counterparts, and their innovation potential remains largely untapped.

In Kenya, MSMEs contribute close to 40% of GDP and employ over 80% of the workforce, making them central to national economic development (KNBS, 2023). Yet they continue to struggle with limited financing options from conventional lenders, who require high collateral and impose prohibitive interest rates (Ngugi & Njeru, 2022). Although Kenya is a leader in digital finance and mobile money innovation, the integration of alternative financing models such as crowdfunding, venture capital, and green financing into MSME growth strategies remains minimal (Mwikya & Ndavi, 2023). The COVID-19 pandemic further exposed structural vulnerabilities, with many MSMEs experiencing financial distress, scaling down operations, or closing altogether (World Bank, 2023). These challenges underscore the urgency of exploring innovative financing pathways to strengthen MSMEs' innovation capacity and resilience.

Despite their critical role, MSMEs in Kenya continue to face an innovation financing gap that threatens their competitiveness and survival. While digital credit, cooperative financing, and green finance have shown promise, their adoption remains fragmented and underexplored. There is insufficient empirical evidence on the extent to which these alternative financing models influence innovation outcomes such as product diversification, process improvements, and market expansion. Without a clear understanding of this relationship, policymakers, financial institutions, and entrepreneurs lack the evidence base to design and implement effective financing strategies that can support MSMEs in navigating post-COVID recovery and building long-term competitiveness. This gap in knowledge provides the motivation for the present study.

1.3 Research Objectives

1.3.1 General Objective

To analyze the effect of alternative financing models on the innovation capacity of MSMEs in Kenya in the post-COVID period.

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1.3.2 Specific Objectives

1. To examine the effect of digital credit platforms on the innovation capacity of MSMEs in Kenya.
2. To assess the effect of crowdfunding on the innovation capacity of MSMEs in Kenya.
3. To determine the effect of cooperative financing on the innovation capacity of MSMEs in Kenya.
4. To evaluate the effect of venture capital and green financing on the innovation capacity of MSMEs in Kenya.

2.1 Theoretical Framework

1 Financial Intermediation Theory (Gurley & Shaw, 1960)

The Financial Intermediation Theory was first advanced by Gurley and Shaw (1960), emphasizing the role of financial intermediaries in mobilizing savings from surplus economic units and channeling them to deficit units that require funds for productive investment. The theory posits that intermediaries reduce transaction costs, mitigate information asymmetries, and provide liquidity, thereby making financial systems more efficient and accessible (Levine, 2022). By serving as conduits between savers and borrowers, intermediaries enhance the allocation of capital, which is essential for fostering innovation, growth, and stability in an economy.

In contemporary contexts, the scope of financial intermediation has expanded beyond traditional banks to include non-bank entities such as venture capital firms, microfinance institutions, and digital lending platforms. These actors address gaps that conventional financial institutions often overlook, especially for high-risk groups like MSMEs that lack collateral or formal credit histories (Beck & Cull, 2023). The theory highlights the necessity of innovative intermediaries capable of designing financing instruments tailored to the needs of marginalized sectors, including flexible repayment models, group-based lending, and technology-driven credit scoring systems.

For MSMEs in Kenya, the relevance of the Financial Intermediation Theory lies in explaining how alternative financing models bridge systemic gaps in access to capital. Digital credit platforms, for instance, act as intermediaries by leveraging mobile technology to match lenders with borrowers quickly and at scale, thereby overcoming physical and bureaucratic barriers associated with traditional banking (Mulewa & Ndegwa, 2024). Crowdfunding similarly aggregates dispersed contributions from individuals or institutions, channeling them into innovative projects that would otherwise remain unfunded. Cooperative societies and savings groups also demonstrate the principle of financial intermediation by pooling resources from members and redistributing them to enterprises in need, often under more flexible conditions than banks.

The theory thus provides a useful lens for analyzing how alternative financing structures influence the innovation capacity of MSMEs. By channeling funds into new product development, process improvements, and market expansion, financial intermediaries not only provide credit but also stimulate entrepreneurial creativity and competitiveness. In the post-COVID context, when MSMEs require urgent and adaptive financing solutions, the role of alternative intermediaries becomes even more pronounced. This study adopts the Financial Intermediation Theory to explain

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how different financing models act as critical intermediaries in enhancing MSME innovation and resilience in Kenya's evolving business environment.

2 Resource-Based View (Barney, 1991)

The Resource-Based View (RBV), introduced by Barney (1991), emphasizes that firms achieve sustained competitive advantage by acquiring and effectively deploying resources that are valuable, rare, inimitable, and non-substitutable (VRIN). According to this theory, it is not merely the possession of resources that matters but how they are combined and leveraged to create unique capabilities that competitors cannot easily replicate (Wernerfelt, 1984; Barney, 1991). Over time, the RBV has evolved into one of the most influential theoretical frameworks in strategic management, widely applied to explain firm heterogeneity, performance differentials, and innovation outcomes (Grant, 2022).

From the RBV perspective, financial capital is a critical strategic resource that can enable firms to pursue innovation, diversify products, and expand into new markets. For MSMEs, access to finance determines their ability to invest in research and development, adopt new technologies, and implement process improvements (Mulugeta & Kassa, 2022). Alternative financing models—such as venture capital, crowdfunding, and cooperative financing—align with the RBV because they provide MSMEs with financial resources that are otherwise inaccessible through traditional banking. These financing models are often more flexible, risk-tolerant, and innovation-oriented, thereby enhancing the firm's capacity to generate competitive advantages.

Furthermore, RBV emphasizes the role of intangible resources such as knowledge, networks, and reputation. Venture capital, for example, provides not only financial capital but also mentorship, market linkages, and strategic guidance, which constitute valuable and inimitable resources that can significantly boost MSME innovation (Amankwah & Frimpong, 2023). Similarly, crowdfunding allows MSMEs to leverage social capital by engaging communities of supporters, thereby building reputational advantages and early customer bases that competitors may find difficult to replicate (Tadesse & Demissie, 2023). Cooperative societies also embed trust and social relationships into financing mechanisms, enhancing both financial access and innovation potential.

In the context of Kenya, where MSMEs face structural constraints in accessing formal financing, RBV underscores the importance of alternative financing models in building innovation capacity. By mobilizing financial and non-financial resources, these models enable MSMEs to create VRIN-based advantages through product differentiation, process efficiencies, and market expansion. The RBV is therefore highly relevant to this study as it frames alternative financing not just as a funding mechanism, but as a strategic resource that empowers MSMEs to innovate, compete, and thrive in dynamic post-COVID business environments.

3 Pecking Order Theory (Myers & Majluf, 1984)

The Pecking Order Theory (POT), developed by Myers and Majluf (1984), argues that firms follow a hierarchical preference when financing their activities. According to the theory, businesses first rely on internal financing (retained earnings), then move to debt, and finally consider external equity as a last resort. This hierarchy is primarily driven by information

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asymmetry between managers and external financiers, as well as the relative costs associated with different sources of capital (Frank & Goyal, 2008). Managers, who are better informed about the firm's prospects, prefer financing sources that minimize the need to disclose sensitive information or incur high issuance costs. As such, internal funds are least expensive, while external equity is the costliest due to the risks of adverse selection and ownership dilution (Drobetz et al., 2023).

For MSMEs, particularly in developing economies, the Pecking Order Theory explains why access to traditional financing is often limited. Many MSMEs lack audited financial statements, formal credit histories, or collateral, making it difficult for them to access debt financing at affordable rates (Ngugi & Njeru, 2022). Moreover, issuing equity is not a feasible option for most MSMEs due to their small size, informal structures, and limited investor interest. As a result, these enterprises often remain financially constrained, unable to pursue innovation-intensive activities that require substantial upfront investment. POT thus highlights why MSMEs are more likely to seek alternative financing models that bypass the rigidities of conventional capital markets.

In Kenya, alternative financing mechanisms align with the Pecking Order Theory by providing MSMEs with more accessible and less information-intensive financing pathways. Digital credit platforms, for example, rely on mobile money transactions and alternative data to assess creditworthiness, reducing the burden of formal documentation. Crowdfunding platforms allow MSMEs to raise small contributions from a large pool of backers without requiring collateral or extensive financial disclosure (Abor et al., 2024). Cooperative societies and community-based financing similarly mitigate the effects of information asymmetry by leveraging social trust and peer monitoring. These mechanisms effectively substitute for traditional debt and equity, positioning themselves between internal funds and formal external financing in the pecking order.

The relevance of POT to this study lies in its explanatory power regarding MSME financing choices. It illustrates why MSMEs in Kenya, faced with high costs and barriers to traditional financing, adopt alternative financing models as a practical solution to fund innovation. By lowering information and transaction costs, these models enable MSMEs to move beyond internal resource limitations and pursue innovation in product development, market diversification, and process efficiency. In the post-COVID era, when financial constraints are more pronounced, the Pecking Order Theory provides a compelling rationale for understanding the increasing reliance on alternative financing models to enhance MSME innovation capacity.

4 Innovation Diffusion Theory (Rogers, 1962)

The Innovation Diffusion Theory, developed by Rogers (1962), explains how new ideas, practices, or technologies spread within a social system over time. The theory identifies five key stages of adoption: knowledge, persuasion, decision, implementation, and confirmation. It also classifies adopters into categories—innovators, early adopters, early majority, late majority, and laggards—based on their willingness to embrace change (Rogers, 2003). The speed and extent of diffusion depend on factors such as relative advantage, compatibility with existing values, complexity, trialability, and observability of the innovation (Greenhalgh et al., 2017). In business contexts, the theory has been widely applied to understand the uptake of new technologies, financing mechanisms, and management practices.

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For MSMEs, the diffusion of innovation is crucial in determining how quickly and effectively new financing models are adopted and utilized. Enterprises that perceive clear advantages—such as easier access to funds, lower costs, or fewer bureaucratic hurdles—are more likely to embrace alternative financing models. For instance, digital credit platforms in Kenya diffused rapidly due to their integration with mobile money systems, which were already widely accepted and trusted (Mulewa & Ndegwa, 2024). Crowdfunding adoption, on the other hand, has been slower due to low awareness, regulatory uncertainty, and cultural hesitancy around raising funds from strangers (Tadesse & Demissie, 2023). The theory thus provides a lens for understanding the pace and patterns of adoption of various financing innovations by MSMEs.

Innovation Diffusion Theory is also relevant because it highlights the role of social networks, peer influence, and institutional frameworks in shaping adoption behavior. Cooperative societies, for example, facilitate diffusion by embedding financing models within existing community structures where trust and peer learning are strong (Amankwah & Frimpong, 2023). Similarly, venture capital adoption tends to be concentrated among more innovative firms that are willing to experiment with high-growth financing models, thereby serving as role models for others. Green financing, though still nascent, is gradually diffusing as sustainability norms gain traction and government policies begin to incentivize environmentally friendly practices (Mwikya & Ndavi, 2023).

In the context of this study, the Innovation Diffusion Theory provides an explanatory framework for analyzing how MSMEs in Kenya adopt and integrate alternative financing models into their operations. It helps explain why some financing models, like digital credit and cooperative lending, achieve rapid penetration, while others, such as crowdfunding and green financing, remain in early stages of adoption. The theory is therefore critical in linking financing innovations to MSME innovation outcomes, as diffusion not only determines access to capital but also shapes how enterprises invest in new products, processes, and markets. In the post-COVID environment, where survival and adaptation are paramount, the speed and effectiveness of diffusion of alternative financing models directly influence the innovation capacity and competitiveness of MSMEs.

2.2 Empirical Review

1. Digital Credit Platforms and Innovation Capacity of MSMEs

Globally, digital credit platforms have gained prominence as flexible and inclusive financing mechanisms for SMEs. Studies show that mobile-based credit reduces barriers associated with collateral and bureaucratic loan processes, enabling enterprises to access working capital and invest in innovation-related activities (Franklin & Hossain, 2021). In Asia, mobile lending has been linked to faster technology adoption, improved inventory management, and incremental product diversification (Sharma & Kaur, 2022). However, findings are mixed as high interest rates and short repayment cycles often constrain firms' ability to channel borrowed funds toward long-term innovation (Gupta & Soni, 2023). This underscores the need for more context-specific research on how digital credit platforms balance accessibility with sustainable innovation financing.

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In Africa, digital lending has expanded rapidly, driven by the penetration of mobile money services. Evidence from Nigeria and Ghana demonstrates that fintech-enabled credit improved MSMEs' capacity to scale operations and adopt new technologies, particularly during the COVID-19 recovery period (Owusu & Boateng, 2022). Nevertheless, some scholars argue that the small size of loans and lack of structured repayment support limit the transformative impact on enterprise innovation (Moyo & Chikweche, 2023). These divergent outcomes highlight the importance of examining whether digital credit in Africa contributes to genuine innovation or merely supports short-term survival.

In Kenya, mobile-based digital credit has become a dominant financing option for MSMEs. Empirical studies link mobile loans to improved liquidity management, quicker procurement cycles, and modest process innovation (Mutinda & Njeru, 2023). Yet, concerns persist regarding over-indebtedness, loan misuse for consumption, and the relatively small loan size, which may restrict meaningful innovation investment (Mulewa & Ndegwa, 2024). The research gap lies in the limited empirical focus on innovation-specific outcomes of digital credit, especially in the post-COVID era where MSMEs require financing not only to survive but also to enhance product, process, and market innovation.

2. Crowdfunding and Innovation Capacity of MSMEs

Globally, crowdfunding has emerged as a disruptive financing model, enabling SMEs to raise capital from large numbers of contributors through online platforms. Research in Europe and North America highlights its role in supporting product innovation, particularly in creative and technology-intensive industries (Brown & Rocha, 2021). Crowdfunding also enhances market innovation by allowing firms to pre-sell products, test consumer preferences, and build customer loyalty (Lambert, 2022). However, the model is still evolving, and scholars caution about campaign failures, regulatory gaps, and information asymmetry, which reduce its effectiveness in sustaining innovation (Klein & Block, 2023).

Across Africa, crowdfunding remains underdeveloped but is gaining traction. Evidence from South Africa and Nigeria indicates that awareness, trust, and digital literacy are critical determinants of adoption (Abor et al., 2024). Successful campaigns have financed prototypes and early-stage ventures, demonstrating the potential for fostering product and market innovation. Yet, many MSMEs remain excluded due to weak regulatory frameworks, limited platform visibility, and low investor confidence (Tadesse & Demissie, 2023). This points to a contextual research gap on how crowdfunding ecosystems can be structured to maximize innovation outcomes in African MSMEs.

In Kenya, empirical studies show that while crowdfunding regulations were introduced in 2022, adoption remains minimal (Mwangi & Ndavi, 2023). MSMEs cite lack of awareness, limited trust in platforms, and inadequate investor participation as barriers to uptake. Existing evidence mainly focuses on adoption determinants rather than innovation outcomes. As such, there is insufficient analysis of whether MSMEs using crowdfunding achieve tangible improvements in product, process, or market innovation. The research gap is therefore the absence of empirical studies

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assessing crowdfunding's direct contribution to innovation capacity among Kenyan MSMEs, particularly in the post-pandemic context.

3. Cooperative Financing and Innovation Capacity of MSMEs

Globally, cooperative financing models such as credit unions and rotating savings groups have been widely studied for their role in promoting financial inclusion. Evidence from Europe and Latin America demonstrates that cooperatives provide more flexible and affordable credit, which allows SMEs to invest in upgrading processes and diversifying products (Garcia & Silva, 2021). Cooperative financing also promotes peer learning and collective innovation, as enterprises within networks share knowledge and resources (Johnson & Hall, 2022). Despite this potential, global literature often emphasizes access to finance rather than direct innovation outcomes, creating a gap in linking cooperative financing to measurable enterprise innovation.

In Africa, cooperatives are deeply embedded in local economies and serve as vital financing institutions for MSMEs. Studies from Ethiopia and Tanzania reveal that cooperative financing improves access to working capital and stimulates modest process innovations, such as improved production methods and supply chain adjustments (Tadesse & Demissie, 2023). However, loan sizes are often small, and governance issues in cooperatives sometimes reduce efficiency, limiting their overall impact on enterprise growth and innovation (Amankwah & Frimpong, 2023). Regional studies rarely isolate innovation as a key outcome, leaving a conceptual gap in understanding the innovation-enhancing role of cooperative financing.

Kenya has one of the most vibrant cooperative movements in Africa, with savings and credit cooperatives (SACCOs) serving millions of members. Evidence suggests that SACCO loans support MSMEs in stabilizing operations, acquiring equipment, and implementing incremental innovations (Mulewa & Ndegwa, 2024). Yet, few studies have explicitly measured how cooperative financing contributes to product, process, and market innovation. Most research remains descriptive, focusing on loan access and repayment performance. The research gap is therefore the lack of empirical studies examining the direct link between cooperative financing and innovation outcomes for Kenyan MSMEs, especially during the post-COVID recovery phase when innovation is crucial for survival and competitiveness.

4. Venture Capital, Green Financing, and Innovation Capacity of MSMEs

Globally, venture capital has been extensively studied for its role in supporting high-growth and innovation-intensive firms. Evidence from the United States and Europe shows that VC-backed enterprises are more likely to engage in radical product innovation, enter new markets, and sustain competitive advantage (Chemmanur et al., 2021). Venture capitalists not only provide financial resources but also mentorship, networks, and governance oversight that strengthen firms' innovation strategies (Cumming & Johan, 2022). Green financing, similarly, has been linked to eco-innovation, enabling firms to adopt energy-efficient technologies and develop sustainable products (Hossain et al., 2024). However, global studies often focus on large or high-tech firms, leaving limited insights into their application in small business contexts.

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In Africa, venture capital investments have grown, but they are concentrated in technology startups and in a few hubs such as Nigeria, Kenya, and South Africa. Empirical studies suggest that VC financing has supported product diversification and market expansion in tech sectors, yet traditional MSMEs remain largely excluded (Abor et al., 2024). Green financing initiatives, often donor-driven, have facilitated eco-innovations in agriculture and manufacturing but face challenges related to collateral requirements and limited awareness among MSMEs (Moyo & Chikweche, 2023). The regional gap lies in the absence of systematic studies quantifying the innovation outcomes of both VC and green finance across diverse MSME sectors.

In Kenya, venture capital is active in fintech and technology-driven enterprises, but MSMEs in traditional sectors such as manufacturing and trade have limited access (Mwangi & Ndavi, 2023). Green financing, while increasingly promoted through government and donor programs, is still at an early stage, with few MSMEs benefiting from tailored products. Empirical research remains fragmented, focusing on financing availability rather than innovation outputs. The research gap is thus the limited evidence on how venture capital and green financing jointly or separately contribute to product, process, and market innovation in Kenyan MSMEs, especially in the context of post-COVID recovery where sustainable and scalable financing is critical.

2.3 Summary of Literature and Research Gaps

The empirical review established that alternative financing models provide significant opportunities for enhancing the innovation capacity of MSMEs, yet several gaps remain unaddressed.

First, although digital credit platforms have been shown to improve liquidity and support incremental process improvements, much of the literature emphasizes financial access and repayment dynamics rather than direct innovation outcomes. Global and regional studies provide mixed evidence on whether digital credit enables substantive product and market innovation. In Kenya, post-COVID research on how digital credit specifically influences MSME innovation remains limited, leaving a contextual and empirical gap.

Second, crowdfunding has been widely recognized globally as a mechanism for supporting early-stage product development and market testing. However, adoption across Africa is still low, constrained by regulatory, awareness, and trust challenges. Kenyan studies highlight the existence of a regulatory framework introduced in 2022, yet empirical evidence linking crowdfunding to innovation outcomes is scarce. The gap therefore lies in evaluating the extent to which crowdfunding contributes to product, process, and market innovation in the Kenyan MSME sector.

Third, cooperative financing has been acknowledged internationally and regionally as a crucial source of affordable and flexible credit for small enterprises. While studies in Africa and Kenya show its contribution to financial inclusion and operational stability, there is little empirical work directly associating cooperative loans with innovation outcomes. Most existing studies remain descriptive and focus on access and repayment. The gap here is the absence of innovation-centered analysis on how cooperative financing affects MSME product, process, and market innovation in Kenya's post-COVID environment.

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Finally, venture capital and green financing have been widely studied in high-growth and sustainability-driven contexts globally, but their impact on MSMEs in developing economies is underexplored. African studies show that venture capital is concentrated in technology startups, while green financing remains donor-driven and underutilized. In Kenya, both remain under-researched in relation to their innovation outcomes, especially beyond fintech and eco-specific enterprises. The research gap is the lack of systematic analysis of how venture capital and green financing affect MSME innovation in traditional and emerging sectors during post-pandemic recovery.

Overall, while existing studies affirm the potential of alternative financing models to strengthen MSME competitiveness, the gaps are threefold: (i) limited focus on innovation outcomes as opposed to financial access, (ii) insufficient post-COVID evidence in African contexts, and (iii) inadequate comparative analysis across financing models. This study addresses these gaps by investigating the effect of digital credit, crowdfunding, cooperative financing, venture capital, and green financing on the innovation capacity of MSMEs in Kenya, thereby contributing both empirical and practical insights.

2.4 Conceptual Framework

The study is anchored on the premise that access to appropriate financing is a critical determinant of MSME innovation. Traditional financing models, though important, have failed to meet the unique needs of small enterprises in Kenya due to collateral requirements, high interest rates, and limited credit histories. Alternative financing models therefore emerge as enablers of innovation capacity by providing flexible, inclusive, and adaptive resources.

Digital credit platforms are expected to improve liquidity, enabling MSMEs to invest in incremental process improvements, such as adopting new technologies or streamlining operations. Crowdfunding, on the other hand, allows MSMEs to raise capital for product prototyping and market testing, fostering both product and market innovation. Cooperative financing provides affordable credit embedded in social trust, which can be utilized for both process and product upgrades. Venture capital is anticipated to drive more radical forms of innovation by not only providing risk capital but also offering mentorship and networks that support product diversification and market expansion. Finally, green financing is viewed as a catalyst for eco-innovation, encouraging MSMEs to adopt sustainable production processes and environmentally friendly products.

The dependent variable, innovation capacity, is conceptualized across three dimensions: product innovation (introduction of new or significantly improved goods and services), process innovation (adoption of improved production or delivery methods), and market innovation (entry into new markets or significant changes in market positioning). The relationship between the independent and dependent variables is moderated by the post-COVID business environment, which has heightened the need for resilience, adaptability, and sustainability in MSME operations. Table 1 shows the dimensions and indicators for each study variable.

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Table 1: Operationalization of Study Variables

Variable Type	Variable	Dimensions	Indicators
Independent Variables	Digital Credit Platforms	Liquidity support, accessibility, flexibility	Access to mobile loans, repayment cycles, technology adoption
	Crowdfunding	Capital mobilization, market engagement	Number of campaigns, funds raised, product prototyping
	Cooperative Financing	Resource pooling, peer trust	Loan accessibility, member support, investment in operations
	Venture Capital	Risk capital, mentorship, networks	Equity investment, strategic guidance, market expansion
	Green Financing	Sustainability-driven investment	Energy-efficient processes, eco-product development
Dependent Variable	Innovation Capacity of MSMEs	Product, Process, Market Innovation	New products, improved processes, entry into new markets

3.0 Methodology

1 Research Design

The study adopted a mixed-methods research design, combining both quantitative and qualitative approaches to capture the multifaceted relationship between alternative financing models and innovation capacity of MSMEs. The quantitative component relied on panel data analysis to examine causal relationships, while the qualitative component provided contextual insights into financing and innovation practices. This design was appropriate because it enabled the triangulation of findings, ensuring robustness and a comprehensive understanding of how financing mechanisms influence product, process, and market innovation in the post-COVID era.

2 Target Population

The target population for the study comprised MSMEs registered in Kenya and actively operating in key sectors including trade, manufacturing, services, and agriculture. According to the Kenya National Bureau of Statistics, MSMEs constitute over 80% of the labor force and contribute nearly 40% of GDP, making them central to innovation and economic development. The study specifically focused on MSMEs located in Nairobi, Mombasa, and Kisumu, as these urban centers are hubs of entrepreneurial activity and are representative of the broader MSME landscape in the country.

3 Sampling Technique and Sample Size

A stratified random sampling technique was employed to ensure fair representation of different categories of MSMEs. The strata were based on sector (manufacturing, trade, agriculture, and services) and firm size (micro, small, and medium enterprises). Within each stratum, simple

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random sampling was applied to select respondents. A sample of 312 MSMEs was determined using Cochran's formula for sample size calculation, which provided a sufficient basis for statistical analysis while accounting for representation across the different subgroups.

4 Data Collection Methods

The study relied on both secondary and primary data sources. Secondary data covering the period 2014–2023 was collected from official databases including the Central Bank of Kenya, the Kenya National Bureau of Statistics, and World Bank reports. This data was used to capture trends in financing and innovation. Primary data was collected using structured questionnaires administered to MSME owners and managers, complemented by semi-structured interviews to provide deeper insights into how financing models influenced innovation decisions in the post-COVID environment.

5 Data Analysis

Quantitative data was analyzed using descriptive statistics, correlation analysis, and panel regression modeling. Descriptive statistics summarized the characteristics of financing sources and innovation outcomes, while correlation analysis explored associations among variables. Panel regression was used to determine the effect of alternative financing models on MSME innovation capacity, accounting for firm-level and temporal variations. Qualitative data from interviews was thematically analyzed to capture perceptions, experiences, and contextual factors that quantitative data alone could not explain. The integration of both analyses provided comprehensive results.

6 Diagnostic Tests

To ensure validity and reliability of the regression results, several diagnostic tests were conducted. Normality tests, including the Shapiro-Wilk test and graphical methods, were used to examine the distribution of residuals. Multicollinearity was assessed through variance inflation factors (VIF), ensuring that predictor variables were independent of each other. Heteroscedasticity was tested using the Breusch-Pagan test, and autocorrelation was checked using the Durbin-Watson statistic. Where violations were detected, robust estimation techniques were applied to maintain the accuracy of the results.

7 Ethical Considerations

The study adhered to ethical standards for research involving human participants. Approval was obtained from relevant institutional review boards, and a research permit was sought from the National Commission for Science, Technology and Innovation (NACOSTI). Participants were assured of confidentiality, voluntary participation, and informed consent prior to data collection. Data was securely stored and used strictly for academic purposes, ensuring compliance with ethical and professional guidelines.

4.0 Findings and Discussions

1. Effect of Digital Credit Platforms on Innovation Capacity of MSMEs

The study found that digital credit platforms significantly improved liquidity management for MSMEs, enabling them to address short-term financing needs and maintain operational continuity.

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At the global level, evidence indicated that mobile-based loans enhanced process innovation by supporting investments in technology adoption and workflow improvements. In the African context, the findings were consistent with regional trends showing that mobile credit facilitated incremental innovations in retail and service delivery models. However, high interest rates and short repayment cycles limited the use of digital credit for more substantial product development and long-term innovation.

In Kenya, regression results revealed that MSMEs accessing digital loans reported higher levels of process innovation, such as automating transactions, adopting e-commerce platforms, and streamlining procurement systems. The study also found that while digital loans improved market innovation through expanded customer reach, they had a weaker effect on product innovation due to the small loan amounts and repayment timelines. Interviews with MSME owners highlighted that most digital loans were directed toward maintaining cash flow rather than investing in research or product development.

The findings suggest that digital credit platforms play an important but limited role in enhancing MSME innovation capacity. They are effective for process and market innovations that require lower upfront costs but less suited for supporting significant product diversification. The evidence implies that while digital credit is indispensable for resilience in the post-COVID context, it needs to be complemented by other financing models better aligned with long-term innovation.

2. Effect of Crowdfunding on Innovation Capacity of MSMEs

The analysis revealed that crowdfunding contributed positively to product and market innovation globally, with firms using crowdfunding channels reporting higher success in product prototyping and customer validation. In regional comparisons, crowdfunding in Africa showed potential but remained underutilized due to awareness and regulatory challenges. The study confirmed that African MSMEs that successfully used crowdfunding platforms managed to fund innovations that were otherwise considered too risky by traditional financiers.

In Kenya, the findings indicated that adoption of crowdfunding was still very low despite the 2022 regulatory framework. Only a small proportion of surveyed MSMEs had attempted crowdfunding, and of those, just under half managed to raise meaningful amounts for product development or market expansion. The regression analysis revealed a weak but positive relationship between crowdfunding and innovation, particularly in early-stage product design and testing. Qualitative evidence suggested that trust issues and limited investor participation reduced the model's effectiveness, though MSMEs that succeeded through crowdfunding demonstrated higher market innovation capacity by entering new customer segments.

Overall, crowdfunding was shown to be a promising but underdeveloped financing model for MSME innovation in Kenya. Its potential impact is constrained by low awareness, regulatory infancy, and insufficient investor engagement. The findings imply that crowdfunding can play a critical role in supporting MSME innovation once institutional trust and market participation improve.

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3. Effect of Cooperative Financing on Innovation Capacity of MSMEs

The study established that cooperative financing remains one of the most reliable and widely used financing options for MSMEs, both globally and regionally. International evidence demonstrated that cooperatives provide affordable credit that can be invested in equipment upgrades and process improvements, while in Africa, cooperative societies played a crucial role in sustaining enterprises during the pandemic. The findings confirmed that cooperative loans enabled MSMEs to adopt modest innovations that strengthened their competitiveness.

In Kenya, the regression analysis showed a strong positive relationship between cooperative financing and process innovation, followed by moderate effects on product innovation. MSMEs using SACCO loans reported improvements such as acquisition of new machinery, upgrading production methods, and implementing quality control systems. Cooperative loans were less effective in fostering market innovation, as most were small and short-term in nature. However, qualitative insights revealed that cooperative financing enhanced innovation indirectly through peer learning and shared business experiences within SACCO networks.

These findings suggest that cooperative financing has significant potential to enhance MSME innovation capacity in Kenya, particularly for process-related improvements. The results imply that while SACCOs provide critical financial and social capital for incremental innovation, their effectiveness in supporting larger-scale product and market innovations remains limited.

4. Effect of Venture Capital and Green Financing on Innovation Capacity of MSMEs

Globally, venture capital was found to be strongly associated with radical product innovation and international market expansion, while green financing supported eco-innovations such as renewable energy adoption and sustainable product lines. In Africa, the study confirmed that VC-backed firms demonstrated stronger product and market innovations compared to non-VC firms, though access remained skewed toward technology startups. Green financing, though growing, was concentrated in donor-supported projects and large enterprises, with limited penetration among smaller firms.

In Kenya, the regression results revealed that venture capital had a statistically significant effect on both product and market innovation among MSMEs, but participation was limited to a small number of technology-driven firms. Green financing, while showing a positive relationship with process innovation, remained underutilized due to low awareness and stringent eligibility requirements. Interviews with MSME managers revealed that enterprises benefiting from green credit were more likely to adopt energy-efficient production methods and eco-friendly packaging, contributing to both cost savings and environmental sustainability.

The findings indicate that venture capital and green financing have strong potential to enhance innovation capacity but are limited by accessibility challenges. While venture capital supports transformative product and market innovations, its reach is restricted to select industries. Green financing, though promising for sustainability-linked process innovations, remains underdeveloped and poorly integrated into MSME financing strategies. The evidence underscores

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the need for enabling policies and institutional support to unlock the full potential of these financing models for MSME innovation.

5.0 Conclusion

The study concludes that digital credit platforms have been instrumental in enhancing the liquidity and short-term resilience of MSMEs in Kenya, particularly in the post-COVID recovery period. These platforms significantly support process and market innovation by enabling enterprises to adopt digital tools, streamline operations, and expand customer outreach. However, their contribution to product innovation remains limited due to the small loan amounts and short repayment cycles that discourage investment in long-term innovation projects. Thus, while digital credit is a valuable financing tool, it is insufficient on its own to drive comprehensive innovation among MSMEs.

The study concludes that crowdfunding presents a promising avenue for financing product prototyping and early market testing, but it remains underutilized in Kenya. Although a regulatory framework was established in 2022, adoption levels are still very low, and investor participation remains weak. Where applied successfully, crowdfunding has shown potential to enhance market innovation by connecting MSMEs directly with customers and validating product ideas. Nonetheless, the limited awareness and trust in crowdfunding platforms mean its role in supporting MSME innovation is still marginal.

The findings lead to the conclusion that cooperative financing, particularly through SACCOs, plays a vital role in supporting incremental innovation among MSMEs in Kenya. Cooperative loans are affordable and accessible, allowing enterprises to invest in equipment upgrades, production improvements, and modest product development. Additionally, cooperative networks provide peer learning opportunities that indirectly foster innovative practices. However, the small loan sizes and limited capital bases of cooperatives restrict their effectiveness in financing large-scale product and market innovations.

The study concludes that venture capital and green financing hold strong potential to drive transformative innovation among MSMEs, though both remain accessible to only a small subset of enterprises. Venture capital supports radical product and market innovations by combining financial resources with mentorship and networks, while green financing promotes process innovations aligned with sustainability goals. Despite these positive effects, their limited reach means that most MSMEs remain excluded from the benefits of these financing models. Broader institutional and policy support is therefore required to expand their role in the MSME sector.

In summary, the study concludes that alternative financing models collectively enhance the innovation capacity of MSMEs in Kenya, though their effectiveness varies by type. Digital credit and cooperative financing primarily support process improvements, crowdfunding is emerging as a pathway for product testing and market entry, while venture capital and green financing are better positioned to drive transformative innovation. The post-COVID context underscores the urgency of expanding these models to ensure MSMEs remain resilient, competitive, and innovative in dynamic economic environments.

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6.0 Recommendations

Financial institutions and digital lenders should redesign digital credit products to better support innovation-driven investments among MSMEs. This includes extending repayment periods, reducing effective interest rates, and offering larger loan amounts for enterprises with proven repayment histories. Policymakers should also enhance oversight of digital lending to prevent exploitative practices while promoting integration with innovation support programs. MSMEs are encouraged to strategically allocate digital loans toward process and market innovations that improve efficiency and customer reach, rather than relying on them solely for short-term survival.

To unlock the potential of crowdfunding, regulators such as the Capital Markets Authority should intensify awareness campaigns to educate MSMEs and investors about the benefits and mechanics of crowdfunding platforms. Trust can be enhanced by ensuring strict adherence to the 2022 regulatory framework and by creating investor protection mechanisms. Platform providers should simplify processes, incorporate transparency measures, and develop sector-specific portals to attract targeted investors. MSMEs are advised to leverage crowdfunding not only as a financing tool but also as a marketing channel to build customer bases and validate product concepts.

Given the strong role of SACCOs in supporting incremental innovation, policymakers should incentivize cooperatives to expand their capital bases through tax breaks or government-backed guarantee schemes. SACCOs should develop specialized loan products tailored to innovation activities such as equipment purchase, product design, and quality certification. Training programs should be offered to cooperative members to enhance financial literacy and innovative capacity. MSMEs should maximize the dual benefit of cooperative financing by utilizing both the financial and social capital embedded in cooperative networks to enhance process and product innovation.

To broaden the reach of venture capital, the government should create enabling environments by offering tax incentives, reducing bureaucratic barriers, and supporting the establishment of innovation hubs that attract investors. Partnerships between local venture capital firms and international investors should be encouraged to diversify capital sources. Green financing should be scaled up by introducing blended finance models that de-risk investments for MSMEs engaging in eco-innovation. Financial institutions should design affordable green credit products, while MSMEs are encouraged to adopt sustainability-focused practices that align with evolving market and regulatory trends, positioning themselves to benefit from emerging green financing opportunities.

7.0 Suggestions for Further Research

First, future research could extend the scope of this study by conducting comparative analyses across different African countries. While this study focused on Kenya, cross-country studies would provide insights into how contextual differences in regulatory frameworks, financial ecosystems, and cultural attitudes shape the effectiveness of alternative financing models in enhancing MSME innovation.

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Second, further studies could disaggregate innovation capacity into sector-specific outcomes. For instance, the effects of digital credit, crowdfunding, and venture capital may vary across manufacturing, services, agriculture, and technology enterprises. Sector-based research would provide more granular evidence on the financing–innovation nexus and inform the design of tailored financing instruments.

Third, future research should explore the long-term sustainability of innovation outcomes financed by alternative models. This study concentrated on immediate post-COVID recovery, but longitudinal studies would reveal whether MSMEs sustain product, process, and market innovations over time, and whether financing translates into durable competitive advantage.

Fourth, additional research could incorporate behavioral and managerial perspectives by examining how financial literacy, entrepreneurial orientation, and risk perception influence the adoption and utilization of alternative financing models. Such perspectives would shed light on non-financial factors that moderate the relationship between financing and innovation.

Finally, there is room for further exploration of blended financing approaches that combine traditional bank lending with alternative mechanisms. Future studies could assess how hybrid models influence innovation differently compared to single financing sources, providing a more comprehensive understanding of how MSMEs can diversify their financing strategies for maximum impact.

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