



The Impact of Artificial Intelligence (AI) Adoption on the Productivity of Small and Medium Enterprises (SMES) Industries in Indonesia

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Abstract

The fact that Artificial Intelligence (AI) technologies develop at an extremely large rate has transformed the dynamics of the business environment across the world, and, at the same time, the adoption of this technology among the Small and Medium Enterprises (SMEs) in Indonesia is low due to its contextual influence. This is a theoretical paper of inquiry on the development impacts of AI adoption on the productivity of SMEs, where the cost of high implementation, ignorance, and lack of adequate infrastructure are the middle term factors that inhibit the digital transformation. The overall objective is to investigate the impact of the following mediators in the correlation between the adoption of AI and the increase in productivity in the industry of Indonesian SMEs. The present paper is conducted in the form of conceptual and thematic review, resource-based View (RBV), Technology- Organization- Environment (TOE), and Diffusion of Innovation (DOI) are the only sources of secondary data that include peer-reviewed journals, policy reports, books, and credible online databases. Based on the literature evidence, despite the fact that the process of AI integration is making innovations in operations and efficiency, most Indonesian SMEs are facing structural and capacity-related barriers to effective adoption. The policy should support the creation of affordable AI solutions, digital literacy, as well as the development of infrastructures, which this research suggests should help achieve productive growth in all spheres of the board. The paper concludes that a strategic combination of technology readiness, policy intervention and enhancing human capital is very much desired to ensure maximum out of the transformative potential of AI in the SME sector in Indonesia.

Keywords: Artificial Intelligence (AI), SMEs, Productivity, Technological Readiness, Indonesia.

Original Research Articles

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1.0 Introduction to the Study

1.1 Background of the Study

Artificial intelligence (AI) is a new revolution in the business world as the technological change rate is high, and it has changed the mode of conducting businesses, their productivity, and competitiveness in any industry around the world. Artificial intelligence has the potential to make organizations more automated in their operations and

processes, handle large volumes of data, enhance decision-making, and coordinate the allocation of resources (Mohammed and Sundararajan, 2023; Brynjolfsson and McAfee, 2017). The implementation of AI has been established as an innovation basis in the developed world to enable companies to achieve significant productivity, efficiency, and cost-effectiveness (World Economic forum, 2022).



The trend in the adoption of AI is rapidly increasing in Asia because of the digital transformation process, the state regulations, and the growing need to become a distinguished competitor. The examples of the countries that have factored AI into national industrial plans to promote economic growth and technological supremacy are China, South Korea, Japan, and Singapore (Li et al., 2021; OECD, 2022). However, the degree of uptake is rather uneven across the regions, and structural, financial, and knowledge-based barriers are observed in developing countries of Southeast Asia, such as Indonesia, Malaysia, and Vietnam (Aliyu et al., 2022; Mohammed et al., 2021).

Indonesia has more than 99 percent of total businesses and approximately 60 percent national GDP, which is composed of small and medium businesses (SMEs) (Ministry of Cooperatives and SMEs, 2023). They are not economically developed, and despite the fact that they are not technologically developed, they have limited access to AI-based solutions (Suryani and Nugroho, 2022). They do not rely on AI due to its high cost, the lack of technical expertise, and digital illiteracy to be more productive and competitive (Mohammed, Lawal, and Sundararajan, 2023; Rahardjo and Setiawan, 2021). Moreover, absence of adequate digital ecosystems, low use of the internet in the rural communities, and the insufficient awareness regarding the usefulness of AI are also adding to the widening of the adoption gap (Kurniawan et al., 2022).

The relevance of AI in enhancing the productivity of SMEs is particularly a crucial topic to consider because Indonesia strives to make an Industry 4.0 and a digital economy by 2030. The AI technologies can support the SMEs by automating, conducting data analytics, contacting customers, conducting predictive maintenance, and supply chain optimization (World Bank, 2021). Nonetheless, the AI transformative potential is inapplicable due to the multidimensional issues, monetary, knowledge-based and infrastructural (Mohammed and Sundararajan, 2023).

Therefore, the role of the use of AI on the performance of SMEs in Indonesia and the mediation of the role of high cost, lack of knowledge, and poor

infrastructure, regarding the impact of using AI, is of interest among policymakers, researchers, and practitioners. The empirical evidence on the global and regional level is reflected in the conceptual research and offers the framework on how to enhance the process of AI adoption and productivity performance of Indonesian SMEs.

1.2 Problem Statement

Although the rest of the world can be described as a testament of the potential of AI to boost productivity, the advantages of AI-led innovation to the Indonesian SME have not been realized in significant proportions. Scientific literature points to the fact that despite its ability to increase efficiency of businesses, reduce costs, and improve competitiveness (Brynjolfsson and McAfee, 2017; Li et al., 2021), AI is comparatively low in the case of SMEs in developing countries (Mohammed and Sundararajan, 2023; Suryani and Nugroho, 2022).

The impediments to adoption are:

1. Higher implementation cost- AI implementation is cost-prohibitive to SMEs to install AI systems, software, and talent.
2. Ignorance and digital illiteracy - insufficient demonstration of AI capabilities and insufficient training cannot allow using it effectively.
3. Poor infrastructure - poor internet connectivity, poor digital ecosystems and poor cloud computing facilities hamper potential adoption.

Consequently, unlike larger firms in Indonesia that are becoming more technologically modernized with the use of AI, SMEs continue to operate on a lower level than they could, further widening the digital gap in the industrial landscape (Aliyu et al., 2022; Rahardjo and Setiawan, 2021). These mediating problems play a key role in the achievement of an inclusive digitalization of the industry and competitiveness of the Indonesian economy in the digital era.

1.3 Significance of the Study

The study has theoretical significance to the recent body of research on the use of AI and the

productivity of SMEs in emerging economies.

1. By generalizing the findings of a study on the global, Asian, and Indonesian setting, Bridges fills in certain empirical gaps as a means of offering a blanket proposal of a model that determines the link between AI adoption and the productivity of SME.
2. Facts out the mediating variables, namely, high cost, knowledge deficiency, and poor infrastructure, whether or not the use of AI is linked to SME productivity in Indonesia poorly.
3. Provides a theoretical framework of the combination of Technology-Organization-Environment (TOE) and Resource-Based View (RBV) theories in order to understand AI-based productivity enhancement.
4. Government organizations and development partners may use the policy recommendations to enhance the digital infrastructure, capacity building, and AI preparedness of SMEs.

As this contribution to the dimensions suggests, this theoretical study provides a strategic direction on how to enhance the SME productivity in the sustainable implementation of AI in the national policy of digital transformation and the global tendency towards intelligent and data-driven economies.

1.4 Research Objectives

The primary objective of the study will be to conceptualize the impact of the adoption of Artificial Intelligence (AI) on the productivity of Small and Medium Enterprises (SMEs) in Indonesia and how the mediating variables of high costs, lack of knowledge, and inadequate infrastructure can alter this process. In order to achieve this overall goal, the following specific objectives are adopted by the study:

1. To test the level to which the adoption of AI is associated with the productivity of SMEs in the context of the new digital economy of Indonesia.
2. To establish the barriers and mediating variables, i.e., high implementation cost, lack of knowledge and insufficient infrastructure that

affect the adoption of AI among the Indonesian SMEs.

3. To synthesize theoretical knowledge of the Resource-Based View (RBV) and Technology Organization Environment (TOE) model to comprehend the dependence of AI acceptance and productivity outcomes.
4. To design a conceptual framework that can characterize the influence of the mediating variables on the strength of the association between AI adoption and SME productivity.
5. To provide policy/strategic recommendations to policy makers and industry players to encourage AI-based productivity and sustainable competitiveness in the SMEs environment in Indonesia.

1.5 Research Questions

This study will be set to respond to the following research questions based on the objectives:

1. How will the introduction of Artificial Intelligence (AI) impact the productivity of SMEs in Indonesia?
2. What are the major threats to the introduction of AI in the Indonesian SMEs?
3. How the AI adoption influence the productivity of the SMEs in relation to high cost, lack of knowledge, and poor infrastructure?
4. What are the theoretical relations between integration of AI, the Resource-Based View (RBV) and the Technology Organization Environment (TOE) model in the explanation of the productivity outcomes?
5. How can AI adoption and productivity among Indonesian SMEs be improved by using strategic interventions?

1.6 Scope and Context of the Study

It is a conceptual paper that focuses on the Indonesian SMEs, which are the backbone of the economy in Indonesia. The given analysis will rely on the history of the digital transformation and

Industry 4.0, and the way the incorporation of AI may influence the productivity of various SME industries, such as manufacturing, services, agriculture, and trade.

It can be defined as follows:

Geographical location: The study is limited to Indonesia, and this is premised on the fact that the country is a distinct case in the socio-economic environment, digital readiness and inadequacy in infrastructures compared to other ASEAN economies.

Sectoral scope: It targets those SMEs that work in manufacturing and service industries where AI technologies (e.g., automation, predictive analytics, machine learning, and data-driven decision systems) will result in a significant productivity increase.

Conceptual scope: The research analysis examines conceptual scope of adoption of AI (independent variable) and its impact on SME productivity (dependent variable) and high cost, ignorance and lack of infrastructure as mediating variables.

Temporal scope: The research is conceptual, though, the author mentions the up-to-date developments in the last several years (2019-2024) and follows the alterations of digital transformation projects in Indonesia as a part of the Making Indonesia 4.0 roadmap.

The proposed study is dedicated to the addition to the existing discussion of the subject of digitalization and AI transformation in the new economies, which can impact the industrial policy, SME competitiveness, and long-term economic growth.

2.0 Literature Review

The literature review provides a conceptual, theoretical, and empirical information on how the implementation of Artificial Intelligence (AI) leads to productivity in Small and Medium Enterprises (SMEs). It is a combination of the global and regional perspective and lays emphasis on the situation in Indonesia in terms of the Industry 4.0 transformation endeavors.

2.1 Conceptual Review

2.1.1 Concept of Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to the ability of computer systems and machines to perform activities, which are considered to be carried out by the human intelligence, such as learning, reasoning, perception, and problem-solving (Chen et al., 2023). Machine cognition and computational intelligence In 1956 systematic study of machine cognition began and the name Artificial Intelligence was first used by John McCarthy at the Dartmouth Conference. Since that time, AI has gone through various phases, but rule-based expert systems in the 1970s and machine learning in the 1980s, followed by the deep learning and neural networks that are already the new standard in AI studies nowadays (World Economic Forum [WEF], 2023).

AI can be described in the modern sense as a wide variety of technologies, including machine learning (ML), natural language processing (NLP), computer vision, robotics, and predictive analytics. The technologies are more likely to enter the organizational processes in order to make the decision making process more effective, automatize the routine processes, and even streamline the operations (OECD, 2023; Mohammed and Sundararajan, 2023).

The second element that shaped the evolution of AI is the advancement of the sphere of big data analytics, cloud computing, and Internet of Things (IoT) infrastructure, which causes intelligent automation and digital transformation to coexist (Mohammed, 2023; Lawal et al., 2023). So, AI is no longer a technological invention but a business tool and a strategic aspect of the organization that has the capacity to generate new business models and a competitive landscape (Kumar et al., 2024).

The AI applications within business and industry have been integrated into the optimization of work, predictive analytics, and management of customer relations. AI-based systems are enabled to predict maintenance, track real-time, and manage quality in the manufacturing process with the help of sensors and sensor-based analytics (Mohammed, 2023; Sundararajan et al., 2023). In the field of finance and e-commerce and making it efficient and profitable,

AI can assist in fraud detection, algorithmic trading, and the recommendation of personalized products to users (Mohammed and Sundararajan, 2023).

However, it has been proved that the application of AI can significantly positively influence the use of resources, correct decision-making, and productivity (OECD, 2023; Chen et al., 2023). The customer engagement in the service industry is enhanced with chatbots and intelligent virtual assistant, and the analytics are driven by AI to market and supply chain strategy (WEF, 2023).

In addition, AI has been used to develop sustainable management and environmental monitoring, which is gaining popularity at least in resource-bound economies (Lawal et al., 2023). Such applications align with the sustainability goals of the world because they promote efficiency and minimization of waste through smart energy management and smart logistics (UNIDO, 2023).

AI is a challenge to as well as an opportunity to the developing economies, particularly in Asia and Africa. Despite the opportunities brought about by AI such as productivity, competitiveness, and innovation, high implementation cost, insufficient technical know-how, and an inadequate infrastructure would also be possible hindrances to its use by most SMEs (World Bank, 2024; PwC Indonesia, 2022).

The government initiative Making Indonesia 4.0, in the example of Indonesia is concerned with the digital transformation as the source of industrial modernization and development of SMEs. However, AI application is underutilized among SMEs as the technology is not available to everyone, the digital literacy levels of the latter are low, and not all SMEs have access to financial resources to utilize technologies (UNIDO, 2023; PwC Indonesia, 2022).

As Aliyu (2023) and Mohammed et al. (2024) claim, the AI-based innovation has a positive impact on organizational agility and the ability to manage human resource and develop as an entrepreneur, which do not normally happen in a developing environment due to the inefficient policy implementation and lack of appropriate capacity. This creates an advantage in the productivity of the SMEs in the developed economies as compared to

the emerging economies, including Indonesia. Mohammed (2023) further explains that integration of AI and digital systems can help the SMEs to make superior decisions about their operations, be more efficient, and develop competitiveness within the dynamic markets. Nevertheless, in order to take advantage of the transformational power of AI, SMEs should overcome the structural barriers, especially those related to costs, infrastructure, and technical expertise.

2.1.2 Concept of Small and Medium Enterprises (SMEs)

The role of small and Medium Enterprises (SMEs) in the economic system of Indonesia is truly impressive, as it is what drives the development of the industrial sector and the number of workers of the country. Indonesia sorts SMEs into such categories based on asset ownership and annual turnover: micro enterprises (assets under IDR 50 million), small enterprises (IDR 50 -500 million), and medium enterprises (IDR 500 million -10 billion).

The features of SME businesses typical of Indonesia are low capital base, family ownership, informal management structure, and local operations (World Bank, 2024). Though restrictive these have a positive impact on the diffusion of innovations, local job creation and economic proliferation. Mohammed and Sundararajan (2023) argue that SMEs provide an adaptive mechanism in the dynamic economies by way of entrepreneurship and as the economy oscillates; they enable the country to be resilient to the oscillating forces. The empirical data indicate that SMEs provide more than 60 percent of the GDP and consume more than 97 percent of the total employment in Indonesia (OECD, 2023; UNIDO, 2023). They are also important in the development of the region as they close the gap between the rural and urban income and enhance decentralized industrialization. Aliyu (2023) and Mohammed et al. (2024) highlight that the competitiveness of the SMEs and their ability to embrace digital innovations form a significant part of the strength of the industrial ecosystem in Indonesia. With the country moving into Industry 4.0, the SMEs are at the center of realizing productivity-led development using digitalization, innovation, and integration of

technology.

Nevertheless, the productivity of SMEs is still low in comparison with large companies because of structural inefficiencies and inaccessibility to sophisticated technology (PwC Indonesia, 2022). This is the productivity gap that makes AI-based digital transformation efforts a necessity. Therefore, irrespective of the described importance, SMEs in Indonesia are faced with a number of challenges, such as unavailability of financial sources, inadequate infrastructure, and low digital literacy (World Bank, 2024; UNIDO, 2023). The majority of the SME owners know nothing about how AI and other emerging technologies can assist them in making the work of their companies more efficient.

According to Mohammed (2023), one of the reasons why SMEs are not involved in the digital economy is poor technological preparedness and the absence of strategic plans related to digital planning. According to the report issued by PwC Indonesia (2022), this means that the total rate of AI implementation by the Indonesian SMEs is below 15 percent, and it is primarily caused by the barriers to the implementation caused by the cost and the shortage of qualified personnel. These issues imply that the capacity-building programs, infrastructure support, and digital policy change should become the means to accelerate the SME readiness to Industry 4.0.

2.1.3 Concept of Productivity (Dependent Variable – DV)

The ratio of output to the input required in the production process is the most prevalent definition of productivity (OECD, 2023). SME productivity also encompasses both labor productivity (output per worker) and total factor productivity (TFP) that is the level of resource efficiency, such as capital, labor, and technology (World Bank, 2024).

Mohammed (2023) expands on the idea and adds digital productivity that involves integrating technology-related instruments and data analysis to streamline the decision-making process and resource management. Productivity is hence non-dimensional- it encompasses operational, financial and innovative deliverables (Lawal et al., 2023).

Sales growth, revenue per employee, operational

efficiency, and product innovation can serve as the metrics of productivity in case of SMEs (OECD, 2023). However, not all SMEs in the developing economies possess good data systems, and therefore, they cannot be measured. As Mohammed and Sundararajan (2023) explain, digital technology is more accurate with regard to the ability to track and increase productivity, such as management information systems (MIS), enterprise resource planning (ERP), and analytics via AI. Another aspect through which the adoption of such tools in the work of SMEs in Indonesia can be evaluated is the enhancement of the performance, particularly manufacturing and services (PwC Indonesia, 2022).

Innovation and digital technologies are crucial in the productivity of SMEs. It is also noted that the adoption of the digital is positively correlated with increasing productivity because of the improvement of automation of the processes, reduction of transaction costs, and the use of data-driven policies (Chen et al., 2023). Mohammed et al. (2024) point out that strategic human resource management integrating with digital innovation leads to the enhancement of the performance and sustainability of the entrepreneur. On one hand, the digital platform, AI-based analytics, and smart production technologies can be used in the Indonesian scenario to transform SMEs into competitive players both regionally and globally (UNIDO, 2023; WEF, 2023).

2.1.4 Artificial Intelligence Adoption

The process of integrating AI-based systems into the work of the firms to make the processes more efficient, allow making decisions and being innovative can be called the use of AI (Chen et al., 2023). Awareness, trial, implementation and institutionalization is a common process that is known as the stages of adoption (OECD, 2023).

Resource constraints, uncertainty of returns, and technical deficiency are some of the factors that make the SMEs adopt slowly (PwC Indonesia, 2022). Mohammed (2023) states that perception of usefulness and awareness are key predictors of the early adoption phases and that the infrastructure and organizational support influence the later phases.

Three broad contexts (implicated in the Technology-

Organization-Environment (TOE) approach) will influence the adoption of AI:

- There are technological determinants such as IT infrastructure, compatibility, and relative advantage.
- The forces of the organization such as backing of the leadership, human resource and culture of innovation.
- The environment, including the intensity of competition, the regulatory environment and governmental support (OECD, 2023).

Incorporating AI in organizations is more likely to occur in organizations with a high innovation culture and learning orientation (Mohammed & Sundararajan, 2023). Similarly, as stated by Aliyu (2024), AI-based transformation development in the context of the developing environment is conditional upon upskilling and the establishment of digital literacy. The high cost of technology, the lack of digital skills, data privacy concerns, and the lack of governmental support are the key barriers to the use of AI that SMEs face (PwC Indonesia, 2022; UNIDO, 2023).

Some of the SMEs in Indonesia still operate on old systems and with manual operations, and it is difficult to incorporate AI solutions (World Bank, 2024). Mohammed et al. (2023) assume that such barriers are enhanced by the absence of direct policy frameworks on the digitalization of SMEs leading to the discrepancies between the adoption rates in various sectors. The implementation of AI also implies a diverse range of beneficial outcomes, including the efficiency of operations, saving money, enhanced decision-making, and customer satisfaction (Chen et al., 2023). As Mohammed (2023) notes, AI technologies have the potential to improve business intelligence levels due to the possibility of predictive analytics and repetitive work that is conducted automatically. It has also been empirically proven that AI-based firms perform better in terms of becoming more innovative and resilient to economic shocks (Kumar et al., 2024; Lawal et al., 2023). The productivity and competitiveness of ASEAN digital economy are the key to the use of AI in the case of the Indonesian SMEs (UNIDO, 2023; WEF, 2023).

2.1.5 Technological Readiness

Technological readiness is where an establishment has the technical equipment, and computer-like skills and innovation spirit to adopt and exploit the enhanced technologies in an effective way (OECD, 2023). Digital literacy, interoperability of the systems, and availability of IT resources are examples of technological readiness in the context of SMEs (Mohammed and Sundararajan, 2023). It is among the key predictors of the successful implementation of AI and the overall results of the digital transformation.

The minimum condition of AI implementation is a sufficient ICT infrastructure, which is a broadband connection, data facilities, and cloud services. However, the issue of the infrastructure gap remains a major challenge in Indonesia, and it influences SMEs that are not located in large cities (World Bank, 2024). The materials presented by Mohammed (2023) and Lawal et al. (2023) enable digital literacy and an innovation-oriented culture to focus more on the technology absorption process. SMEs can be trained and have capacity-building regularly to enable them to cope with AI-powered tools and stay competitive because of innovation.

Technological preparedness is directly linked to the degree of intensity, speed, and AI adoption success. Firms that are more digitally prepared will better opportunities of positive performance outcomes of AI initiatives (Chen et al., 2023). According to the report released by the PwC Indonesia (2022) in Indonesia, SMEs with sufficient IT infrastructure and qualified human resources are twice as likely to make a decision regarding the use of AI solution compared to those that do not. Mohammed et al. (2024) confirm that technological readiness is a strategic facilitator, which links the digital transformation projects to productivity increase.

2.2 Theoretical Framework

The theoretical foundation of the work is grounded on three theories (Resource-Based View (RBV), Technology- Organization- Environment (TOE), and Diffusion of Innovation (DOI) which are connected to one another to describe the aspects that influence the adoption of Artificial Intelligence (AI)

and its relation to the productivity of Small and Medium Enterprises (SMEs) in Indonesia. The combination of all these theories establishes the interaction of organizational resources, contextual factors, and dynamics of innovation and determines the result of using and adopting digital technologies.

2.2.1 Resource-Based View (RBV)

Resource- Based View (RBV) as popularized by Barney (1991) is founded on the assumption that competitive advantage of a firm comes about as a result of resources that the firm has: they are valuable, rare, inimitable, and non-substitutable (VRIN) resources. The latest type of strategic resource is Artificial Intelligence (AI), which enables companies to derive insights out of data, automate the working process, and become more efficient in making decisions in the age of the digital transformation (Chen et al., 2023). Mohammed contends that AI abilities are dynamic faculties (2023) that can be tapped to transform raw data into actionable intelligence and help to improve the efficiency of operations. These intangible digital assets produce long-term productivity gains when integrated in business models successfully. It has been shown that AI applications, such as predictive analytics and automated decision systems, and intelligent customer engagement tools, have created the competitive differentiation (Kumar et al., 2024). Thus, according to the RBV approach, the AI implementation is more capable of enhancing the value creation within an organization concerning cost-efficiency, innovation, and sensitivity to market trends.

Within the framework of the SME, the RBV will be able to take into account the role of internal capabilities on the use of AI and its productivity results (in digital skills, commitment to leadership, and technological competencies) (Mohammed and Sundararajan, 2023). SMEs can also use AI-related capabilities and digital infrastructures as strategic resources to eliminate the size-related drawbacks, which are brought forth by the ability to develop such resources. It is the minor companies that act in Indonesia that especially require such capabilities because of financial and infrastructural limitations (World Bank, 2024).

As Lawal et al. (2023) note, the evolution of the digital resources into an organizational habit will contribute to the sustainable performance, specifically in resource-starved settings. In such a way, RBV is keen to note that SMEs should view AI not as an investment in technology, but as a core competency of the organization that will translate into productivity and competitiveness in the long term.

2.2.2 Technology–Organization–Environment (TOE) Framework

The Technology- Organization- Environment (TOE) model, developed by Tornatzky and Fleischer (1990) provides a broad picture on which one can look at the problems that influence the adoption of technology within the organizations. It is a three dimensional notion which involves:

- Technological context - availability, compatibility and relative advantage of the innovation.
- Organizational environment - firm size, management support, resources and human capital.
- Environmental environment - market forces, competition in the industry, and regulatory systems (OECD, 2023).

Mohammed (2023) refers to these dimensions as the factor that defines the success or failure of AI adoption by the SMEs. The TOE framework can capture internal readiness and the external environmental influences and hence can be applied in the analysis of the flexibility of SMEs to technological disturbance. Aliyu (2024) observes that the organizations that enjoy good managerial support, digital literacy, and right infrastructure have a high likelihood of succeeding in the adoption of AI technologies. Additionally, positive institutional policy, i.e., the Making Indonesia 4.0 roadmap, can also play a significant role in the preparedness of the environment of SME digitalization (PwC Indonesia, 2022).

The TOE framework particularly fits the Indonesian SMEs due to the heterogeneity and the digital level maturity of the latter. The majority of the SMEs are

informal players, with small organizational structures that determine their capacity to adapt to the new technologies (UNIDO, 2023).

By assessing the adoption of AI in the context of the TOE, the present paper concludes that technological readiness (IV2) and environmental factors are the intervening variable between AI adoption (IV1) and productivity (DV). This approach aligns with the results of Mohammed et al. (2024), who discovered that the strategic alignment between technology resources and organizational strategy facilitates performance in the emerging economies. Thus, the reflection guide of the contextual factors influencing the adoption of AI among the Indonesian SMEs will be the use of TOE.

2.2.3 Diffusion of Innovation (DOI) Theory

Rogers (2003) forwarded the theory of diffusion of Innovation (DOI) that is a theory explaining how a new technology spreads among individuals, organizations or even the society over a certain duration due to communication channels. DOI identifies five stages of adoption, which include: knowledge, persuasion, decision, implementation, and confirmation. There are also five innovations characteristics that influence adoption, as mentioned by Rogers and they are relative advantage, compatibility, complexity, trialability, and observability. They are properties which determine the rate and the extent of diffusion (Rogers, 2003).

In the case of AI, the dimensions can be utilized to learn why the adoption rates and the success of implementation differ among SMEs. Mohammed (2023) states that the higher is the digital literacy of SMEs, the less complicated and advantageous AI in their opinion, which enhances the accelerated diffusion. Not-so-technologically advanced enterprises, in turn, fear diffusion due to low awareness and perceived risks (PwC Indonesia, 2022). Application of DOI to the adoption of AI by the Indonesian SMEs provides an insight into behavioral and perceptual barriers that affect the digital transformation. The number of small businesses at the knowledge and persuasion stage, where awareness and perceived usefulness is the decisive factor, remains quite high in Indonesia

(World Bank, 2024).

According to Aliyu (2023), institutional support and peer learning are the main factors that encourage the transfer of SMEs to implementation and confirmation levels. Moreover, according to Lawal et al. (2023), the distribution of the digital innovation depends on the existence of social networks, training, and collaborative ecosystems that reduce the degree of uncertainty and increase confidence in the utilization of technologies. DOI framework is the complement of RBV and TOE since it talks about human and behaviour issues with technology adoption, therefore is an essential theoretical pillar in conceptual integration of this study.

The three components are combined to provide a comprehensive foundation on the concept of the adoption of AI and its effects on the productivity of SME. RBV explains a nature of what internal resource is relevant, TOE nature of how contextual factors enable or stop adoption, and the nature why and when innovation diffuses among SMEs. These frameworks, together, enable researchers to possess a multidimensional perspective on AI adoption among the Indonesian SMEs, to relate strategic resources, organizational preparedness and innovation behavior to productivity outputs.

2.2.4 Linkages between Theories

With the multi-level perspective of the mechanisms through which Artificial Intelligence (AI) ends up being the source of productivity to SMEs, one can obtain the multi-level view of the process by combining the Resource-Based View (RBV), the Technology Organization Environment (TOE) framework, and the Diffusion of Innovation (DOI) one. The focus of RBV is internal capabilities and resources (what the company has and generates) that generate sustainable advantage (Barney, 1991). TOE is also useful in supplementing RBV as it determines such resources within technological, organizational and environmental conditions that favor and restrict the adoption (Tornatzky and Fleischer, 1990). DOI allows adding the aspect of behavioral, time-related perspective: the manner of how knowledge, the perceived features of AI (relative advantage, compatibility, complexity), and social diffusion impact the pace and the success of

adoption (Rogers, 2003).

Synthesis principle: AI can only be fruitful when it is (a) a strategic resource that is highly difficult to replicate (RBV) and (b) in favourable technological, organizational, and environmental conditions (TOE),

and is (c) effectively diffused through organizational actors and networks (DOI). That is, RBV explains the value and scarcity of AI-competencies; TOE explains what enablers must be present to allow the value to be realized; DOI explains how firms cross boundaries of adoption.

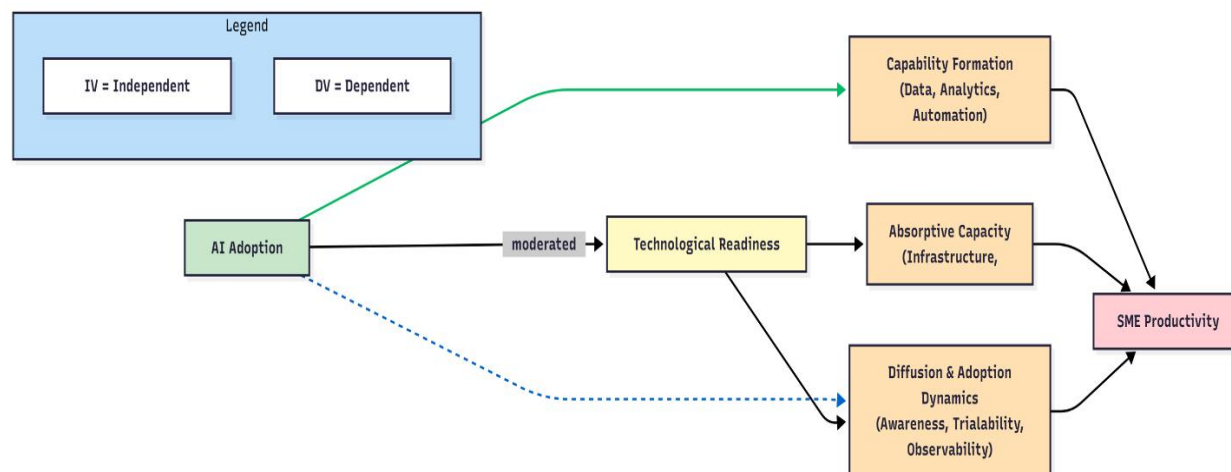


Figure 2.1: Conceptual Framework Linking AI Adoption, Technological Readiness, and SME Productivity

Source: Researcher's Conceptualization (2025), adapted from RBV, TOE, and DOI frameworks.

Figure 2.1 illustrates the conceptual model of the hypothesis, which outlines the resource-based view (RBV), technology-organisation-environment (TOE) and diffusion of innovations (DOI) theories in that the implementation of the Artificial Intelligence (AI) and technological preparedness drive the productivity of the SMEs through interconnected processes. The model demonstrates that AI usage enhances productivity through the establishment of organizational traits, such as the use of data to become a decision-maker, automation, and innovativeness (RBV pathway). The latter effect is supported with technological preparedness providing the necessary infrastructure, digital literacy, and absorptive capacity to the extent of efficient AI use (TOE pathway). In addition, more extensive integration and faster dissemination of productivity gains in the SMEs is achieved via the diffusion aspects, such as awareness, trialability and observability (DOI pathway). The general structure makes it clear that the increase in the productivity of the factories of the Indonesian SMEs does not just

depend on the readiness to adopt AI, but also on the readiness of the technological environment and the atmosphere of the conditions under which the diffusion must take place.

AI Adoption and Technological Readiness, Drive SME Productivity

1. Direct resource → performance pathway (RBV lens).

With AI (IV1) implemented by SMEs and AI capabilities integrated into data pipelines, ML models, and automated decision rules are becoming strategic resources (value, rare, hard to copy) that can be used to increase operational efficiency, reduce error, and create new value-creating routines. RBV predicts such internal capabilities which can enhance total factor productivity (TFP) and labor productivity because of the possibility to use the available inputs more effectively (Barney, 1991; Chen, Zhang and Liu, 2023; Mohammed, 2023).

2. Enabling context and absorption pathway (TOE lens).

The success of the implementation of AI depends on the level of technological preparedness (IV2) - ICT infrastructure, cloud-access, digital literacy, interoperability. TOE does not simply augment or diminish the predictor, it is a facilitator (or a bottleneck). Even high-potential AI solutions cannot demonstrate productivity when the organizational processes, the commitment of the leaders, or even the environmental supports (regulation, vendor ecosystems) are feeble (Tornatzky and Fleischer, 1990; PwC Indonesia, 2022). As such, IV2 positively influences productivity directly and moderately affects the success of AI implementation.

3. Adoption dynamics and behavior pathway (DOI lens).

DOI describes the adoption stages with knowledge resulting in persuasion, in turn resulting in decision, resulting in implementation, and resulting in confirmation, but attributes (relative advantage, compatibility, complexity, trialability, observability) that influence them (Rogers, 2003). Those SMEs which believe that AI can be well aligned with the existing processes and can be tested at an affordable cost pass through the stages of adoption faster, generating productivity gains earlier. Diffusion (as a result of social influence, the champions of an industry) uptake can be eventually translated into an increase in aggregate productivity between networks (Mohammed & Sundararajan, 2023; Aliyu, 2024).

4. Interaction and mediated mechanisms.

These outcomes create 3 major processes of IV1 + IV2 and DV:

Capability formation (RBV mediated): adoption AI, creating data/ analytics capability, improved processes, innovation, decision making quality, productivity.

Absorptive capacity (TOE moderated): Technological preparedness increases the ability of the firm to absorb AI capabilities; insufficient preparedness reduces the process of AI adoption to

productivity.

Diffusion acceleration (DOI facilitated): The apparent risk decreases in SMEs which leads to a perceived risk resulting in observable gains in the visible part, which increases productivity spillovers within the sector.

Propositional summary (conceptual):

P1. The relationship existing between AI adoption (IV1) and SME productivity (DV) is positive, by making the processes more efficient and decision quality better.

P2. Technological readiness (IV2) moderates the relationship between the implementation of AI and productivity of SMEs positively - the greater is the technological readiness, the greater the relationship between the IV1 and DV.

P3. The diffusion factors (knowledge sharing, trialability, observability) are hastening the adoption, therefore, decreasing lag to observable productivity gain.

2.3 Empirical Review

2.3.1 Global Studies on AI Adoption in SMEs

The use of AI has been more accepted and proven through empirical evidence worldwide, but the effect of AI usage depends on the situation, industry, and the abilities of the firms. Wamba-Taguimdje et al. (2020) have summarized the findings of cases to illustrate that AI-enabled transformation initiatives generate tangible business value- Improvements that come to reality as firms re-structure processes, data capabilities and alliances. Smaller reviews (Filippucci, Gal, and Jona Lasinio, 2024; Enholm et al., 2022) highlight that AI is a heterogeneously diffused general-purpose technology with the previous gains already being reaped by larger firms and digitally mature SMEs and abandon smaller or less digitally mature ones. The positive effects on productivity that are localised have econometric and firm-level studies that reveal productivity effects in those industries that are capable of swiftly adopting AI in the existing processes (Wang, Sun, and Xu, 2023; Damioli, Van Roy, and Vertesy, 2021). Altogether, global statistics

indicate that the potential is good, but it is conditional the benefits of AI depend on other investments (skills, information, reconfiguration of processes), and the ability of companies to internalize and extend AI solutions.

2.3.2 AI Adoption in Developing Economies

Using new markets, empirical research proves distinctive hindrances and circumstantial forces. Several studies, which are regional, show that AI uptake among SMEs is low to moderate, and the gaps of under-adoption are explained by cost, dearth of skills, and inadequate infrastructure (Akoh, 2024; Uzoamaka, Eneh and Anyahara, 2025). The tangible benefits of adoption have been demonstrated in Asian and African research (Christian, 2025; Soomro et al., 2025; Ahmad et al., 2024) where adoption has occurred- e.g., operations, response, and sustainability outcomes efficiency. According to the research on family-owned and small businesses (Upadhyay et al., 2023; Ahmad et al., 2024), the determinants that define the organizational culture, entrepreneurial orientation and support of the top management are. Altogether, AI may be beneficial to the SMEs of developing countries, yet the obstacles are structural (finance, skills, policy), and provoke productivity-enhancing bottlenecks.

2.3.3 Technological Readiness and SME Performance Studies

Among the trends that occur repeatedly in the literature is the fact that returns to AI are conditional and dependent on the presence of technological readiness, typically perceived as ICT infrastructure, human resources (digital literacy), and organizational capacity. The existing empirical research and reviews (PwC Indonesia, 2022; Chen, Zhang, and Liu, 2023; Wang et al., 2023) indicate that the higher the level of digital infrastructure has been implemented by a company and the higher is its absorptive capacity, the higher are the productivity gains of AI. The same can be seen in terms of spatial heterogeneity in the country-level analysis: the disparity in infrastructure across the territories results in varying adoption and productivity trends (Fu & Rasiah, 2024; Al-Barghouthi and Gopal, 2025). In case and survey studies, the facilitating

factors in the successful implementation of AI also denote the significance of vendor support, training, and managerial commitment (Chen, Li, and Chen, 2021; Kumar et al., 2024).

2.3.4 AI–Productivity Relationship Studies

The articles whose central topic is the nexus of AI-productivity offer rather contradictory but positive outcomes. In firm-level patent and performance investigations (Damioli et al., 2021), AI-related patenting is linked to higher labor productivity -effects, notably that are more feelable in the SME industry and the service industry, where the agile reconfiguration is possible. According to long-run economic growth and productivity Macroeconomic and cross-country works (Kalai, Becha, and Helali, 2024; Filippucci et al., 2024), AI affects economic growth and productivity positively, but in the long run, it also preconditions distributional problems (inequality, skills-based impacts). The new hybrid research works of SEM with ANN (Soomro et al., 2025) relate organizational aspects (top management support, employee capability) to the application of AI and then to the economic, social, and environmental performance-evidence of that the impact of AI on productivity is mediated, in most cases, by internal capabilities. There is a greater operational efficiency and quality of services in developing-country SME samples that are both trained and redesigned in processes in the use of AI (Dey et al., 2024; Kumar et al., 2024), and the gains in productivity are minimal when an individual investment in AI is provided without the accompanying complements.

2.3.5 Summary of Empirical Findings

Constant positive potential: AI can make the productive processes more effective, especially when combined with the organizational change and investments in skills (Wamba-Taguimdje et al., 2020; Chen et al., 2023).

Conditionality: Productivity performance is conditional on the presence of complementary signatures: technology preparedness, human capital, managerial, and facilitating policy (PwC Indonesia, 2022; Chen et al., 2023; Wang et al., 2023).

Limitations in developing-country: The common obstacles to the implementation of AI by SMEs include cost, skill gap, and the absence of infrastructure, which limit the real growth in productivity (Akoh, 2024; Uzoamaka et al., 2025).

Heterogeneity: Heterogeneity in industry, firm-specific and geographical location. The impact is more intense on digitally intensive cluster SMEs acquiring faster than isolated or resource constrained SMEs (Fu et al., 2024; Damioli et al., 2021).

Available knowledge gap on mediation: Despite reports of many studies on enablers and barriers, more explicitly model mediation processes (e.g., how high cost or lack of knowledge mediates AI to productivity), an empirical and theoretical gap exists, which is particularly desirable to fill in the case of Indonesia.

2.4 Research Gap

Despite the increasing number of literature on AI and the performance of firms, there has been a little research carried out on the relationship between AI performance and the focus on Indonesia because of the correlation between the same performance and the high cost, lack of knowledge, and poor infrastructure. Existence of barriers and adoption patterns in most of their empirical work have been mostly reported in Indonesia and other emerging markets (PwC Indonesia, 2022; World Bank, 2024), but have not yet been formally modelled in one productivity framework.

The literature on the topic may be rather fragmented: some of the research is focused on macro-level or firm-level productivity effects (Kalai et al., 2024; Damioli et al., 2021), some of the studies are about the determinants of adoption (Chen et al., 2021; Chen, Li, and Chen, 2021), but other studies are

sectoral (Wang et al., 2023; Dey et al., 2024). It is yet to determine an integrated model that: (a) factored AI adoption as a key independent variable, (b) factored technological preparedness as a second independent/conditioning variable, and (c) factored cost, knowledge and infrastructure to be explicit mediators between AI adoption and productivity within the framework of Indonesian SME.

Given the situational nature of the effects of AI, there is a necessity to possess one conceptual model that would describe the direct and moderating and mediating effects between AI adoption and SME productivity. The suggested model should (i) leverage the mechanisms using RBV, TOE and DOI, (ii) operationalize technological preparedness as facilitating construct, and (iii) explicitly model high cost, knowledge deficit, and poor infrastructure as intervening variables with the potential to dilute/obstruct impact of productivity of AI. This is exactly what is met in the suggested conceptual framework of this paper, which gives a theoretical clarity and a direction on further empirical testing in Indonesia.

2.5 Conceptual Framework and Model of the Study

2.5.1 Proposed Conceptual Framework Diagram

Figure 2.2 proves the suggested conceptual map of the hypothesized relationships among AI adoption (IV1), technological readiness (IV2) and SME productivity (DV). In addition, it introduces high cost, lack of knowledge and poor infrastructure as mediating variables, which are contextual factors which find out how far the utilization of AI becomes productive.

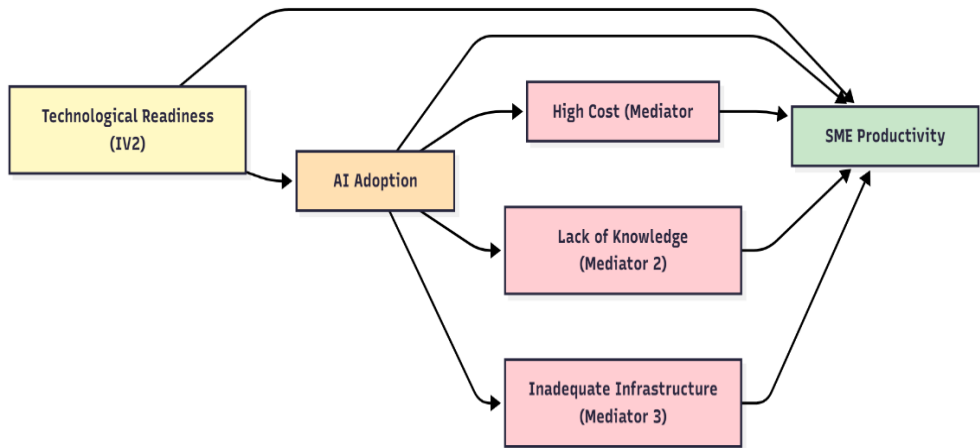


Figure 2.2: Proposed Conceptual Framework Linking AI Adoption, Technological Readiness, and SME Productivity

Source: Researcher’s Conceptualization (2025), adapted from RBV, TOE, and DOI frameworks.

2.5.2 Model Pathways

Path A → B: AI Adoption and SME Productivity

The way the AI is adopted and translated into the productivity of SMEs relies on the Resource-Based View (RBV) according to which the capabilities related to technology can be converted into strategic resources aimed at achieving sustainable competitive advantage (Barney, 1991; Chen et al., 2023). By automating and making predictions and increasing process efficiency with predictive analytics and optimization, AI enhances efficiency within operations, redundancy, and decision quality (Wamba-Taguimdje et al., 2020; Damioli et al., 2021). The results of empirical evidence are consistently demonstrating that those companies that use AI tools are more productive and innovative than those which do not (Wang et al., 2023). The potential impact of AI-driven productivity gains in the Indonesian market, with SMEs being the bread and butter of the economy, could be quite revolutionary in regards to the firm and sector competitiveness (PwC Indonesia, 2022; World Bank, 2024).

Path C → A/B: Technological Readiness as Enabler of AI Adoption and Productivity

The Technology-Organization-Environment

(TOE) model pays attention to technological preparedness as one of the predisposing factors to digital transformation (Tornatzky and Fleischer, 1990). The issue of success in the use and application of AI tools by SMEs is determined by technological preparedness (ICT infrastructure, digital literacy, and organizational innovation capacity) (Chen et al., 2021; Fu and Rasiah, 2024). Increased readiness will accelerate the adoption process, simplify it and will help to maintain the benefits in performance. Conversely, its unpreparedness may slow down its implementation and disorient its productivity outcomes even in situations when companies strive to adopt AI technologies (Kumar et al., 2024). Thus, the technological preparedness is not only a direct predictor of productivity but also an indirect one because of facilitating effect on the adoption of AI.

Paths A → D/E/F → B: Mediating Role of High Cost, Lack of Knowledge, and Inadequate Infrastructure

Despite this possibility of AI, there are structural constraints through which the impact of AI on productivity arises particularly in the example of SMEs in developing settings.

- Expensive nature (equipment, software, integration and maintenance) reduces the ability of the SMEs to use AI applications to their

maximum potential (Akoh, 2024; Uzoamaka et al., 2025).

- Ignorance (technical and managerial). Unawareness, preparation, and implementation of AI solutions (Ahmad et al., 2024; Soomro et al., 2025).
- Poor infrastructure, including the lack of electricity, weak broadband, and others, is a direct constraint to the AI functionality and scalability (UNIDO, 2023; World Bank, 2024).

These mediating factors compromise or diminish the productivity effects of AI adoption. In theory, they act as internal and external boundaries that lead to the distortion of the straight correlation between investments in AI and the outcomes of the firm. In order to achieve the maximum potential of AI in the SMEs of Indonesia, these barriers should thus be addressed.

The three theoretical pillars are the basis of the synthesized framework:

- In his work, RBV expounds that the use of AI will bring about company specific capabilities that will lead to productivity.
- TOE focuses on the environment and organizational backgrounds (technological preparedness) that should be embraced successfully.
- DOI (Rogers, 2003) provides a diffusion lens, in which the traits of innovation (complexity, trialability, observability) and communication channels have an influence on AI adoption between SMEs.

3.0 Research Methodology

3.1 Nature of the Study (Conceptual)

The research design used in this study is a conceptual design because of theoretical synthesis instead of collecting empirical evidence to support the ideas. Conceptual research is appropriate to a developing field, such as the use of Artificial Intelligence (AI) within Small and Medium Enterprises (SMEs) as outcomes are dispersed or restricted to bring a consistent image (Snyder, 2019). The research uses a number of theoretical and

empirical methods in coming up with a comprehensive conceptual framework that explains the links among adoption of AI, technological preparedness, and the productivity of the SMEs in the Indonesian example. Constructivist nature allows studying constructs, relationships and mechanisms that have never been reformulated in the literature but have never been done in a systematic way (Fawcett and Garity, 2009).

The study is in line with the existing literature of conceptual analysis that indicates that the researcher needs to propose frameworks to assist in finding solutions to the complex problems of technological adoption within the developing economies (Mohammed and Sundararajan, 2023; Chen et al., 2023; Kumar et al., 2024).

3.2 Approach and Literature Sources

The study employs conceptual synthesis approach, which is systematic, to include systematic literature review approaches and theoretical mapping. The literature sources were peer-reviewed journals, conference proceedings, institutional reports, and authoritative databases, such as Scopus, Web of Science, Science Direct, Emerald Insight, and SpringerLink.

Global and regional (Asian and Indonesian) perspectives were also included to consider the contextual differences of AI adoption and SME performance. Most significant ones were empirical (e.g., Chen et al., 2023; Wamba-Taguimdje et al., 2020) and conceptual (e.g., Rogers, 2003; Tornatzky and Fleischer, 1990) studies and policy-based reports presented by OECD (2023), UNIDO (2023), and the World Bank (2024).

3.3 Review Protocol and Inclusion Criteria

As conceptual research, a systematic review protocol was formulated based on Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) adjusted to the conceptual research (Page et al., 2021). The process of the inclusion was the following:

Identification: The searches were conducted with the help of key words such as AI adoption, SME productivity, technological readiness, digital

transformation, Indonesia and developing economies.

Screening: To ensure that the studies were recent and relevant to the current AI developments, the articles that were published in the period between 2018 and 2025 were utilized.

Eligibility: The articles which were kept were peer-reviewed journal articles, book chapters as well as institutional reports that included conceptual, empirical, or theoretical knowledge regarding AI adoption and productivity.

Inclusion: 75 academic sources and 16 institutional documents were included into the list of sources to be synthesized and this ensured the most comprehensive coverage of the global, regional and national perspectives.

Research papers were filtered out when they did not have conceptual relevance, addressed only technical issues of AI with no management consequences, or were not available in any academic databases.

3.4 Analytical Procedure (Thematic Synthesis)

The thematic analysis methodology allowed the ability to elicit specific patterns and conceptual relationships and theoretical ties among various studies which were integrated in the data (Braun and Clarke, 2019). This has been done in three stages of analysis:

Stage 1: Coding and Categorization - A coding of the literature was made based on conceptual keywords to formulate that were pertinent to the study, such as AI adoption, technological readiness, and SME productivity.

Stage 2: Theme Development - The codes were grouped into bigger themes according to determinants, mediators, and outcomes of the adoption of AI. The correspondence of the themes with the theoretical perspectives was in the Resource-Based View (RBV), Technology-Organization-Environment (TOE) perspective and Diffusion of Innovation (DOI) theory.

Stage 3: Conceptual Integration - The themes were consolidated into one model which offers an

illustration of how AI implementation and technological preparedness is driving productivity whose mediating factors are high cost, lack of knowledge and inadequate infrastructure.

The thematic synthesis gave theoretical consistency, the understandability of the concepts, and logical connectivity of the constructs.

3.5 Reliability, Validity, and Ethical Considerations

To achieve reliability, the literature selection and analysis were conducted in a systematic and replicable procedure as recommended by PRISMA. The strength and diversity of the results were improved by the use of various sources in databases.

To ascertain the full explanation of AI adoption dynamics, validity was achieved through triangulation of theoretical perspectives, i.e. RBV, TOE, and DOI. The external validity was optimized through cross-checking with policy and industry-wide reports (e.g. OECD, UNIDO, PwC Indonesia) on the basis of which academic findings were adjusted to reality.

The ethical considerations were dealt with by appropriating due credit to all sources which were consulted, and also the intellectual transparency. No ethical risk was linked to the study because it did not imply using human subjects or primary data collection. However, the ethics of scholarly integrity and citation were adhered to until the final point in order to provide scholarly integrity and compliance with the Scopus publication standards (Committee on Publication Ethics, COPE, 2023).

4.0 Findings of the Study

4.1 Synthesized Theoretical Insights

The literature synthesis based on the Resource-Based View (RBV) Technology-Organization-Environment (TOE) model and the Diffusion of Innovation (DOI) theory demonstrates that the adoption of Artificial Intelligence (AI) is a key factor that predetermines productivity growth in SMEs. Nevertheless, contextual and structural influences, including high costs, low knowledge, and

poor infrastructural facilities, moderate the ability of Indonesian SMEs to exploit AI technologies fully. The RBV approach highlights AI as an intangible resource that is strategic and improves innovation and efficiency when properly supported due to organizational capabilities. The TOE model goes on to point out that the level of technology preparedness and environmental support plays a crucial role in determining the level of adoption.

4.2 Conceptual Relationships Identified

The specified conceptual correlations of the review indicate that the use of AI positively influences the productivity of SMEs as it provides them with the opportunity to enhance the efficiency of work, automate processes, and use data to make decisions. High cost, lack of knowledge and poor infrastructure are mediating variables that however put down the strength of this relationship. The technological preparedness is revealed as a prerequisite and intervening variable that determines the extent to which AI will be productive. The fusion of the RBV and the TOE provides a comprehensive platform that links the internal and the external enablers on which the SMEs may strategically harmonize the resources and the technology and achieve productivity.

4.3 Policy and Managerial Implications

The findings prove the need of policy and managerial interventions which are to be aligned to eradicate the barriers to adoption. Policymakers should focus on the investments in digital infrastructure and the programs of developing AI skills and subsidizing the access of AI technologies by SMEs. Instead, managers and entrepreneurs should adopt the proactive approach to learning and the exploration of digital partnerships, as well as the reorganization of the inner operations that would enhance the absorptive capacity of the AI technologies. These combined can bridge the capability gap and bring on an enabling ecosystem to AI-powered productivity in the SME sector in Indonesia.

5.0 Recommendations of the Study

5.1 Policy Recommendations

1. Consider a countrywide AI strategy that encompasses SMEs, which includes financial incentives and digital literacy and joint innovation centers to enhance technological preparedness.
2. Increase the number of small-business-specific low-cost digital unit and AI service platforms in the public-private partnership (PPP).
3. Subsidies or grants on the investments of AI tools, training and research collaborations by SMEs in the form of tax breaks.
4. Establish AI knowledge zones and education at the local economic regions to distribute technological awareness in an inclusive manner.

5.2 Managerial Recommendations

1. The owners of the SMEs are encouraged to design AI-based business models through the combination of the strategic objectives with the data analytics, automation, and innovation.
2. It is suggested that the companies invest in advancing human capital through constant training, upskilling, and partnership with technology providers.
3. The management will perform AI-readiness audits in order to identify the gaps and implement it one step at a time.
4. Adopted shared learning networks among SMEs to share AI experiences, practices and resources.

5.3 Research Recommendations and Future Agenda

1. This study should be used in future research to confirm the conceptual relationships through the use of empirical models in structural equation modelling (SEM).
2. The next generation of research on the subject should be devoted to the industry-related effects of AI implementation in manufacturing, service, and creative industries in Indonesia.

3. The comparison and contrasting between the Indonesian SMEs with those of other economies in the ASEAN region are recommended to create an idea on the level of maturity in adoption.

The research of the feedback mechanism in policies should be the second step which should be further investigated to identify the effects of AI-inspired productivity on regulatory frameworks in the long term.

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