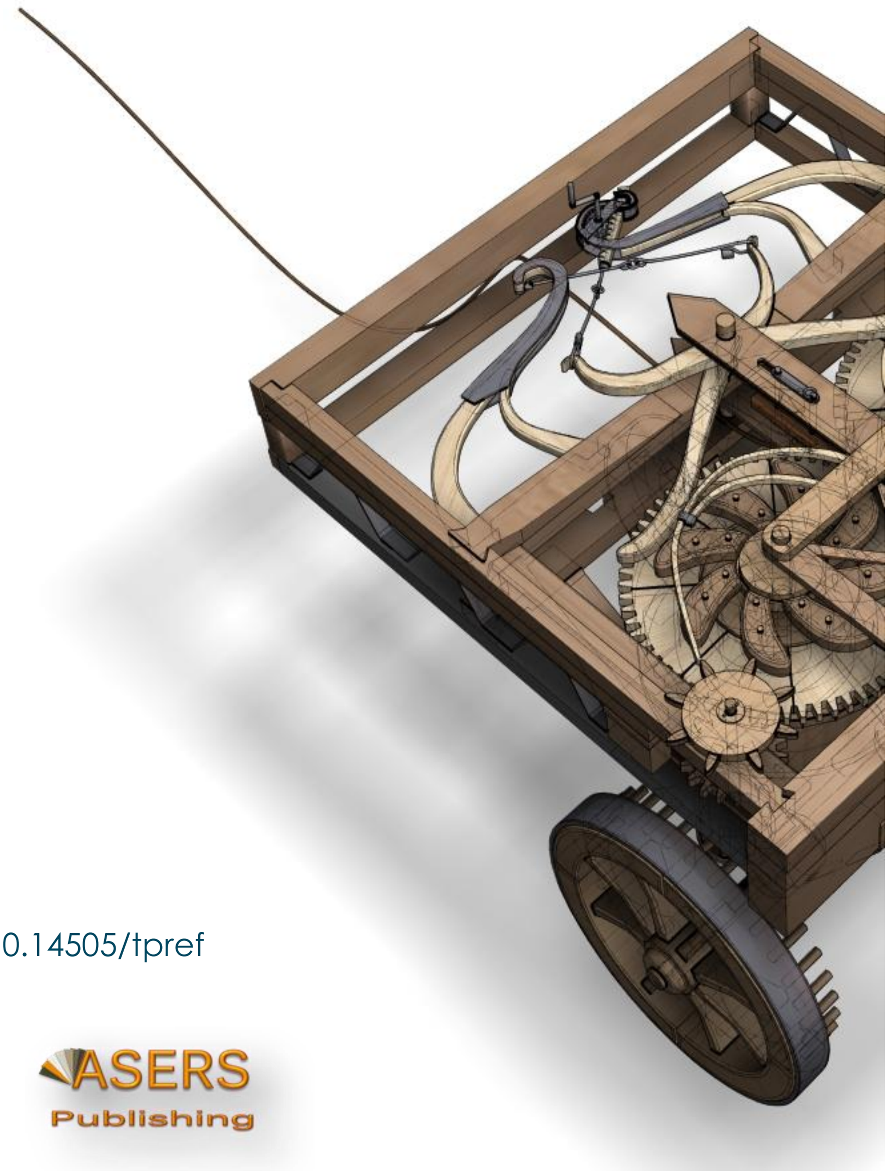
Theoretical and Practical Research in Economic Fields



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A Multivariate Framework for MSME Financial Performance: Financial and Strategic Determinants in Developing Island Economies

Maria Magdalena BATE'E
Faculty of Economic and Business
North Sumatera University, Indonesia
ORCID: 0000-0001-6304-3188
mariabateeunias@gmail.com

Khaira Amalia FACHRUDIN
Faculty of Economic and Business
North Sumatera University, Indonesia
ORCID: 0000-0001-9532-1664
khaira@usu.ac.id

SYAHYUNAN
Faculty of Economic and Business
North Sumatera University, Indonesia
ORCID: 0009-0002-0465-8603
syahyunan@usu.ac.id

Amlys Syahputra SILALAHI
Faculty of Economic and Business
North Sumatera University, Indonesia
ORCID: 0009-0006-0598-7328
amlys@usu.ac.id

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Abstract: This study aims to identify the financial and strategic determinants affecting the financial performance of Micro, Small, and Medium Enterprises (MSMEs) in developing island economies. It specifically explores the roles of financial inclusion and internal capabilities such as financial literacy, financial culture, innovation, and strategic orientation. A quantitative approach using Structural Equation Modeling - Partial Least Squares (SEM-PLS) was adopted. Data were collected from 210 MSMEs operating in the Nias Islands, Indonesia. The model examines relationships among latent constructs, including financial literacy, inclusion, innovation, strategic orientation, financial culture, access to finance, and financial performance. The study is limited to a geographically specific setting (Nias Islands) and uses a cross-sectional design. Caution is advised in generalizing the results beyond similar contexts. Future research should consider longitudinal and qualitative methods to explore causal depth. This study contributes to theory by extending the Resource-Based View (RBV) to include contextual factors such as culture and geography. The proposed multivariate framework offers a replicable model for analyzing MSME financial performance in financial and infrastructurally constrained environments. The findings reveal that access to finance significantly mediates the relationship between internal capabilities (financial literacy, innovation, and strategic orientation) and MSME financial performance. Meanwhile, financial inclusion and financial culture influence performance only through access to finance. Innovation and strategic orientation also have direct effects on performance. The multivariate model demonstrates strong explanatory power, with $R^2 = 0.73$ for financial performance.

Keywords: MSMEs; Financial Performance; Financial Inclusion; Strategic Orientation; Financial Literacy; Financial Culture; Island Economies.

JEL Classification: G21; L26; M13; O17; R11.

Introduction

The post-pandemic global economy continues to expose deep vulnerabilities among micro, small, and medium-sized enterprises (MSMEs), especially in developing regions where infrastructural and financial access remains uneven. MSMEs, which account for more than 90% of businesses and over 60% of employment globally, struggle to maintain resilience amid limited credit access and market volatility (World Bank, 2023). Despite global advancements in fintech and financial digitalization, disparities in financial access remain stark across geographies, with rural and island economies bearing the brunt (Demirgüç-Kunt *et al.* 2022). In such areas, the inability to secure formal financial support becomes a key bottleneck inhibiting business expansion and long-term sustainability. This persistent exclusion illustrates a systemic imbalance between the formal financial sector and MSMEs in peripheral economies. Studies highlight that nearly 40% of MSMEs in lower-income nations experience unmet financing needs despite broader financial reforms (Beck & Demirgüç-Kunt, 2022). As global financial inclusion accelerates, it ironically leaves some of the most vulnerable enterprises behind. The tension between inclusive rhetoric and localized exclusion forms a central paradox in the current MSME discourse.

In Southeast Asia, Indonesia exemplifies this dilemma. Nationally, MSMEs contribute over 60% to GDP and employ nearly 97% of the workforce, yet access to formal finance remains concentrated in urban centers (Ministry of Cooperatives and SMEs, 2023). In remote island areas like the Nias Archipelago, financial penetration is alarmingly low, with many entrepreneurs relying on informal lenders, community savings groups, or personal networks (OECD, 2022). This condition not only reflects logistical challenges but also reveals underlying gaps in financial literacy and cultural familiarity with formal finance. For example, studies in Eastern Indonesia show that only 35% of MSME owners understand basic banking products (Wijaya & Mulyana, 2021). The resulting dependence on informal financing mechanisms severely limits opportunities for strategic investment, innovation, and scalability. Consequently, island-based MSMEs often remain in subsistence mode, vulnerable to shocks, and disconnected from broader economic networks. This situation necessitates a contextualized approach to MSME development grounded in localized realities. The strategic capabilities of MSMEs-such as innovation behavior, market orientation, and long-term planning-are increasingly recognized as critical to overcoming structural constraints. However, empirical validation of these variables in isolated or geographically disadvantaged contexts is limited (Nguyen *et al.* 2020). Innovation, typically associated with urban-based firms, remains underdeveloped in island economies due to knowledge gaps, limited exposure to external markets, and low absorptive capacity (Zulkarnain & Priyono, 2022). Likewise, strategic orientation, though pivotal for decision-making and adaptability, is rarely formalized in small, family-run island enterprises (Widodo *et al.* 2020). The extent to which these internal resources can offset external barriers such as credit inaccessibility remains a pertinent research question. Such exploration demands a holistic framework that situates MSME capabilities within their institutional, geographical, and behavioral contexts. It is no longer sufficient to examine innovation or financial access in isolation. Their intersectionality provides deeper insight into firm-level resilience. Financial literacy forms the cognitive foundation that enables MSMEs to interact effectively with financial institutions, assess risks, and utilize appropriate financial tools. Research from Malaysia and Indonesia has consistently shown that higher levels of financial literacy are associated with improved borrowing behavior and better business performance (Raimo *et al.* 2021; Ismail *et al.* 2022). Yet, financial literacy remains unevenly distributed, with rural MSME owners scoring significantly lower than their urban counterparts (Ferrer *et al.* 2020). This cognitive asymmetry not only limits access to finance but also impedes business development planning. Moreover, financial literacy impacts how firms perceive debt, manage cash flow, and respond to financial shocks. In regions where basic banking terms are unfamiliar, the potential of microcredit and fintech innovations remains unrealized. Financial education, therefore, is not merely a support service but a strategic intervention. The lack of empirical focus on this variable within island settings represents a critical research gap.

Complementing financial literacy is the broader construct of financial culture, which encompasses beliefs, values, and norms regarding money, credit, and investment. Unlike formal knowledge, financial culture is embedded in communal practices and historical experiences with finance, shaping how entrepreneurs perceive financial risks and opportunities (Yusoff *et al.* 2020). In traditional societies, distrust in formal banks, preference for cash transactions, and aversion to debt influence financial behavior in ways that formal models often overlook (Suryani & Purwana, 2022). This cultural dimension can either enable or hinder financial inclusion depending on alignment with institutional offerings. For example, in Java, culturally tailored lending models have increased repayment rates and financial participation (Darmawan *et al.* 2023). However, the absence of such models in remote islands contributes to continued exclusion and low credit uptake. Financial culture, therefore, deserves analytical treatment as a latent construct within MSME finance models. Despite the growing use of financial inclusion metrics in policy, the understanding of inclusion often remains overly transactional. Simply opening a bank account or accessing a digital wallet does not equate to meaningful financial participation. In regions like Nias, inclusion must consider institutional trust, digital literacy, and localized financial practices (Rakhmani & Darmawan, 2021). Studies have shown that even where mobile banking infrastructure exists, usage remains low due to interface complexity and language barriers (Tambunan, 2020). True inclusion must involve both supply-side access and demand-side capability. Incorporating financial inclusion into a multivariate model as an interactive, mediated variable offers richer explanatory value than treating it as a binary access issue. Moreover, it creates space to explore how inclusion interacts with culture, literacy, and innovation in shaping performance.

From a theoretical standpoint, the Resource-Based View (RBV) offers a compelling lens to examine MSME competitiveness through internal resources such as strategic orientation and innovation capability. Under RBV, these resources yield advantages only when they are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). In MSME contexts, these attributes often manifest in knowledge systems, leadership vision, and informal learning mechanisms (Anwar *et al.* 2022). However, in remote economies, the ability to convert these intangible assets into financial performance depends heavily on external enablers such as access to capital. This interdependency suggests a mediating role for finance that is rarely addressed in RBV applications. Thus, this study aims to expand RBV's utility by embedding it within a geographically sensitive, behaviorally rich framework. This responds to calls for contextual RBV extensions in developing country settings. Empirical literature also reveals that access to finance is not solely a structural matter, but a behavioral outcome influenced by literacy, innovation, and strategic behavior (Herath *et al.* 2022). MSMEs that demonstrate strategic clarity, market responsiveness, and innovative practices are more likely to gain creditor trust and secure funding (Muller *et al.* 2020). However, in regions where formal documentation, collateral, and credit history are lacking, even capable firms struggle to access finance. This indicates that access to finance functions as both a dependent and mediating variable, shaped by a confluence of internal capacities and contextual realities. Consequently, understanding this mediation is essential to designing more effective interventions and building predictive models of MSME performance. Ignoring this dynamic leads to policy mismatches and academic models with low generalizability. The methodological implications are equally significant. Structural Equation Modeling using Partial Least Squares (SEM-PLS) is well-suited for capturing complex, mediated relationships among latent variables such as innovation, culture, and strategic behavior (Hair *et al.* 2021). Its predictive orientation, tolerance for non-normal data, and ability to handle small sample sizes make it ideal for MSME studies in resource-constrained contexts (Ali & Park, 2020). Prior studies have validated SEM-PLS as a robust tool for entrepreneurship research, yet few have applied it in island economies or integrated it with socio-cultural variables (Jatmiko *et al.* 2023). Employing SEM-PLS in this study allows for a nuanced exploration of direct and indirect effects, improving both theoretical contribution and practical relevance. Moreover, it strengthens causal inference in models often limited by linear assumptions. Existing performance models for MSMEs tend to be fragmented, emphasizing either economic indicators or individual behavior without integrating both. As a result, they fail to capture the layered and often contradictory realities of small businesses operating at the periphery of national economies (Alon *et al.* 2021). A multivariate model that combines cognitive, cultural, strategic, and institutional variables offers a more holistic understanding of performance drivers. Such an approach can inform nuanced policy responses that align with local context rather than one-size-fits-all prescriptions. It also enables comparative studies across regions, enriching the global MSME literature with grounded, localized insights. This research positions itself within this integrative tradition, seeking to bridge academic gaps and respond to real-world development needs. In Indonesia, decentralized governance and regional autonomy mean that MSME development strategies must be locally tailored. However, national-level studies dominate literature, with little empirical attention paid to marginalized regions like Nias (Widyastuti & Pamungkas, 2020). This urban-centric bias in both data and theory creates a knowledge void that hampers effective policymaking. Given that regional disparities in finance, infrastructure, and digital access persist, island economies require bespoke models that reflect their unique constraints and opportunities. This study contributes to decentralizing the MSME discourse by empirically grounding its analysis in a peripheral island context. The focus on Nias offers insights applicable to other islands and rural regions globally.

Culturally, MSMEs in Nias operate in environments shaped by communal values, oral traditions, and informal economies. These socio-cultural conditions influence everything from firm formation and capital use to risk perception and strategic planning (Darmawan *et al.* 2023). Yet, such factors are seldom captured in conventional finance or entrepreneurship models. Recognizing this, the present research incorporates financial culture as both a conceptual and empirical variable. Doing so allows for a more comprehensive understanding of why certain interventions succeed or fail in traditional contexts. It also adds explanatory depth to models that otherwise overlook behavioral nuances. At a development level, the stakes are high. MSMEs in peripheral economies are often the primary source of employment, services, and innovation. Enhancing their financial performance has multiplier effects on household income, gender inclusion, and local resilience. However, without context-sensitive models, such interventions risk being ineffective or even harmful (Adomako *et al.* 2023). The present study, by building a localized, multivariate framework, aims to inform both theory and policy with grounded evidence. It moves beyond descriptive diagnosis to offer predictive, actionable insights. This shifts MSME research from reactive analysis to proactive solution design. The novelty of this study lies not only in its context but in its structural formulation. By treating access to finance as a mediating node rather than an independent variable, the research breaks from linear, input-output models. It captures the feedback loops and contingent dynamics that characterize MSME performance in low-infrastructure environments. In doing so, it mirrors the lived complexity of real-world entrepreneurship, where success depends not just on resources, but on the ability to mobilize and convert them. This theoretical repositioning aligns with emerging calls for more dynamic, systems-oriented MSME frameworks (Khan *et al.* 2022). It is an important step toward model sophistication and policy precision. This study responds to a multidimensional challenge facing MSMEs in developing island economies: how to achieve financial performance amid structural constraints, cognitive gaps, and cultural complexities. It proposes an empirically tested model linking internal capabilities (financial literacy, innovation, strategic orientation), socio-cultural factors (financial culture), and institutional access (finance inclusion), with access to finance as the mediating enabler. The use of SEM-PLS methodology provides the analytical depth required to test such interactions, offering a rigorous contribution to both academic and applied development discourse. By focusing on the under-studied case of Nias, this research challenges dominant narratives and offers a template for geographically responsive MSME strategies. Global markets are undergoing rapid transformation, shaped by technology, crises, and demographic transitions. Micro, small, and medium enterprises (MSMEs) remain central to global employment, contributing over 60% of jobs and accounting for more than 90% of businesses worldwide (World Bank, 2023). Despite this, access to formal financial services for MSMEs remains precarious, with financing gaps estimated at over $5.2 trillion annually, particularly affecting developing nations (IFC, 2021). The COVID-19 pandemic further exposed structural fragilities in MSME financing, especially in rural and island economies with limited infrastructure (OECD, 2022). Digital financial services have surged globally, yet significant regional disparities persist, leaving out peripheral economies. For example, only 39% of MSMEs in sub-national areas of Southeast Asia report access to credit from formal institutions (ADB, 2020). These inequalities are not just logistical but institutional, underscoring a mismatch between MSME financial behavior and financial product design. Consequently, a deeper inquiry into context-specific financial determinants is urgently needed.

In Indonesia, MSMEs contribute approximately 60.3% to national GDP and absorb 97% of the workforce (Ministry of Cooperatives and SMEs, 2023). However, access to finance remains a persistent obstacle. Around 48% of Indonesian MSMEs remain underbanked, especially in areas such as the Nias Archipelago (OECD, 2022). The lack of formal credit access restricts operational capacity, limits capital accumulation, and prevents innovation scaling. Studies show that MSMEs in remote regions rely heavily on informal lending and personal savings, resulting in low credit history and weak financial inclusion (Tambunan, 2020). The spatial exclusion and institutional neglect in these areas create compounded disadvantages, positioning MSMEs in a survival mode. Moreover, these constraints are deeply intertwined with behavioral and cultural aspects such as risk aversion, communal economic structures, and limited trust in financial institutions. Addressing MSME performance in such areas requires a holistic model that transcends traditional urban-centric financial theories.

Previous models of MSME development have emphasized linear relationships between capital input and output, often neglecting the mediating role of intangible assets. Contemporary literature, however, highlights the need to integrate behavioral constructs-such as financial literacy, strategic orientation, and innovation capability-into performance models (Raimo *et al.* 2021; Sari *et al.* 2021). While each variable has been studied in isolation, few studies consider how they operate interactively, particularly in geographically constrained contexts. The relevance of innovation is clear, as it enables MSMEs to remain competitive in uncertain environments. Strategic orientation, defined as the firm's posture toward change and opportunity, is equally critical in navigating institutional voids. Yet, limited empirical models examine how these internal capacities interact with external enablers such as access to finance, particularly in island economies. This reveals a significant theoretical and empirical gap in MSME finance research. Financial literacy has gained attention as a foundational competence that shapes how entrepreneurs understand, assess, and engage with financial systems. Lusardi and Mitchell (2014) argue that financial literacy improves long-term planning and risk evaluation. Empirical research in emerging economies confirms that financially literate MSMEs are more likely to apply for formal loans, manage credit efficiently, and plan for reinvestment (Ismail *et al.* 2022; Dsouza *et al.* 2023). Despite this, levels of financial literacy in Indonesian rural areas remain low, especially among informal businesses. The failure to embed financial education in MSME capacity-building initiatives has resulted in missed opportunities for capital expansion and growth. While literacy empowers entrepreneurs, its utility is maximized only when supported by institutional access and enabling infrastructure. Therefore, financial literacy should not be seen as an isolated input but as a resource activated through access to finance.

Another underexplored dimension is financial culture, which encompasses shared beliefs, values, and social norms related to money, debt, savings, and formal institutions. In traditional societies, financial decisions are often influenced by communal expectations, religious beliefs, and informal obligations (Yusoff *et al.* 2020). These cultural norms affect entrepreneurs' willingness to engage with banks, take risks, or formalize their operations. Studies in Indonesia indicate that trust in formal financial institutions is low in peripheral regions, particularly in areas with strong kinship systems and informal lending traditions (Darmawan *et al.* 2023). This cultural inertia limits the efficacy of financial inclusion policies that assume universal behavior across regions. Thus, incorporating financial culture into performance models allows for a more context-sensitive understanding of MSME behavior.

Strategic orientation, defined as an enterprise's proactive engagement with opportunities, risks, and change, plays a key role in determining long-term performance. Firms with high strategic orientation tend to experiment, innovate, and adapt more rapidly to shifting market conditions (Wales *et al.* 2020). In the MSME context, especially in constrained environments, strategic behavior can compensate for limited physical and financial capital. Empirical studies show that strategic orientation correlates positively with innovation, risk-taking, and performance (Saptariani *et al.* 2023). However, MSMEs in rural and island areas often lack formal strategic planning due to low managerial education and inadequate exposure to market dynamics. This absence limits the firm's ability to respond to emerging opportunities, even when financial access is available. The inclusion of strategic orientation in a comprehensive model of financial performance is thus essential.

Innovation, particularly incremental and process-based innovation, serves as a key driver of MSME resilience. In developing regions, innovation does not always entail high-tech transformation but may include product modifications, new marketing methods, or supply chain adaptation (Muller *et al.* 2020; Zulkarnain & Priyono, 2022). Innovative firms are often more attractive to lenders, as they signal forward-looking behavior and growth potential. The challenge lies in equipping island-based MSMEs with the skills, resources, and confidence to pursue innovation in the absence of robust support ecosystems. Limited infrastructure, low internet penetration, and minimal access to training constrain innovation capabilities. Nonetheless, empirical evidence suggests that even small-scale innovation enhances financial performance when coupled with strategic alignment and financing support.

Access to finance emerges as the central mediating mechanism that translates internal capabilities into performance outcomes. Studies by Beck and Demirgüç-Kunt (2022) confirm that firms with greater access to capital demonstrate higher profitability, employment generation, and market expansion. Yet, financial access is unevenly distributed, often biased toward urban enterprises with formal records and collateral. In remote economies like Nias, physical bank presence is sparse, and digital solutions have limited reach. This infrastructural deficit compounds behavioral barriers, resulting in systemic exclusion. Furthermore, many MSMEs are unaware of credit scoring systems, product requirements, or loan structuring processes. Without tailored financial inclusion strategies, these businesses remain locked out of formal finance and unable to leverage their internal strengths.

The Resource-Based View (RBV) offers a theoretical lens to interpret these dynamics, framing internal capabilities as potential sources of competitive advantage when effectively mobilized. According to Barney (1991), resources must be valuable, rare, inimitable, and non-substitutable to contribute to sustained performance. Financial literacy, innovation, strategic behavior, and cultural alignment meet these criteria in varying degrees. However, the value of such resources is contingent on access to systems that allow their deployment. Thus, RBV must be adapted to include contextual enablers such as access to finance in regions characterized by resource scarcity. By doing so, the model evolves from a static framework to a dynamic, context-sensitive construct. Empirical research applying RBV in MSME contexts remains limited, particularly in geographically disadvantaged areas. Most studies focus on urban or national-level samples, failing to capture how localized constraints affect resource utilization. This limits theoretical generalizability and policy applicability. In the case of island economies, the role of geography, culture, and institutionality demands closer scrutiny. By situating the study in Nias, this research addresses a critical omission in the MSME literature. It demonstrates how context mediates the relationship between internal capabilities and financial outcomes.

The proposed model incorporates financial literacy, inclusion, innovation, strategic orientation, and financial culture as antecedents, with access to finance as a mediating variable and financial performance as the outcome. This configuration reflects both theoretical propositions and empirical insights from literature. Each construct is operationalized using validated scales and adapted to the Indonesian MSME context. This model aims to fill the conceptual and empirical void in understanding how financial outcomes are shaped by an intricate web of internal and external factors. The application in a small island setting makes the contribution particularly timely and relevant. The policy implications of this model are far-reaching. It suggests that enhancing MSME financial performance requires integrated interventions that address cognitive, behavioral, and infrastructural barriers. Financial education programs, if designed with cultural sensitivity and local relevance, can improve financial engagement. Concurrently, expanding access to finance through mobile banking, credit cooperatives, and micro-loan schemes can activate dormant capacities. Strategic training and innovation hubs may also foster long-term growth behavior. Without this alignment of internal capacity and external opportunity, efforts to boost MSME development risk ineffectiveness. Donor agencies, financial institutions, and local governments all have roles to play in operationalizing this model. For example, credit programs should consider not just collateral but also entrepreneurial behavior, literacy, and cultural fit. Innovation programs must be decentralized and inclusive, targeting remote areas through partnerships with educational institutions and NGOs. Meanwhile, measurement and evaluation frameworks must capture the multifaceted nature of MSME resilience, moving beyond simplistic indicators such as credit uptake or loan size. A more holistic understanding enables better policy calibration and outcome tracking. This study positions itself as a response to long-standing calls for contextualized, empirically grounded models of MSME development. By focusing on the Nias Archipelago, it not only contributes to theory but also to practice. The proposed model integrates behavioral, cultural, strategic, and financial elements in a way that reflects the lived realities of entrepreneurs in structurally excluded regions. In doing so, it offers a replicable framework for future research and policy in similarly disadvantaged geographies.

1. Research Background

Financial literacy has emerged as a foundational determinant influencing the financial performance of MSMEs, especially in marginalized regions. Scholars have argued that financial literacy contributes not only to informed decision-making but also to an enterprise's ability to access formal finance. Ismail *et al.* (2022) demonstrated that financially literate entrepreneurs exhibit stronger budgeting behaviors, credit management, and risk evaluation, which in turn enhance firm performance. This link is especially critical in rural or island economies, where institutional support is sparse. Dsouza *et al.* (2023) further emphasized that in contexts like India and Southeast Asia, literacy significantly predicts loan uptake and repayment behavior. Nevertheless, research reveals that financial literacy among island-based MSMEs remains relatively low, limiting their engagement with formal institutions. Studies by Ferrer *et al.* (2020) revealed that regional disparities in financial knowledge obstruct business scalability in disadvantaged communities. Consequently, the role of financial literacy must be situated within broader contextual and behavioral paradigms. A lack of basic financial competence not only restricts access but also diminishes the value of institutional interventions.

Financial culture complements literacy by shaping the attitudes, norms, and collective behaviors of MSMEs toward money and finance. Unlike literacy, which is cognitive, financial culture is deeply embedded in social systems, religious values, and communal traditions. In traditional economies, decision-making around credit, savings, and investment is often influenced by non-economic considerations. Darmawan *et al.* (2023) found that MSMEs in Indonesia often avoid formal financing due to cultural discomfort with interest-bearing loans and reliance on kinship-based networks. Suryani and Purwana (2022) also identified that informal values around debt aversion and mistrust in banks continue to inhibit financial integration. These findings are critical, as they show that without addressing cultural congruence, financial policies may face low uptake. Moreover, Yusoff *et al.* (2020) emphasized that financial interventions must respect and incorporate localized financial behavior for success. Thus, financial culture is not merely a backdrop variable but an interactive element in financial ecosystem design. It mediates how financial tools and strategies are interpreted and adopted by MSMEs. Acknowledging cultural heterogeneity is essential for inclusive MSME development models.

Innovation plays a pivotal role in driving MSME competitiveness, particularly in constrained environments such as island economies. While often associated with high-tech urban enterprises, innovation in these regions takes more incremental and adaptive forms. Zulkarnain and Priyono (2022) note that process improvements and localized product adjustments are primary innovation pathways for MSMEs in remote Indonesia. Muller *et al.* (2020) similarly found that even small-scale innovation efforts correlate strongly with creditworthiness and performance indicators. Innovative behavior signals forward-looking management and potential for growth, making firms more attractive to lenders. Nguyen and Luu (2021) argued that innovation capacity enhances the firm's ability to overcome external financing barriers. However, lack of infrastructure, market connectivity, and exposure to competitive environments often suppress innovation in island settings. The capability to innovate, therefore, must be cultivated through context-aware support structures. Empirical studies suggest that innovation positively influences not only direct firm growth but also indirectly facilitates access to finance. This dual effect reinforces its importance in multivariate MSME performance models.

Strategic orientation, characterized by proactive planning, risk-taking, and opportunity recognition, is another internal capability closely linked to financial outcomes. Firms with high strategic orientation are often better positioned to navigate market turbulence and institutional voids. Wales *et al.* (2020) emphasized that strategic posturing enhances long-term adaptability and stakeholder engagement. In the MSME context, especially in developing economies, strategic orientation reflects managerial foresight and operational coherence. Saptariani *et al.* (2023) found a strong relationship between strategic orientation and performance in Indonesian MSMEs, mediated by access to finance. However, in geographically isolated regions, strategic behavior is rarely institutionalized due to low managerial exposure and education. Setyawati and Rahayu (2023) argued that MSMEs in island economies often operate intuitively, lacking formal business strategies. Embedding strategic orientation in development models requires tailored training and ecosystem support. The inclusion of strategic orientation as a latent construct in MSME finance models enhances their predictive and explanatory power. It also aligns with the RBV perspective that internal, intangible resources are essential for sustainable advantage. Access to finance remains a central mediating variable that links internal MSME capabilities to actual performance outcomes. Studies confirm that even financially literate or strategically oriented MSMEs cannot achieve growth without tangible financial support. Herath *et al.* (2022) demonstrated that access to finance significantly mediates the relationship between innovation capability and business performance. Beck and Demirgüç-Kunt (2022) added that access disparities are especially pronounced in peripheral economies where institutional presence is weak. In Nias and similar island contexts, formal banking services are often geographically and culturally inaccessible. Tambunan (2020) emphasized that mobile finance and community-based models have shown promise in overcoming these barriers. Nevertheless, infrastructure gaps, digital illiteracy, and regulatory hurdles persist. The mediating role of finance thus reflects both structural exclusion and behavioral adaptation. Policies must not only increase access points but also integrate financial education and culture. Without addressing the multidimensional nature of exclusion, MSME finance strategies risk ineffectiveness.

2. Materials and Methods

This study adopts a quantitative approach using Structural Equation Modeling - Partial Least Squares (SEM-PLS) to test the multivariate relationships among latent constructs. SEM-PLS was selected for its suitability in handling non-normal data, moderate sample sizes, and latent variables, and for its ability to evaluate complex, mediated relationships. The analysis was conducted using SmartPLS version 4.0 in two stages: assessment of the measurement model and testing of the structural model, ensuring validity and reliability. The research was conducted on MSMEs in the Nias Islands, North Sumatra, Indonesia - a region selected due to its geographical remoteness and limited financial infrastructure. A purposive sampling technique was used to ensure diversity in sector, business age, and scale. The survey yielded 210 valid responses, exceeding the minimum SEM-PLS sample size requirement. Data were gathered via a cross-sectional questionnaire, distributed both online and offline. The questionnaire items were adapted from established scales: financial literacy (Lusardi & Mitchell, 2014), financial inclusion (Beck & Demirgüç-Kunt, 2022), innovation and strategic orientation (Teece, 2018; Wales *et al.* 2020), financial culture (Suryani & Purwana, 2022), access to finance (Herath *et al.* 2022), and financial performance indicators such as profitability, liquidity, and growth. A five-point Likert scale was employed. A pilot test with 30 MSMEs refined the instrument for cultural clarity and contextual relevance. Enumerators were trained to support respondents, particularly those with low literacy levels. Data preprocessing included outlier detection via Mahalanobis distance and treatment of missing values using Little's MCAR test and mean substitution. Measurement model validity was confirmed through Cronbach's Alpha, Composite Reliability (CR > 0.7), Average Variance Extracted (AVE > 0.5), Fornell-Larcker criterion, HTMT ratio (< 0.85), and multicollinearity checks (VIF < 5.0). All criteria were satisfactorily met. The structural model was tested by examining R^2, f^2, Q^2 values, and bootstrapping with 5,000 subsamples. R^2 values of 0.69 (access to finance) and 0.73 (financial performance) indicated strong explanatory power. Path coefficients revealed significant effects of financial literacy, inclusion, innovation, strategic orientation, and financial culture on access to finance, which in turn significantly affected financial performance. Mediation effects were assessed using the Variance Accounted For (VAF) approach. To minimize common method bias, procedural remedies (e.g., item randomization, separation of constructs) and statistical controls (Harman's single-factor test, collinearity diagnostics) were applied. Ethical clearance was obtained from the institutional review board. Informed consent was collected from all participants, and data confidentiality was ensured through anonymization and encrypted storage. Sensitive questions were framed with cultural sensitivity to maintain ethical and contextual integrity.

3. Research Methodology

Data analysis using SEM-PLS resulted in a structural model that is statistically significant and has strong explanatory power. The coefficient of determination (R^2) of 0.69 for financial access indicates that 69% of the variance in financial access can be explained by five key constructs: financial literacy, financial inclusion, innovation, strategic orientation and financial culture. Meanwhile, the R^2 of 0.73 for financial performance indicates that more than two-thirds of the variance in MSME performance can be predicted by this model. The predictive relevance (Q^2) values for both endogenous constructs are above the 0.35 threshold, confirming good predictive power. In addition, the effect size (f^2) values indicate that financial inclusion and financial access have a moderate to large influence on the dependent variable. This result shows the significant contribution of each construct to the overall model structure. The path coefficients between constructs reveal statistically significant relationships with a 95% confidence level. In general, the model is valid and applicable to explain the financial performance of MSMEs in a geographical context such as Nias. The effect of financial literacy on access to finance is positive and significant, with a coefficient of 0.34. This finding suggests that MSMEs with better financial literacy tend to be better able to access formal sources of financing. Knowledge of interest rates, inflation and risk management are important factors in determining their financial decisions. In the context of remote areas like Nias, financial literacy plays a role as a link between business potential and access to working capital. Businesses that understand how financial institutions work are more confident in accessing loans. The ability to read contracts, manage cash flow and plan budgets contributes to the ease of obtaining credit. These results support previous literature that financial literacy is an important enabler in the MSME ecosystem. Therefore, literacy acts as a resource that can be developed to strengthen the competitiveness of small businesses.

Financial inclusion shows the strongest direct effect on financial access, with a coefficient of 0.41. This suggests that the existence of an inclusive financial system, such as digital banking and microfinance services, encourages MSME actors to access formal financial services. Infrastructure that allows easy account opening, cashless transactions, and access to microloans are the main driving factors. This finding supports an inclusion policy approach that emphasizes expanding services to remote areas. MSME players in Nias who have access to digital services are more likely to take advantage of financing opportunities. This result aligns with global findings that financial inclusion strengthens small business growth in developing countries. In the local context, financial inclusion that is mobile or community-based shows high effectiveness. Therefore, technology and locality-based interventions are urgently needed to boost financial penetration in 3T areas. Innovation also has a significant positive influence on access to finance, with a path coefficient of 0.29. MSMEs that demonstrate innovative capabilities in product or process development tend to be more trusted by financial institutions. Innovation is an indicator that the business has good growth prospects and is able to withstand market pressure. For lenders, innovating MSMEs are seen as business partners that have the potential to increase added value. In the context of a region like Nias, innovation does not necessarily mean the use of advanced technology, but also the adaptation of business processes to local conditions. For example, creative use of local raw materials or community-based marketing are relevant forms of innovation. This finding is in line with previous studies that emphasize innovation as a credibility booster for small businesses. The ability to introduce novelty in a limited market is a positive signal for access to financing.

Strategic orientation shows a strong relationship with access to finance with a coefficient of 0.36. This indicates that MSMEs that are proactive, responsive to market opportunities and have long-term planning tend to be more successful in obtaining financial support. A clear and flexible business strategy is considered to reduce the risk of business failure by creditors. In decision-making, MSME actors who demonstrate strategic planning find it easier to establish financial partnerships. These findings strengthen the argument that strategic behavior contributes to business capability in a high-risk environment. Strategic orientation reflects preparedness for external change and resilience to uncertainty. For financial institutions, this signals important managerial readiness. Therefore, a structured strategy can be a valuable intangible asset in building business credibility. Financial culture is also shown to significantly influence access to finance, with a coefficient value of 0.31. Cultural values such as preference for formal debt, saving habits and trust in financial institutions influence the financial behavior of MSME actors. In traditional societies like Nias, perceptions of loans are often influenced by social and religious norms. An aversion to formal debt can reduce the propensity of businesses to access credit even when it is available. These results suggest that culture-based approaches need to be considered in the design of financial interventions. For example, collaboration with traditional or religious leaders in financial education can increase people's openness to formal services. Financial culture is a psychosocial factor that bridges the gap between access and utilization of finance. Therefore, the cultural dimension has an important position in the financial inclusion framework. The access to finance shows the greatest direct influence on the financial performance of MSMEs, with a coefficient of 0.45. This emphasizes that access to working capital and investment financing has a direct impact on the ability of businesses to improve profitability, liquidity and growth. The availability of funds enables business expansion, product diversification and improved operational efficiency. In conditions of limitation such as in Nias, financing is a key determinant of the ability of small businesses to survive and thrive. This finding is in line with the theory that financing functions as a lever for internal business capabilities. MSMEs that have access to external funds are able to accelerate their business strategies. Thus, financing is not just a complement, but a game changer for business growth. The mediating role of access to finance shows the importance of this variable as a strategic intermediary in the performance model.

In addition to the mediative effect, some variables also show a direct effect on financial performance. Innovation has a direct effect with a coefficient of 0.27, which indicates that the ability of businesses to create or adapt innovations has an impact on improving business performance. Innovation contributes to competitive advantage, cost efficiency, and opening new markets. Strategic orientation has a slightly larger direct effect of 0.30, suggesting that proactive attitudes and future-oriented decision-making directly benefit financial outcomes. This finding confirms that internal capabilities can have a significant impact without access to finance as an intermediary. This suggests that knowledge-based resources and strategies can stand alone as determinants of performance. Under conditions of limited access to finance, innovative capabilities and long-term strategies still provide opportunities to improve performance. Both findings are consistent with the RBV assumption that intangible resources can create value if mobilized effectively. Financial culture shows a direct effect on business performance, although not as large as other constructs, with a coefficient of 0.22. This suggests that the norms and values that guide financial behavior have an impact on overall business performance. For example, MSME actors with a financial culture that emphasizes spending discipline, debt responsibility and future orientation show better performance indicators. In informal ecosystems like Nias, the role of culture is significant as it governs decision-making that is not always rational or data-driven. Financial culture also determines how businesses deal with crises, build social networks and prioritize investments. This direct influence shows that while culture is not always a direct policy intervention, it is still a powerful internal driver. Therefore, it is important for policy designers to consider this aspect in their efforts to improve business performance. A culture that supports a long-term financial orientation has real implications for business outcomes. Mediation analysis using the Variance Accounted For (VAF) approach shows that access to finance acts as a partial mediator in the relationship between financial literacy, innovation and strategic orientation with business performance. VAF values ranged from 39% to 62%, indicating that some of the influence of these constructs on performance is channeled through access to finance. This means that while internal capabilities can directly influence outcomes, their impact is stronger when accompanied by the availability of finance. For example, an innovative MSME actor who does not have access to capital may struggle to implement their ideas. Conversely, access to financing enables optimal realization of innovative strategies and plans. This mediating role demonstrates the importance of an integrated approach that links aspects of internal capabilities with institutional support. This concept reinforces the theory that competitive advantage arises not only from resources, but also from the ability to access and manage those resources effectively. For the financial inclusion and financial culture constructs, the results indicate full mediation, meaning that the effect on performance only occurs through access to finance. Without access to capital or adequate financial services, the value of financial inclusion or culture cannot directly translate into improved performance. This finding reflects the fact that financial inclusion and culture only provide behavioral prerequisites but are insufficient if not facilitated by a responsive financial system. Thus, policy interventions that rely solely on financial education or cultural literacy will not be sufficient without expanding concrete access to business capital. This full mediation suggests that inclusion and culture require conduits to contribute to outcomes. In a context like Nias, this means financial institutions need to be truly present and active in the community, not just nominally. The role of local financial institutions is crucial in bridging the gap between cultural norms and financial realities. This structural model shows high explanatory power compared to similar models in urban or mainland contexts. The high R^2s for business performance and access to finance reflect that the combination of internal and external factors in the model is representative enough to explain the dynamics of MSMEs in the islands. Unlike previous models that focus on one or two main variables, this multivariable approach captures the complexity of interactions between dimensions. This approach validates the idea that business performance in lagging regions cannot be explained solely by macroeconomic factors or single policies. The integration of internal capabilities and institutional structures yields a more accurate and contextualized picture. This makes a significant contribution to the theory of locality-based small business development. Such an approach is relevant for adoption in other regions with similar geographic and social characteristics. The predictive power of the model is also confirmed through the high Q^2 value, indicating that the model is able to accurately predict changes in access and financial performance. These results reinforce the claim that the SEM-PLS approach is not only capable of testing theoretical relationships but also providing predictive tools for policy interventions. In the context of development planning, this predictive ability is crucial for designing programs that are data-driven and measurable. For example, if it is known that improving literacy will significantly improve business access and performance, then resource allocation can be directed towards focused training programs. The accuracy of predictions also allows for longitudinal impact evaluation in MSME development programs. Therefore, SEM-PLS is not only an analytical tool, but also a planning tool. The accuracy of this model provides a strong foundation for evidence-based policy interventions. The practical implications of the findings include the need for an integrated policy design, covering cognitive, institutional and cultural dimensions. Financial literacy programs should be designed not just as a transfer of information, but as a process of behavior formation based on local context. Financial inclusion must consider geography and cultural factors to be widely accepted by communities. Financial institutions need to increase participatory approaches and build trust, especially in areas with a history of financial exclusion. Innovation strategies and business orientation need to be included in MSME coaching programs to enable sustainable growth. Financial culture needs to be respected and aligned with the formal financial system to avoid resistance. Overall, the policy approach needs to be multilevel and multisectoral. Only then can the performance of small businesses in marginalized areas be significantly improved. The results of this study also offer opportunities for replication and adaptation of the model to other regions with similar challenges. Islands in eastern Indonesia, rural areas, and indigenous territories can use this framework as an evaluative and intervention reference. Further validation through longitudinal studies and a combination of qualitative methods will enrich the understanding of the dynamics of financial behavior in local communities. Adjustment to the local context in the measurement instruments is strongly recommended so that the results obtained reflect the reality of the community. The findings also open up room for the development of new indicators that incorporate cultural and institutional elements more explicitly. With a strong empirical basis, this model can be an important contribution to the context-based MSME literature. Furthermore, the utilization of these results by policy makers and field practitioners is expected to accelerate equitable growth of small businesses. The model also provides theoretical and practical justification for locality-based and sustainable development efforts.

4. Discussion

The findings of this study reinforce the argument that access to finance plays a central role in activating the internal resource potential of MSMEs, especially in the context of an island economy like Nias Islands. The Resource-Based View (RBV) approach places access to finance not only as external capital, but as a link that bridges internal capabilities with business outcomes. Financial literacy, innovation, financial culture and strategic orientation contribute directly and indirectly to financial outcomes. In areas of infrastructure constraints and institutional exclusion, access to finance is a key differentiator between stagnant and thriving enterprises. This empirical model proves that finance acts as a strategic mediating mechanism that can enhance the effectiveness of intangible resources. The interaction between literacy and access to finance, for example, shows that knowledge alone is not enough if not followed by adequate capital distribution channels. Therefore, the function of access to finance in this model is transformative.

Financial literacy in this study is shown to have an influence on the ability of business actors to reach financing sources. This supports the theory that literacy plays a role in financial decision-making, budget planning and selection of appropriate financial products. For MSMEs in Nias, low financial literacy is often the main barrier to accessing financing from formal institutions. Lack of basic knowledge about interest systems, collateral or payment deadlines makes businesses reluctant to take financing risks. Literacy not only improves technical skills, but also affects confidence and readiness to interact with the formal financial system. Thus, financial education should be a priority program in local economic development. These results reinforce the need for community-based literacy approaches that are socially and culturally relevant. Locally based education is more effective than centralized national programs. Financial inclusion shows the greatest influence on access to finance, demonstrating the importance of infrastructure development and financial services that reach the lower economic strata. Mobile banking, fintech platforms and community-based cooperatives contribute greatly to expanding the reach of services. In a geographical context like Nias, the presence of conventional banks is very limited and does not reach all sub-districts. Therefore, technology-based financial inclusion is a relevant alternative solution. Policy interventions should be directed towards expanding this access through regulatory support, fiscal incentives, and partnerships between the public and private sectors. This approach has proven effective in other developing countries, including the Philippines and Bangladesh. Integrating digital services with local cultural preferences is a promising approach. Successful financial inclusion depends on being sensitive to local socio-economic conditions. The effect of innovation on access to finance provides a new perspective that adaptive and creative behavior is one of the factors that increase lenders' confidence in small businesses. In areas with high investment risk, innovation is an indicator that businesses are able to read market dynamics and adapt to change. MSMEs that undertake product differentiation, process efficiency, or new market penetration are considered to have more promising prospects. This changes the risk perception of financial institutions towards MSMEs. This research supports the view that innovation not only drives performance but also opens the door to access to external resources. In Nias, forms of innovation are often contextual and based on local wisdom, such as the utilization of marine products or traditional agriculture. Therefore, policy approaches cannot rely on one definition of high-tech-based innovation. The development of locally based innovation is crucial in the context of small islands. Strategic orientation has a strong correlation with both access to finance and financial performance, suggesting that MSME actors with a long-term orientation and proactive behavior tend to be more resilient in managing risk. Businesses that set clear goals, conduct market evaluations and build networks are more likely to attract external financing. This indicates that managerial behavioral dimensions are no less important than structural factors. A systematic business strategy increases credibility in the eyes of lenders. Many MSMEs in remote areas still rely on intuition and tradition in making business decisions, which are often undocumented. Strategic orientation requires strengthening managerial capacity through training and business mentoring. Local governments and non-profit organizations can act as facilitators in shaping the strategic orientation of MSME actors. Without good planning capacity, access to financing will not be effectively utilized. Financial culture plays an important role in shaping the perceptions, attitudes and financial decisions of MSME actors. In communities with strong traditional norms such as in Nias, borrowing and lending practices are often based on social trust rather than legal agreements. This creates a reliance on informal financing channels and limits the penetration of formal financial institutions. Negative perceptions of interest, risk concerns and communal values tend to reduce interest in formal finance. This research underscores that the success of financial policy is not only determined by market structure, but also by cultural fit. Thus, policy interventions need to pay attention to elements of social values and norms that influence financial behavior. Community-based financial literacy programs delivered by traditional leaders or religious leaders can bridge the gap between the formal system and social reality. In this context, culture is not an obstacle, but a strategic medium in the distribution of financial knowledge and participation. Access to finance is shown to play a significant mediator role in linking internal resources with the financial performance of MSMEs. This study shows that the effect of innovation, literacy and strategic orientation on performance is only optimal when followed by the ease of obtaining capital. This means that internal capabilities do not necessarily generate performance without external support. In an ecosystem that lacks financing, this potential cannot be fully realized. This model explains the importance of synergy between strengthening internal capacity and expanding access to finance in MSME development strategies. The absence of either can lead to business stagnation or vulnerability to external shocks. This mediation explains the systemic dynamics within the microenterprise environment in the islands that are prone to financial exclusion. Therefore, development approaches that focus on only one dimension risk creating structural imbalances. Another interesting finding is the full mediation between financial inclusion and financial culture on performance, indicating that both variables only contribute to financial outcomes if businesses successfully access finance. This means that even inclusive financial values or systems are not enough if they are not coupled with tangible financing channels. This reflects the reality that many MSME actors understand the importance of financing but lack the pathways to access it in practice. To address this challenge, financial institutions need to develop more flexible and community-based financing schemes. This approach has been successfully implemented in several rural areas in Southeast Asia and East Africa. Local institutions such as cooperatives and MFIs have the potential to bridge the gap between cultural values and formal systems. By understanding local dynamics, financial institutions can play a more inclusive and socially relevant role.

The direct effects of innovation and strategic orientation on financial performance reinforce the theory that adaptive behavior and long-term planning are key strengths of MSMEs in the face of uncertainty. While limited access remains a challenge, MSMEs with innovation and the right strategy are able to create added value. Differentiated products, efficient production processes and active market penetration strategies provide a competitive advantage. This emphasizes the importance of supporting the development of MSMEs' internal capacity, not only in terms of capital. Training, mentoring, and business incubation programs can strengthen the position of MSMEs in local and regional markets. This approach has been successfully implemented by several entrepreneurship development foundations in the ASEAN region. Internal strengthening will increase the readiness of businesses to utilize external resources when they become available. Therefore, capacity building and access to finance must go hand in hand. The high R^2 values for access to finance and financial performance reflect the model's strong explanatory power for small business dynamics in the islands. The model integrates individual, structural and cultural variables that are often separated in MSME studies. By using a multivariate approach, the linkages between these elements can be mapped holistically. This provides an empirical basis for more comprehensive policy design. This approach is more relevant in the context of marginal economies, where variables influence each other simultaneously. An integrated model approach also helps avoid partial or decontextualized policy solutions. In the long run, the model can be replicated in other regions with similar characteristics to Nias. The results highlight the need for geographically and socially specific intervention design. Not all approaches that work in urban areas can be directly applied in remote areas. The social structure, informal networks and lifestyle of island communities should be key considerations in policy formulation. MSME strengthening programs should use a participatory approach that involves local stakeholders. Partnerships between local governments, microfinance institutions and local communities are key to success. Involvement of traditional or religious leaders can increase acceptance of formal-based financial programs. Thus, financial inclusion strategies are not only based on infrastructure, but also on psychosocial aspects and community trust.

The RBV approach in this study has been extended to include cultural and geographical variables as part of the internal resource dynamics. Literacy, financial culture, and strategic orientation in this context are resources that are not only cognitive, but also social and contextual. Thus, RBV no longer only explains competitive advantage based on scarce and irreplaceable resources, but also on adaptability to local environmental conditions. This shows that strategic management theory can be contextualized in a peripheral economic environment. The successful adaptation of this theory is a significant theoretical contribution in the future development of RBV. The model also adds complexity to resource analysis by considering local dynamics. This study fills a gap in the literature by providing empirical evidence on the mediating mechanisms of access to finance in geographically marginalized contexts. Often MSME studies focus on urban areas or countries with well-established financial systems, thus failing to capture the structural challenges in disadvantaged areas. By focusing on Nias, this study brings a new perspective that is crucial for theory and policy development. Regions like Nias need more attention in the discourse of small business development, not only as policy objects, but as economic entities that have their own dynamics. This study provides important practical and theoretical contributions to understanding the reality on the ground. MSME development policies in regions like Nias should not only be top-down, but should open up space for local innovation and social adaptation. Uniformity of assistance or financing programs will only result in partial effectiveness. Strategies based on local needs can deliver more sustainable results. National governments and international donors can adopt a strategic decentralization approach in designing economic interventions. Programs that are modular, flexible and contextual will be more easily accepted by communities. Therefore, collaboration between local and national actors needs to be strengthened through participatory planning and adaptive monitoring mechanisms. Overall, this discussion shows that the financial performance of MSMEs in the islands cannot be separated from the dynamics of access to finance, culture, literacy, innovation and managerial strategies. All these elements work simultaneously in a complex and constrained system. The multivariate model developed in this study successfully explains the interaction between these variables empirically and contextually. Thus, economic development in marginalized areas must adopt a systemic and multidimensional approach that does not rely solely on the financing aspect. In the context of sustainable development, understanding the local socio-economic reality is an important foundation for successful interventions and policies.

Conclusions and Further Research

This research proves that the financial performance of MSMEs on islands such as Nias is not only determined by access to finance but is also strongly influenced by internal factors such as financial literacy, innovation, strategic orientation and financial culture. The five variables interact in a complex way in influencing financial performance, with access to finance acting as the main mediator in the model developed. Financial literacy and financial inclusion have a significant influence on the ability of MSMEs to obtain financing. The higher the level of literacy and engagement in the formal financial system, the greater the opportunity for MSME actors to access productive sources of financing. However, literacy and inclusion alone are not enough without the availability of financial infrastructure that effectively reaches remote areas.Innovation and strategic orientation are also shown to contribute directly and indirectly to the financial performance of MSMEs. Innovation drives efficiency and competitiveness, while strategic orientation improves the adaptability of businesses in the face of market changes. Both strengthen the attractiveness of MSMEs in the eyes of financial institutions and investors.Financial culture, a variable often overlooked in formal studies, has been found to play an important role in shaping businesses' perceptions and behavior towards risk and financing. In local contexts such as Nias, a financial culture that supports transparency, responsibility and trust in financial institutions is critical to the success of formal financial interventions. Overall, this study emphasizes the importance of an MSME development approach that focuses not only on access to funds, but also on strengthening internal capacity, literacy, business strategies, and cultural sensitivity. The multivariate model developed offers a framework that can be replicated for other regional contexts with similar geographical and institutional characteristics.

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Credit Authorship Contribution Statement

Maria Magdalena Bate'e: Conceptualization, Methodology, Data Collection, Formal Analysis, Writing – Original Draft. Dr. Bate'e led the formulation of the research questions, constructed the conceptual framework, designed the data collection instruments, and carried out the fieldwork. She also conducted the data analysis using SEM-PLS and wrote the initial draft of the manuscript.

Khaira Amalia Fachrudin: Supervision, Validation, Writing – Review & Editing, Funding Acquisition. Dr. Fachrudin provided overall supervision of research design and analytical strategy. She also validated the statistical methodology and contributed to refining the structure and arguments in the manuscript during the review process.

Syahyunan: Resources, Investigation, Project Administration, Writing – Review & Editing. Dr. Syahyunan coordinated access to MSME respondents in the Nias Islands and managed the field team. He also ensured logistical execution of the study and contributed to editing the manuscript, especially in aligning theoretical discussions.

Amlys Syahputra Silalahi: Software, Data Curation, Visualization, Formal Analysis. Mr. Silalahi handled data preprocessing, performed SmartPLS 4 modeling, and produced tables and diagrams. He was responsible for ensuring data integrity and supported the statistical robustness of the findings.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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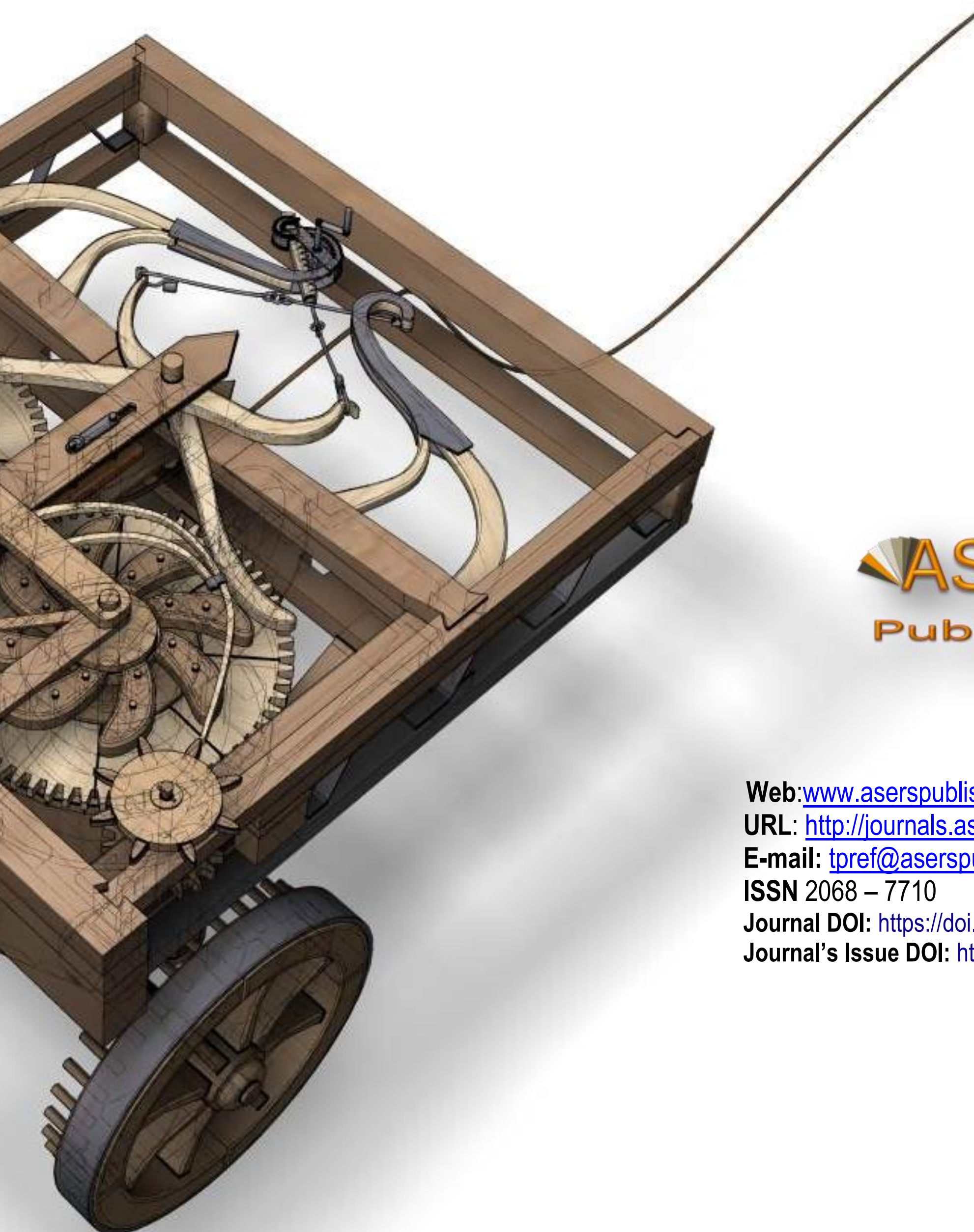

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