

Enhancing MSME Performance Through Customer Centered Design and Competitive Intelligence

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ABSTRACT

This study examines the impact of customer centered design and competitive strategy on the business performance of Micro, Small, and Medium enterprises (MSMEs) in the technology and manufacturing sectors, with a focus on Bekasi Regency, Indonesia. Through a **mixed methods approach**, the research integrates strategic absorptive capacity and competitive intelligence as mediators to explore how these factors influence business performance. The results indicate that customer experience management significantly enhances strategic absorptive capacity, which, in turn, positively impacts competitive intelligence and business performance. However, product development capability was found to have no direct effect on strategic absorptive capacity. The **findings** highlight the importance of developing strategic absorptive capacity to effectively utilize customer insights and market trends, thereby improving business competitiveness. The study provides valuable insights for MSMEs owners and managers, especially in rapidly developing regions, offering practical recommendations for building capabilities that foster sustainable growth and market adaptability. These findings contribute to the theoretical understanding of innovation management and competitive strategy in MSMEs.

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1. INTRODUCTION

In this fast moving era of globalization, the business world especially in the technology sector faces increasingly complex challenges and opportunities [1]. Rapid technological advancements and the growth of digital platforms have significantly changed both consumer behavior and how companies compete in the global market [2]. One key factor contributing to a company's success is its ability to integrate customer centered design with sustainable competitive strategies [3]. Empirical evidence suggests that firms effectively integrating design innovation with competitive intelligence tend to demonstrate stronger business performance, particularly in terms of market responsiveness, customer retention, and long term profitability.

Innovation management and competitive strategy theories play a crucial role in helping companies achieve superior business performance [4]. Along with the development of these theories, concepts such as design thinking and competitive analysis have evolved to provide deeper insights into how businesses can meet customer needs while staying competitive in the global market [5]. The theory of competitive advantage

suggests that integrating innovation strategies with customer experience management can create a sustainable edge over competitors. However, despite the extensive discussion around these concepts, many companies still struggle with how to implement such strategies effectively to improve their actual business performance [6].

Globally, several leading technology firms have demonstrated that customer focused product design and advanced technological integration can significantly enhance business outcomes, including innovation performance, market expansion, and competitive positioning [7]. The main challenge, however, lies in how these best practices can be adapted by smaller scale businesses across different industries particularly within MSMEs [8]. For instance, in Bekasi Regency an area known for its rapidly growing MSMEs sector the implementation of these innovative strategies remains limited, despite the sectors strong potential to boost competitiveness both in domestic and global markets [9].

There is a clear research gap few studies have explored in depth how the integration of customer centered design and competitive strategy affects business performance, especially in the MSME sector [10]. Most existing research focuses on large corporations or does not analyze the relationship between these elements within local or small scale business contexts [11]. Therefore, it is important to investigate whether such strategies can be adapted and applied effectively in smaller contexts, and whether they can still lead to significant performance improvements.

Recent studies in innovation management focus on large or digitally mature firms in developed economies, which differ from MSMEs in emerging countries [12]. While customer-centered design and competitive intelligence have been studied individually, limited research integrates them into a strategic capability framework for MSME performance. In Indonesia, MSMEs face limited innovation resources, low market intelligence accessibility, and rely on adaptive customer relationship strategies [13]. This study addresses this gap by examining strategic absorptive capacity and competitive intelligence as mediating mechanisms linking customer-oriented and product development capabilities to MSME business performance [14].

Unlike previous global studies that generally examine innovation capability, customer orientation, and market competitiveness as separate strategic dimensions, this study proposes an integrated framework linking Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, and Competitive Intelligence within a unified MSMEs business performance model. This framework offers theoretical advancement by explaining how internal customer oriented and innovation driven capabilities are transformed into external competitive outcomes through absorptive learning and strategic intelligence processes [15]. In doing so, the study fills an important gap in MSMEs strategic management literature by providing empirical evidence from Indonesia, an emerging market context that remains relatively underrepresented in global innovation and competitive strategy research [16].

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This study contributes to the existing literature by extending Customer Experience Management and Strategic Absorptive Capacity theories into the MSMEs strategic performance context. Unlike previous studies that mainly examined these constructs independently, this research integrates customer oriented capability, absorptive learning, and competitive intelligence into a unified strategic framework to explain MSMEs business performance in emerging economies.

This study examines the influence of integrating customer-focused design and competitive strategy on

MSME business performance, focusing on technology and manufacturing sectors [17]. Theoretically, it contributes to innovation management and competitive strategy for MSMEs. Practically, it provides guidance for MSME owners and managers in Bekasi Regency and other regions on designing strategies to enhance competitiveness and business performance [18]. By understanding the relationship between customer-centered design and competitive strategy, businesses can develop approaches to meet market needs, strengthen competitiveness, and sustain operations in a technology-driven global environment [19].

Furthermore, implementing these strategies not only improves business performance but also supports local economic development. Bekasi Regency, as an industrial growth hub, has potential to strengthen its MSMEs through innovation and enhanced customer experience [20]. This research benefits local industries and can guide future regional economic policies [21]. Customer-centered innovation and competitive intelligence contribute to regional development, global competitiveness, and sustainable industrial transformation. These strategies align with SDGs 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation, and Infrastructure), enabling MSMEs to promote inclusive growth and resilient business ecosystems in emerging economies like Indonesia [22].

From a methodological perspective, this study applies Structural Equation Modeling (SEM) to examine the complex relationships among Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, Competitive Intelligence, and Business Performance. The integration of Strategic Absorptive Capacity and Competitive Intelligence within the SEM framework provides a more comprehensive understanding of how internal strategic capabilities influence MSMEs competitiveness and long term business sustainability. This study employs a quantitative research approach using primary survey data collected from MSMEs actors in Bekasi Regency. The use of Structural Equation Modeling (SEM) enables a more objective and comprehensive examination of the relationships among Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, Competitive Intelligence, and Business Performance. By empirically testing these relationships, this study provides stronger evidence regarding how integrated strategic capabilities can enhance MSME competitiveness and long term business sustainability.

2. LITERATURE REVIEW

2.1. Customer Experience Management and Strategic Absorptive Capacity

Customer Experience Management (CEM) is an important strategy for understanding customer needs and improving organizational learning within SMEs [23]. Customer interactions provide external knowledge that supports Strategic Absorptive Capacity (SAC), namely the ability to identify, assimilate, and apply strategic information for competitive advantage [24]. Previous studies indicate that effective CEM increases organizational sensitivity toward market changes and accelerates strategic decision making processes [25]. Based on this understanding, the following hypothesis is proposed:

H1: Customer Experience Management has a positive influence on Strategic Absorptive Capacity.

2.2. Product Development Capability and Strategic Absorptive Capacity

Product Development Capability reflects a firm's ability to design and develop products according to market demands [26]. This capability encourages firms to utilize external knowledge such as customer preferences, market trends, and technological developments, which are closely related to Strategic Absorptive Capacity [27]. Strong product development capability improves strategic learning and knowledge utilization. Therefore, the following hypothesis is proposed:

H2: Product Development Capability has a positive influence on Strategic Absorptive Capacity.

2.3. Product Development Capability and Competitive Intelligence

Competitive Intelligence (CI) refers to the process of collecting and analyzing market and competitor information to support strategic decision making [28]. Product development requires firms to monitor competitors, technology, and customer expectations [29]. Accordingly, the following hypothesis is proposed:

H3: Product Development Capability has a positive influence on Competitive Intelligence.

2.4. Strategic Absorptive Capacity and Competitive Intelligence

Strategic Absorptive Capacity enables organizations to recognize, assimilate, and utilize external knowledge effectively. Firms with high absorptive capacity can process strategic information more efficiently, resulting in stronger Competitive Intelligence and better strategic responses to market dynamics. Therefore,

the following hypothesis is proposed:

H4: Strategic Absorptive Capacity has a positive influence on Competitive Intelligence.

2.5. Competitive Intelligence and Business Performance

Competitive Intelligence helps firms understand market trends, customer behavior, and competitor strategies, enabling organizations to formulate more adaptive business strategies. Previous studies show that effective intelligence utilization improves SME performance. Thus, the following hypothesis is proposed:

H5: Competitive Intelligence has a positive influence on Business Performance.

2.6. Strategic Absorptive Capacity and Business Performance

Strategic Absorptive Capacity contributes to organizational learning, innovation, and strategic adaptability, which are essential for improving business performance in SMEs. Effective integration of external knowledge improves competitiveness and sustainability. Therefore, the following hypothesis is proposed:

H6: Strategic Absorptive Capacity has a positive influence on Business Performance.

2.7. Customer Experience Management as a Mediator between Strategic Absorptive Capacity and Business Performance

Customer Experience Management can mediate the relationship between Strategic Absorptive Capacity and Business Performance by transforming external knowledge into customer oriented strategies and service improvements. Positive customer experiences contribute significantly to customer satisfaction and organizational competitiveness. Accordingly, the following hypothesis is proposed:

H7: Customer Experience Management mediates the relationship between Strategic Absorptive Capacity and Business Performance.

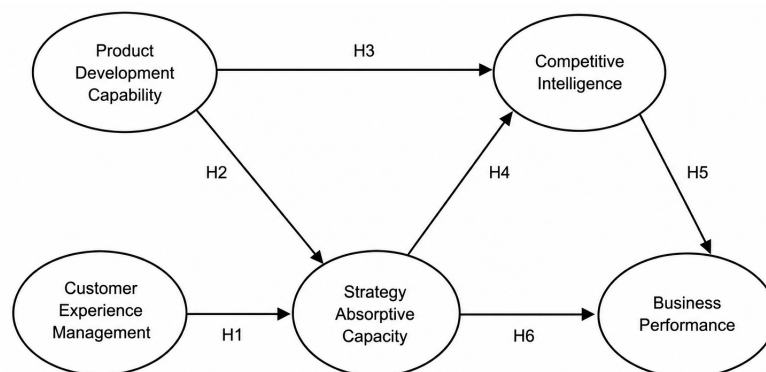


Figure 1. Theoretical Framework

Figure 1 presents the conceptual framework of this study, showing hypothesized relationships among Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, Competitive Intelligence, and Business Performance. Customer Experience Management and Product Development Capability act as exogenous variables influencing Strategic Absorptive Capacity and Competitive Intelligence, which in turn affect Business Performance. The model also highlights the mediating role of Strategic Absorptive Capacity and Competitive Intelligence, forming the theoretical basis for the SEM analysis.

3. METHOD

3.1. Research Methodology and Measurement

This study employs a quantitative survey approach to examine the relationships among the proposed variables. Data were collected from 662 MSMEs respondents in the technology sector located in Bekasi Regency, West Java, using purposive sampling techniques. The sample size is considered sufficient for Structural Equation Modeling (SEM) analysis. The research instrument used a 10 point Likert scale ranging from 1 (strongly disagree) to 10 (strongly agree). Customer Experience Management was measured through customer feedback integration and service improvement practices, while Product Development Capability was assessed

through product innovation and market adaptation indicators. Business Performance was evaluated using sales growth and profitability indicators.

3.2. Measurement of Variables

To measure the variables in this study, we used a survey instrument based on a 10 point Likert scale, ranging from 1 (Strongly Disagree/Highly Irrelevant) to 10 (Strongly Agree/Highly Relevant). This scale allows respondents to provide more precise and nuanced assessments. Customer Centric Design, the main independent variable, is measured by the extent to which the company integrates customer feedback, personalizes products, and pursues continuous improvement. Sample questions include Does the company regularly collect and analyze customer feedback and Does the design of products or services reflect customer needs

Competitive Strategy, another independent variable, is assessed through the companys ability to differentiate itself from competitors, achieve cost advantages, and focus on specific market segments. For example, we asked Does the company have a clear strategy to differentiate its products and Does the company regularly monitor competitors strategies Sales Growth, as a dependent variable, is evaluated based on the increase in sales volume and market share expansion. Example questions include Has the company experienced a significant increase in sales over the past 12 months and Has the market share shown steady growth

Profitability, the final dependent variable, is measured using financial performance indicators such as net profit margin and Return on Investment (ROI). Sample questions are Has the company consistently increased its net profit and is the profit margin higher than the industry average. All items in this instrument were carefully designed to ensure they are relevant and comprehensive in measuring each concept within the research model. The data collected from this questionnaire will serve as the basis for quantitative analysis using Structural Equation Modeling (SEM). SEM was considered appropriate for this study because it allows simultaneous testing of direct and indirect relationships among multiple latent variables within a unified analytical framework. Compared to conventional regression methods, SEM provides stronger capability for evaluating mediating effects and overall model fit in complex strategic relationship models.

3.3. Validity and Reliability Testing

Validity testing was conducted using Confirmatory Factor Analysis (CFA). Indicators were considered valid if the factor loading and Average Variance Extracted (AVE) values exceeded 0.5. Reliability testing used Cronbach's Alpha and Composite Reliability (CR), with acceptable values above 0.7. These procedures ensure the consistency and accuracy of the measurement model used in this study.

- Construct validity was assessed based on the factor loading values of each item. An item is considered valid if it has a loading value greater than 0.5.
- Convergent validity was evaluated using the Average Variance Extracted (AVE). The AVE value should be greater than 0.5 ($AVE > 0.5$). If any item fails to meet this requirement, it will be removed from the model to ensure that each construct accurately represents its underlying latent variable.

Next, this study conducted a reliability test to examine the internal consistency of each construct, ensuring survey items were coherent and consistently reflected the underlying variables. This process identifies weak items, confirms measurement stability across respondents, and strengthens the overall trustworthiness and accuracy of the data.

- Reliability was tested using Cronbachs Alpha and Composite Reliability (CR).
- A construct is considered reliable if Cronbachs Alpha is greater than 0.7 ($\alpha > 0.7$) and Composite Reliability is also greater than 0.7 ($CR > 0.7$).

These tests are crucial to ensure that the research findings are not only valid accurately measuring the intended phenomena but also reliable and consistent, so the results can be trusted and reproduced in future studies. Assessing validity and reliability helps identify potential measurement errors or biases, strengthening the studys overall integrity. High construct validity ensures indicators reflect the underlying latent variables, while strong reliability indicates consistent results across samples. This dual verification supports confident data interpretation, robust theoretical analysis, and enhances the credibility and generalizability of the findings for both academic and practical applications.

Table 1. Measurement of Loading Factors, Validity, and Reliability

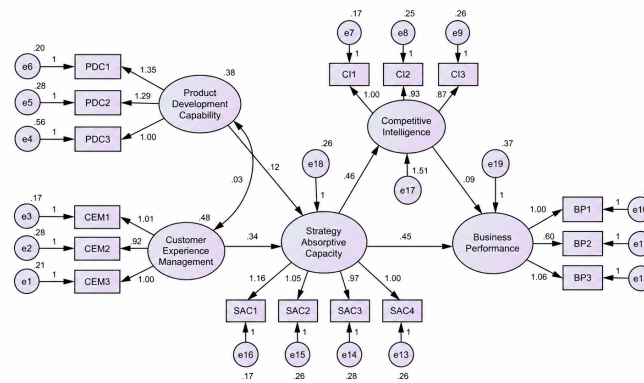
Variable & Indicator	Scale Item	Reference	Std. Loading (Lambda Value)	Critical Ratio ≥ 1.96
Customer Experience Management				
	- Convergent Validity – AVE = ?	[30]		
	- Construct Reliability – CRI = ?	[31]		
Personalization of Service	I actively collect data on my customers preferences and purchase history to provide more personalized service.	[32] [33]	0.700	6.019
Customer Journey Mapping	I have a clear understanding of each stage of the customer journey, from initial product awareness to the point of purchase.		0.700	6.019
Multichannel Engagement	I use multiple platforms (e.g., social media, e-commerce, and physical stores) to sell products and interact with customers.		0.700	6.019
Strategy Absorptive Capacity				
	- Convergent Validity – AVE = ?	[34]		
	- Construct Reliability – CRI = ?	[35]		
Knowledge Acquisition	I regularly engage in discussions with fellow MSME actors to gain new insights.	[36]	0.700	6.019
Knowledge Assimilation	I frequently reflect on how new knowledge can be applied to my business.		0.700	6.019
Knowledge Transformation	I am capable of adapting and modifying external knowledge to align with my business’s unique needs.		0.700	6.019
Knowledge Exploitation	The knowledge I have applied has yielded tangible benefits, such as increased sales or reduced costs.		0.700	6.019
Product Development Capability				
	- Convergent Validity – AVE = ?	[37]		
	- Construct Reliability – CRI = ?	[38]		
Product Design	The design of my product provides added value that differentiates it from competitors’ products.	[39]	0.700	6.019
Prototype Testing	I test the prototype to ensure its quality and functionality.		0.700	6.019
Innovation in Materials	I use innovative raw materials to create unique products.		0.700	6.019
Competitive Intelligence				
	- Convergent Validity – AVE = ?	[40]		
	- Construct Reliability – CRI = ?	[41]		
Competitor Analysis	I understand the strengths and weaknesses of competitors’ products or services compared to my business.	[42] [43]	0.700	6.019
Market Research	I use the results of market research to develop products or services that align with customer demand.		0.700	6.019
Industry Trend Monitoring	I apply relevant trends to update my products, services, or business strategies.		0.700	6.019
Business Performance				
	- Convergent Validity – AVE = ?	[44]		
	- Construct Reliability – CRI = ?	[45]		
Financial Performance	I make business decisions based on financial data and analysis, not just estimates.	[46]	0.700	6.019

Variable & Indicator	Scale Item	Reference	Std. Loading (Lambda Value)	Critical Ratio ≥ 1.96
Return on Investment (ROI)	I always consider the potential significant investments or expenditures.		0.700	6.019
Profitability	I have a clear strategy for increasing my business's profitability		0.700	6.019
Goodness of Fit Test				
Chi-square / DF = 61 at $\alpha = 0.05$ / CMIN Significance		41.159 ≥ 0.05	1.49 0.069	Fit Fit
The goodness of Fit Index		≥ 0.90	0.975	Fit
The Adjusted Goodness of Fit Index		≥ 0.90	0.965	Fit
Comparative Fit Index		≥ 0.90	0.990	Fit
Tucker Lewis Index		≥ 0.90	0.988	Fit
RMSEA-Root Mean Square Error of Approximation		≤ 0.08	0.027	Fit
Source: SEM Output using AMOS Version 24				

Table 1 presents the measurement model evaluation, including standardized loading factors, convergent validity, and construct reliability for each variable [47]. All indicator items exceed the 0.70 loading threshold and 1.96 critical ratio, confirming validity [48]. Construct reliability and convergent validity indicate all constructs are reliable and suitable for SEM analysis, representing the relationships among Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, Competitive Intelligence, and Business Performance [49].

4. RESULTS AND DISCUSSION

Structural Equation Modeling (SEM) analysis shows that product development capability and customer experience management do not directly affect business performance, as their effects are fully mediated by strategic absorptive capacity and competitive intelligence [50]. Strong model fit indicators confirm alignment between the theoretical model and the data. Customer experience management enhances strategic absorptive capacity, which strengthens competitive intelligence and ultimately improves business performance, while product development capability does not significantly relate to strategic absorptive capacity [51]. Overall, improving business performance requires channeling internal capabilities through strategic mechanisms. Companies should develop strategic absorptive capacity to acquire, assimilate, and apply external knowledge, leveraging it to enhance competitive intelligence. This approach transforms investments in customer experience and product development into competitive advantages and sustainable outcomes, providing a practical guide for navigating complex markets [36].



Chi-square (χ^2) = 148.483; Probability (p) = .001; CMIN/DF = 1.515; RMSEA = .028; GFI = .973; AGFI = .962; TLI = .987; CFI = .989; AIC = 224.483; BIC = 395.303; ECVI = .340

Figure 2. Structural Model Based on SEM Analysis

Figure 2 illustrates the structural relationship among Customer Experience Management, Product Development Capability, Strategic Absorptive Capacity, Competitive Intelligence, and Business Performance within the proposed SEM framework [52]. The directional paths shown in the model directly correspond to hypotheses H1 through H7, where each arrow represents the hypothesized causal relationship between constructs [53]. The standardized path coefficients provide empirical evidence regarding the strength and significance of each relationship, while the mediating pathways highlight the indirect strategic mechanisms through which customer oriented capability and product development capability influence business performance [54]. Therefore, Figure 2 serves not only as a visual representation of the conceptual model but also as an empirical confirmation of the theoretical relationships tested in this study. Table 2 presents the results of the standardized structural coefficients [55].

Table 2. Hypothesis Testing

Hypothesis Variable	Standardized Estimate	Estimate	S.E.	C.R.	P	Conclusion
H1 : Customer Experience Management → Strategy Absorptive Capacity	660	660	660	8.159	***	Supported
H2 : Product Development Capability → Strategy Absorptive Capacity	099	465	465	5.662	***	Supported
H3 : Product Development Capability → Competitive Intelligence	357	357	357	6.105	***	Supported
H4 : Strategy Absorptive Capacity → Competitive Intelligence	602	602	602	9.346	***	Supported
H5 : Competitive Intelligence → Business Performance	465	465	465	5.662	***	Supported
H6 : Strategy Absorptive Capacity → Business Performance	443	443	443	5.484	***	Supported
H7 : Customer Experience Management → Strategy Absorptive Capacity → Business Performance	0.145	0.16	0.029	5.523	***	Mediated

Source: SEM Output using AMOS Version 24.

Table 2 based on the findings of this study, most of the proposed hypotheses were supported. Six out of seven tested hypotheses showed strong and significant relationships among the key variables. Only one hypothesis H2 was rejected [56]. This hypothesis proposed that Product Development Capability positively influences Strategic Absorptive Capacity however, the relationship was found to be statistically insignificant among MSMEs. The rejection of Hypothesis H2 indicates that Product Development Capability alone may not be sufficient to strengthen Strategic Absorptive Capacity within MSMEs. In many MSMEs contexts, product development activities are often operationally oriented and primarily focused on short term market adaptation rather than systematic knowledge acquisition and strategic learning processes [57]. Limited organizational resources, insufficient technology integration, and restricted access to external strategic information may reduce the ability of MSMEs to transform product development activities into broader absorptive learning capabilities [58]. Therefore, the findings suggest that product development initiatives must be supported by stronger organizational learning mechanisms and knowledge management practices to effectively contribute to Strategic Absorptive Capacity [59].

On the other hand, one of the most important findings highlights the crucial role of Strategic Absorptive Capacity [60]. Hypothesis H7 demonstrated that this capability acts as a mediator between Customer Experience Management and Business Performance. The findings suggest that Customer Experience Management contributes to business performance indirectly through the companys enhanced ability to absorb and apply strategic knowledge. The better a company becomes at understanding and utilizing new information, the greater its impact on business performance. Additionally, the study revealed significant relationships among several other variables. Customer Experience Management was found to have a significant influence on Strate-

gic Absorptive Capacity (H1). A positive relationship was also observed between Competitive Intelligence and Business Performance (H5), as well as between Strategic Absorptive Capacity and Business Performance (H6). In summary, this research highlights the importance of the interaction among various strategic elements in enhancing overall business performance.

5. MANAGERIAL IMPLICATIONS

This study has significant theoretical implications by enriching the literature on innovation management and competitive strategy, particularly within the context of MSMEs. The findings emphasize that internal capabilities such as customer experience management and product development do not directly enhance business performance. Instead, their impact is mediated by strategic absorptive capacity and competitive intelligence. This highlights the critical role of strategic absorptive capacity as a bridge that transforms internal knowledge into competitive advantage. From a practical standpoint, this study offers concrete strategic guidance for MSMEs owners and managers, especially in the Bekasi Regency. To improve business performance, the focus should not only be on core capabilities but also on the processes that enable MSMEs to absorb, analyze, and utilize information gained from customer experiences and product development initiatives.

The study recommends that MSMEs shift their investment priorities. Rather than concentrating solely on product development or customer experience programs, resources should be allocated to building and strengthening strategic absorptive capacity. This can be achieved by training employees in data analysis, adopting information technologies, and fostering an organizational culture that encourages knowledge sharing and continuous learning. Furthermore, investment in competitive intelligence is essential. MSMEs are advised to systematically gather information about competitors, market trends, and customer preferences. By doing so, they can make more accurate, responsive, and adaptive strategic decisions in response to the constantly changing market dynamics. For future research, it is recommended to broaden the scope of study to include other industrial sectors beyond technology and manufacturing, to assess whether the findings remain consistent. Additionally, qualitative or mixed method approaches could be used to explore the underlying mechanisms behind the relationships identified in this study. For example, in depth case studies could provide richer insights into how MSMEs actually build strategic absorptive capacity and competitive intelligence in their day to day operations.

6. CONCLUSIONS


This study confirms that Customer Experience Management significantly strengthens Strategic Absorptive Capacity, which subsequently enhances Competitive Intelligence and Business Performance among MSMEs. The findings reveal that business performance improvement is not generated directly through customer oriented initiatives or product development alone, but through the organizations capability to absorb external knowledge, transform it into strategic insight, and utilize competitive intelligence for adaptive decision making. These results contribute theoretically by reinforcing the strategic role of absorptive learning and market intelligence within MSMEs development, while practically encouraging managers to institutionalize customer feedback systems, strengthen internal knowledge sharing mechanisms, and develop continuous market monitoring practices. Despite these contributions, this study is limited by its cross sectional design and reliance on self reported survey data, which may restrict stronger causal interpretation.

The use of cross sectional data may introduce temporal bias because the relationships among variables are measured at a single point in time, making it difficult to fully capture dynamic organizational capability development processes. Nevertheless, Structural Equation Modeling (SEM) was selected because it enables simultaneous examination of multiple complex relationships among latent constructs and provides stronger explanatory power for mediation analysis compared to conventional regression approaches. While longitudinal methods may offer deeper insights into causal changes over time, SEM remains appropriate for validating the integrated strategic capability framework proposed in this study within the MSMEs context.

Future research is encouraged to apply longitudinal approaches and broader industrial contexts to validate and extend the generalizability of these findings. These findings also highlight the broader contribution of MSMEs strategic capability development toward achieving sustainable economic growth and fostering innovation driven industrial resilience, in line with SDGs 8 and SDGs 9.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: SY and ES; Methodology: SY and AP; Software: AP; Validation: ES and AP; Formal Analysis: SY and ES; Investigation: SY; Resources: ES; Data Curation: AP; Writing Original Draft Preparation: SY; Writing Review and Editing: ES and AP; Visualization: AP. All authors, SY, ES, and AP, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

Data supporting this study are openly available from Zenodo at <https://doi.org/10.5281/zenodo.20077697>.

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7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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