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Strategic Pillars of MSME Sustainability: The Role of Digital Value Chains and Green Finance in Deli Serdang Regency

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ABSTRACT
Micro, Small, and Medium Enterprises (MSMEs) represent a cornerstone of Indonesia's economic structure, particularly in regions like Deli Serdang. Yet, MSMEs continue to face persistent challenges in digital transformation and environmental sustainability. This study investigates the synergistic role of digital value chains and green finance in enhancing the sustainability of MSMEs by focusing on their strategic capabilities. Using a quantitative approach with Structural Equation Modeling (SEM), data were collected from 400 MSME respondents across 22 sub-districts. SEM was chosen due to its suitability for analyzing complex relationships among latent constructs. The study addresses the following research question: To what extent does the integration of digitalization and green finance influence MSME sustainability through strategic capabilities? Findings indicate that digital adoption improves operational efficiency and market responsiveness, while green finance strengthens long-term sustainability orientations. Notably, their interaction creates a compounded effect on resilience and competitiveness. Practical implications suggest that this integrative model can guide policymakers, financial institutions, and local stakeholders in designing inclusive digital-financial ecosystems for MSMEs. The study extends the Resource-Based View and Triple Bottom Line frameworks by demonstrating their applicability in local MSME contexts.

Keywords: MSME, Sustainability, Digitalization, Green Finance, Strategic Capabilities.

I. Introduction

Micro, Small, and Medium Enterprises (MSMEs) play a central role in Indonesia's economic structure, contributing more than 60% of the national Gross Domestic Product (GDP) and employing approximately 97% of the national workforce (Ministry of Cooperatives and SMEs, 2021). In a local context such as Deli Serdang Regency, MSMEs serve as key drivers of the regional economy, dominating sectors such as agriculture, trade, food processing, and the creative industry. However, rapid advancements in digital technology and the dynamics of globalization require MSMEs to adapt quickly in order to remain relevant and competitive. Unfortunately, the majority of MSMEs in this region still operate using conventional business models. The

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limited adoption of digital technology constrains production, distribution, and marketing efficiency, thereby weakening their position in an increasingly digitized market. In addition, the digital divide becomes even more complex when combined with limited access to environmentally friendly financing that supports sustainable business practices. These structural and cultural barriers further intensify the challenges faced by MSMEs in developing long-term competitiveness. Previous studies have highlighted the importance of integrating digital and sustainable approaches to accelerate the transformation of the MSME sector (Porter & Heppelmann, 2014; Elkington, 1997). However, a significant research gap remains in explaining how the synergy between value chain digitalization and green finance can enhance the strategic capabilities and sustainability of MSME businesses, particularly in the context of developing regional economies such as Deli Serdang Regency. This situation creates a need for studies that are not only descriptive but also analytical and practically applicable. Digital transformation has been shown to accelerate the growth of MSMEs in various global regions by improving cost efficiency and expanding market reach (Bharadwaj et al., 2013). However, in Indonesia, technology utilization is still constrained by low levels of digital literacy and uneven infrastructure development, particularly in rural areas.

At the same time, green finance which includes investments, credit, and funding oriented toward environmental sustainability remains a relatively new concept for many MSME actors. Limited understanding and accessibility to these financial instruments restrict the adaptive capacity of MSMEs to respond to the demands of a sustainable economy. The urgency to integrate these two approaches continues to increase in line with the growing need for business models that are adaptive, resilient, and socially as well as ecologically responsible. In this context, the integration of digital value chains and green finance is considered a potential strategy for developing MSMEs that are not only operationally efficient but also inclusive and sustainable (Barney, 1991; Hart & Milstein, 2003). Evidence-based interventions are therefore urgently needed to address the structural challenges faced by MSMEs. This study aims to empirically analyze the relationship between digitalization and green finance in shaping the strategic capabilities of sustainability-oriented MSMEs. By employing the Resource-Based View (RBV) and Triple Bottom Line (TBL) approaches, this study develops a conceptual model that links digital adoption, access to green finance, and sustainability management. The Structural Equation Modeling (SEM) approach is used to analyze data collected from 400 MSMEs across various business sectors and administrative regions in Deli Serdang Regency. Through the integration of theoretical and practical perspectives, this study is expected to contribute to the formulation of local policy strategies while simultaneously expanding the theoretical discourse on digital–financial integration in sustainable entrepreneurship.

II. Literature Review and Hypothesis Development

2.1. Digital Value Chain in the Context of MSMEs

The digital value chain refers to the integration of information and communication technology across the entire spectrum of business activities, ranging from raw material procurement and production processes to distribution and after-sales services (Porter & Heppelmann, 2014). This integration enhances efficiency, transparency, and responsiveness, which are critical elements for achieving competitive advantage in the digital era. For Micro, Small, and Medium Enterprises (MSMEs), the adoption of digital value chains offers opportunities to streamline business operations, improve productivity, and expand market reach. However, in practice, the implementation of digitalization in the MSME sector faces significant challenges. Infrastructure limitations, low levels of digital literacy, and resistance to technological change represent major barriers that hinder comprehensive digital transformation (Ghobakhloo, 2018). In regions such as Deli Serdang Regency, these challenges are both structural and cultural, further widening the digital divide among business actors. Previous studies have demonstrated that the integration of digital technology can significantly enhance the productivity and operational efficiency of MSMEs when implemented through approaches that are adaptive to the local context (Yunis et al., 2017). In this regard, digitalization should not be viewed merely as an

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operational tool but rather as a strategic enabler that supports the development of more competitive and resilient business models. Furthermore, digital transformation contributes to the formation of dynamic capabilities, defined as an organization's ability to respond rapidly and effectively to environmental changes (Teece, 2007; Teece, 2014). By utilizing technologies such as information systems, big data analytics, and e-commerce platforms, MSMEs can improve data-driven decision-making processes and enhance customer engagement through more personalized services. Despite these advantages, the existing literature has not sufficiently explored the relationship between digital value chains and long-term business sustainability within the MSME sector, particularly through a systemic and cross-sectoral perspective. Most studies focus primarily on operational efficiency and productivity improvements rather than on sustainability outcomes. Therefore, this study seeks to address this research gap by examining digital integration not only as a tool for operational efficiency but also as a strategic foundation for sustainable business development. In this study, the digital value chain is measured through several indicators, including the adoption of production technologies, marketing digitalization, and the utilization of digital financial systems. These indicators are intended to capture the technological dimension that strengthens MSME capabilities in responding to both local and global challenges in a sustainable manner.

2.2. Green Finance and Business Sustainability

Green finance refers to financial instruments and investment mechanisms designed to support economic activities that generate positive environmental impacts. These instruments include green loans, green bonds, and sustainability-oriented financing mechanisms (UNEP, 2016). Within the context of MSMEs, green finance provides opportunities for businesses to adopt environmentally friendly technologies, improve energy efficiency, and implement sustainable production practices. Nevertheless, the penetration of green finance in the MSME sector remains relatively low, both in terms of supply from financial institutions and demand from business actors. A lack of understanding of green financial instruments, limited access to relevant information, and complex regulatory frameworks represent major barriers that prevent MSMEs from utilizing such financing mechanisms effectively (Zhang et al., 2019). From a sustainability perspective, green finance encompasses not only environmental considerations but also economic and social dimensions. Sustainable and inclusive financing plays a critical role in strengthening the resilience of small businesses against environmental challenges, economic volatility, and social changes (Sachs et al., 2019). Consequently, the integration of green finance into MSME business models has become increasingly important for achieving long-term sustainability. Empirical studies conducted in several developing countries indicate that when MSMEs gain access to green financing, there is a notable increase in the adoption of clean technologies and environmentally responsible practices (Wang & Zhi, 2016; Bai et al., 2020). However, these improvements often require complementary support such as training programs, policy incentives, and institutional facilitation. Despite the growing body of research on green finance, relatively few studies have examined its interaction with digital transformation in the MSME sector. Existing literature tends to treat digitalization and green finance as separate research domains, even though both have the potential to interact synergistically in fostering sustainable business innovation. Therefore, this study aims to develop both conceptual and empirical insights into how access to green finance can strengthen digital transformation and support the sustainability of MSMEs. In this research, green finance is operationalized through several indicators, including access to environmentally oriented financing, financial incentives for green business practices, and institutional support mechanisms. These variables are used to empirically evaluate the contribution of green finance to the efficiency, resilience, and sustainability of MSMEs, particularly in developing regional contexts.

2.3. Digital–Green Finance Strategy and Adaptive Capabilities

A digital–green finance strategy refers to an integrated approach that combines the digitalization of financial processes with principles of environmental sustainability. This strategy involves the use of digital

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financial systems such as digital accounting applications, fintech services, and the integration of ESG (environmental, social, and governance) indicators into financial decision-making processes (Ghosh & Vinod, 2017). This concept is particularly relevant for Micro, Small, and Medium Enterprises (MSMEs), which often face challenges in managing financial activities that are transparent, efficient, and adaptive. Digital financial systems enable MSME actors to record transactions in real time, manage cash flow effectively, and monitor financial performance periodically. When combined with environmental awareness, these systems have the potential to strengthen long-term business resilience. Furthermore, digital–green finance strategies influence not only operational efficiency but also the adaptive capabilities of businesses in responding to regulatory changes, shifting market demands, and climate-related risks. Such adaptability is essential for ensuring business sustainability in increasingly uncertain economic environments (Lengnick-Hall et al., 2011). Despite these potential benefits, the adoption of digital–green finance strategies among Indonesian MSMEs remains relatively limited. Constraints such as limited knowledge, low levels of digital financial literacy, and insufficient incentives from formal financial institutions represent major barriers to implementation (ADB, 2021). Consequently, empirical research examining the relationship between digital–green finance strategies and adaptive capabilities is still urgently needed. The theoretical framework of this study integrates the Resource-Based View (RBV), which emphasizes the strategic importance of internal resources, with the Triple Bottom Line (TBL) approach, which highlights the simultaneous achievement of economic, social, and environmental performance. Through this integrated perspective, the adaptive capabilities of MSMEs are viewed as the outcome of the strategic utilization of digital technologies and green financial instruments. The variables used in this study are designed to capture the strategic dimensions of integrating digitalization with financial sustainability. This framework enables an empirical assessment of whether the combination of digital finance technologies and sustainability-oriented financial practices can create competitive advantages and enhance business resilience in the face of market pressures and environmental challenges.

2.4. Strategic Capabilities of MSMEs in the Resource-Based View Perspective

The Resource-Based View (RBV) theory views competitive advantage as the result of utilizing internal resources that are valuable, rare, difficult to imitate, and irreplaceable (Barney, 1991). In the context of MSMEs, strategic capabilities are key assets in facing increasingly complex competition. These resources include managerial competence, technology, social capital, and flexible organizational structures. Strategic capabilities also involve the ability to integrate, build, and reconfigure internal and external resources in response to market dynamics (Teece, 2014). Within the RBV framework, digitalization and green finance can be positioned as strategic elements that enhance the effectiveness of SME resource utilization. Digitalization enables the strengthening of internal information systems, while green finance opens access to financial resources that support environmentally friendly innovation. A study by Newbert (2007) emphasizes that mastery of technology and finance is not only an instrumental aspect but also part of the dynamics of continuous organizational learning. MSMEs that are able to manage intangible assets such as adaptive capabilities and digital knowledge have proven to be more resilient in the face of external pressures, such as economic crises or regulatory changes. In the context of developing regions such as Deli Serdang, MSMEs generally face resource constraints. However, the RBV approach shows that superiority does not always depend on the size of the business, but rather on how MSME actors are able to utilize resources strategically (Wernerfelt, 1984). Innovations derived from digitalization and access to green finance can be important differentiators. A common obstacle faced by MSMEs is the weak integration between digital resources and financial resources in daily business practices. Therefore, this study evaluates the extent to which the integration of digitalization and green finance enhances strategic capabilities relevant to RBV theory, such as adaptability, innovation, and business process efficiency. By incorporating RBV into the analytical framework, this study contributes to the literature emphasizing the importance of resource-based internal management as a strategic approach to strengthening the competitiveness and sustainability of MSMEs. It also expands the scientific dialogue on how digital and financial resources can be combined into strategic capital that has a real

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impact. The Resource-Based View (RBV) emphasizes competitive advantage as the result of utilizing internal resources that are valuable, rare, difficult to imitate, and organized (Barney, 1991). In the context of MSMEs, strategic capabilities include financial literacy, digital readiness, and environmental awareness. With the RBV approach, MSMEs can excel even with limited resources, as long as they are able to strategically utilize intangible assets (Newbert, 2007; Wernerfelt, 1984).

2.5. MSME Sustainability in the Triple Bottom Line Framework

The Triple Bottom Line (TBL) framework introduced by Elkington (1997) emphasizes that business success is not only measured by economic performance, but also by its social contribution and environmental impact. This concept is particularly relevant in analyzing MSMEs, which, despite operating on a small scale, have a broad impact on the community and the surrounding environment. The economic dimension of TBL refers to business efficiency and profitability. In the context of MSMEs, digitization and adequate access to finance can drive increased productivity and cost efficiency (Bocken et al., 2014). However, economic sustainability cannot stand alone without closely related social and environmental sustainability. In the social dimension, TBL encourages the strengthening of the role of MSMEs in creating jobs, improving community welfare, and building trust-based social networks (Dyllick & Hockerts, 2002). MSMEs that adopt social principles tend to be more adaptive to crises because they have strong social ties with the local ecosystem. Meanwhile, the environmental dimension of TBL emphasizes business practices that are responsible for natural resources and carbon emissions. The implementation of green finance is a crucial means of enabling MSMEs to carry out environmentally friendly production processes, such as the use of renewable energy and waste reduction (Schaltegger et al., 2012). Environmental sustainability will become increasingly important in responding to the challenges of climate change. Several studies show that MSMEs often face a dilemma between short-term economic needs and a commitment to sustainable practices (Revell et al., 2010). Therefore, the integration of digitalization and green finance can be a strategic solution in reducing this trade-off by creating innovative and efficient business models. By adopting the TBL framework in empirical analysis, this study seeks to evaluate the sustainability of SMEs holistically. This approach ensures that digitalization and green finance not only improve economic performance but also strengthen social contributions and environmental responsibility as an integrated part of a sustainable business system The Triple Bottom Line (TBL) emphasizes that business success is not only measured by economic profits but also by social contributions and environmental impact (Elkington, 1997). The digital value chain and green finance can influence all three dimensions simultaneously. This study adopts the TBL approach to assess the sustainability of MSMEs comprehensively.

III. Research Method

This research uses a quantitative approach to analyze the influence of digitalization and green finance on the sustainability of MSMEs, with strategic capabilities as a mediating variable. The conceptual model used refers to the Resource-Based View (RBV) and Triple Bottom Line (TBL) frameworks, which enable the simultaneous measurement of economic, social, and environmental performance. The survey was conducted cross-sectionally in 22 sub-districts of Deli Serdang Regency, representing various MSME sectors such as food processing, agriculture, retail, and creative industries.The population in this study was all MSME actors registered with the North Sumatra Cooperative and MSME Office (2023). A sample of 400 MSMEs was taken using proportional stratified random sampling to ensure regional and business sector representation. 's primary data was obtained through structured questionnaires and semi-structured interviews. The questionnaire was compiled based on indicators that had been validated from previous literature (Barney, 1991; Ghosh & Vinod, 2017; Elkington, 1997), which were divided into five sections: Digitalization Adoption, Green Finance Access, Strategic Financial Management, Adaptive Capabilities, and Sustainability Performance (Economic, Social, Environmental). Validity and reliability tests were conducted using statements developed

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based on the literature and translated into Indonesian, then retested using back-translation. A pre-test was conducted on 30 MSME actors. Reliability was tested using Cronbach's Alpha (> 0.70). Validity was tested using Confirmatory Factor Analysis (CFA).

IV. Result and Discussion

4.1. Analysis Result

This study examines the integrative role of the digital value chain and green finance on the sustainability of MSMEs in Deli Serdang Regency through a quantitative approach based on Structural Equation Modeling (SEM). Data were collected from 400 MSME actors spread across 22 sub-districts, with respondents divided proportionally based on business sector and administrative area. The analysis results showed a significant relationship between digitalization, access to green finance, and strategic capabilities on the dimensions of economic, social, and environmental sustainability. Descriptive analysis shows that most respondents (72%) have used basic digitalization elements in their operations, such as social media for marketing and simple digital cashier applications. However, only 26% have implemented a comprehensive digital-based management system. Meanwhile, understanding of the concept of green finance is still very limited; only 18% of respondents have heard the term, and 12% have accessed environmentally friendly forms of financing such as environmentally-based business credit.

4.2. Structural Equation Modeling (SEM) Results

The structural model was tested using SmartPLS 4.0, and the results indicate a satisfactory level of model fit based on several key goodness-of-fit indicators. The Comparative Fit Index (CFI) value of 0.937 indicates a strong level of agreement between the proposed model and the empirical data, exceeding the commonly accepted threshold of 0.90. This suggests that the model demonstrates a good overall fit. The Root Mean Square Error of Approximation (RMSEA) value of 0.041 is below the recommended maximum limit of 0.08, indicating a low level of residual error and an adequate level of model parsimony. Furthermore, the Standardized Root Mean Square Residual (SRMR) value of 0.045 is also within the acceptable range (less than 0.08), which further supports the validity of the structural relationships specified in the model. Overall, these goodness-of-fit indicators confirm that the proposed research model is statistically valid and theoretically consistent. Therefore, the empirical results provide support for the relationships between digitalization, green finance, strategic capabilities, and the sustainability dimensions examined in this study. The results of the hypothesis testing are presented in Table 1. The findings indicate that all proposed hypotheses are supported by the empirical data.

Table 1. Hypothesis Testing Results

Hypothesis	Path Coefficient (β)	Significance (p-value)	Status
H1	0.42	< 0.001	Supported
H2	0.35	< 0.01	Supported
H3	0.39	< 0.001	Supported
H4	0.47	< 0.001	Supported (Confirmed Mediator)

4.3. Interpretation of Findings

The results of this study confirm that value chain digitalization significantly improves the operational efficiency of MSMEs, supporting the findings of previous studies by David J. Teece (2014) and Yunis et al. (2017). Through the adoption of digital technologies, business actors become more responsive to market demands and more efficient in managing operational costs. Digitalization also enhances productivity and

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improves the quality of customer service, thereby contributing indirectly to the economic sustainability of MSMEs. The SEM results indicate that the digital value chain has a positive and significant effect on the operational efficiency of MSMEs ($\beta = 0.42$, $p < 0.001$). In addition to improving operational performance, digitalization contributes to strengthening the adaptive capabilities of MSMEs, particularly in terms of responding rapidly to market changes and managing customer data more effectively. In the green finance pathway, the findings show that access to green finance has a significant influence on strengthening strategic management capabilities ($\beta = 0.35$, $p < 0.01$). MSMEs that have access to green financing tend to be better able to integrate sustainability principles into their production processes, including waste management, energy efficiency, and the use of environmentally friendly raw materials. However, the direct influence of green finance on economic performance remains relatively limited, indicating the need for greater institutional support and capacity-building initiatives. Furthermore, the integration of digitalization and green finance demonstrates an interaction (moderating) effect that strengthens strategic capabilities and overall business sustainability. The digital–green model has been shown to enhance business resilience in responding to external disruptions such as market fluctuations and environmental pressures. This finding is supported by strong model fit indicators (CFI = 0.937; RMSEA = 0.041), confirming that the proposed model is consistent with the empirical data. Overall, the three sustainability dimensions—economic, social, and environmental—are significantly influenced by the strategic capabilities of MSMEs formed through the integration of digitalization and green finance. Among these dimensions, the economic dimension shows the strongest effect ($\beta = 0.49$), followed by the social dimension ($\beta = 0.44$) and the environmental dimension ($\beta = 0.38$). These results support the assumption that business sustainability is closely linked to the ability of MSMEs to develop adaptive and strategic capabilities in responding to evolving market demands, regulatory environments, and expectations for environmentally responsible business practices.

4.4. Comparison with Previous Studies

Table 2. Comparison with Previous Studies

Aspect	Previous Studies	This Study
Impact of Digitalization	David J. Teece (2014); Ghobakhloo (2018) emphasize operational efficiency and technological innovation.	Demonstrates that digitalization strengthens adaptive capabilities and improves market responsiveness among MSMEs.
Role of Green Finance	Wang & Zhi (2016); Bai et al. (2020) focus on macro-level sustainable development impacts.	Expands the analysis to the regional MSME context, highlighting its role in strengthening business resilience and sustainability orientation.
Digital–Green Integration	Rarely examined simultaneously in previous studies.	Shows a moderating interaction effect between digitalization and green finance in improving sustainability outcomes.

A comparative analysis between previous studies and the findings of this research reveals several important contributions. Earlier studies, such as those by David J. Teece (2014) and Ghobakhloo (2018), primarily emphasized the role of digitalization in improving operational efficiency and technological innovation. This study extends those findings by demonstrating that digital adoption not only enhances efficiency but also strengthens the adaptive capabilities and market responsiveness of MSME actors. In terms of green finance, previous studies such as Wang and Zhi (2016) and Bai et al. (2020) largely focus on its contribution to sustainable development at the macroeconomic level. In contrast, this study examines the role of green finance in the local MSME context, demonstrating that access to environmentally oriented financing contributes directly to business resilience and promotes greater environmental awareness among entrepreneurs. Furthermore, the integration of digitalization and green finance—an area that has rarely been

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examined simultaneously in previous research—has been shown to produce a moderating effect on sustainability outcomes. This indicates that digital transformation and green financial support operate synergistically rather than independently in strengthening MSME sustainability. Finally, while many earlier studies relied on a single theoretical perspective, such as the Resource-Based View (RBV) or the Triple Bottom Line (TBL), this study adopts an integrated theoretical framework combining both approaches. This holistic perspective provides a more comprehensive understanding of how digital capabilities and sustainable financial resources jointly contribute to competitive advantage and long-term sustainability performance among MSMEs.

4.5. Discussion

The results of this study confirm that value chain digitalization plays an important role in improving the operational efficiency of MSMEs, as hypothesized in the Resource-Based View (RBV) framework. These findings are in line with Teece's (2014) view that digitalization can strengthen dynamic capabilities by accelerating decision-making, increasing production flexibility, and strengthening market access through digital channels. In the context of Deli Serdang MSMEs, the use of basic technologies such as social media and financial recording applications has been proven to increase productivity, although the level of adoption is still limited systemically. The integration of digital technology into the value chain has also been shown to have a significant impact on improving adaptive capabilities. This reinforces Ghobakhloo's (2018) claim that technology adoption by MSMEs is not only for short-term efficiency but also shapes strategic and innovative mindsets. These results are also consistent with the study by Yunis et al. (2017), which shows that MSMEs with good digital capacity have organizational agility in responding to market changes and economic externalities. From the green finance perspective, the results show that access to environmentally friendly financing contributes to strengthening sustainability strategies. This is in line with the study by Wang and Zhi (2016), which confirms that sustainability-based financial support encourages MSMEs to adopt ecologically responsible production practices. However, the direct influence of green finance on economic performance is still weak, indicating that green finance currently supports the process rather than the end result.

Another interesting finding is the moderating effect of the integration of digitalization and green finance on strategic capabilities. This combination has been proven to strengthen the resilience of MSMEs in facing environmental changes and pressures. This phenomenon expands on previous literature, which tended to view digitalization and sustainability as two separate domains (Bocken et al., 2014). This study shows that the two can synergize in an adaptive, long-term business strategy model. Within the Triple Bottom Line (TBL) framework, these findings reinforce the position that business sustainability cannot be achieved through an economic approach alone. MSMEs succeed in improving their economic, social, and environmental performance when their adaptive capabilities are formed through the use of structured and progressive technology and financing. Social dimensions, such as job creation and community participation, as well as environmental dimensions, such as waste management, emerge simultaneously when these two approaches are strategically combined. Although the research results make an important contribution, several limitations should be noted. First, the level of understanding of MSME actors regarding the concept of green finance is still low, which may limit the actual impact of this variable. Second, the quantitative SEM-based approach does not fully capture qualitative dynamics such as motivation, risk perception, and cultural factors that can influence the implementation of green digital strategies.

V. Conclusion

This study concludes that the integration of digital value chains and green finance contributes significantly to the strategic capabilities and long-term sustainability of MSMEs, especially in the context of regional economies such as Deli Serdang Regency. Empirical findings show that: Digitalization improves operational efficiency and market responsiveness. Green finance strengthens sustainability orientation,

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especially in the social and environmental dimensions. The interaction between the two creates a double effect on resilience and competitive advantage. From a theoretical perspective, this study reinforces the Resource-Based View (RBV) by showing that intangible internal resources such as digital systems and sustainable financial strategies can be converted into lasting competitive advantages. Additionally, the Triple Bottom Line (TBL) framework is reinforced through a holistic evaluation of sustainability performance covering economic, social, and environmental aspects. This research shows that the integration of the digital value chain and green finance contributes significantly to the formation of strategic capabilities and sustainability of MSMEs, particularly in the context of a dynamic local economy such as Deli Serdang Regency. Digitalization has been proven to improve operational efficiency and adaptive response to the market, while green finance strengthens long-term sustainability orientation, especially in the social and environmental dimensions. When both are implemented simultaneously, this digital-green model forms a strong foundation for the resilience and sustainable growth of MSMEs. These findings broaden the theoretical perspective that has separated the discourses of digitalization and sustainability, showing that combining the two creates synergistic effects on business capabilities. This integration also proves the relevance of the Resource-Based View theory in explaining how internal resources—in the form of innovative technology and financial systems—can be converted into lasting competitive advantages. At the same time, the Triple Bottom Line framework provides a normative basis for assessing SME performance holistically across three key dimensions: economic, social, and environmental. Based on these findings, public policy and institutional interventions need to focus on three main areas.

First, expanding digital access and literacy for SMEs, not only through technical training but also through inclusive digital infrastructure support, especially in rural areas. Digitalization should not be viewed merely as an operational tool, but as a strategic investment for business sustainability. Second, strengthening the green finance ecosystem for MSMEs, including regulations that encourage financial institutions to provide environmentally friendly financing products that are appropriate to the scale and characteristics of MSMEs. This can be supported by fiscal incentives and cross-sector partnerships to make green finance schemes more familiar and affordable for small businesses. Third, integrating MSME empowerment programs based on green-digital strategies, through synergies between local governments, educational institutions, the private sector, and donor agencies. This approach enables the creation of local business models that are not only adaptive to market changes but also contribute to the national and global sustainable development agenda. Future MSME development policies and programs need to be based on data and empirical findings as presented in this study. With an integrated, transformative, and evidence-based approach, MSME s can play a strategic role as catalysts for the local economy and agents of change towards social and environmental sustainability. The author expresses his highest appreciation to the Director of Research and Community Service, Directorate General of Research and Development, Ministry of Higher Education, Science, and Technology of Indonesia for funding support through the 2025 Regular Fundamental Research Grant Scheme. This support has been an important foundation for the implementation of this research and the preparation of this scientific article. The funding provided not only strengthens research capacity in the field of digital transformation and local economic development, but also enables the creation of academic contributions that are relevant to the strategic needs of national development. Without the support of the Directorate General of Research and Development, this research would not have achieved the depth of analysis and breadth of policy implications as presented in this article.

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