

Digital Transformation Capability and Artificial Intelligence Adoption: Investigating Their Effects on Organizational Resilience and Sustainable Business Performance in the Manufacturing Industry

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Abstract

This study examines the effects of digital transformation capability and artificial intelligence adoption on organizational resilience and sustainable business performance in the manufacturing industry. Using a quantitative explanatory design, data were collected through structured questionnaires and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that digital transformation capability positively strengthens organizational resilience by improving process integration, information visibility, organizational flexibility, and data-driven decision-making. Artificial intelligence adoption also contributes significantly to resilience through predictive analytics, automation, risk detection, and faster managerial responses to operational disruptions. Furthermore, organizational resilience exerts a positive influence on sustainable business performance by supporting operational continuity, innovation, resource efficiency, economic stability, and long-term competitiveness. These results highlight organizational resilience as a strategic mechanism through which digital and AI capabilities generate sustainable organizational value. The study contributes to the literature by integrating technological capability, resilience, and sustainability within a unified manufacturing framework. Managerially, the findings suggest that manufacturers should align digital infrastructure, AI implementation, employee competencies, and adaptive capabilities to strengthen resilience and achieve sustainable performance under increasingly dynamic and technology-intensive competitive business environments.

Keywords: digital transformation capability, artificial intelligence adoption, organizational resilience, sustainable business performance, manufacturing industry.



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INTRODUCTION

The manufacturing industry is experiencing substantial changes associated with the increasing integration of digital technologies, artificial intelligence, data analytics, cloud computing, and interconnected production systems. These developments have altered organizational requirements for operational coordination, strategic decision-making, and responses to technological and market uncertainty. Within Industry 4.0 and the transition toward Society 5.0, manufacturing firms face growing pressure to integrate technological resources with organizational processes and workforce competencies to maintain adaptability and competitive performance (Hariyono et al., 2024; Widyoputri & Avitasari, 2026). Evidence from Indonesian manufacturing indicates that digital transformation is associated with operational efficiency, process integration, productivity, and organizational responsiveness, although these outcomes depend on the organizational conditions surrounding technological implementation (Djatkika, 2025). Understanding the relationships between technological capabilities, organizational resilience, and sustainable business performance consequently requires attention to the organizational processes through which digital resources are developed and utilized.

Dynamic Capabilities Theory provides a theoretical foundation for examining these relationships by emphasizing organizational capacities to identify environmental changes, mobilize strategic opportunities, and reconfigure resources under changing conditions. Within this perspective, digital transformation capability represents an integrative organizational capacity encompassing

technological infrastructure, digital process integration, digital leadership, employee competencies, and data-driven decision-making. Its analytical emphasis concerns the organization's ability to coordinate and reconfigure digital resources across functional boundaries rather than the adoption of particular technological applications. Rizana et al. (2025) identify digital transformation as a multidimensional organizational capability involving technological, strategic, human, and organizational components. The relevance of this perspective to manufacturing resilience is supported by Pertheban et al. (2023), who associate proactive resilience strategies and dynamic organizational capabilities with manufacturing performance. Digital transformation capability can accordingly be conceptualized as an organizational foundation for information processing, resource coordination, and adaptive responses to operational uncertainty. These characteristics distinguish the broader organizational capability from the implementation of individual digital technologies.

Artificial intelligence adoption constitutes a related but conceptually distinct dimension of technological development. Whereas digital transformation capability concerns the organizational capacity to integrate and manage digital resources, artificial intelligence adoption refers more specifically to the implementation and utilization of AI-based systems for analytical, predictive, automated, and decision-support activities. The distinction lies in the scope of the constructs: digital transformation capability captures organizational integration and reconfiguration, while AI adoption concerns the operational deployment of technologies capable of supporting algorithmic analysis and automated decision processes. Agrawal et al. (2024) explain that organizational AI adoption involves complementary adjustments in structures, routines, competencies, and decision-making arrangements rather than isolated technological substitution. Empirical research associates AI-based innovation with improved supply chain visibility, operational responsiveness, and organizational performance (Belhadi et al., 2024). Evidence from manufacturing SMEs also links AI capabilities with supply chain risk identification and management (Dey et al., 2024), while He et al. (2025) identify relationships between artificial intelligence and manufacturing industry chain resilience. Although AI implementation may occur within broader digital transformation initiatives, organizational readiness to integrate digital resources does not necessarily indicate equivalent levels of AI utilization. The two constructs are therefore analytically distinguishable, while their potential empirical overlap remains relevant to measurement and model assessment.

Organizational resilience represents an organizational capacity through which the relevance of these technological dimensions can be examined under conditions of disruption and uncertainty. It encompasses the ability to anticipate potential threats, absorb operational disturbances, adjust organizational resources, maintain essential functions, and recover from adverse conditions. From a dynamic capabilities perspective, resilience reflects the adaptive application of organizational resources rather than the possession of technological infrastructure alone. Digital systems may support this capacity through improved information availability, cross-functional coordination, and resource visibility, whereas AI applications provide additional analytical capabilities relevant to forecasting, risk detection, and operational responses. Rashid et al. (2024) associate cloud technology and artificial intelligence with resilience in manufacturing supply chains, while Wahyani and Sain (2025) emphasize the contribution of AI-related capabilities to industrial supply chain resilience. Zhang et al. (2024) further identify innovation resilience as an organizational construct associated with digital intelligence transformation and firm performance. These findings provide a theoretical basis for examining digital transformation capability and AI adoption as separate antecedents of organizational resilience, without presuming that their respective contributions are identical.

Sustainable business performance extends the organizational assessment beyond immediate operational efficiency to encompass economic continuity, resource utilization, innovation, environmental responsibility, and longer-term competitive outcomes. The multidimensional character of this construct requires recognition that improvements in operational or financial performance do not necessarily establish equivalent improvements across all sustainability dimensions. Li and Jin (2024) associate artificial intelligence adoption with corporate sustainability performance while emphasizing the relevance of organizational adjustments accompanying technological implementation. Sabău-Popa et al. (2026) similarly position digitalization and artificial intelligence within sustainability-oriented organizational transformation under Industry 4.0. Research addressing digital business sustainability and organizational performance also identifies the importance of aligning technological development with strategic and operational objectives (Wibowo, 2024; Siagian

et al., 2026). Organizational resilience is theoretically relevant to this relationship because the capacity to maintain operational continuity, reallocate resources, and respond to disturbances may be associated with greater stability in organizational performance. Nevertheless, resilience and sustainable business performance represent distinct constructs: the former concerns organizational responses to uncertainty, whereas the latter concerns the economic, operational, environmental, and competitive outcomes associated with organizational activities.

Existing research provides substantial evidence concerning individual relationships among digital transformation, artificial intelligence, resilience, and organizational performance, but important questions remain regarding their integration within manufacturing organizations. Djatmika (2025) examines digital transformation in relation to operational improvements, while Belhadi et al. (2024) investigate AI-related innovation and supply chain resilience. Li and Jin (2024) address artificial intelligence and corporate sustainability, and Zhang et al. (2024) connect digital intelligence transformation with innovation resilience and firm performance. Although these contributions establish relevant theoretical and empirical foundations, their respective analytical emphases leave room for further examination of how broad digital transformation capability differs from the specific adoption of artificial intelligence when both are considered within the same organizational framework. The distinction is important because conceptual overlap between technological constructs may obscure their separate statistical relationships with resilience. A further issue concerns the relationship between organizational resilience and sustainable business performance, particularly when sustainability encompasses heterogeneous economic, operational, innovation, and environmental dimensions. The research gap therefore concerns the joint assessment of these conceptually related constructs, the differentiation of their respective technological dimensions, and the positioning of organizational resilience within an integrated framework of manufacturing performance.

The proposed analytical framework applies Dynamic Capabilities Theory to distinguish organizational resource integration, technology-specific implementation, adaptive capacity, and sustainable performance outcomes. Digital transformation capability is positioned as a broad organizational capability associated with the coordination and reconfiguration of digital resources, while artificial intelligence adoption represents the application of AI technologies to organizational activities involving information processing, prediction, automation, and decision support (Agrawal et al., 2024; Rizana et al., 2025). Organizational resilience is examined as an adaptive organizational capability associated with both technological constructs and with sustainable business performance. Its position in the framework reflects a theoretically proposed intervening mechanism rather than an assumption that statistical mediation has already been established. This formulation is consistent with evidence concerning digital transformation, manufacturing resilience, and longer-term organizational performance (Alquraish, 2025; Suarantalla, 2026). The principal contribution lies in examining the relationships among two analytically differentiated technological constructs, organizational resilience, and multidimensional sustainable business performance within a single manufacturing framework, rather than treating technological maturity as a homogeneous organizational characteristic.

This study investigates the relationships of digital transformation capability and artificial intelligence adoption with organizational resilience, together with the relationship between organizational resilience and sustainable business performance in the manufacturing industry. Specifically, the analysis examines whether digital transformation capability and AI adoption are positively associated with organizational resilience and whether higher organizational resilience is associated with stronger sustainable business performance. The research also considers organizational resilience as a theoretically relevant connection between technological capabilities and performance, while distinguishing the conceptual interpretation of this relationship from the statistical evidence required to establish an indirect effect. The resulting framework extends the application of dynamic capabilities reasoning to the joint examination of organizational digital integration, AI implementation, resilience, and sustainability-related performance. Its empirical contribution concerns the assessment of the specified relationships within the manufacturing context, with interpretations confined to the associations supported by the research design and reported statistical evidence.

RESEARCH METHODS

This study employed a quantitative research approach with an explanatory research design to examine the effects of digital transformation capability and artificial intelligence adoption on organizational resilience and sustainable business performance in the manufacturing industry. The research population comprised managers, supervisors, and employees involved in digital transformation, operational management, information technology, production, and strategic decision-making within manufacturing companies. Data were collected through a structured questionnaire using a five-point Likert scale ranging from strongly disagree to strongly agree. Respondents were selected using purposive sampling based on predetermined criteria to ensure sufficient knowledge and experience regarding digital technology implementation, artificial intelligence adoption, organizational resilience, and sustainability practices within their organizations.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the measurement and structural models. Measurement model assessment covered indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, while structural model assessment examined path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and the statistical significance of the hypothesized relationships. Bootstrapping procedures were employed to determine the significance of direct and indirect effects among the research variables. This analytical approach enabled the simultaneous examination of multiple latent constructs and complex causal relationships involving digital transformation capability, artificial intelligence adoption, organizational resilience, and sustainable business performance.

RESULTS AND DISCUSSION

The Effect of Digital Transformation Capability on Organizational Resilience

The empirical findings indicate that digital transformation capability has a positive and significant effect on organizational resilience in manufacturing firms. Digital transformation capability in this study reflects the organization's ability to integrate digital technologies, data-driven processes, human resources, and managerial capabilities into operational and strategic activities. Organizations with stronger digital capabilities tend to respond more effectively to changes in market conditions, technological disruptions, supply chain uncertainty, and increasingly complex customer demands. This finding is consistent with Rizana et al. (2025), who emphasize that digital transformation requires a combination of technological resources, organizational capabilities, and managerial readiness rather than merely the acquisition of new digital technologies. Digital transformation therefore provides manufacturing firms with an adaptive infrastructure through which information can be processed more rapidly and organizational responses can be coordinated efficiently. The development of integrated digital systems also enables firms to improve visibility across production, logistics, and administrative functions. Greater visibility allows managers to recognize emerging risks before they develop into serious operational disruptions. Hariyono et al. (2024) similarly argue that digital transformation in the Industry 4.0 environment strengthens organizational flexibility through connectivity, automation, and data integration. These capabilities contribute directly to the ability of organizations to absorb shocks and continue their critical activities. Consequently, digital transformation capability can be regarded as an important organizational foundation for strengthening resilience in the manufacturing sector.

The descriptive findings further demonstrate that respondents generally perceive the implementation of digital transformation their organizations positively. The strongest dimension is digital process integration, suggesting that manufacturing organizations have increasingly connected production, operational, and managerial processes through digital platforms. Digital leadership also receives a relatively high assessment, indicating that organizational leaders play an important role in encouraging technology adoption and supporting changes in work processes. The relatively lower score for digital employee capability, however, indicates that human resource competence remains an important challenge in maximizing digital transformation outcomes. This condition is relevant because sophisticated technologies cannot create sustainable organizational benefits without adequate employee knowledge and digital skills. Djatmika (2025) explains that digital transformation in Indonesian manufacturing can increase operational efficiency when technological adoption is supported by organizational readiness and appropriate human capabilities. Similarly, Widyoputri and

Avitasari (2026) emphasize that transformation in the Indonesian business environment requires the integration of technology, human resources, innovation, and strategic leadership. Therefore, improvements in employee digital literacy and technological competence remain essential for strengthening the ability of manufacturing firms to utilize digital resources effectively. The descriptive statistics for the digital transformation capability construct are presented in Table 1.

Table 1. Descriptive Statistics of Digital Transformation Capability

Dimension		Mean	Standard Deviation	Interpretation
Digital Technology Infrastructure		4.18	0.61	High
Digital Process Integration		4.31	0.56	Very High
Digital Leadership		4.25	0.59	Very High
Digital Employee Capability		4.02	0.67	High
Data-Driven Decision Making		4.27	0.58	Very High
Overall Digital Transformation Capability		4.21	0.60	Very High

Source: Authors' analysis of survey data.

The results presented in Table 1 show an overall mean value of 4.21, indicating a very high level of digital transformation capability among the manufacturing organizations represented in the study. Digital process integration achieves the highest mean score of 4.31, demonstrating that respondents perceive their organizations as increasingly capable of connecting digital technology with operational processes. Data-driven decision making also records a high mean of 4.27, suggesting that digital information has become an important basis for managerial and operational decisions. This result supports the argument that digital transformation involves a fundamental change in how organizations generate, distribute, and utilize information. Alquraish (2025) notes that digital transformation contributes to manufacturing resilience by increasing information transparency, operational integration, and the capacity to respond to supply chain disruptions. Integrated digital technologies can reduce information asymmetry between departments and accelerate organizational responses during periods of uncertainty. In addition, digital platforms enable manufacturing companies to coordinate production planning, inventory management, suppliers, and customer requirements more efficiently. Such coordination becomes particularly important when organizations face sudden changes in supply availability or market demand. The high level of digital transformation capability observed in this study therefore provides a strong basis for the development of organizational resilience. These findings suggest that manufacturing organizations increasingly recognize digital capabilities as strategic resources rather than merely operational support tools.

Organizational resilience was also assessed through several dimensions, including anticipation capability, adaptive capacity, response capability, recovery capability, and organizational learning. The descriptive results indicate that respondents perceive organizational resilience at a relatively high level, suggesting that manufacturing firms have developed mechanisms to manage disruptions and maintain operational continuity. Adaptive capacity records one of the highest evaluations, showing that firms are generally able to modify processes, resource allocations, and operational strategies when environmental conditions change. This is important because resilience does not simply refer to returning to previous operating conditions after a disruption, but also involves the capacity to adapt and develop new organizational responses. Pertheban et al. (2023) show that proactive resilience strategies and dynamic capabilities positively contribute to organizational performance in manufacturing SMEs. Their findings demonstrate that resilience emerges from an organization's ability to anticipate problems, reconfigure resources, and develop flexible responses. In a similar manner, Zhang et al. (2024) demonstrate that digital intelligence transformation can strengthen innovation resilience and consequently contribute to firm performance. These arguments are

consistent with the present findings, which indicate that organizations with higher digital transformation capability also exhibit stronger resilience characteristics. Digital transformation therefore appears to provide information, technological flexibility, and coordination mechanisms that support organizational adaptation. The relationship becomes clearer when the structural model results are examined.

The structural model analysis confirms that digital transformation capability significantly predicts organizational resilience. The estimated path coefficient is positive, indicating that increases in digital transformation capability are associated with higher organizational resilience. The statistical significance of the relationship suggests that digital transformation capability is not merely an operational characteristic but an important strategic antecedent of organizational resilience. Organizations with integrated digital systems can obtain real-time information about production performance, resource availability, supply chain conditions, and external environmental changes. This information allows managers to identify vulnerabilities and develop corrective actions more rapidly. Rashid et al. (2024) find that cloud technology and artificial intelligence contribute to resilience and sustainable manufacturing supply chains by improving digital connectivity and information-processing capabilities. Although their study emphasizes cloud and artificial intelligence adoption, the findings reinforce the broader argument that interconnected digital resources enhance organizational preparedness and responsiveness. Digital transformation also enables organizations to establish more flexible organizational processes because data and operational activities are less dependent on traditional manual systems. Such flexibility supports continuity when physical processes, human resources, or supply networks experience disruption. The statistical results regarding the hypothesized relationship are summarized in Table 2.

Table 2. Structural Model Result for Digital Transformation Capability and Organizational Resilience

Hypothesized Relationship	Path Coefficient (β)	t-Statistic	p-Value	Effect Size (f^2)	Size	Decision
Digital Transformation Capability → Organizational Resilience	0.486	7.214	<0.001	0.294		Supported
R^2 Organizational Resilience	0.524	-	-	-		Moderate–Strong
Q^2 Organizational Resilience	0.361	-	-	-		Predictively Relevant

Source: Authors' PLS-SEM analysis.

As shown in Table 2, digital transformation capability has a positive path coefficient of $\beta = 0.486$ toward organizational resilience, with a t-statistic of 7.214 and a p-value below 0.001. The result indicates that the hypothesized effect is statistically significant and therefore supports the proposed relationship between digital transformation capability and organizational resilience. The effect size of 0.294 also indicates that digital transformation capability makes a meaningful contribution to explaining variation in organizational resilience. Meanwhile, the R^2 value of 0.524 indicates that the predictor variables included in the broader model explain 52.4% of the variance in organizational resilience. The Q^2 value of 0.361 further demonstrates adequate predictive relevance of the model for organizational resilience. These results are consistent with the dynamic capability perspective because digital transformation enables firms to sense changes, seize technological opportunities, and reconfigure resources in response to environmental pressures. Rizana et al. (2025) identify digital transformation capability as a multidimensional organizational competence involving technological, strategic, human, and organizational dimensions. When these dimensions are

appropriately integrated, manufacturing firms are better equipped to cope with disruptions and uncertainty. Thus, the statistical findings reinforce the theoretical argument that resilience depends partly on the organization's capability to transform its processes through digital technologies. Digital transformation should therefore be considered a strategic resilience capability rather than a purely technological investment.

The positive relationship identified in this study can also be explained through the ability of digital transformation to increase organizational information-processing capacity. Manufacturing organizations operate in environments characterized by complex production networks, supplier dependencies, fluctuating demand, and rapid technological changes. Digital systems enable organizations to capture and analyze operational information continuously, making it possible to identify risks before they escalate into major disruptions. Zhang et al. (2024) argue that enterprise digital intelligence transformation enhances innovation resilience by improving organizational responsiveness and facilitating the reconfiguration of resources. This mechanism is particularly relevant for manufacturing firms because delays in information transmission can directly affect production continuity, inventory availability, and customer fulfillment. Digital dashboards, integrated enterprise systems, predictive analytics, and connected manufacturing technologies allow managers to monitor operational conditions more comprehensively. As a result, strategic and operational decisions can be made with greater speed and accuracy. Wibowo (2024) further notes that business sustainability in digital ecosystems depends on organizations' capacity to continuously adapt to technological and environmental changes. Organizational resilience is therefore strengthened when digital transformation improves both the quality and timeliness of organizational information. In this sense, digital transformation capability serves as an enabling mechanism through which organizations can anticipate, respond to, and recover from disruptions.

Another important explanation concerns the contribution of digital transformation to organizational flexibility and resource reconfiguration. Traditional manufacturing systems often depend on rigid organizational procedures and fragmented information structures, which may limit the ability of firms to respond to sudden environmental changes. Digital transformation allows organizations to redesign processes, automate repetitive activities, decentralize selected decision-making processes, and coordinate different functional areas through integrated information systems. Such capabilities enable manufacturing firms to rapidly shift production priorities, adjust supply sources, and modify resource allocation during disruptions. Pertheban et al. (2023) demonstrate that dynamic and ambidextrous capabilities are important mechanisms through which proactive resilience strategies influence organizational performance. Digital transformation can strengthen these capabilities because technology provides the information and operational flexibility necessary to simultaneously maintain existing activities and explore alternative solutions. Digital platforms can also facilitate collaboration between employees, suppliers, customers, and other business partners. This increased connectivity reduces organizational isolation and improves coordinated responses to emerging challenges. Therefore, manufacturing firms with mature digital transformation capabilities are more likely to develop flexible organizational structures capable of responding to uncertainty. This flexibility becomes an essential component of organizational resilience in increasingly dynamic manufacturing environments.

Human and managerial capabilities remain equally important in determining whether digital transformation successfully translates into organizational resilience. The descriptive results show that digital employee capability receives a slightly lower score than other dimensions, highlighting the importance of continuous human resource development. Technology itself does not automatically create resilience if employees cannot interpret digital information, operate new systems, or make decisions based on analytical insights. Umboh (2025) emphasizes that organizational adaptation in the era of artificial intelligence requires human resource strategies that support digital competency development, learning, and technological acceptance. Although the study focuses on the banking industry, its managerial implications are relevant to manufacturing organizations undergoing digital transformation. Similarly, Julianti and Siregar (2026) show that the adoption of artificial intelligence and digital technologies in business decision-making requires entrepreneurial and technological capabilities that enable organizations to effectively translate technological resources into business outcomes. Manufacturing firms therefore need to invest not only in infrastructure but also in digital training, change management, and managerial competence. Leaders must create an organizational

culture that encourages experimentation, learning, collaboration, and acceptance of technological changes. These cultural and human factors increase the probability that digital tools will actually improve organizational responses during periods of disruption. Consequently, the development of employee and managerial digital capabilities should be considered an integral element of organizational resilience strategies.

The findings also have important implications for long-term organizational sustainability and competitiveness. Resilient manufacturing firms are more capable of maintaining production continuity, protecting critical resources, preserving relationships with suppliers and customers, and adapting their strategies during economic or technological disruptions. Digital transformation strengthens these capacities by enabling organizations to integrate operational intelligence with strategic decision-making. Sabău-Popa et al. (2026) argue that sustainability-oriented digital transformation under Industry 4.0 requires organizations to integrate digitalization and artificial intelligence with managerial strategies that support sustainable development. Similarly, Li and Jin (2024) demonstrate that technology adoption can improve corporate sustainability performance when supported by appropriate organizational change. These findings imply that digital transformation can create value beyond short-term efficiency improvements because it can strengthen organizational adaptability and long-term survival. Suarantalla (2026) also emphasizes that artificial intelligence and digital transformation have potential long-term implications for organizational and financial performance when technological investments are embedded within strategic transformation processes. In manufacturing organizations, resilience provides an important bridge between technological transformation and sustainable business outcomes because resilient firms are better able to withstand shocks without sacrificing strategic objectives. Therefore, strengthening digital transformation capability may simultaneously support resilience, sustainability, and competitive advantage. The current findings provide empirical support for positioning digital transformation as a strategic capability for sustainable organizational development.

Overall, the results confirm that digital transformation capability has a substantial positive influence on organizational resilience within the manufacturing industry. The relationship reflects several interconnected mechanisms, including greater information visibility, faster decision-making, stronger operational integration, enhanced organizational flexibility, and improved capacity for learning and adaptation. The findings are consistent with previous research that associates digital transformation with operational efficiency, resilience, innovation capability, and organizational performance (Djatkika, 2025; Rizana et al., 2025; Zhang et al., 2024). They also reinforce the argument of Alquraish (2025) that digital transformation can contribute to manufacturing resilience and sustainability by improving connectivity and responsiveness across organizational and supply chain systems. From a managerial perspective, manufacturing firms should therefore treat digital transformation as a comprehensive organizational capability rather than as a series of independent technology projects. Investment should simultaneously address technological infrastructure, process integration, employee competence, leadership commitment, and data-driven decision-making. Organizations that achieve this integration are more likely to anticipate disruptions, adapt operational strategies, and recover effectively from unexpected events. In increasingly uncertain manufacturing environments, such capabilities become essential for maintaining organizational continuity and competitiveness. Accordingly, the first hypothesis proposing a positive relationship between digital transformation capability and organizational resilience is supported. This result provides the foundation for examining how other technological capabilities, particularly artificial intelligence adoption, contribute to organizational resilience and sustainable business performance in subsequent analyses.

The Effect of Artificial Intelligence Adoption on Organizational Resilience

Artificial intelligence adoption has become an increasingly important strategic capability for manufacturing organizations seeking to strengthen their capacity to anticipate, respond to, and recover from operational disruptions. The empirical results of this study indicate that AI adoption has a positive and significant effect on organizational resilience, suggesting that firms with more intensive implementation of artificial intelligence tend to demonstrate stronger adaptive and response capabilities. AI technologies enable manufacturing organizations to analyze large volumes of operational data, identify emerging patterns, automate repetitive processes, and support rapid

decision-making under uncertain conditions. Agrawal et al. (2024) explain that the adoption of artificial intelligence should be understood as a system-wide organizational transformation because its effects extend beyond individual tasks and influence broader organizational structures and decision processes. This perspective is particularly relevant to manufacturing firms in which production activities, logistics, inventory management, quality control, and supplier coordination are highly interconnected. When AI is integrated across these functions, organizations can detect potential disturbances more rapidly and coordinate corrective responses more effectively. AI-supported systems can also improve demand forecasting, production scheduling, predictive maintenance, and supply chain visibility. Such capabilities are highly valuable when organizations operate in environments characterized by volatility and unpredictable disruptions. Therefore, the positive relationship between AI adoption and organizational resilience reflects not only technological advancement but also an improvement in organizational information-processing and adaptive capability. These findings suggest that AI adoption represents an important component of resilience-building strategies in contemporary manufacturing organizations.

The descriptive results show that the participating manufacturing organizations have adopted artificial intelligence at relatively high levels across several operational and managerial dimensions. The highest perceived implementation is found in AI-supported data analysis and decision-making, indicating that manufacturing firms increasingly utilize intelligent systems to process information and support managerial decisions. Predictive analytics also receives a strong assessment because AI allows organizations to forecast equipment failures, market demand, operational bottlenecks, and supply chain risks more accurately. Automation based on intelligent technologies is similarly perceived as an important area of implementation, particularly in production and operational processes. Dey et al. (2024) demonstrate that AI-driven capabilities enhance supply chain resilience in manufacturing SMEs by improving information processing and responsiveness to operational disruptions. Belhadi et al. (2024) likewise find that AI-driven innovation can strengthen both supply chain resilience and performance, particularly under conditions of high supply chain dynamism. These findings suggest that AI technologies provide firms with greater visibility and predictive capacity in highly uncertain operating environments. Nevertheless, the successful implementation of AI requires reliable digital infrastructure, data quality, organizational readiness, and human competencies. AI systems that are implemented without adequate organizational integration may generate limited strategic value. The descriptive results of AI adoption are summarized in Table 3.

Table 3. Descriptive Statistics of Artificial Intelligence Adoption

Dimension		Mean	Interpretation	Standard Deviation	Interpretation
AI-Based Automation	Process	4.12		0.63	High
Predictive Analytics		4.24		0.58	Very High
AI-Supported Decision Making		4.29		0.55	Very High
Intelligent Supply Chain Management	Supply	4.18		0.61	High
AI-Based Risk Detection	Risk	4.21		0.60	Very High
Overall Artificial Intelligence Adoption	Artificial	4.21		0.59	Very High

Source: Authors' analysis of survey data.

As shown in Table 3, the overall mean value of artificial intelligence adoption is 4.21, indicating a very high perceived level of implementation among the manufacturing organizations included in the study. AI-supported decision making has the highest mean value of 4.29, demonstrating that respondents perceive artificial intelligence as particularly useful for improving managerial and operational decisions. Predictive analytics records a mean of 4.24, while AI-based risk detection reaches 4.21, reflecting the growing importance of AI for anticipating operational disturbances. He et al. (2025) show that artificial intelligence can enhance manufacturing industry

chain resilience by improving information integration, risk prediction, coordination efficiency, and adaptive responses across production networks. Rashid et al. (2024) similarly demonstrate that AI adoption, combined with cloud-based technologies, can optimize resilience and sustainability in manufacturing supply chains through enhanced digital connectivity. These findings are consistent with the present descriptive results because manufacturing organizations appear to emphasize those AI applications that directly improve anticipation and response capability. The ability to predict equipment failures, supplier disruptions, production deviations, or sudden changes in market demand can reduce organizational vulnerability. AI-supported decision systems can also reduce the time required to evaluate alternative responses during periods of disruption. Consequently, the high level of AI adoption provides an important technological foundation for improving organizational resilience. However, the strategic effectiveness of AI depends on whether firms can integrate predictive insights into actual organizational decisions and operational actions.

The positive contribution of AI adoption to organizational resilience can be explained through its capacity to improve organizational anticipation capability. Resilient firms do not merely react to disruptions after they occur but actively identify potential threats and prepare appropriate responses in advance. Artificial intelligence enables organizations to detect weak signals and hidden patterns within large data sets that may not be immediately recognizable through conventional analytical methods. Predictive algorithms can analyze historical production data, supplier performance, machine conditions, customer behavior, and external market information to estimate potential future disruptions. Wahyani and Sain (2025) emphasize that artificial intelligence can strengthen industrial supply chain resilience by enabling more accurate forecasting, faster risk identification, and more responsive operational planning. Dey et al. (2024) similarly highlight the value of AI-driven analytics in improving resilience among manufacturing SMEs facing supply chain uncertainty. Such predictive capabilities reduce dependence on reactive crisis management because organizations can develop contingency strategies before disruptions become severe. For example, firms may increase safety stock, diversify suppliers, reschedule production, or perform preventive maintenance based on AI-generated risk information. These actions can limit operational losses and shorten recovery periods following disruptive events. Therefore, AI adoption contributes to organizational resilience primarily by transforming uncertainty into more manageable information. This anticipatory advantage represents one of the strongest mechanisms connecting artificial intelligence with resilient organizational performance.

The structural model results further confirm that artificial intelligence adoption has a statistically significant positive relationship with organizational resilience. The estimated path coefficient indicates that increases in AI adoption are associated with corresponding improvements in organizational resilience. This result supports the hypothesis that AI contributes directly to firms' capacity to manage disruption through improved prediction, automation, analytical capability, and organizational responsiveness. Manufacturing organizations using intelligent technologies are able to access and process operational information more rapidly than organizations relying predominantly on conventional decision processes. Belhadi et al. (2024) provide empirical evidence that AI-driven innovation improves supply chain resilience and performance under dynamic environmental conditions. Their findings indicate that technological intelligence can create value when organizations use AI to support adaptive responses across complex operational networks. Similarly, He et al. (2025) report that AI contributes to greater manufacturing industry chain resilience by strengthening coordination and technological capabilities. These results reinforce the view that artificial intelligence functions as more than an efficiency-enhancing technology. AI can also serve as a strategic mechanism that improves organizational preparedness for unexpected events. The structural model estimates for the relationship between artificial intelligence adoption and organizational resilience are reported in Table 4.

Table 4. Structural Model Result for Artificial Intelligence Adoption and Organizational Resilience

Hypothesized Relationship	Path Coefficient (β)	t-Statistic	p-Value	Effect Size (f^2)	Decision
Artificial Intelligence Adoption → Organizational Resilience	0.421	6.583	<0.001	0.231	Supported
R^2 Organizational Resilience	0.524	-	-	-	Moderate–Strong
Q^2 Organizational Resilience	0.361	-	-	-	Predictively Relevant

Source: Authors' PLS-SEM analysis.

The results in Table 4 show a positive path coefficient of $\beta = 0.421$ between artificial intelligence adoption and organizational resilience, with a t-statistic of 6.583 and a p-value below 0.001. These values indicate that the relationship is statistically significant and support the proposed hypothesis concerning the positive effect of AI adoption on organizational resilience. The effect size of 0.231 demonstrates that AI adoption provides a meaningful contribution to explaining differences in organizational resilience. The R^2 value of 0.524 indicates that the predictors in the broader structural model collectively explain 52.4% of the variance in organizational resilience, while the Q^2 value of 0.361 confirms adequate predictive relevance. The positive coefficient also suggests that AI adoption complements other organizational capabilities rather than functioning independently from them. Agrawal et al. (2024) argue that the productivity and organizational consequences of AI emerge through system-wide adjustments involving workflows, coordination mechanisms, and managerial decision structures. Thus, organizations derive stronger resilience benefits when artificial intelligence is embedded within broader transformation processes. Julianti and Siregar (2026) similarly emphasize the growing importance of AI in business decision-making and digital transformation, particularly where technological adoption supports more adaptive and evidence-based managerial practices. Manufacturing companies should therefore combine investments in intelligent systems with organizational redesign, workforce development, and appropriate governance structures. The statistical evidence supports the conclusion that AI adoption is an important determinant of organizational resilience when its technological and organizational dimensions are integrated.

AI adoption also contributes to resilience by supporting rapid organizational response during periods of disruption. Manufacturing disruptions frequently require managers to make immediate decisions regarding production sequencing, procurement, logistics, inventory, workforce allocation, and customer commitments. Traditional decision processes may be too slow when the organization must analyze numerous variables simultaneously. Artificial intelligence can provide real-time recommendations based on large-scale operational data and rapidly evaluate alternative scenarios. Rashid et al. (2024) demonstrate that AI-supported digital systems can improve resilience in sustainable manufacturing supply chains by increasing responsiveness and the ability to manage operational complexity. AI can also enable automated adjustments in certain production and logistical activities, reducing the delay between the identification of a problem and the implementation of a corrective response. These capabilities are particularly relevant in highly interconnected manufacturing systems where disruptions in one operational area can quickly affect other organizational functions. Improved response speed reduces downtime and prevents minor operational disturbances from escalating into wider business failures. Furthermore, AI systems can continuously update recommendations as new information becomes available, allowing organizations to adapt decisions dynamically. This capability is consistent with the concept of organizational resilience as an

ongoing process of adaptation rather than a one-time recovery action. Accordingly, AI adoption strengthens resilience by improving both the speed and quality of organizational responses.

Another important mechanism relates to organizational learning and the development of adaptive intelligence. Artificial intelligence systems can store, process, and analyze historical information from previous disruptions, allowing organizations to identify recurring vulnerabilities and improve future responses. This process enables manufacturing firms to institutionalize lessons learned from operational failures, supply chain interruptions, equipment problems, and market changes. Zhang et al. (2024) demonstrate that digital intelligence transformation can strengthen innovation resilience and firm performance by improving firms' capacity to adapt and innovate in response to environmental change. AI therefore contributes not only to immediate operational decisions but also to longer-term organizational learning and capability development. Historical data can be transformed into predictive knowledge that improves future planning and reduces repeated operational mistakes. This learning mechanism also supports continuous improvement because managers can evaluate which responses were effective during previous disruptions. Siagian et al. (2026) emphasize that dynamic strategies in the adoption of green artificial intelligence can strengthen sustainable competitive advantage in manufacturing when technological implementation is combined with adaptive capabilities. Although their emphasis is on green AI, their argument illustrates the strategic importance of aligning AI adoption with organizational learning and dynamic capabilities. Manufacturing organizations should therefore develop systems that allow AI-generated knowledge to be shared across functional units and incorporated into strategic planning. In this way, artificial intelligence becomes an organizational learning infrastructure that continually strengthens resilience over time.

The benefits of AI adoption also depend substantially on organizational and human resource readiness. The implementation of intelligent technologies can create changes in job responsibilities, decision authority, competence requirements, and interaction patterns between employees and automated systems. Umboh (2025) notes that organizations operating in an AI-intensive environment must develop adaptive human resource management strategies to ensure that employees possess adequate competencies and are able to adjust to technologically driven workplace changes. Although this argument originates from the banking context, it has strong relevance to manufacturing because AI adoption increasingly affects production planning, maintenance, quality assurance, logistics, and managerial decision-making. Employees must be able to interpret AI-generated information and exercise appropriate managerial judgment rather than relying mechanically on algorithmic recommendations. Sabău-Popa et al. (2026) also emphasize the role of managerial perceptions and organizational orientation in shaping sustainability-oriented digital transformation involving digitalization and AI. This indicates that technological adoption produces stronger organizational benefits when leaders provide clear strategic direction and encourage employee acceptance. Training, digital literacy, data competence, and cross-functional collaboration are therefore essential supporting conditions. Organizations that neglect these human dimensions may encounter resistance, incorrect interpretation of AI outputs, or ineffective integration into business processes. AI adoption should therefore be accompanied by systematic change management and employee development initiatives. These complementary investments strengthen the ability of manufacturing firms to translate AI capabilities into organizational resilience.

From a broader strategic perspective, AI-driven resilience can also contribute to sustainable organizational performance because resilient firms are better positioned to preserve operational continuity and allocate resources efficiently during disruption. Li and Jin (2024) find that the intensity of artificial intelligence adoption can influence corporate sustainability performance, particularly through organizational change mechanisms. Their findings indicate that AI-related benefits do not stop at operational efficiency but can extend to longer-term economic, organizational, and sustainability outcomes. Suarantalla (2026) similarly highlights the potential of artificial intelligence as a driver of financial performance within broader digital transformation initiatives, emphasizing the importance of evaluating its long-term organizational effects. Sustainable performance in manufacturing depends partly on the organization's ability to avoid prolonged disruptions, reduce resource waste, improve production efficiency, and sustain value creation under changing environmental conditions. AI-enabled resilience can contribute to these objectives by predicting risk, optimizing resources, and maintaining continuity. Wibowo (2024) also argues that business

sustainability within digital ecosystems requires continuous organizational adaptation to technological and competitive change. Therefore, resilience may constitute an important organizational mechanism through which artificial intelligence generates more durable business outcomes. Organizations that develop AI capability without strengthening adaptive organizational structures may capture only short-term technological efficiency. Conversely, firms that embed AI within resilience strategies are more likely to convert technological adoption into sustainable competitive advantages.

Overall, the findings of this subsection demonstrate that artificial intelligence adoption has a significant positive influence on organizational resilience in the manufacturing industry. The relationship is supported through several mechanisms, including improved risk prediction, faster information processing, automated response, enhanced decision quality, organizational learning, and greater adaptive capability. These results are consistent with prior studies showing that AI contributes to supply chain resilience, manufacturing network resilience, and organizational performance under dynamic environmental conditions (Belhadi et al., 2024; Dey et al., 2024; He et al., 2025). They also support the system-wide perspective proposed by Agrawal et al. (2024), in which the value of AI depends on organizational changes that allow intelligent technologies to reshape processes and decision structures. In practical terms, manufacturing organizations should not approach AI adoption as a collection of isolated technological projects. AI initiatives should instead be integrated into production systems, supply chain processes, risk management, human resource development, and strategic decision-making. Such integration allows firms to use artificial intelligence not only to improve productivity but also to strengthen organizational preparedness and continuity. The evidence further suggests that the resilience benefits of AI become stronger when supported by digital infrastructure, employee competence, managerial commitment, and adaptive organizational culture. Accordingly, the hypothesis proposing a positive relationship between artificial intelligence adoption and organizational resilience is supported. This finding establishes an important basis for the subsequent analysis of how digital transformation capability, AI adoption, and organizational resilience contribute to sustainable business performance.

The Effect of Organizational Resilience on Sustainable Business Performance

The empirical findings indicate that organizational resilience has a positive and significant effect on sustainable business performance in manufacturing firms. Organizational resilience enables companies to anticipate disruptions, maintain essential operations, adapt resources, and recover from unexpected environmental changes while preserving long-term strategic objectives. In manufacturing environments, this capability is increasingly important because firms face technological disruption, volatile supply chains, changing customer expectations, cost pressures, and sustainability requirements simultaneously. Pertheban et al. (2023) demonstrate that proactive resilience strategies strengthen organizational performance when they are supported by dynamic and ambidextrous capabilities. Resilient firms are therefore not merely able to survive disruptive events but can also use uncertainty as an opportunity to redesign processes and improve organizational effectiveness. This capability is particularly relevant to sustainable business performance because sustainability requires organizations to maintain economic viability while continuously responding to social, technological, and environmental pressures. Wibowo (2024) argues that business sustainability within digital ecosystems increasingly depends on the capacity of organizations to maintain adaptability and continuity amid technological and competitive change. Organizational resilience thus provides a strategic foundation for maintaining performance under conditions in which conventional efficiency alone may no longer be sufficient. The positive relationship found in this study suggests that resilient organizations are better positioned to preserve productivity, manage resources efficiently, and sustain stakeholder value over time. Accordingly, organizational resilience should be regarded as a strategic capability that supports the continuity and sustainability of manufacturing businesses.

The descriptive results show that the participating organizations demonstrate relatively strong sustainable business performance across economic, operational, innovation, environmental, and long-term competitiveness dimensions. Operational sustainability records one of the highest assessments, indicating that respondents perceive their organizations as capable of maintaining efficient production and service continuity despite environmental uncertainty. Long-term competitive performance is also assessed positively, reflecting organizational efforts to preserve market position through continuous adaptation and technological development. Sustainability in manufacturing is increasingly associated

not only with environmental responsibility but also with the capacity to create enduring economic and operational value. Alquraish (2025) highlights that digital transformation and supply chain resilience are closely associated with sustainable manufacturing because resilient digital systems can reduce disruptions and support more efficient resource utilization. Similarly, Sabău-Popa et al. (2026) emphasize that sustainability-oriented digital transformation requires management to integrate technological development with broader economic, operational, and sustainability objectives. These findings indicate that sustainable business performance is multidimensional and cannot be measured solely through short-term financial indicators. Manufacturing firms must simultaneously maintain efficiency, competitiveness, adaptive capacity, innovation, and responsible resource management. The descriptive results suggest that organizations capable of strengthening resilience are also more likely to perform consistently across these dimensions. The descriptive statistics of sustainable business performance are presented in Table 5.

Table 5. Descriptive Statistics of Sustainable Business Performance

Dimension	Mean	Standard Deviation	Interpretation
Economic Sustainability	4.18	0.60	High
Operational Sustainability	4.30	0.55	Very High
Innovation Performance	4.22	0.59	Very High
Environmental and Resource Efficiency	4.09	0.66	High
Efficiency Long-Term Competitive Performance	4.27	0.57	Very High
Overall Sustainable performance	4.21	0.59	Very High

As shown in Table 5, the overall mean score of sustainable business performance is 4.21, indicating a very high perceived performance level among the manufacturing organizations included in the study. Operational sustainability achieves the highest mean score of 4.30, suggesting that the organizations are generally able to maintain operational continuity, production effectiveness, and process stability. Long-term competitive performance records a mean value of 4.27, while innovation performance reaches 4.22, indicating that respondents also perceive sustained competitiveness and innovation as important organizational outcomes. These results are consistent with Widyoputri and Avitasari (2026), who emphasize that digital transformation is changing the Indonesian business landscape toward innovation and sustainable growth. Sustainable performance therefore requires organizations to combine operational excellence with the capacity to continuously introduce improvements and respond to technological change. Zhang et al. (2024) similarly identify an important relationship among digital intelligence transformation, innovation resilience, and firm performance, indicating that resilience can support performance by enabling organizations to continue innovating during uncertain conditions. Organizations with strong resilience are less likely to suspend strategic development when disruptions occur because they possess mechanisms for resource reallocation and adaptive decision-making. This allows them to maintain both short-term operational continuity and long-term strategic initiatives. Consequently, organizational resilience may explain why some manufacturing firms sustain performance despite severe changes in technological, market, and supply chain conditions. The descriptive evidence therefore provides initial support for the role of resilience as an important antecedent of sustainable business performance.

From an economic perspective, organizational resilience contributes to sustainable performance by reducing losses associated with operational disruptions and improving the ability of firms to preserve revenue-generating activities. Manufacturing disruptions can generate significant costs through production downtime, delayed deliveries, inventory shortages, quality problems, and contractual penalties. Resilient organizations are better able to mitigate these costs because they

possess contingency systems, alternative resources, flexible decision structures, and faster recovery mechanisms. Pertheban et al. (2023) find that proactive resilience strategies significantly contribute to organizational performance in manufacturing SMEs by improving the ability of firms to balance adaptation and exploitation of existing capabilities. Resilience therefore supports economic sustainability by preventing temporary disruptions from developing into prolonged financial difficulties. Suarantalla (2026) also emphasizes that digitally enabled organizational transformation can create long-term financial benefits when technological investments support improved decision-making and organizational performance. Although artificial intelligence and digitalization are technological mechanisms, their economic value depends partly on whether they strengthen organizational capacity to respond effectively to uncertainty. Organizations that recover rapidly from shocks can preserve cash flows, maintain customer relationships, and avoid excessive recovery expenditures. Such capabilities improve long-term financial stability and reduce organizational vulnerability to future disturbances. Thus, the contribution of resilience to sustainable business performance can be understood partly through its ability to protect economic value during adverse conditions.

The structural model analysis confirms that organizational resilience has a statistically significant positive effect on sustainable business performance. The estimated path coefficient indicates that higher resilience is associated with stronger sustainable performance outcomes across the participating manufacturing firms. This finding implies that resilience is not merely a defensive organizational characteristic but also a productive capability that supports long-term value creation. Firms that can anticipate and absorb disruption can dedicate more resources to innovation, efficiency improvements, technological development, and sustainable business initiatives. Zhang et al. (2024) demonstrate that innovation resilience acts as an important mechanism connecting digital intelligence transformation with firm performance. Likewise, Li and Jin (2024) show that organizational change plays an important role in translating artificial intelligence adoption into corporate sustainability performance. These studies reinforce the argument that organizational capabilities mediate the value created by technological transformation. In the present research framework, organizational resilience functions as one of the principal capabilities through which firms maintain business continuity while adapting to technological and environmental changes. The effect is therefore strategically important because sustainable business performance requires organizations to produce stable outcomes over an extended period rather than merely achieve temporary performance improvements. The structural model results concerning this relationship are presented in Table 6.

Table 6. Structural Model Result for Organizational Resilience and Sustainable Business Performance

Hypothesized Relationship	Path Coefficient (β)	t-Statistic	p-Value	Effect (f^2)	Size	Decision
Organizational Resilience → Sustainable Business Performance	0.563	8,146	<0.001	0.367		Supported
R ² Sustainable Business Performance	0.618	-	-	-		Substantial
Q ² Sustainable Business Performance	0.428	-	-	-		Predictively Relevant

Table 6 indicates that organizational resilience has a positive path coefficient of $\beta = 0.563$ toward sustainable business performance, with a t-statistic of 8.146 and a p-value below 0.001. The hypothesis proposing a positive relationship between organizational resilience and sustainable business performance is therefore statistically supported. The effect size of 0.367 indicates a relatively

strong contribution of organizational resilience to sustainable business performance within the proposed structural model. Furthermore, the R^2 value of 0.618 indicates that 61.8% of the variance in sustainable business performance is explained by the relevant predictors included in the broader model. The Q^2 value of 0.428 also demonstrates satisfactory predictive relevance, indicating that the model possesses meaningful capacity to predict sustainable performance outcomes. These findings are compatible with the resilience perspective proposed by Pertheban et al. (2023), which emphasizes the importance of proactive and dynamic capabilities for sustaining organizational performance. They also correspond with Alquraish (2025), who identifies resilience as a critical dimension connecting digital transformation with sustainability within manufacturing systems. The magnitude of the coefficient suggests that firms capable of responding, adapting, and recovering effectively are more likely to preserve long-term organizational value. Therefore, resilience should not be treated solely as a crisis-management function but should be embedded into corporate strategy, operational planning, technology investment, and sustainability programs. The statistical evidence consequently strengthens the theoretical argument that sustainable performance depends substantially on the organization's ability to remain adaptive under disruptive conditions.

Organizational resilience also supports sustainable performance by maintaining innovation capability during periods of uncertainty. Firms experiencing severe disruption often reduce investments in innovation because resources are redirected toward immediate operational recovery. Resilient manufacturing firms, however, are more capable of maintaining a balance between short-term continuity and long-term technological development. Zhang et al. (2024) explain that innovation resilience allows enterprises undergoing digital intelligence transformation to maintain innovative activity and subsequently improve firm performance. This capacity is particularly important because sustainable competitive advantage in manufacturing increasingly depends on continuous technological improvement, product innovation, process redesign, and data-driven decision-making. Siagian et al. (2026) similarly argue that dynamic strategies associated with green artificial intelligence adoption can contribute to sustainable competitive advantage when firms develop adaptive technological capabilities. Resilience makes such innovation more sustainable because the organization can continue experimentation and strategic development even when external conditions become unstable. Furthermore, AI-enabled decision systems and digital platforms can accelerate organizational learning by converting operational disruptions into knowledge that informs future innovation. Julianti and Siregar (2026) identify AI adoption as an increasingly relevant component of digital transformation and business decision-making, particularly for organizations seeking to improve adaptive entrepreneurial capabilities. Accordingly, resilience and innovation should not be understood as separate organizational objectives because resilient firms are often more capable of sustaining innovation under pressure. This connection strengthens their ability to generate long-term business value.

Sustainable business performance also depends increasingly on environmental and resource efficiency, particularly in manufacturing industries characterized by intensive use of materials, energy, transportation, and production infrastructure. Resilient organizations can contribute to environmental sustainability by improving resource planning, reducing operational waste, avoiding repeated production failures, and optimizing inventory and logistics systems. Rashid et al. (2024) demonstrate that artificial intelligence and cloud adoption can simultaneously strengthen supply chain resilience and sustainable manufacturing by improving coordination and resource optimization. Similarly, Alquraish (2025) emphasizes the interconnected nature of digital transformation, resilience, and sustainability, suggesting that technology-supported resilience can contribute to more efficient manufacturing systems. Artificial intelligence can also assist organizations in identifying inefficient resource consumption patterns and optimizing production decisions under changing operating conditions. Siagian et al. (2026) further highlight the emerging role of green artificial intelligence in developing sustainable competitive advantages within manufacturing. These technological capabilities can contribute to sustainability only when organizations possess sufficient resilience to integrate new technologies and maintain strategic programs during disruptions. A resilient organization is less likely to abandon sustainability objectives when confronted with unexpected pressures because it possesses stronger adaptive capacity and resource flexibility. Thus, organizational resilience contributes to environmental performance by enabling organizations to sustain efficiency and sustainability initiatives even under adverse conditions. The relationship between resilience and sustainable

performance consequently extends beyond financial outcomes to encompass responsible and efficient resource utilization.

The findings also suggest that digital transformation capability and artificial intelligence adoption may contribute to sustainable business performance indirectly through organizational resilience. Digital transformation provides integrated systems, data visibility, connectivity, and organizational flexibility, while artificial intelligence provides advanced forecasting, automation, analytical, and predictive capabilities. However, technological capabilities alone do not automatically guarantee sustainable outcomes if firms are unable to transform technological resources into effective organizational responses. Agrawal et al. (2024) stress that AI adoption creates substantial value through system-wide organizational changes rather than isolated technological implementation. Li and Jin (2024) similarly demonstrate that organizational change affects the relationship between AI adoption intensity and sustainability performance. Rizana et al. (2025) further highlight that successful digital transformation depends on organizational capabilities that integrate technological, managerial, strategic, and human dimensions. These arguments support the proposition that organizational resilience functions as an important transmission mechanism linking technological capabilities with longer-term business outcomes. When digital transformation and AI strengthen anticipation, adaptation, and recovery, firms are more capable of preserving productivity and competitiveness under uncertainty. In turn, this resilience contributes to sustainable business performance by maintaining continuity, supporting innovation, and optimizing resource utilization. The findings therefore suggest that manufacturing firms should evaluate digital investment not only through immediate efficiency gains but also through the extent to which technology strengthens organizational resilience. Such an integrated perspective provides a more comprehensive explanation of how digital transformation creates enduring organizational value.

The managerial implications of these findings are particularly important for manufacturing firms navigating the transition from Industry 4.0 toward increasingly intelligent and sustainability-oriented business systems. Management should develop organizational resilience as an integrated strategic capability involving digital infrastructure, artificial intelligence, human resource development, supply chain flexibility, risk management, and organizational learning. Hariyono et al. (2024) emphasize that digital transformation in the progression toward Society 5.0 requires organizations to integrate technological development with human-centered organizational capabilities. Umboh (2025) similarly highlights the importance of adaptive human resource strategies in organizations operating under increasing AI adoption because employee capabilities remain critical to successful technological transformation. Sabău-Popa et al. (2026) also demonstrate that managerial perceptions and strategic orientation influence how digitalization and AI contribute to sustainability-oriented transformation. Manufacturing managers should therefore establish cross-functional resilience mechanisms involving production, information technology, procurement, human resources, finance, and sustainability units. Regular scenario planning, employee digital training, supplier diversification, predictive analytics, and continuity planning should become part of organizational strategy. Such initiatives can improve the capacity of firms to respond to disruptions without compromising long-term sustainability targets. Wahyani and Sain (2025) further emphasize that AI can improve industrial supply chain resilience, indicating that intelligent technologies should be incorporated into broader risk-management processes. Therefore, strengthening resilience requires simultaneous investments in technology, organizational systems, and human capabilities.

Overall, the findings confirm that organizational resilience plays a critical role in improving sustainable business performance in manufacturing firms. Resilient organizations demonstrate stronger capacity to maintain operational continuity, preserve economic value, sustain innovation, improve resource efficiency, and respond strategically to technological and environmental uncertainty. These results are consistent with research linking proactive resilience with organizational performance (Pertheban et al., 2023), digital intelligence transformation with innovation resilience and firm performance (Zhang et al., 2024), and artificial intelligence adoption with sustainability outcomes (Li & Jin, 2024). The results are also aligned with Dey et al. (2024), Belhadi et al. (2024), and He et al. (2025), who collectively demonstrate the importance of AI-driven capabilities for resilience in manufacturing and supply chain environments. Furthermore, Rashid et al. (2024), Alquraish (2025), and Wahyani and Sain (2025) reinforce the argument that technology-supported resilience can contribute to more sustainable manufacturing systems. The broader digital

transformation perspective proposed by Djatmika (2025), Rizana et al. (2025), Hariyono et al. (2024), and Widyoputri and Avitasari (2026) also supports the integration of technological capability with organizational adaptation and long-term performance. Meanwhile, the findings of Julianti and Siregar (2026), Sabău-Popa et al. (2026), Siagian et al. (2026), Suarantalla (2026), Umboh (2025), and Wibowo (2024) provide complementary evidence that technological transformation, managerial adaptation, human capability, and sustainability should be understood as interrelated dimensions of contemporary organizational development. Accordingly, the hypothesis that organizational resilience positively influences sustainable business performance is supported, while the overall research model indicates that digital transformation capability and artificial intelligence adoption can create greater long-term value when they strengthen the organization's resilience capacity. Taken together, the three subsections demonstrate that sustainable manufacturing performance is most effectively achieved when technological transformation, intelligent decision-making, organizational adaptation, and resilience are managed as an integrated strategic system.

CONCLUSION

This study concludes that digital transformation capability and artificial intelligence adoption play significant roles in strengthening organizational resilience in the manufacturing industry. Digital transformation capability enhances resilience by improving process integration, information visibility, organizational flexibility, technological connectivity, and data-driven decision-making, while artificial intelligence adoption reinforces organizational capacity through predictive analytics, automation, intelligent risk detection, and faster responses to operational disruptions. The findings demonstrate that technological transformation should not be perceived merely as the implementation of sophisticated digital tools, but rather as a strategic organizational capability that enables firms to anticipate uncertainty, adapt their resources, and maintain operational continuity. Accordingly, manufacturing firms that successfully integrate digital technologies and artificial intelligence into their organizational systems are better positioned to develop adaptive and resilient capabilities in increasingly dynamic business environments.

The study further concludes that organizational resilience contributes positively to sustainable business performance by strengthening operational continuity, economic stability, innovation capability, resource efficiency, and long-term competitiveness. Organizational resilience therefore represents an important strategic mechanism through which digital transformation capability and artificial intelligence adoption can be translated into sustainable organizational outcomes. These findings emphasize that manufacturing firms should simultaneously develop technological infrastructure, AI capabilities, employee digital competencies, organizational learning, and adaptive managerial practices rather than focusing exclusively on technology investment. By integrating digital transformation, artificial intelligence, and organizational resilience within a coherent strategic framework, manufacturing organizations can improve their ability to manage disruptions while maintaining sustainable value creation. Overall, the study contributes to the growing literature on digital transformation and sustainable manufacturing by demonstrating the interconnected roles of technological capability, organizational resilience, and sustainable business performance.

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