



Empowering MSMEs for the Digital Era: A Comprehensive SWOT and AHP – Based Development Strategy in Bekasi Regency

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ARTICLE INFO

Keywords: Digital Transformation, MSMEs, SWOT, AHP

Received : 1 November

Revised : 23 December

Accepted: 23 January

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ABSTRACT

Bekasi Regency, known as an industrial hub in Indonesia, has witnessed a surge in digital transformation efforts among Micro, Small, and Medium Enterprises (MSMEs). Despite their significant economic contributions, MSMEs face challenges such as uneven digital infrastructure, limited digital literacy, and organizational readiness gaps. This study investigates strategies for empowering MSMEs to embrace digital transformation using a hybrid SWOT and Analytic Hierarchy Process (AHP) methodology. SWOT analysis explores the internal and external factors influencing MSME readiness, while AHP prioritizes strategic alternatives for actionable recommendations. The findings highlight critical factors, including the need for enhanced digital infrastructure, increased digital literacy among MSME stakeholders, and strengthened cross-sectoral collaborations to address challenges such as limited resources and cybersecurity concerns. The integration of SWOT and AHP methodologies results in prioritized strategies, with the expansion of digital infrastructure emerging as the top priority, followed by fostering digital partnerships and enhancing digital literacy. Managerial implications emphasize the importance of equitable digital access, the creation of MSME digitalization centers, and the development of curated e-commerce platforms to strengthen competitiveness. These strategies are essential to promoting sustainable and inclusive growth in the region. The study concludes that government and private-sector collaboration is vital for bridging digital divides and enabling MSMEs to thrive in an increasingly digital economy. This research contributes to the limited discourse on MSME digital transformation in emerging markets, providing a strategic framework to achieve inclusive growth and regional economic resilience. Future research should explore the longitudinal impact of these strategies on MSME development and their scalability across diverse socio-economic contexts

INTRODUCTION

Bekasi Regency hosts the largest industrial zone in West Java Province, spanning approximately 9,496 hectares. Strategic policies enacted by both local and national governments have profoundly influenced this industrial area, catalyzing economic growth. Consequently, a substantial influx of investors has been drawn to capital-intensive sectors requiring a significant local workforce as well as a cadre of skilled expatriate professionals.

The industrial zones in Bekasi Regency are spread across various districts, including Central Cikarang, North Cikarang, South Cikarang, West Cikarang, South Tambun, and Cibitung. These areas are renowned as major industrial hubs operating on both national and international scales. These industrial zones play a pivotal role in contributing significantly to national income, particularly from the industrial sector.

The economy of Bekasi Regency has shown positive growth over the past five years (2016-2020), with its Gross Regional Domestic Product (GRDP) growth rate rising from 4.84% in 2016 to 6.02% in 2018, based on the constant-price growth rate with a 2010 base year. However, in 2020, Bekasi Regency experienced a sharp economic downturn, with growth plummeting to -3.40%, significantly lower than the 3.94% recorded in 2019, due to the negative impacts of the Covid-19 pandemic.

MSMEs (Micro, Small, and Medium Enterprises) in Bekasi Regency play a crucial role in the local economy, this rapidly growing region has a thriving industrial and commercial sector. Over the past five years, the MSME sector in Bekasi Regency has shown an increasing contribution to the formation of the Gross Regional Domestic Product (GRDP) at Current Prices. MSMEs initially contributed 11.99% in 2016, with gradual annual increases to 12.33% (2017), 12.46% (2018), 12.92% (2019), and reaching 13.77% in 2020 (BPS, 2021).

Aligned with this growth, the number of MSMEs in Bekasi Regency grew from 2018 to 2021, with 10,523 units in 2018, 18,796 units in 2019, 20,135 units in 2020, and 20,610 units in 2021, though it slightly declined to 19,111 units in 2022 (BPS West Java Province, 2024). MSMEs in Bekasi Regency operate across various business categories, including trade, crafts, culinary arts, and services.

The economic crisis triggered by the Covid-19 pandemic has accelerated technological innovation within the MSME sector. The use of digital technology is now seen as an effective solution to enhance competitiveness and expand MSMEs in Bekasi Regency, proving to be more efficient than traditional methods (Saad et.al, 2021). The increased adoption of digital technology in MSMEs has not only positively impacted their performance and growth but also provided convenience and ease for consumers.

As a foundational pillar of the economy, MSMEs must integrate digital technology to enhance performance and support to adopt digital technology. The readiness of MSMEs to adopt technology will significantly expand their reach, increase profitability, and strengthen competitiveness (Ricci et al., 2021; Saad et al., 2021; Denicolai et al., 2021).

BPS report 2019 indicates that the rapid growth of MSMEs has been driven by advancements in digital technology, which have spurred the rise of online entrepreneurship, millennials' preference for flexible work, and MSMEs

as an employment alternative for workers not requiring specialized skills or higher education.

Many MSME actors in Bekasi Regency have yet to fully recognize the importance of digital technology adoption, with its application often limited to basic functions. Human resource readiness is one of the factors influencing the decision to integrate digital technology into business operations. Although some MSMEs have adopted digital technology for marketing, their numbers remain small. Overall, digital technology knowledge among MSMEs is still low, with many yet to understand the significant benefits this technology can offer in supporting business development (Canhoto et al, 2021 and Denicolai et al., 2021).

As a cornerstone of the economy, MSMEs must integrate digital technology to enhance performance and support digital adoption. The readiness of MSMEs to embrace technology will significantly expand their reach, increase profits, and strengthen competitiveness (Ricci et al., 2021; Saad et al., 2021; Denicolai et al., 2021).

However, MSMEs in Bekasi Regency face numerous challenges in preparing for digital technology transformation, such as limited knowledge (Canhoto et al., 2021), organizational management constraints, scarce internal resources, a shortage of specialized labor, and limited experience in formulating effective strategies to implement digital technology and enhance business performance (Ricci et al. & Saad et al., 2021). Additionally, cultural factors, trust levels, lack of support in the form of digital networks and platforms, and concerns over security and limited understanding of the value of digital technology further impede progress (Adejumo et al., 2020; Canhoto et al.; Ricci et al., 2021). Singh et al. (2021) emphasize that readiness for digital transformation requires a supportive organizational culture, strong competitiveness, cognitive preparedness, effective organizational management, and alignment between strategy and digital technology readiness.

The government must take proactive measures to enhance the digital readiness of MSMEs to boost competitiveness and foster higher growth in the economic sector (Ricci et al., 2021; Jutla et al., 2002). Optimizing the use of digital technology should be a priority in strategic decision-making, encompassing policy formulation, improving services for MSMEs, and fostering innovation and creativity (Saad et al., 2021). Nonetheless, supporting the cultural, trust, and readiness factors of MSME stakeholders to adopt digital technology for sustainable growth remains critically important (Canhoto et al., 2021; Nair et al., 2019).

Setting the direction and design for MSME development, alongside a digital transformation strategy, requires a comprehensive understanding of MSME characteristics and the challenges they face, to ensure that formulated policies align with specific needs and drive growth. In Bekasi Regency, digital transformation readiness is not yet fully integrated with other economic sectors, cross-sectoral coordination, or spatial planning, resulting in suboptimal support for growth. Achieving this requires collaboration among government agencies, relevant stakeholders, and the private sector. This study highlights a model strategy that supports digital transformation in advancing MSME development in Bekasi Regency.

In developing a strategic model to support the digital transformation of MSMEs in Bekasi Regency, a SWOT and AHP analysis is employed. SWOT analysis is a highly valuable strategic tool for understanding the internal and external factors that impact MSME development within the context of digitalization, enabling the identification of strengths, weaknesses, opportunities, and threats faced by MSMEs undergoing digital transformation (Osterwalder & Pigneur, 2015). AHP is a method used for making complex decisions and aids in selecting the best alternative based on various criteria. AHP is highly relevant in the context of MSME digitalization, as numerous factors must be considered in choosing the right digital strategy (Saaty, 2008). Saaty and Vargas (2000) highlights in his studies on business sector decision-making that AHP is highly effective for analyses involving multiple variables and uncertainties, which frequently arise in decisions related to MSME digitalization. These methods are highly relevant, providing a comprehensive and systematic framework for formulating effective strategies to address the challenges of digitalization.

SWOT-AHP is a hybrid method that combines two decision-making tools: SWOT and AHP. Its integrated application within a unified process is designed to optimally leverage the strengths of each method while supporting multi-criteria decision-making (Kangas et al., 2003; Yuksel and Dagdeviren, 2007). In this approach, SWOT provides the overarching framework, while AHP is utilized within this framework to incorporate quantitative analysis into the decision-making process. Utilizing a combination of SWOT and AHP in strategic model development allows MSMEs in Bekasi Regency to gain deeper insights into their strategic positioning through SWOT, which is then followed by data-driven decision-making on necessary strategic actions facilitated by AHP (Helms & Nixon, 2010).

LITERATURE REVIEW

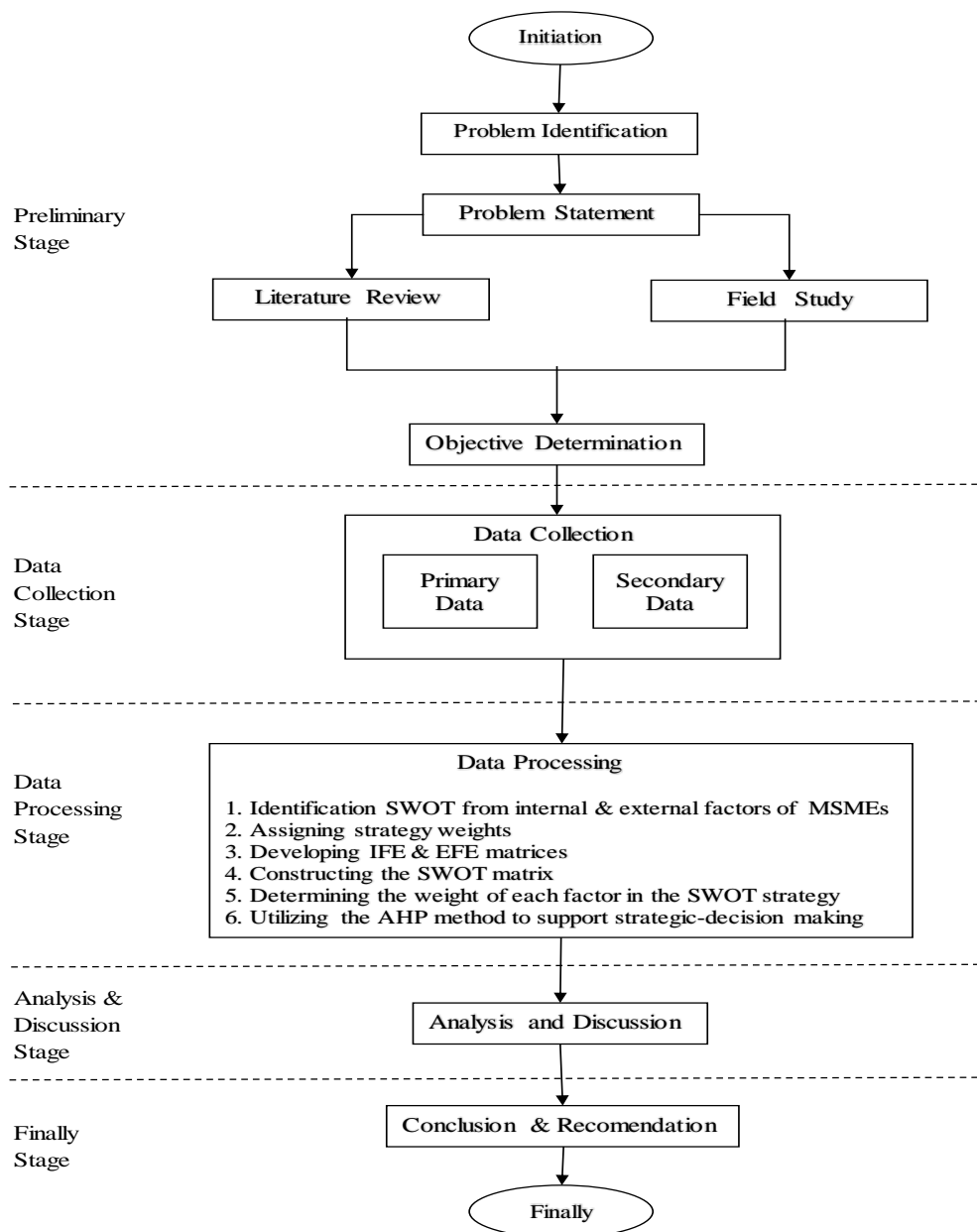
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METHODS

The research was conducted in Bekasi Regency, West Java Province. The location was purposively selected in key MSME (Micro, Small, and Medium Enterprises) development centres. The MSME actors in Bekasi Regency operate a variety of business types, so the sample selection was carried out using a non-probability method, specifically cluster random sampling by region. This approach ensured that the sample represented the diversity of business actors

and included individuals with the relevant authority and knowledge needed for the research. The research steps consist of the preliminary stage, data collection stage, data processing stage, and conclusion stage.

To meet the respondent criteria, data were gathered through relevant institutions using s data collection from the Cooperative and MSME Office of Bekasi Regency. Locations were purposively selected in MSME clusters under guidance programs. The observed respondents comprised MSME actors who have utilized digital information technology across various business sectors pertinent to the study, as these sectors predominantly drive the adoption of digital technology. Figure 1 illustrates the research methodology to be conducted by the researcher.



RESULTS

The characteristics of MSMEs are considered as one of the factors that potentially influence MSME performance (Supartha, 2011). These characteristics are related to the duration of the business, the resources possessed, as well as the income generated. The following table presents the characteristics of the MSME respondents in Bekasi Regency:

Table 1. Proportional Distribution of MSME Characteristics s in Bekasi Regency

MSME Characteristics	Proportional Levels	Total Percentage	Total Distribution
Age of MSMEs	Young (< 10 Years)	32%	87
	Middle-aged (10 -15 years)	39%	107
	Old (> 15 Tahun)	29%	79
Workforce Size	Small (< 3 workers)	26%	71
	Medium (3 - 4 workers)	40%	109
	Large (> 4 workers)	34%	93
Income Levels	Low (< IDR 5.000.000)	32%	87
	Medium (IDR 5.000.000 to IDR 10.000.000)	42%	115
	High (> IDR 10.000.000)	26%	71

Based on Table 1, the study reveals that 39% of MSMEs have been operating for 10 to 15 years, 32% have operated for less than 10 years, and 29% have been in operation for more than 15 years. Furthermore, in terms of workforce size, 40% of MSMEs employ between 3 to 4 workers, 34% employ more than 4 workers, and 26% employ fewer than 3 workers. Regarding income, 42% of MSMEs generate revenue ranging from IDR 5,000,000 to IDR 10,000,000, 32% earn below IDR 5,000,000, and 26% generate income above IDR 10,000,000.

SWOT and AHP Analysis Identification

This research begins with conducting interviews and distributing questionnaires to identify the strengths, weaknesses, opportunities, and threats related to the digital transformation of MSME development in Bekasi Regency. Data collection involves distributing questionnaires to expert respondents, including the Chairpersons of MSME Associations at the sub-district level, the Office of Cooperatives and MSMEs, and the Office of Industry and Trade of Bekasi Regency. The next step involves structuring internal and external aspects using the SWOT analysis approach, which is understood as a compilation of strengths, weaknesses, opportunities, and threats. Subsequently, Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices are developed to calculate their total scores. Internal and external factors are then analysed to determine the company's status and formulate the Internal-External (IE) matrix. Additionally, a SWOT matrix is created, resulting in four distinct strategies: Strength-Opportunities (SO), Strength-Threats (ST), Weakness-Opportunities (WO), and Weakness-Threats (WT). The AHP method is utilized to support multi-criteria decision-making. Weights are assigned to each factor in the SWOT strategies, followed by constructing pairwise comparisons to evaluate

the importance of each strategic alternative using the AHP Calculator Priority software. This process identifies priority strategies for selecting the most appropriate and effective strategy for developing digitally transforming MSMEs in Bekasi Regency. Figure 2 illustrates the SWOT-AHP hierarchy in this study.

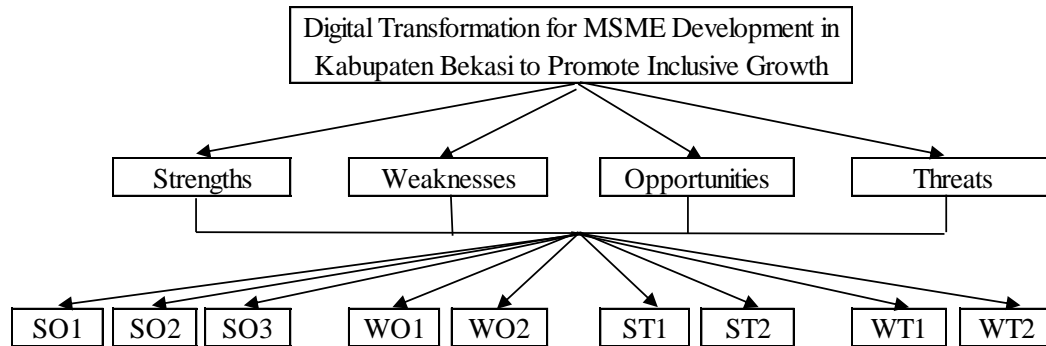


Figure 2. the SWOT-AHP Hierarchy

Key Internal and External Factor Analysis

The results of interviews and the distribution of questionnaires to expert respondents, including the Chairpersons of MSME Associations at the sub-district level, the Office of Cooperatives and MSMEs, and the Office of Industry and Trade of Bekasi Regency, were utilized to identify the strengths, weaknesses, opportunities, and threats (SWOT) of MSMEs in Bekasi Regency. The subsequent step involved the development of the Internal Factor Evaluation (IFE) matrix, which provides a detailed representation of the internal conditions of MSMEs in the region, specifically focusing on strengths and weaknesses. This matrix assigns weight and rating to each factor, resulting in a strength score of 1.87 and a weakness score of 1.37, thereby yielding a total internal factor score of 3.24. Table 2 presents the IFE matrix, while Table 2 displays the External Factor Evaluation (EFE) matrix for MSMEs in Bekasi Regency.

Table 2. IFE Matrix of MSMEs in Bekasi Regency

<i>Internal Factor Evaluation</i>					
		Strategic Factors	Weight	Rating	Score
<i>Strength</i>	1	Boost digital sales volume	0.11	4	0.43
	2	Develop new digital products/services	0.11	4	0.43
	3	Expand into new digital market	0.07	3	0.20
	4	Enhance business efficiency & effectiveness	0.09	4	0.35
	5	Improve product and service quality	0.07	3	0.20
	6	Reduce production and service cost	0.09	3	0.26
		Sub Total			1.87
<i>Weakness</i>	7	Expand digital infrastructure for accessibility	0.11	3	0.33
	8	Boost cybersecurity to protect	0.09	3	0.27

		system and data			
	9	Ensure transparency in digital markets	0.09	2	0.18
	10	Upgrade human resources skills in digital tech.	0.11	3	0.33
	11	Ensure IT readiness to support digital operations	0.09	3	0.27
	Sub Total				1.37
TOTAL			1	35	3.24

Table 3. EFE Matrix of MSMEs in Bekasi Regency

<i>External Factor Evaluation</i>					
		Strategic Factors	Weight	Rating	Score
<i>Opportunity</i>	1	Innovate products, services & processes to maintain competitiveness	0.07	3	0.21
	2	Enable cashless payment methods.	0.09	4	0.37
	3	Conduct online purchasing.	0.12	4	0.47
	4	Simplify the search for products, services, or pricing	0.09	3	0.28
	5	Ensure flexibility in time and location at low cost.	0.07	3	0.21
	6	Utilize data analytics for informed decision-making	0.07	3	0.21
	7	Leverage digital marketing to reach customers	0.09	4	0.37
	8	Foster digital collaboration and partnerships	0.09	3	0.27
	9	Enable the organization to adapt and grow easily	0.07	3	0.21
	10	Adopt a digital organizational culture as a work ethic	0.07	3	0.21
	Sub Total				2.81
<i>Threads</i>	11	Ensure IT strategy readiness for digital adoption	0.02	3	0.06
	12	Prepare for data security & privacy in digital tech.	0.05	3	0.14
	13	Equip human resources to adapt to change	0.05	3	0.14
	14	Uphold technological ethics & social responsibility	0.05	3	0.14
		Sub Total			
TOTAL			1	45	3.29

The steps for constructing the EFE matrix to map the external conditions of MSMEs in Bekasi Regency involve identifying opportunities and threats. This matrix outlines the opportunities available to MSMEs in the region and the threats they face in the context of digital transformation for MSMEs development. The results of the EFE matrix (Table 3) indicate an opportunity score of 2.81 and a threat score of 0.48, yielding a total external factor score of 3.29.

Following the development of the IFE and EFE matrices, the next step involves constructing the IE (Internal-External) matrix to determine the strategic positioning of MSMEs in Bekasi Regency. This matrix serves as a foundational step in formulating alternative strategies for MSME development through digitalization to achieve competitive advantage.

The IFE score of 3.24 falls within the average range of 3.00–4.00, while the EFE score of 3.29 is also categorized at a high level. David (2017) explained that the positioning within the IE matrix, which comprises nine cells, can ultimately be classified into three strategic divisions: grow and build, hold and maintain, and harvest or divest. The results of the IE matrix analysis place MSMEs in Bekasi Regency in Quadrant I, recommending a Grow and Build strategy. This strategy emphasizes promoting digital adoption to support MSME development and sustainably strengthen their competitiveness in the region. This approach is crucial given the significant potential of the MSME sector to drive local economic growth and enhance the Gross Regional Domestic Product (GRDP). Figure 3 illustrates the IE Matrix for MSMEs in Bekasi Regency.

		Total Weighted IFE Score		
		Strong 3.0 to 4.0	Average 2.0 to 2.99	Weak 1.0 to 1.99
Total Weighted EFE Score	High 3.0 to 4.0	4.0 3.0 I	2.0 II	1.0 III
	Medium 2.0 to 2.99	IV	V	VI
	Low 1.0 to 1.99	VII	VIII	IX

Figure 3. IE Matrix MSMEs in Bekasi Regency

SWOT Matrix Analysis

The subsequent stage involves conducting a SWOT matrix analysis for MSMEs to identify digital transformation strategies that support the development of MSMEs in Bekasi Regency and enhance their competitiveness in the market. The SWOT matrix is employed to assist in developing and implementing strategies (David, 2017), with these strategies taking into account both internal and external factors that influence MSMEs, both in the present and in the future (Wheelen & Hunger, 1992). This analysis focuses on

leveraging strengths and opportunities while minimizing weaknesses and mitigating threats. The SWOT matrix analysis is conducted to formulate strategies by integrating four key factors: Strength-Opportunity (S-O) strategies, Strength-Threat (S-T) strategies, Weakness-Opportunity (W-O) strategies, and Weakness-Threat (W-T) strategies (David, 2017).

These strategies address internal weaknesses and external threats faced by businesses. By effectively implementing weakness-threat strategies, competitiveness can be enhanced, risks mitigated, and relevance maintained in a dynamic market. These approaches play a pivotal role in optimizing digital transformation and achieving MSME business development objectives more effectively. Table 4 presents the SWOT matrix utilized to analyse each strategic approach systematically.

Table 4. SWOT Matrix Analysis

<p>IFE</p> <p>EFE</p>	<p>Strength</p> <ol style="list-style-type: none"> 1. Boost digital sales volume 2. Develop new digital product/services 3. Expand into new digital market 4. Enhance business efficiency & effectiveness 5. Improve product & service quality 6. Reduce production & service cost 	<p>Weakness</p> <ol style="list-style-type: none"> 1. Expand digital infrastructure for accessibility 2. Boost cybersecurity to protect system and data 3. Ensure transparency in digital markets 4. Upgrade human resources skills in digital technology 5. Ensure IT readiness to support digital operations
<p>Opportunity</p> <ol style="list-style-type: none"> 1. Innovate products, services & processes to maintain competitiveness 2. Enable cashless payment methods 3. Conduct online purchasing 4. Simplify the search for products, services or pricing 5. Ensure flexibility in time & location at low cost 6. Utilize data analytics for informed decision-making 7. Leverage digital marketing to reach customers 8. Foster digital collaboration & partnerships 9. Enable the MSMEs to adapt and grow easily 10. Adopt a digital organizational culture as a work ethic 	<p>SO Strategies :</p> <ol style="list-style-type: none"> 1. Enhancing digital sales volume through the establishment of strategic digital partnership collaborations. 2. Optimizing operational efficiency and effectiveness by leveraging the temporal and spatial flexibility enabled by digital technology. 3. Harnessing access to financing & digital incentives provided by government initiatives or technology-driven financial institutions. 	<p>WO Strategies :</p> <ol style="list-style-type: none"> 1. Advancing digital infrastructure development to facilitate broader and more affordable access across all regions, with a particular focus on underserved and remote areas. 2. Enhancing cybersecurity and IT system resilience by leveraging technologies and support programs provided by governmental initiatives or technology service providers.
<p>Threat</p> <ol style="list-style-type: none"> 1. Ensure IT strategy readiness for digital adoption 2. Prepare for data security & privacy in digital tech. 3. Equip human resources to adapt to change 4. Uphold technological ethics & social responsibility 	<p>ST Strategies :</p> <ol style="list-style-type: none"> 1. Expanding digital markets by establishing a robust and responsive digital ecosystem capable of addressing operational challenges. 2. Enhancing product and service quality by integrating technological ethics into digital processes, ensuring transparency in customer data usage, and maintaining a strong commitment to social 	<p>WT Strategies :</p> <ol style="list-style-type: none"> 1. Strengthening transparency and digital ethics through regulations emphasizing responsible technology governance. 2. Enhancing digital literacy & developing human resource competencies related to digital technologies & adaptation to digital transformation.

AHP Analysis

The next stage involves determining the priorities of each alternative strategy. The hierarchy is constructed by defining the goal as the digital transformation objective for MSME development strategies in Bekasi Regency, followed by the four perspectives of strengths, weaknesses, opportunities, and threats as criteria. Each internal and external factor serves as a sub-criterion. Meanwhile, the strategic outcomes outlined in the SWOT matrix are used as alternatives to be evaluated through pairwise comparison weighting in the AHP model. The SWOT matrix guides the development of MSMEs in formulating digital transformation strategies to enhance competitiveness.

Table 5. AHP Analysis

Criteria	Strategic Alternatives	Weights of Strategic Alternatives
Strengths	1 Optimizing Partnership Collaboration (SO1)	0,154
	2 Flexibility and Operational Efficiency (SO2)	0,038
	3 Managing Access to Financing & Digital Resources (SO3)	0,044
Weaknesses	1 Expanding Digital Infrastructure (WO1)	0,168
	2 Enhancing Digital Security (WO2)	0,135
Opportunities	1 Integrating The Digital Ecosystem (ST1)	0,115
	2 Implementing Technology Ethics in Digital Business (ST2)	0,075
Threats	1 Formulating Digital Regulations and Policies (WT1)	0,135
	2 Enhancing Digital Literacy of Human Resources (WT2)	0,135

The results of the pairwise (table 5) comparison calculations for strategic alternatives using the Analytic Hierarchy Process (AHP) indicate that expanding digital infrastructure, with a priority weight of 0.168, emerges as the primary focus for facilitating digital transformation in MSME development in Bekasi Regency. The dominance of this strategy underscores the critical role of technological accessibility in enabling digital adaptation among MSME actors. Enhancing infrastructure—such as extending internet networks, establishing digital service hubs, and providing affordable technological devices—lays the foundation for integrating MSMEs into a broader digital ecosystem. Adequate infrastructure not only supports more efficient operations but also enables MSMEs to harness data-driven technologies, e-commerce, and digital marketing tools effectively.

The second priority strategy, with a weight of 0.154, emphasizes optimizing digital partnership collaborations. This strategy highlights the importance of synergy among various stakeholders, including government bodies, private enterprises, technology providers, and educational institutions, to accelerate MSME digitalization. Collaborative efforts may encompass joint training programs, community-based platforms, and the development of tailored technological solutions to meet the specific needs of MSMEs. Effective partnerships can facilitate access to resources and knowledge, empowering MSMEs to strengthen their position in the increasingly competitive digital market.

Three strategies share the third priority position, each with a weight of 0.135: enhancing digital literacy among human resources, strengthening digital security, and formulating digital regulations and policies. Improving digital literacy is essential to ensure MSME actors acquire the skills necessary to utilize technology effectively. Competency-based training programs, workshops, and mentoring sessions can help MSMEs understand digital tools, manage online businesses, and analyse data for informed decision-making.

Simultaneously, strengthening digital security addresses the growing complexity of cybersecurity threats. Protecting business data, customer privacy, and digital transactions requires implementing robust security protocols. MSMEs need awareness of best practices for safeguarding digital assets, such as using multi-factor authentication, data encryption, and regular threat monitoring. In parallel, the formulation of digital policies provides a regulatory

framework to ensure organized, equitable, and sustainable digital transformation. These policies should include incentives for MSMEs to adopt digital technologies, data protection measures, and regulations that support innovation.

The fourth priority, integrating the digital ecosystem, with a weight of 0.115, plays a vital role despite its lower priority level. This strategy focuses on fostering integration among various elements of the digital ecosystem, including logistics, payments, marketing, and customer service. By creating a cohesive ecosystem, MSMEs can optimize relationships with business partners, simplify access to supply chains, and enhance customer experiences. This strategy also supports cross-sector collaboration to strengthen connections and synergies between MSME actors and the digital market.

The inconsistency value of 0.064 indicates that the calculations meet the consistency criteria, providing strong validity for the established priorities. This result confirms that the analysis can serve as a reliable foundation for designing an integrated digital transformation strategy. The proposed strategies complement one another, forming a holistic framework to support the sustainable development of MSMEs.

Overall, the AHP results offer clear strategic direction to advance MSME digital transformation in Bekasi Regency. By leveraging robust infrastructure, fostering close collaboration, enhancing human resource capacity, securing digital operations, implementing supportive policies, and integrating the digital ecosystem, MSMEs can thrive more inclusively. This approach is expected not only to enhance MSME competitiveness but also to drive inclusive and sustainable local economic growth, benefiting the broader community in Bekasi Regency.

Managerial Implications

In the context of digital transformation for MSMEs in Bekasi Regency, this study has demonstrated that integrating technology significantly enhances operational efficiency, market reach, and competitiveness. The findings highlight the importance of addressing internal and external factors, as analysed through SWOT and AHP methodologies, to ensure sustainable growth and inclusivity.

1. Optimization of Digital Infrastructure and Technical Support

- **Equitable Digital Infrastructure:** Bekasi Regency requires the development of fibre-optic-based internet networks across all districts, including underserved areas such as southern and rural regions. A digital technology-driven smart village program can be implemented in villages with high MSME concentrations but limited digital access. Spatial analysis underscores the regional disparities in technology adoption, necessitating targeted interventions to bridge the digital divide.
- **MSME Digitalization Centres:** Establish technical service centres tailored for MSMEs in each economic cluster, such as in Cikarang and Tambun. These centres should offer affordable software solutions for financial management, marketing, and logistics, enabling MSMEs to streamline operations and enhance their competitive advantage.

2. Cross-Sector Collaboration to Enhance Competitiveness

- **Multi-Stakeholder Synergy:** Local governments must establish integrated collaboration mechanisms with the private sector and financial institutions to drive investments in technological solutions tailored to the needs of MSMEs. This approach ensures that the technological advancements align with the operational and market requirements of these enterprises, fostering sustainable growth and innovation.
 - **Curated Digital Market Platforms:** Develop a localized e-commerce platform specifically designed for MSME products from Bekasi Regency, supported by efficient digital logistics systems. This initiative aims to overcome market access limitations and boost the competitiveness of local products in both national and international markets.
- 3. Enhancing Digital Literacy for MSME Actors**
- **Localized Needs-Based Training:** Implement training programs tailored to the specific needs of MSMEs in dominant sectors such as garment production, handicrafts, and processed foods within Bekasi Regency. The training should cover topics such as online marketing, application-based inventory management, and the use of production automation tools, ensuring practical and sector-relevant skill development.
 - **Partnerships with Higher Education Institutions:** Collaborate with universities in the Bekasi region to deliver digital mentoring programs for MSMEs. These initiatives can involve students serving as technology facilitators, bridging the gap between academic expertise and the technological needs of local enterprises.
- 4. Cross-Sector Collaboration to Enhance Competitiveness**
- **Multi-Stakeholder Synergy:** Local governments must establish integrated collaboration mechanisms involving the private sector and financial institutions to stimulate investments in technological solutions tailored to MSME needs. These collaborative efforts should align technological advancements with MSME operational priorities, fostering innovation and sustainable growth.
 - **Localized E-Commerce Platform:** Develop a curated e-commerce platform exclusively for MSME products from Bekasi Regency, supported by efficient digital logistics systems. This initiative aims to overcome market access limitations while enhancing the competitiveness of local products in both national and international markets.
- 5. Strengthening Regulations and Funding**
- **Tax Incentives and Digital Loans:** Provide tax incentives for MSMEs actively adopting digital technologies and expand access to technology-based financing programs through local fintech platforms. These measures can stimulate digital adoption while easing financial constraints.
 - **Digital Protection and Security:** Enhance regulations on data protection and digital security to mitigate the risks of fraud, which often hinder technology adoption among MSMEs.
- 6. Big Data-Based Monitoring and Evaluation Systems**
- **Big Data Utilization:** Develop big data-driven systems to monitor the effectiveness of MSME digitalization efforts, including real-time analysis

of MSME contributions to the Gross Regional Domestic Product (GRDP) of Bekasi Regency.

- **Inclusive Success Indicators:** Establish success indicators that include increased MSME contributions to GRDP, reduced digital divides across regions, and growth in the number of MSMEs leveraging digital technologies.

7. Long-Term Sustainability Strategies

- **Integration with RPJMD:** Digital transformation must be integrated into the Regional Medium-Term Development Plan (RPJMD), with specific indicators for the development of digitally empowered MSMEs that support inclusive growth.
- **Sustainability Commitment:** The Bekasi Regency government should allocate dedicated funds to ensure the sustainability of MSME digitalization programs, including periodic updates to technology infrastructure and ongoing technical support.

This combination of policies reflects a holistic approach that not only addresses technical challenges but also establishes a sustainable digital ecosystem to support inclusive growth in Bekasi Regency

CONCLUSIONS AND RECOMMENDATIONS

1. The findings of this study emphasize the critical role of digital transformation in advancing MSMEs in Bekasi Regency to achieve inclusive economic growth. SWOT analysis identified several strengths, such as the increasing number of MSMEs and supportive government policies, alongside weaknesses like insufficient technological infrastructure in certain areas and low levels of digital literacy among MSME actors. Opportunities include the rapid development of digital technologies and expanding access to global markets, counterbalanced by threats such as regulatory shifts and intensified competition in the digital space. Using the AHP method, priority strategies were formulated, including enhancing technological infrastructure, implementing comprehensive digital literacy training, and fostering cross-sectoral collaboration.
2. Spatial analysis revealed that digital readiness among MSMEs in Bekasi Regency is predominantly concentrated in regions with superior access to technological infrastructure, providing them with a significant advantage in leveraging digital tools for business operations. Conversely, areas with inadequate infrastructure exhibit lower levels of digital readiness, underscoring the urgent need for governmental intervention. Investments in digital infrastructure and capacity-building programs are essential to address these disparities. The integration of SWOT and AHP methodologies highlights the necessity of a holistic approach to ensure equitable access to digital technologies for all MSMEs, regardless of geographical location.
3. The policy implications of this research are profound. Government incentives for MSMEs adopting digital technologies and the development of a robust digital ecosystem through partnerships with the private sector and local communities are imperative. Moreover, sustained digital literacy training programs and the extension of reliable internet access to remote areas should be prioritized to promote inclusive digital transformation.

These strategies are expected to significantly enhance MSME competitiveness, create job opportunities, and ultimately foster equitable economic growth across Bekasi Regency.

Recommendations

1. **Strengthen Digital Infrastructure:** Prioritize investments in broadband internet and other technological infrastructure, particularly in underdeveloped regions, to bridge the digital divide and enhance MSME access to technology.
2. **Enhance Digital Literacy Programs:** Implement continuous and scalable training initiatives to build digital competencies among MSME owners and workers. This includes workshops, online courses, and support services tailored to the needs of various industries.
3. **Promote Cross-Sector Collaboration:** Establish partnerships between government bodies, private companies, and local communities to create an integrated digital ecosystem. These collaborations should focus on resource sharing, mentorship, and technological innovation.
4. **Provide Incentives for Digital Adoption:** Develop fiscal and non-fiscal incentives for MSMEs transitioning to digital operations, such as tax breaks, subsidized technology costs, and recognition programs for digitally adept businesses.
5. **Monitor and Evaluate Implementation:** Establish a robust monitoring and evaluation framework to track the effectiveness of digital transformation strategies, ensuring adaptability to emerging challenges and opportunities.
6. By adopting these recommendations, policymakers and stakeholders can create a conducive environment for MSMEs to thrive in the digital era, enhancing their contribution to inclusive and sustainable economic development.

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