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Organizational Readiness for AI Adoption in Indonesian Manufacturing SMEs

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Abstract

This study aims to explore and analyze the organizational readiness of Indonesian manufacturing Small and Medium-sized Enterprises (SMEs) in adopting Artificial Intelligence (AI) technologies. Given the pivotal role of SMEs in the national economy and their increasing exposure to digital transformation pressures, understanding their internal preparedness to integrate AI is both timely and essential. Employing a qualitative research methodology grounded in an extensive literature-based analysis, the study synthesizes empirical and conceptual findings from 45 peer-reviewed sources published between 2010 and 2024. The research adopts an interpretivist epistemological stance and applies thematic content analysis to uncover recurring patterns related to AI readiness across strategic, infrastructural, human, and institutional domains. The findings reveal that Indonesian manufacturing SMEs exhibit uneven levels of AI readiness, with significant gaps in strategic alignment, digital infrastructure, human capital development, and leadership commitment. Notably, cultural resistance and limited access to ecosystemic support further hinder sustainable AI adoption. However, the study also identifies emerging examples of collaborative innovation, particularly among SMEs engaged with universities, tech providers, and government initiatives. These cases illustrate the potential of context-sensitive readiness strategies tailored to Indonesia's industrial landscape. The research contributes to the literature by integrating AI adoption frameworks with a nuanced understanding of local SME dynamics and offers actionable insights for business leaders and policymakers. Ultimately, this study calls for a multidimensional, continuous, and ecosystem-driven approach to AI readiness to ensure inclusive and sustainable digital transformation within Indonesia's manufacturing sector.

Keywords: ***Artificial Intelligence, Organizational Readiness, Indonesian SMEs, Manufacturing Sector, Digital Transformation.***

1. Introduction

In an era defined by rapid digital transformation, the integration of Artificial Intelligence (AI) into organizational processes has emerged as a powerful catalyst for enhancing operational efficiency, decision-making quality, and competitive advantage. Across industries, AI technologies such as machine learning, predictive analytics, and intelligent automation are reshaping traditional business models, enabling enterprises to move beyond conventional limitations in data handling and process optimization. While global corporations have made significant strides in embedding AI within their strategic frameworks, the readiness of smaller enterprises, particularly Small and Medium-sized Enterprises (SMEs), to adopt and implement AI remains a pressing and under-explored subject. This issue is especially pertinent in the context of emerging economies, where technological infrastructure, organizational capacity, and cultural adaptability may pose significant challenges to successful AI integration. In Indonesia, SMEs form the

backbone of the national economy, contributing to more than 60% of the country's gross domestic product and providing employment for a significant portion of the population. Within the manufacturing sector, SMEs play a pivotal role in driving industrial productivity, innovation, and regional economic development. However, despite their economic significance, Indonesian manufacturing SMEs often face a multitude of constraints in adopting advanced digital technologies. These constraints range from limited financial and human resources to inadequate digital infrastructure and low levels of digital literacy among employees and managers. The advent of AI, while promising substantial gains in productivity and innovation, also demands a high degree of organizational readiness. Organizational readiness refers to the extent to which an enterprise possesses the necessary structures, culture, competencies, and motivation to successfully implement and benefit from AI technologies. It is a multidimensional construct that encompasses strategic alignment, technological infrastructure, employee capability, leadership commitment, and the organizational culture of innovation.

The increasing pressure to digitalize processes and remain competitive in an AI-driven global market places Indonesian SMEs in a complex position. While AI adoption is often seen as a strategic imperative, especially in the manufacturing sector where automation and optimization are critical, the reality is that many SMEs struggle to assess their internal capabilities and preparedness. The lack of empirical research focused on assessing organizational readiness for AI within this segment of the Indonesian economy represents a significant gap in the literature. Existing studies on AI adoption have predominantly concentrated on large-scale enterprises, leaving a knowledge vacuum concerning SMEs—particularly those operating in resource-constrained environments such as Indonesia. Recent scholarly efforts have begun to address various factors influencing digital transformation among SMEs. For instance, studies by Dwivedi et al. (2021) and Vial (2019) highlight how technological readiness, organizational culture, and leadership vision critically determine the success of digital innovation. In the context of AI, Bianchini and Michalkova (2023) emphasize that adoption is not solely a technological challenge but also a strategic and organizational endeavor. Furthermore, research by Jöhnk et al. (2022) demonstrates that SMEs require a tailored framework for AI readiness, one that accounts for their limited scale and distinct managerial structures. In Indonesia, limited empirical evidence exists on how these global frameworks translate into actionable insights for SMEs in the manufacturing domain. A few national studies, such as those by Setiawan and Hidayat (2023), explore the broader concept of digital maturity among Indonesian SMEs, but they often lack a specific focus on AI readiness as a construct that can be quantitatively assessed.

The phenomenon of uneven digital adoption across SME segments underscores the urgency of systematically examining organizational readiness for AI. This is particularly relevant as Indonesia moves forward with its "Making Indonesia 4.0" roadmap, a national strategy launched by the Ministry of Industry aimed at revitalizing the manufacturing sector through the adoption of Industry 4.0 technologies, including AI. The roadmap identifies SMEs as a critical focus area, acknowledging the disparities in digital preparedness across enterprise scales. However, without a clear empirical understanding of the current state of AI readiness within SMEs, particularly in the manufacturing sector, policy formulation and support programs risk being misaligned or ineffective. This study is situated within this critical context. It aims to fill the empirical gap by quantitatively describing the organizational readiness of Indonesian manufacturing SMEs to adopt AI technologies. Unlike studies that emphasize technological capabilities or external market pressures, this research centers on internal organizational attributes that influence AI adoption. These include leadership orientation toward innovation, employee skills and attitudes, digital infrastructure availability, strategic alignment with AI goals, and openness to change. By applying a descriptive quantitative methodology, the study provides a comprehensive snapshot of the current readiness levels, thus offering practical insights for business leaders, policymakers, and researchers alike.

The relevance of this research lies in its focus on measurable indicators of organizational readiness, which allows for a grounded understanding of the internal dynamics within SMEs. This is essential, as readiness is often assumed rather than assessed in digital transformation projects. Without adequate readiness, AI implementation can lead to resource waste, employee resistance, and strategic misalignment—outcomes that are especially detrimental for SMEs operating on tight margins. Moreover, the descriptive nature of this research enables the identification of specific areas where interventions or capacity-building efforts are most needed. For instance, if the data reveals a high level of strategic interest but low employee digital competency, training programs could be prioritized. Conversely, if technological infrastructure exists but leadership commitment is weak, leadership development initiatives could be more impactful. Another contribution of this study is its alignment with contemporary theoretical models of technology adoption, such as the Technology-Organization-Environment (TOE) framework and the Diffusion of Innovations

(DoI) theory. These frameworks emphasize the interplay between organizational context, external pressures, and technological characteristics in shaping adoption behavior. However, this study narrows its lens to the "Organization" component within the TOE model, examining how internal readiness factors interact to shape an SME's capacity to embrace AI. In doing so, it complements and extends the literature by offering a focused, context-specific analysis of organizational conditions that facilitate or hinder AI readiness. This study also responds to calls for more context-sensitive research in technology management literature. Scholars such as Wamba-Taguimdje et al. (2020) argue that technology adoption models must be tailored to the socio-economic realities of the environment in which they are applied. In Indonesia, where SMEs represent a highly heterogeneous group with varying levels of formality, resource access, and managerial sophistication, a one-size-fits-all approach to AI readiness is insufficient. Hence, this research not only quantifies readiness but also explores the contextual factors that may explain variations across firms.

The objective of this study, therefore, is to descriptively analyze the level of organizational readiness for AI adoption among Indonesian manufacturing SMEs. The research seeks to identify the readiness dimensions most and least developed within this population, providing a data-driven foundation for targeted strategies aimed at facilitating successful AI implementation. Through a structured questionnaire distributed to SME decision-makers across selected manufacturing clusters, the study gathers quantifiable insights into readiness indicators. These include leadership commitment to AI, employee digital literacy, organizational culture of innovation, availability of technological infrastructure, and alignment of AI adoption with strategic goals. Ultimately, the goal is not only to measure readiness but also to generate actionable insights that can inform both practice and policy. For business leaders, the findings may offer a diagnostic tool to evaluate their own preparedness and identify critical gaps. For policymakers, the results can guide the development of support programs, subsidies, or capacity-building initiatives that are responsive to the actual conditions on the ground. For scholars, this study adds empirical depth to the growing literature on AI adoption in SMEs, especially within emerging market contexts where such research remains limited. AI continues to redefine the landscape of industrial competitiveness and innovation, ensuring that Indonesian manufacturing SMEs are not left behind is both an economic and strategic imperative. Organizational readiness serves as a critical enabler for this transformation, influencing whether AI adoption leads to sustainable gains or failed experiments. By adopting a quantitative descriptive approach, this research aims to illuminate the current state of readiness and catalyze informed action among all stakeholders involved in Indonesia's digital industrial future.

2. Literature Review

2.1 Conceptualizing Organizational Readiness for AI Adoption

Organizational readiness is a multidimensional construct that refers to the extent to which an organization is psychologically, culturally, and structurally prepared to implement technological innovations. In the context of AI adoption, organizational readiness entails more than just technological capacity—it includes leadership commitment, employee competence, organizational culture, and the alignment of AI initiatives with strategic goals (Wamba-Taguimdje et al., 2020). This conceptual breadth distinguishes readiness from mere willingness or intention, positioning it as a foundational prerequisite for the success of complex digital transformations. Readiness reflects not only the presence of enabling resources but also the organization's dynamic capability to integrate and absorb change.

As AI systems differ from traditional IT due to their complexity, learning capacity, and decision autonomy, the threshold for readiness becomes significantly higher. Research by Jöhnk et al. (2022) emphasizes that AI readiness encompasses an organization's ability to understand, experiment with, and trust intelligent technologies, thereby requiring a high level of cognitive and behavioral preparedness across all levels of the organization. This holistic understanding is particularly relevant in manufacturing SMEs, where centralized decision-making and limited technical expertise may hinder adaptive change. Therefore, assessing readiness in such firms must consider structural and human dimensions equally.

The readiness framework often intersects with broader models of technology adoption, such as the Technology–Organization–Environment (TOE) framework. In this model, the "organizational" component has been consistently identified as a key determinant in the adoption and assimilation of digital innovations (Tornatzky & Fleischer, 1990). Applying TOE to AI, Mittal et al. (2022) argue that organizational readiness is not only a moderating factor but an enabler that directly influences the firm's

absorptive capacity for AI innovation. This suggests that without sufficient internal alignment, even favorable technological and environmental conditions may fail to lead to successful AI implementation. Moreover, organizational readiness is particularly crucial in emerging market contexts where external support and institutional frameworks may be weak or fragmented. In such environments, internal readiness becomes the primary driver of technological progress. For SMEs in Indonesia, readiness is often constrained by limited strategic foresight and inadequate digital infrastructure (Setiawan & Hidayat, 2023). Thus, enhancing organizational readiness must be seen as a deliberate and strategic process, one that requires investment in both technical and cultural dimensions of change.

2.2 Factors Influencing AI Adoption in SMEs

Small and medium-sized enterprises face unique challenges when integrating emerging technologies like AI due to their limited financial resources, constrained human capital, and low levels of digital maturity. Unlike larger firms, SMEs typically lack specialized IT departments or innovation units capable of managing complex technological change (Horváth & Szabó, 2019). As such, the decision to adopt AI is often shaped by managerial perceptions, risk tolerance, and the anticipated return on investment. In many cases, the uncertainty surrounding AI's value proposition further complicates the readiness-building process. Leadership has been repeatedly cited as a decisive factor in determining whether and how AI is adopted within SMEs. According to Bresciani et al. (2021), visionary leadership plays a pivotal role in setting the tone for digital experimentation and innovation acceptance. Leaders who actively support AI initiatives can foster a learning culture that encourages knowledge-sharing and experimentation. In the Indonesian context, where hierarchical organizational structures dominate, leadership endorsement is not merely symbolic but instrumental in mobilizing resources and legitimizing change. Without such leadership, readiness initiatives may lack coherence and sustainability.

Organizational culture is another salient factor. A culture that supports innovation, embraces change, and tolerates risk is essential for AI readiness. As Bianchini and Michalkova (2023) suggest, AI adoption is not only about installing new systems but about transforming mindsets and workflows. In SMEs, where employees often perform multiple roles, cultivating a culture of agility and adaptability is vital. However, many Indonesian SMEs continue to operate within rigid bureaucratic norms, which may stifle innovation and reduce openness to intelligent technologies. This cultural inertia must be addressed through targeted organizational development efforts. Employee skills and digital literacy are perhaps the most tangible manifestations of organizational readiness. AI adoption demands a basic understanding of data management, algorithmic processes, and system integration. Research by Dwivedi et al. (2021) highlights the necessity of continuous upskilling and reskilling initiatives as part of digital transformation strategies. For SMEs, investing in training and capacity-building is both a challenge and an opportunity. While resource limitations exist, the relatively smaller workforce of SMEs allows for more targeted interventions and faster knowledge dissemination when leadership prioritizes such efforts.

2.3 Measuring Organizational Readiness: Approaches and Frameworks

A variety of models have been developed to assess organizational readiness for digital transformation, many of which are now being adapted to account for the specific characteristics of AI. The AI Readiness Framework by Ransbotham et al. (2018), for example, proposes multiple readiness dimensions including strategy, data infrastructure, talent, and ethical awareness. These elements are not isolated but interdependent, requiring a comprehensive assessment approach. Quantitative surveys have proven effective in capturing such readiness dimensions at the organizational level, especially when applied in sectors like manufacturing, where operational variables can be clearly defined. The Organizational Readiness for Implementing Change (ORIC) model is another widely referenced framework, originally designed to assess psychological and behavioral readiness in health care but increasingly applied in business contexts (Shea et al., 2014). This model emphasizes shared commitment and efficacy as central to successful change implementation. When tailored for AI, ORIC can help organizations identify not only what is missing in their capabilities but also how willing and confident employees are in supporting AI-driven initiatives. The dual emphasis on capacity and motivation offers a balanced lens for understanding readiness.

In practice, measuring readiness involves operationalizing abstract concepts into tangible survey items or interview protocols. Research by Ahmad et al. (2021) successfully developed a readiness index for Malaysian SMEs based on dimensions such as top management support, IT infrastructure, employee competency, and organizational learning. Such instruments provide empirical grounding for strategic

decisions, enabling firms to prioritize interventions based on data. In Indonesia, however, there remains a paucity of validated tools specifically focused on AI readiness among manufacturing SMEs, highlighting the importance of context-sensitive scale development. Furthermore, readiness assessments should be seen as diagnostic tools rather than evaluative checklists. Their function is to illuminate gaps and strengths in organizational systems, providing a roadmap for incremental change rather than a binary readiness status. As emphasized by Vial (2019), digital transformation is not a destination but an ongoing journey. Organizations that regularly assess and revisit their readiness are more likely to adapt successfully to evolving technological landscapes, including the increasingly complex domain of AI.

2.4 Contextualizing Readiness in Indonesian Manufacturing SMEs

Indonesia presents a unique environment for examining AI readiness due to its diverse industrial base, rapid urbanization, and uneven digital infrastructure. Manufacturing SMEs in Indonesia are characterized by their operational informality, reliance on manual labor, and low investment in R&D (Tambunan, 2019). These characteristics influence both the perception and practicality of AI integration. For many SMEs, AI remains a distant and abstract concept, associated with high costs and uncertain outcomes. As a result, organizational readiness is often deprioritized in favor of immediate operational concerns. Despite government efforts to promote Industry 4.0 through initiatives such as "Making Indonesia 4.0," the penetration of AI technologies in SMEs remains low. A report by the Ministry of Industry (2022) revealed that while awareness of AI and automation is growing, practical knowledge and implementation remain concentrated in larger firms. SMEs often lack access to technical consultants, training resources, or demonstration projects that could enhance readiness. This digital divide underscores the need for localized support systems that address the specific constraints of small manufacturing firms.

Social and cultural dimensions also play a role in shaping AI readiness. The collectivist culture prevalent in many Indonesian workplaces tends to value conformity and stability over experimentation and change. This may hinder the psychological readiness of employees, who may view AI as a threat to job security or as a disruption to established routines. As noted by Hofstede (2011), high power distance and uncertainty avoidance can dampen innovation adoption in hierarchical cultures. Hence, readiness-building strategies must include change management interventions that foster trust, transparency, and inclusivity. Nevertheless, there are promising signs of change. Several Indonesian SMEs have begun exploring AI applications in quality control, predictive maintenance, and customer analytics, often in partnership with tech startups or academic institutions (Prabowo et al., 2023). These cases demonstrate that with the right support and internal alignment, even resource-constrained organizations can move toward AI readiness. They also reinforce the importance of building foundational readiness elements—such as leadership commitment and employee engagement—before attempting full-scale implementation.

3. Research Methodology

This research adopts a qualitative methodology grounded in an extensive literature-based approach to explore and analyze the organizational readiness of Indonesian manufacturing Small and Medium-sized Enterprises (SMEs) in adopting Artificial Intelligence (AI) technologies. Given the study's objective to construct a comprehensive conceptual understanding rather than to measure or test hypotheses quantitatively, a qualitative design was deemed most appropriate. Qualitative research is particularly valuable for gaining insights into complex, context-bound phenomena where human behavior, institutional dynamics, and social processes are deeply intertwined, and where numeric measurement alone is insufficient to capture the richness of the subject matter. The choice of a literature-based qualitative study is anchored in the interpretivist paradigm, which posits that reality is socially constructed and best understood through the meanings that individuals or organizations attach to it. In this regard, the research does not seek to generalize findings across all SME contexts statistically but instead aims to generate deep theoretical insights into the organizational, cultural, and managerial conditions that influence AI readiness. The interpretivist paradigm underpins the epistemological stance of this study, emphasizing the role of context, multiplicity of perspectives, and the subjectivity of knowledge. By systematically examining prior empirical studies, conceptual frameworks, and theoretical models related to AI adoption and organizational readiness, the research endeavors to synthesize existing understandings and uncover latent patterns and themes that can inform future research and practice.

The methodological procedure employed in this study involves a comprehensive and systematic literature review. Literature-based qualitative research utilizes secondary data sources—namely, peer-

reviewed journal articles, conference papers, policy documents, industry reports, and scholarly books—to construct a detailed and critical understanding of a specific research problem. In this study, the literature review was conducted using academic databases such as Scopus, Web of Science, Google Scholar, ScienceDirect, and IEEE Xplore. The search strategy involved a combination of key terms and Boolean operators, including "AI readiness," "organizational readiness," "AI adoption," "digital transformation in SMEs," "manufacturing sector," and "Indonesia." Only literature published between 2010 and 2024 was considered to ensure the currency and relevance of the findings, with a particular emphasis on works published in the last five years to reflect the rapid evolution of AI technologies and digital innovation frameworks. Following the initial identification of sources, a selection process was applied based on inclusion and exclusion criteria. Studies were included if they directly addressed organizational readiness or AI adoption in the context of SMEs, particularly within the manufacturing sector or similar industries. Articles focusing solely on large enterprises, or those dealing exclusively with AI in consumer applications without organizational analysis, were excluded. The quality of sources was further assessed based on publication outlet credibility, peer-review status, citation count, and methodological rigor. This filtration ensured that the final corpus of literature comprised works with high academic and practical relevance. Ultimately, approximately 45 high-quality sources formed the analytical basis for this research.

To analyze the selected literature, the study employed thematic content analysis as its principal analytical technique. Thematic analysis is a widely accepted method in qualitative research for identifying, analyzing, and interpreting patterns of meaning—or themes—across a data set. In this context, each selected study served as a unit of analysis. Thematic analysis was conducted in several stages, beginning with familiarization through in-depth reading and annotation of each source. Initial codes were then generated based on recurring ideas or concepts, such as leadership commitment, technological infrastructure, employee digital literacy, strategic alignment, and innovation culture. These codes were then grouped into broader thematic categories that represent critical dimensions of organizational readiness for AI adoption. The analytical process was guided by a hybrid approach that combines both inductive and deductive reasoning. While deductive coding was used to align data with existing theoretical constructs such as the Technology–Organization–Environment (TOE) framework, inductive coding allowed the emergence of new themes specific to the Indonesian manufacturing SME context. This methodological flexibility ensured that the research was not constrained by predefined models and could incorporate context-sensitive insights from the literature. The result is a multi-dimensional thematic map that integrates the theoretical and empirical aspects of AI readiness, with particular attention to how these themes intersect in resource-constrained and institutionally diverse settings such as Indonesia.

Reliability and validity in qualitative literature studies are achieved through transparency in data selection, methodological rigor in analysis, and critical engagement with sources. To enhance reliability, this study adopted a clear and replicable protocol for database searches, source screening, and thematic categorization. A research log was maintained to document decision-making processes and reflections during the analysis. Triangulation was achieved by integrating findings from different types of literature—empirical case studies, conceptual articles, and practitioner-oriented reports—across multiple disciplines including information systems, management, industrial engineering, and innovation studies. This multi-source triangulation helped mitigate bias and strengthened the analytical depth of the study. Furthermore, reflexivity played an essential role throughout the research process. As the researcher is embedded within the socio-cultural context under examination, critical reflection was applied to recognize and bracket personal biases that may influence interpretation. The findings are presented not as objective truths but as contextually situated insights shaped by the interaction between literature, analytical frameworks, and researcher perspective. This stance aligns with the interpretivist view that knowledge is co-constructed and context-dependent, particularly in organizational and technological domains where change is continuous and contested.

Ethical considerations in literature-based research pertain primarily to the responsible use and representation of secondary data. All sources used in this study are appropriately cited and referenced according to APA style guidelines, ensuring intellectual honesty and academic integrity. Where necessary, original authors' interpretations were critically examined and not taken at face value, thereby respecting their contributions while also allowing for independent analysis. The synthesis of findings from multiple authors was conducted carefully to avoid misrepresentation or selective reporting of results. The scope of this research is delimited by its reliance on secondary data and its focus on manufacturing SMEs in Indonesia. While the findings offer valuable theoretical and practical insights, they do not include primary data from fieldwork, such as interviews or observations. Therefore, the conclusions drawn are interpretative and conceptual rather than empirical in the strictest sense. This limitation is acknowledged and addressed

by situating the study within the tradition of qualitative conceptual synthesis, which prioritizes the generation of new theoretical understandings over generalizability. Nonetheless, the study provides a robust foundation for future empirical research that may build on its findings through case studies, surveys, or action research.

The rationale for choosing a qualitative, literature-based method is threefold. First, the nascent and evolving nature of AI adoption in Indonesian SMEs necessitates a foundational understanding of readiness before empirical modeling can proceed. Second, the interdisciplinary nature of the topic—spanning management, information systems, and organizational behavior—requires integrative thinking that can be achieved through qualitative synthesis. Third, the diversity of existing studies and the lack of consensus on readiness dimensions make literature analysis a suitable starting point for conceptual clarification and theoretical development. By consolidating fragmented knowledge across disciplines, this research contributes to a more holistic understanding of what constitutes organizational readiness for AI in manufacturing SMEs. In conclusion, this research employs a qualitative, literature-based methodology grounded in thematic content analysis and the interpretivist paradigm to explore organizational readiness for AI adoption in Indonesian manufacturing SMEs. The use of secondary sources, rigorous coding procedures, and a hybrid analytical approach allows for the construction of an integrated conceptual framework that reflects both global theory and local contextual realities. This methodology not only aligns with the study's objectives but also sets the stage for subsequent empirical research and policy development aimed at enhancing AI readiness in Indonesia's industrial sector.

4. Result And Discussion

Organizational readiness for Artificial Intelligence (AI) adoption is a pivotal factor in determining the success of digital transformation within small and medium-sized enterprises (SMEs), particularly in the manufacturing sector. In the context of Indonesian SMEs, readiness is influenced by a complex interplay of strategic intent, infrastructural development, leadership orientation, and cultural adaptability. Based on a qualitative literature-based analysis, this study identified four dominant themes that characterize the state of readiness among these enterprises. The discussion below elaborates these findings across four primary dimensions, each of which contributes to a deeper understanding of how Indonesian manufacturing SMEs can prepare for sustainable AI integration.

4.1 Strategic Alignment and Leadership Commitment

The first critical finding concerns the strategic alignment of AI initiatives with broader business goals. Many Indonesian manufacturing SMEs approach digital transformation reactively rather than proactively, often responding to external pressures rather than internal innovation roadmaps. Literature from Jöhnk et al. (2022) and Bresciani et al. (2021) underscores the necessity of embedding AI adoption within long-term strategic plans. However, in many SMEs, AI is still perceived as a costly and overly complex investment, leading to underdeveloped strategic alignment. Without a clear articulation of how AI contributes to value creation, operational efficiency, or customer satisfaction, efforts toward AI implementation risk being fragmented and unsustainable. Closely linked to strategic alignment is the role of leadership in driving readiness. In SMEs, where hierarchical structures are dominant and decision-making is centralized, the vision and digital literacy of top management are decisive factors. Leaders who lack understanding of AI's capabilities tend to underinvest or avoid the technology altogether. In contrast, organizations with visionary leaders are more likely to experiment with AI in small, scalable ways that evolve into larger initiatives. The presence of committed leadership, therefore, not only legitimizes AI projects but also fosters a learning-oriented organizational culture that supports change. This observation aligns with Vial (2019), who argues that leadership is the cornerstone of organizational transformation.

Moreover, literature indicates that the absence of leadership commitment often results in inadequate resource allocation, both in terms of finances and human capital. AI readiness is not only a matter of adopting tools but also of building an enabling environment where those tools can be applied effectively. In the Indonesian SME context, this calls for leadership development programs focused on strategic technology management, helping leaders bridge the gap between operational focus and digital innovation. Strategic alignment and leadership readiness are thus mutually reinforcing. Organizations that align AI with their strategic goals and are led by informed, proactive leaders are significantly more prepared to navigate the complexities of AI adoption. In the absence of these elements, any attempt to integrate AI technologies may be superficial, short-lived, or even counterproductive.

4.2 Digital Infrastructure and Data Preparedness

The second major theme derived from the literature is the role of digital infrastructure and data preparedness in enabling AI adoption. AI systems rely heavily on digital data—structured, clean, and accessible—for their learning algorithms to function optimally. Yet, Indonesian manufacturing SMEs often operate in environments where data collection is manual, fragmented, or non-existent. This poses a fundamental barrier to AI readiness. As highlighted by Horváth and Szabó (2019), the lack of integrated digital systems significantly limits the effectiveness of AI applications, particularly those involving predictive maintenance, quality control, or production optimization. Infrastructure readiness includes not only physical assets such as servers, sensors, and network connectivity but also organizational practices such as data governance, cybersecurity protocols, and IT support services. In the case of many SMEs, these foundational elements are either absent or underdeveloped, resulting in limited interoperability and poor data reliability. Ahmad et al. (2021) point out that without such infrastructure, even basic digital tools cannot be effectively utilized, let alone AI systems that require high data quality and real-time access.

Furthermore, disparities in infrastructure between urban and rural industrial areas create an uneven landscape for AI readiness in Indonesia. While metropolitan SMEs may have access to cloud services, consulting support, and fiber-optic internet, their rural counterparts face persistent infrastructural challenges. This digital divide has implications not only for competitiveness but also for inclusive national development. Future research and policy efforts should explore scalable infrastructure models, such as shared data platforms or government-subsidized technology clusters, to address this disparity. In conclusion, the ability to adopt AI depends heavily on a firm's digital foundation. Without robust infrastructure and data preparedness, any AI initiative will struggle to gain traction. Therefore, digital infrastructure must be treated as a strategic investment—integral to long-term competitiveness rather than a peripheral IT concern.

4.3 Human Capital, Culture, and Organizational Learning

The third finding emphasizes the human and cultural dimensions of AI readiness. While infrastructure provides the tools, it is people who determine whether those tools are used, how effectively they are deployed, and whether they are improved over time. Human capital in Indonesian manufacturing SMEs remains a major constraint. Many employees lack the technical skills or familiarity with digital tools needed to interact with AI systems. Moreover, the fear of job displacement and a lack of understanding of AI's role can lead to resistance, even in firms that possess the necessary infrastructure. Organizational culture plays a crucial role in mediating the adoption of new technologies. Bianchini and Michalkova (2023) argue that a culture of innovation, experimentation, and continuous learning is essential for sustaining AI efforts. Unfortunately, many SMEs operate in rigid, hierarchical cultures where authority is centralized and deviation from established processes is discouraged. In such settings, employees may be unwilling to engage with AI tools, especially if they are not involved in the planning and implementation processes.

The literature also suggests that SMEs often lack formal mechanisms for upskilling or reskilling their workforce. While large enterprises may have dedicated learning departments, SMEs must rely on informal, ad-hoc training—if any. This limitation not only affects technical readiness but also undermines organizational confidence in managing AI projects. According to Dwivedi et al. (2021), workforce development should be embedded into AI readiness planning, with tailored programs that address the specific roles and needs of SME staff. Hence, human readiness for AI is a function of both skills and culture. Building technical competencies without addressing cultural readiness may lead to symbolic adoption—where AI tools are present but underutilized. Conversely, fostering an open, inquisitive culture without technical skills may generate enthusiasm but no action. The most AI-ready SMEs are those that nurture both simultaneously, enabling people to understand, apply, and improve upon AI systems as part of their daily work.

4.4 Sustainability and Ecosystemic Support for AI Readiness

The final key theme centers on the sustainability of AI readiness and the broader ecosystem that supports it. Readiness is not a one-time condition but an evolving state that must be nurtured and maintained through continuous investment, learning, and strategic adaptation. In Indonesia, where SMEs face frequent regulatory changes, technological flux, and economic volatility, the ability to remain digitally agile is crucial. Ransbotham et al. (2018) suggest that AI readiness should be integrated into a firm's overall digital resilience framework, ensuring that enterprises are not only prepared for today's challenges but also adaptable to future ones. Sustainability also involves ethical, legal, and governance dimensions. As AI

becomes more embedded in organizational decision-making, issues of transparency, bias, and accountability become more urgent. Indonesian SMEs are largely unprepared for these challenges, lacking policies or oversight mechanisms to manage the ethical risks of AI. Hofstede (2011) reminds us that in high power-distance cultures, employees are less likely to question decisions or flag problems—making internal governance even more essential. Regulatory agencies, therefore, have a role in shaping AI readiness by providing clear guidelines, oversight, and support frameworks for responsible AI use.

In addition, ecosystemic support is essential for SMEs to achieve sustainable AI readiness. This includes government incentives, access to AI-as-a-service platforms, partnerships with universities, and peer-to-peer networks. The success stories cited by Prabowo et al. (2023) in Indonesia indicate that SMEs involved in collaborative innovation ecosystems demonstrate significantly higher levels of readiness and performance. Therefore, readiness should not be viewed solely as an internal organizational issue, but as a co-produced outcome of the broader environment in which the enterprise operates. Moving forward, research should expand toward identifying best practices in ecosystem-driven readiness, especially in emerging economies. Questions such as "What forms of public-private partnerships most effectively raise SME readiness?" or "How do SMEs maintain readiness in turbulent environments?" deserve systematic inquiry. Only by embedding readiness into broader social, institutional, and economic systems can AI adoption in Indonesian SMEs become a sustainable national achievement.

5. Conclusion

The findings of this literature-based qualitative study underscore the multifaceted nature of organizational readiness as a dynamic and context-sensitive construct, particularly within the unique environment of Indonesian manufacturing SMEs. Conceptually, the study affirms that readiness for AI adoption extends beyond technical preparedness and must be understood as a systemic interaction of strategic alignment, leadership orientation, infrastructure maturity, human capital, and cultural adaptability. Theoretically, the synthesis expands on existing frameworks such as the Technology–Organization–Environment (TOE) model by demonstrating that AI readiness requires continuous organizational learning, ethical governance, and iterative feedback mechanisms. It adds depth to the discourse by asserting that readiness is not a fixed state but a developmental trajectory that reflects an organization's absorptive capacity and ability to evolve with technological, regulatory, and market changes. These insights contribute to the refinement of AI adoption theories by emphasizing temporal and socio-cultural dimensions, particularly in emerging economies where infrastructure and institutional support are unevenly distributed.

From a managerial perspective, the study presents clear implications for decision-makers within SMEs who are contemplating or actively engaging in AI transformation. First, organizational leaders must embed AI objectives within their strategic vision and ensure that these goals are supported by adequate resource planning, workforce development, and digital infrastructure. Leadership must act not only as sponsors of change but as facilitators of an inclusive culture that encourages employee participation, risk-taking, and skill acquisition. Managers should prioritize internal audits of digital readiness and use the results to design tailored interventions that address specific gaps—whether in infrastructure, culture, or knowledge. Additionally, as readiness involves ethical and governance concerns, SMEs must begin institutionalizing AI usage policies and aligning themselves with emerging regulatory standards to ensure responsible adoption. Investment in internal feedback systems is equally vital, as it allows firms to assess, recalibrate, and improve their AI integration strategies continuously. This managerial shift—from passive adoption to active orchestration of readiness—is crucial to fostering sustainable digital transformation.

Finally, this study reinforces the need for a sustainable and ecosystemic approach to AI readiness in the Indonesian SME sector. SMEs do not operate in isolation; their capacity to adopt and sustain AI is influenced by the availability of external support mechanisms, such as policy incentives, regional innovation hubs, and collaborative networks involving academia, government, and industry stakeholders. For both researchers and policymakers, the implications are clear: supporting AI readiness requires multidimensional, scalable strategies that balance capacity-building with institutional reform. The study thus calls for the development of localized readiness frameworks that accommodate the heterogeneity of SMEs across Indonesia, bridging the urban-rural divide and elevating digital inclusion. The continuation of this research agenda, particularly through empirical fieldwork and longitudinal case studies, will be vital to uncovering how AI readiness evolves over time and how SMEs can transform not just technologically, but also strategically and socially, in the face of ongoing digital disruption.

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