



Big Data and Artificial Intelligence: Implications and Strategies for Business Development in Indonesia

Hugo Sahetapy^{1*}, Maria Yessica Halik², Hendy William Sino³, Joe Roland S. Bokau⁴

¹⁾ Accounting Department, Australia National University, Canberra, Australia

²⁾ Accounting Department, Paul Christian University of Indonesia, Makassar, Indonesia

³⁾ Information Technology Study Program, Handayani University, Makassar, Indonesia

⁴⁾ Master of Management Study Program, Paul Christian University of Indonesia, Makassar, Indonesia

E-mail: sahetapy.hugo@yahoo.com

* Corresponding author

Submitted: 01-03-2025	Review: 08-03-2025	Revision: 11-03-2025	Accepted: 25-03-2025
-----------------------	--------------------	----------------------	----------------------

Abstract: The rapid development of digital technology has significantly influenced business growth in Indonesia. Big Data and Artificial Intelligence (AI) have emerged as crucial tools in optimizing decision-making, improving operational efficiency, and enhancing business competitiveness. This study aims to conduct a Systematic Literature Review (SLR) to analyze the utilization of Big Data and AI in business development in Indonesia. The research identifies key benefits, challenges, and strategies for technology adoption. The findings highlight that Big Data enables businesses to extract valuable insights from vast datasets, while AI facilitates automation and predictive analytics to enhance marketing strategies, customer experience, and supply chain efficiency. However, several challenges hinder widespread adoption, including limited digital infrastructure, a shortage of skilled professionals, high investment costs, and regulatory concerns regarding data security and privacy. The study suggests that strengthening digital literacy, improving technological infrastructure, and fostering collaboration between government, academia, and industry are critical to accelerating the adoption of these technologies. By leveraging Big Data and AI effectively, businesses in Indonesia can enhance their competitive advantage and drive sustainable economic growth in the digital era.

Keywords: Big Data, Artificial Intelligence, Business Development, Digital Transformation, Indonesia

INTRODUCTION

In recent years, business development in Indonesia has undergone a significant transformation, especially with the increasing digitalization in various sectors (J. Halik et al., 2021; J. B. Halik et al., 2023, 2024; J. B. Halik & Halik, 2024). Globalization and technological advances have encouraged business actors to adapt to new trends in order to remain competitive (Latiep et al., 2023). One of the main factors that plays a role in this change is the use of Big Data and Artificial Intelligence (AI). These two technologies not only help in processing data

more efficiently, but also enable more accurate and strategic data-based decision making (Soori et al., 2024).

Big Data refers to a large, ever-growing collection of data that can be analyzed to find useful business patterns or trends (Oussous et al., 2018). Meanwhile, AI enables systems to learn from data and automate business processes, from predicting market trends to optimizing operations (Soori et al., 2023). With Big Data and AI, businesses can increase efficiency, reduce costs, and expand their market reach more effectively (Yaiprasert & Hidayanto, 2024).

However, the adoption of Big Data and AI in the Indonesian business world still faces various challenges. Some of the main obstacles include limited digital infrastructure, lack of human resources with skills in data analysis and AI (Peretz-Andersson et al., 2024), and high costs of technology investment (Zhao et al., 2024). In addition, the lack of regulations that support data security and privacy is also a concern for business actors who want to implement this technology (Admass et al., 2024).

Based on this urgency, this study aims to conduct a Systematic Literature Review (SLR) to examine how Big Data and AI are utilized in business development in Indonesia. This study will identify the main benefits, challenges, and strategies that can be applied to increase the adoption of this technology in the business world.

This study will attempt to answer the following key questions:

- 1) How are the concepts of Big Data and AI applied in the business world?
- 2) What are the main benefits of adopting this technology for business development in Indonesia?
- 3) What are the challenges in implementing Big Data and AI?
- 4) What strategies can be implemented to increase the adoption of this technology?

Through this systematic review, it is hoped that a more comprehensive insight into the role of Big Data and AI in the business world can be obtained and recommendations can be provided that can be implemented by various stakeholders.

METHODS

This study uses a Systematic Literature Review (SLR) approach to identify, analyze, and synthesize various literatures that discuss the use of Big Data and Artificial Intelligence (AI) in business development in Indonesia. SLR was chosen because it allows researchers to gain a more comprehensive understanding of the trends, challenges, and opportunities of implementing this technology in the business world.

The data used in this study were obtained from various academic sources, such as Scopus, Web of Science, Google Scholar, and reputable national journals accredited by SINTA. The selection of articles was carried out by considering the inclusion and exclusion criteria that had been set. Only articles published in the

last ten years and discussing the implementation of Big Data and AI in the context of business were included in the analysis. In addition, only research that had gone through a peer-reviewed process and was available in Indonesian or English was used in this study. The literature selection process was carried out systematically by following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method (Snyder, 2019). This stage includes identifying relevant articles, screening based on abstracts and topic suitability, and in-depth analysis of the research content (Triandini et al., 2019). The selected articles were then categorized based on the main themes that include the concepts of Big Data and AI, the benefits of implementation in the business world, the challenges faced, and adoption strategies that have been applied in various business sectors.

After relevant literature was collected, analysis was conducted using a thematic approach to identify key patterns emerging from previous research (Maguire & Delahunt, 2017). With this approach, the study can present a clearer picture of how Big Data and AI have contributed to business development in Indonesia, as well as provide evidence-based recommendations to increase the adoption of these technologies in the future.

Data synthesis in this study was conducted using a thematic approach, where the collected literature was analyzed based on the main patterns and trends that emerged from various previous studies. This method allows the identification of main categories that are relevant to the use of Big Data and Artificial Intelligence (AI) in business development in Indonesia, such as the main benefits, implementation challenges, and adoption strategies that have been applied in various business sectors.

The synthesis process begins with coding data from the research results that have been collected, where each study is classified based on the main aspects discussed (Naeem et al., 2023). Literature that discusses the benefits of Big Data and AI is further analyzed to identify patterns of use of this technology in improving operational efficiency, data-based decision making, marketing strategies, and supply chain optimization. Meanwhile, studies that examine implementation challenges are categorized based on technological, financial, and regulatory barriers that affect the adoption of technology in the business world in Indonesia.

After the coding stage, a comparative analysis is conducted to compare the results of various studies to find similarities and differences in research findings. This analysis helps in identifying the factors that most influence the success or failure of Big Data and AI implementation in the business world. In addition, relevant case studies are also reviewed to provide a deeper perspective on how this technology is applied in different business contexts, both in Indonesia and in other countries with similar market characteristics. As a final step, the results of this data synthesis are used to build a conceptual framework that describes the relationship between Big Data, AI, and business development in Indonesia. This framework is expected to provide more systematic insights for business actors, policy makers, and academics in understanding how this technology can be optimally adopted to improve business competitiveness in the digital era.

RESULTS AND DISCUSSION

Descriptive Analysis

Summary of Included Studies

In this study, various articles from leading academic databases, such as Scopus, Web of Science, Google Scholar, and reputable national journals accredited by SINTA (Science and Technology Index), an online scientific portal managed by the Ministry of Education, Culture, Research, and Technology (Kemendikbud Ristek) of the Republic of Indonesia, were collected and analysed. From the initial selection results, 75 articles were found related to the use of Big Data and Artificial Intelligence (AI) in business development in Indonesia. After going through a screening process using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method, the number of studies that met the final criteria was 45 articles. The articles included in this study have various study focuses, such as the impact of Big Data and AI on business efficiency, technology implementation strategies in the business world, and the challenges faced in adopting this technology in Indonesia. Most of the studies analysed were published in the period 2015–2024, which shows that this topic has been growing in recent years.

Distribution of Literature Based on Research Type

Based on the results of the analysis of the collected literature, research discussing the use of

Big Data and Artificial Intelligence (AI) in business development in Indonesia can be categorized into several types of approaches. Most of the studies analysed used a quantitative approach, with a portion of around 40% of the total studies reviewed. These studies generally use statistical methods to measure the impact of Big Data and AI on various business indicators, such as increasing operational efficiency, optimizing marketing strategies, and increasing customer satisfaction.

In addition to quantitative research, there are also around 35% of studies that use a qualitative approach. These studies focus more on exploring the experiences of business actors in adopting Big Data and AI technology, as well as identifying factors that support or hinder the implementation of these technologies in various industrial sectors. Through in-depth interviews and phenomenological analysis, this qualitative research provides deeper insight into the challenges faced by business actors, such as limited human resources and uneven digital infrastructure.

Case studies are also one of the approaches that are quite widely used in this research, with a proportion of around 15% of the total literature analysed. These studies highlight the implementation of Big Data and AI in certain companies in Indonesia, such as e-commerce, banking, and manufacturing companies. Through case studies, this research provides a real picture of how this technology is applied in different business contexts and how it impacts company competitiveness.

In addition, there are around 10% of studies that propose conceptual models or conduct literature reviews to understand the relationship between Big Data, AI, and business growth in Indonesia. These studies generally develop theoretical frameworks or present a synthesis of previous studies to provide a broader perspective on technology implementation trends in the business world.

With this diverse distribution of research, the results of the analysis show that the use of Big Data and AI in business in Indonesia has become a major concern in various academic studies. However, the approaches used in research still vary, depending on the purpose of the study and the business sector being studied.

Thematic or Content Analysis

Based on the literature analysis that has been conducted, there are several main themes that emerge in research related to the use of Big Data and Artificial Intelligence (AI) in business development in Indonesia. To compile a more systematic discussion, here are subsections based on the identified themes:

1. Trends in Big Data and AI Adoption in Business in Indonesia

This subsection discusses how the trend of Big Data and AI adoption has developed in the business world, especially in the last decade. Studies show that since 2015, more and more companies in Indonesia have started to integrate this technology into their business operations.

- Increasing use of AI in e-commerce, banking, and manufacturing sectors (Ikhsan et al., 2025; Maspul & Putri, 2025).
- Digital transformation as a major driver of technology adoption (Abdillah, 2023; J. B. Halik & Halik, 2024; Latiep et al., 2023).
- Impact of digital infrastructure development and cloud computing access (Meidyasari, 2024).

2. Benefits of Big Data and AI for Business Development

This subsection highlights the benefits gained from the implementation of Big Data and AI, which significantly increase efficiency and effectiveness in business operations.

- Supply chain optimization and operational efficiency (Abhulimen & Ejike, 2024; Husein et al., 2024).
- Enhanced customer experience through data analytics and service personalization (Susiang et al., 2023).
- Leveraging AI in data-driven strategic decision making (Yusman et al., 2025).

3. Challenges in Implementing Big Data and AI

Despite the many benefits offered, there are still various obstacles in implementing this technology, especially among small and medium enterprises (SMEs).

- Limited technological infrastructure and unequal digital access (Supriadi et al., 2023).

- Lack of skilled workforce in data science and AI (Gayatri et al., 2025).
- High investment costs in implementing Big Data and AI (Asian Development Bank, 2020).
- Risks of data security and customer privacy protection (Judijanto et al., 2024).

4. Regulations and Policies Affecting Technology Adoption

This subsection discusses the role of regulation and policy in supporting or hindering the adoption of Big Data and AI technologies.

- Regulations related to data security and customer privacy in Indonesia (Satwiko, 2021).
- Government initiatives in encouraging digital transformation, such as Making Indonesia 4.0 (Gusman, 2024).
- The gap between existing regulations and industry needs in implementing AI (Firza Cahya et al., 2023; Oktaviani et al., 2024).

5. New Business Models Based on Big Data and AI

This subsection discusses how to utilize Big Data and AI not only as operational tools but also as the core of new business models.

- Implementation of AI in subscription-based business models and data analytics (Hindarsah, 2023; Subroto et al., 2024).
- Development of fintech and AI-based financial services in Indonesia (Marisya et al., 2025; Safitri, 2020).
- Automation of business services and AI-based digital transformation (Agustiawan, 2024; Baltasar & Marbun, 2024; Suraji et al., 2024).

6. Big Data and AI Implementation Strategy in the Business World

This subsection discusses strategies that businesses can implement to adopt Big Data and AI more effectively.

- Strengthening digital literacy and data science-based workforce training (Ika Sari et al., 2024; The SMERU Research Institute et al., 2022).
- Collaboration with technology companies to provide more affordable AI-based solutions (Galib et al., 2024).

- Government support through technology incentives for SMEs (Jayeola et al., 2022; Kementrian Koordinator Bidang Perekonomian RI, 2022).

Discussion

The Concept of Big Data and AI in the Context of Business Development

In today's digital era, Big Data and Artificial Intelligence (AI) have become two key technologies driving major changes in the business world. These two concepts enable businesses to access, analyse, and utilize large amounts of information to improve operational efficiency and competitiveness (Ali et al., 2024). As digital technology advances, companies across sectors are beginning to adopt Big Data and AI as part of their business strategies to optimize decision-making and deliver a more personalized experience to customers (Tang, 2024).

Big Data refers to a collection of data that is so large, complex, and rapidly growing that it cannot be processed using traditional methods. The main characteristics of Big Data are known as the 5Vs, namely Volume (large amount of data), Velocity (high data speed), Variety (various types of data), Veracity (accuracy and validity of data), and Value (value that can be generated from the data) (Hussein, 2020). With Big Data, companies are able to identify market patterns, understand customer behaviour, and develop more targeted business strategies (Odedina, 2023).

Meanwhile, Artificial Intelligence (AI) is a technology that enables computer systems to perform tasks that usually require human intelligence, such as pattern recognition, learning from data, and automated decision-making (TechTarget, 2024). AI encompasses technologies such as machine learning, deep learning, and natural language processing, which have been applied in various aspects of business, from customer service to supply chain optimization. With AI, companies can automate business processes, improve efficiency, and provide a more personalized experience for customers through predictive analytics and recommendation systems.

The main role of Big Data and AI in the business world is very diverse. One of the most important aspects is its ability to improve operational efficiency. Through fast and accurate data analysis, businesses can reduce operational costs, optimize supply chains, and better predict market demand (Husein et al., 2024). In addition,

AI plays a role in supporting data-driven decision-making, where business leaders can use insights generated by AI algorithms to determine more effective marketing strategies, pricing, and investment planning (Haleem et al., 2022). In the e-commerce and banking sectors, AI has been applied in service personalization, allowing companies to provide more relevant product recommendations to customers and improve transaction security through AI-based anomaly and fraud detection (Byrapu Reddy et al., 2024).

In terms of technology adoption, various theoretical models have been developed to understand the factors that influence the success of Big Data and AI implementation in businesses. One of the models that is often used is the TOE Framework (Technology-Organization-Environment), which emphasizes that technology adoption is influenced by three main factors: technological aspects (technology readiness, infrastructure, and benefits of the technology), organizational aspects (human resource capacity, organizational culture, and business strategy), and environmental aspects (industry competition, government policies, and external pressures). This model helps companies identify challenges and opportunities in implementing new technologies (Nguyen et al., 2022).

In addition to the TOE Framework, another model that is often used in analysing technology adoption is the Technology Acceptance Model (TAM), which focuses on psychological factors that influence individuals in accepting and using technology. TAM states that technology acceptance is greatly influenced by perceived usefulness and perceived ease of use. In a business context, this model helps understand how employees and customers react to the application of AI and Big Data in company operations, as well as how strategies can be developed to increase the adoption of these technologies (Syafika & Antonio, 2024).

From various studies that have been conducted, it is clear that the adoption of Big Data and AI in the business world depends not only on the readiness of the technology itself, but also on the readiness of the organization in managing change and support from the external environment. Therefore, for businesses that want to be successful in implementing this technology, a comprehensive strategy is needed, including workforce training, investment in digital infrastructure, and collaboration with the

government and academics in building a more inclusive technology ecosystem.

With increasingly rapid development, Big Data and AI are expected to continue to play an increasingly large role in the business world. Innovations in data processing and artificial intelligence will continue to develop, allowing businesses to be more adaptive in facing market challenges. In Indonesia, although there are still obstacles in implementing this technology, trends show that more and more companies are starting to realize the importance of data and AI-based digital transformation to remain competitive in the era of industry 4.0.

Utilization of Big Data and AI for Business Development in Indonesia

In recent years, the use of Big Data and Artificial Intelligence (AI) in the business world in Indonesia has experienced rapid growth. Various industrial sectors have begun to adopt this technology as part of a digitalization strategy to increase their competitiveness. This trend is in line with the digital transformation that is increasingly being accelerated by the government and the business world in facing the industry 4.0 era.

In the e-commerce sector, for example, Big Data and AI have been used to optimize customer experience and improve operational efficiency. Companies such as Tokopedia, Shopee, and BukaLapak are utilizing AI to implement data-based recommendation systems that can predict customer preferences and provide more personalized offers. In addition, Big Data analytics are also used to understand customer shopping patterns so that marketing strategies can be more effectively targeted (Nur et al., 2024).

The financial and banking sectors are also among the fastest adopters of AI and Big Data. Major banks in Indonesia, such as BCA and Bank Mandiri, have utilized this technology in credit scoring systems, fraud detection, and AI-based chatbots to improve customer service. FinTech such as OVO, GoPay, and Dana are using Big Data to develop more accurate credit risk analytics models, enabling them to provide data-driven lending services to small businesses that previously had difficulty accessing funding from traditional banks (Agustiawan, 2024).

In manufacturing and supply chains, AI and Big Data are being used to improve production and distribution efficiency. Manufacturing companies in Indonesia are starting to use

predictive analytics to forecast market demand, optimize inventory, and reduce raw material waste. AI also helps automate production processes, improve product quality, and speed up production cycle times (Hidayat et al., 2024).

Meanwhile, in the healthcare sector, the use of AI and Big Data is increasing, especially since the COVID-19 pandemic. Hospitals and healthcare technology companies in Indonesia have developed AI-based systems for medical imaging analysis, telemedicine, and early detection of diseases based on patient health data. This technology enables medical personnel to provide faster and more accurate diagnoses, and increases efficiency in healthcare services (Alexandra et al., 2021).

The main benefits of implementing Big Data and AI in the business world in Indonesia are very broad. One of the most significant benefits is increased operational efficiency, where companies can automate business processes, reduce labour costs, and increase productivity. This technology also helps in data-driven marketing strategies, allowing businesses to understand customer behaviour more deeply and design more targeted marketing campaigns.

In addition, AI and Big Data play a major role in supply chain optimization, especially in the retail and logistics industries. By utilizing real-time data analysis, companies can manage stock more efficiently, reduce the risk of shortages or excess inventory, and increase the speed of goods distribution. On the other hand, customer experience is also increasingly enhanced by AI, which allows for more personalized service, faster responses, and more intuitive interactions through virtual assistants and intelligent chatbots.

To understand the effectiveness of implementing Big Data and AI in the business world, case studies from companies in Indonesia and abroad can provide a clearer picture. One successful example in Indonesia is Gojek, which has adopted AI in almost all aspects of its business, from service recommendation systems, fleet allocation, to anomaly detection-based security systems. By utilizing data from millions of daily transactions, Gojek is able to optimize operational efficiency and significantly improve user experience.

In comparison, case studies from global companies such as Amazon and Alibaba show how Big Data and AI can be used massively to change the business landscape. Amazon uses AI to personalize customer shopping experiences,

optimize supply chains, and develop data-driven logistics systems that are able to predict demand patterns very accurately. Meanwhile, Alibaba applies AI in marketing strategies, market trend analysis, and automatic stock management, making it one of the largest e-commerce companies in the world.

From the various examples above, it can be seen that the use of Big Data and AI in the business world is not only a temporary trend, but has also become a fundamental need for companies that want to grow in the digital era. In Indonesia, although challenges such as technological infrastructure, limited human resources, and regulations are still obstacles, the trend of adoption of this technology shows increasingly rapid growth. With the right strategy, progressive policy support, and collaboration between the government, academia, and industry, Big Data and AI have great potential to drive economic growth and accelerate business development in Indonesia.

Barriers and Challenges in Implementation

Although the potential of Big Data and AI in driving business development in Indonesia is enormous, its implementation still faces various challenges that need to be overcome. The main obstacles in implementing this technology include limited access to technology and infrastructure, low digital literacy among business actors, and cost and policy issues that do not fully support the development of the digital ecosystem (Asian Development Bank, 2020).

One of the biggest obstacles is limited access to technology and infrastructure, especially in areas outside big cities. Although Indonesia has made progress in digital transformation, there are still gaps in terms of internet network availability, connection quality, and access to hardware and software that supports Big Data and AI technology. Many small and medium enterprises (SMEs) still rely on conventional methods in running their businesses due to the lack of adequate digital infrastructure (J. B. Halik et al., 2024). Without adequate access, it is difficult for business actors to optimally adopt this technology and compete in an increasingly digitalized market.

In addition to infrastructure, another equally important challenge is the lack of digital literacy among business actors. Many business owners, especially in the MSME sector, still have limited understanding of the benefits and how Big Data and AI work (Anatan & Nur, 2023). Some of them

still consider this technology too complicated or only relevant for large companies. In fact, the use of Big Data and AI can be applied to various business scales, including small businesses that want to improve operational efficiency and understand the market better. The lack of training and education on this technology has resulted in low and sporadic adoption (Bucciarelli et al., 2010). Without sufficient understanding, business actors will also find it more difficult to use data effectively in their business decision-making.

In addition, the problem of costs and policies that are not yet supportive are also major obstacles to the implementation of Big Data and AI in Indonesia (Maspul & Putri, 2025). This technology requires a fairly large initial investment, both for infrastructure, system development, and human resource training. For many business actors, especially SMEs, the cost of adopting digital technology is often considered too great a burden compared to the long-term benefits that they do not yet fully understand.

In terms of policy, although the government has encouraged digitalization through various initiatives, existing regulations have not fully accommodated business needs in adopting Big Data and AI. Several regulations related to data protection and cybersecurity are still developing and can be obstacles for companies that want to implement data analysis widely (Kshetri, 2017). In addition, the lack of incentives for SMEs to adopt this technology also slows down the growth of the digital ecosystem in Indonesia.

To overcome these challenges, collaborative efforts are needed between the government, the private sector, and educational institutions. Improving digital infrastructure in underdeveloped regions, digital literacy training for business actors, and stronger policy support can be strategic steps to encourage wider use of Big Data and AI. With the right approach, these obstacles can be overcome so that digital technology can become a major driver for business development in Indonesia.

Policy Implications and Recommendations

With the increasing development of Big Data and AI technology, wider implementation in the business world in Indonesia can have a significant impact on business efficiency, innovation, and global competitiveness. However, to realize these benefits, the right strategy is needed to encourage the adoption of this technology in various business sectors. Strategic steps must be focused

on improving digital infrastructure, increasing technological literacy for business actors, and formulating policies that better support the development of the digital ecosystem in Indonesia.

One of the main strategies to increase the adoption of Big Data and AI in the business world is through digital skills-based education and training (Sollosy & McInerney, 2022). The government and academic institutions can play a role in providing training programs that can be accessed by business actors, especially SMEs, to improve their understanding of the benefits and applications of Big Data and AI. Thus, business actors can be more confident in integrating this technology into their operations. In addition, collaboration between universities and industry can also be strengthened through technology-based business incubation programs, which allow business actors to get direct assistance from experts and practitioners.

In terms of policy, the government needs to create regulations that are more adaptive and support digital transformation in the business sector (Roreng et al., 2024). One important step is to provide incentives for companies, especially SMEs, who want to adopt digital technology. These incentives can be in the form of tax breaks, subsidies for technology investment, or support in the form of partnerships with technology service providers. In addition, regulations related to data security and privacy need to be further developed to ensure that the use of Big Data and AI in business remains within a safe and responsible corridor. Clarity of regulations in this area will also help increase business actors' confidence in implementing digital technology more widely.

From an industry perspective, large companies that have already implemented Big Data and AI can act as facilitators for small businesses by opening access to this technology through a partnership model. For example, technology-based companies can develop AI-based solutions that are more affordable and easier for SMEs to use. Collaboration in the form of data-based platforms that enable small businesses to gain business insights from Big Data analysis can also be a strategic step to accelerate digital transformation in various sectors.

Going forward, the trend of utilizing Big Data and AI in the business world is expected to continue to grow with improvements in cloud computing technology, increasingly autonomous artificial intelligence, and integration with the

Internet of Things (IoT). In the coming years, the use of AI in business decision-making will become more common, where companies can automatically analyze market patterns, predict customer behavior, and optimize supply chains more efficiently. This trend shows that businesses in Indonesia must start preparing to face an era of more sophisticated automation.

In addition, there are still many opportunities for further research related to the impact and implementation of Big Data and AI in the business world. More in-depth studies can be conducted to explore how the combination of Big Data, AI, and other technologies such as blockchain can provide greater added value to certain business sectors. In addition, research on the factors that drive or inhibit the adoption of this technology at various business scales is also important to provide more specific insights for the formulation of more effective policies.

Overall, the success of the implementation of Big Data and AI in the business world in Indonesia depends not only on technological readiness, but also on policy support, human resource readiness, and synergy between the government, academics, and industry. With a focused strategy and strong collaboration, Indonesia has a great opportunity to become one of the leaders in utilizing digital technology to support economic growth and business innovation in the future.

CONCLUSION

This study highlights how Big Data and artificial intelligence (AI) have become key factors in business development in Indonesia. From the literature review conducted, it was found that the use of this technology is increasingly widespread in various sectors, especially in improving operational efficiency, data-based marketing strategies, and supply chain optimization. However, despite its great potential, the adoption of Big Data and AI still faces various obstacles, including limited infrastructure, low digital literacy among business actors, and policies that do not fully support digital transformation.

Answering the research question, the literature analysis shows that the success of implementing Big Data and AI in business is highly dependent on technological readiness, user understanding, and adequate regulatory support. Adoption models such as the TOE Framework

and TAM emphasize that in addition to technological factors, organizational aspects and the business environment also play an important role in determining the extent to which business actors can integrate this technology effectively. In addition, global trends show that businesses that have successfully adopted Big Data and AI not only improve internal efficiency but are also able to present innovation in their products and services.

Although the development of Big Data and AI continues, there is still much room for further research to better understand its impact on various scales of business in Indonesia.

Future studies can focus more on empirical analysis of the effectiveness of implementing this technology in the context of small and medium enterprises, as well as how regulations can be designed to better support an inclusive digital ecosystem. As technology advances rapidly, a more comprehensive understanding of its challenges and opportunities will be key to ensuring that Big Data and AI can truly drive sustainable economic growth and business innovation.

BIBLIOGRAPHY

- Abdillah, M. D. (2023). Digital Transformation in Indonesian MSMEs : Adoption , Impact , and Future Directions. *Eastasouth Proceeding of Economics and Business (EPEB)*, 1(1), 64–70. <https://asj.eastasouth-institute.com/index.php/epeb>
- Abhulimen, A. O., & Ejike, O. G. (2024). Solving supply chain management issues with AI and Big Data analytics for future operational efficiency. *Computer Science & IT Research Journal*, 5(8), 1780–1805. <https://doi.org/10.51594/csitrj.v5i8.1396>
- Admass, W. S., Munaye, Y. Y., & Diro, A. A. (2024). Cyber security: State of the art, challenges and future directions. *Cyber Security and Applications*, 2(July 2023), 100031. <https://doi.org/10.1016/j.csa.2023.100031>
- Agustiawan, D. A. (2024). Digital Banking Transformation AI Enhances Efficiency And Customer Experience Seminar Perspective Industry. *WACANA: Jurnal Ilmiah Ilmu Komunikasi*, 23(1), 191–200. <https://doi.org/10.32509/wacana.v23i1.4130>
- Alexandra, S., Handayani, P. W., & Azzahro, F. (2021). Indonesian hospital telemedicine acceptance model: the influence of user behavior and technological dimensions. *Heliyon*, 7(12). <https://doi.org/10.1016/j.heliyon.2021.e08599>
- Ali, M., Khan, T. I., Khattak, M. N., & ŞENER, İ. (2024). Synergizing AI and business: Maximizing innovation, creativity, decision precision, and operational efficiency in high-tech enterprises. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(3). <https://doi.org/10.1016/j.joitmc.2024.100352>
- Anatan, L., & Nur. (2023). Micro, Small, and Medium Enterprises' Readiness for Digital Transformation in Indonesia. *Economies*, 11(6). <https://doi.org/10.3390/economies11060156>
- Asian Development Bank. (2020). *INNOVATE INDONESIA: Unlocking Growth Through Technological Transformation*. <https://www.adb.org/sites/default/files/publication/575806/innovate-indonesia-unlocking-growth.pdf>
- Baltasar, S., & Marbun, T. (2024). Artificial Intelligence , Disrupted Innovation And Operational Management. *HUMANIS*, 5(1), 367–381. <http://www.openjournal.unpam.ac.id/index.php/SNH>
- Bucciarelli, E., Odoardi, I., & Muratore, F. (2010). What role for education and training in technology adoption under an advanced socio-economic perspective? *Procedia - Social and Behavioral Sciences*, 9(December 2010), 573–578. <https://doi.org/10.1016/j.sbspro.2010.12.199>
- Byrapu Reddy, S. R., Kanagala, P., Ravichandran, P., Pulimamidi, D. R., Sivarambabu, P. V., & Polireddi, N. S. A. (2024). Effective fraud detection in e-commerce: Leveraging machine learning and big data analytics. *Measurement: Sensors*, 33(December 2023), 101138. <https://doi.org/10.1016/j.measen.2024.101138>
- Firza Cahya, A. D., Samudera, K., Saphira, A., & Hidayat, M. S. (2023). Published by Postgraduate Program, Master of Laws, Faculty of Law. *Universitas Negeri*

- Sahetapy, H. Halik, M. Y. Sino, H. W. Bokaw, J. R. S. (2025). Big Data and Artificial Intelligence: Implications and Strategies for Business Development in Indonesia DOI 10.63416/mrb.v3i1.321
- Semarang, Indonesia VOLUME, 1(2), 14–29.* <https://www.jurnal.id/id/blog/contoh-penerapan-artificial-intelligence-ai-dalam-dunia->
- Galib, M., Rijal, S., & Gunawan, A. (2024). Correlation Between Switching Costs and Customer Loyalty: Integration of AI in Theoretical and Practical Approaches. *MARIOBRE: Journal of Marketing Management and Innovative Business Review, 2(2), 68–75.* <https://www.ojsapaji.org/index.php/mariobre/article/view/309>
- Gayatri, G., Nyoman, I. G., Jaya, M., & Rumata, V. M. (2025). *The Indonesian Digital Workforce Gaps in 2021 – 2025.*
- Gusman, S. W. (2024). Development of the Indonesian Government's Digital Transformation. *Dinasti International Journal of Education Management And Social Science, 5(5), 1128–1141.* <https://doi.org/10.38035/dijemss.v5i5.2868>
- Haleem, A., Javaid, M., Asim Qadri, M., Pratap Singh, R., & Suman, R. (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks, 3(August), 119–132.* <https://doi.org/10.1016/j.ijin.2022.08.005>
- Halik, J. B., & Halik, M. Y. (2024). Open Innovation And Digital Marketing: A Catalyst For Culinary SMEs In Makassar. *Jurnal Manajemen, 28(03), 588–612.* <https://doi.org/10.24912/jm.v28i3.2059>
- Halik, J. B., Parawansa, D. A. S., Sudirman, I., & Jusni, J. (2023). Implications of IT Awareness and Digital Marketing to Product Distribution on the Performance of Makassar SMEs. *유통과학연구 Journal of Distribution Science, 21(7), 105–116.* <https://doi.org/10.15722/jds.21.07.202307.105>
- Halik, J. B., Rantererung, C. L., Sutomo, D. A., Rasinan, D., Daud, M., & Todingbua, M. A. (2024). *Era Disruptif* (J. B. Halik (ed.); 1st ed.). CV. Adanu Abimata. https://books.google.co.id/books?hl=en&lr=&id=kKUDEQAAQBAJ&oi=fnd&pg=PA179&ots=GVM0GTeahE&sig=ixF8ruUsRR4KmAtdE_GYwrlvO4k&redir_esc=y#v=onepage&q&f=false
- Halik, J., Halik, M., Nurlia, N., Hardiyono, H., & Alimuddin, I. (2021). The Effect of Digital Marketing and Brand Awareness on the Performance of SMEs in Makassar City. *ICONEBS 2020: Proceedings of the First International Conference on Economics, Business and Social Humanities, 84.* <https://doi.org/10.4108/eai.4-11-2020.2304613>
- Hidayat, A., Susilowati, H., & Miranti, A. (2024). Utilizing AI for Predicting Demand and Managing Supply Chains in E-commerce Organizations. *Journal of Management and Informatics (JMI), 3(2), 250–266.* <https://doi.org/10.27824/jmi.v3.i2.32>
- Hindarsah, I. (2023). Impact of Using Artificial Intelligence in business modeling. *Journal of Economics and Business (JECOMBI), 4(1), 52–59.* <http://jecombi.seaninstitute.or.id/index.php/JECOMBI/index>
- Husein, M., Putro, H. P., Rajagukguk, J. R., & Putranto, K. E. (2024). The Role of Artificial Intelligence in Improving the Efficiency of the Company's Supply Chain. *International Journal of Engineering, Science and Information Technology, 4(4), 156–172.* <https://doi.org/10.4018/979-8-3693-3350-1.ch011>
- Hussein, A. A. (2020). Fifty-Six Big Data V's Characteristics and Proposed Strategies to Overcome Security and Privacy Challenges (BD2). *Journal of Information Security, 11(04), 304–328.* <https://doi.org/10.4236/jis.2020.114019>
- Ika Sari, G., Winasis, S., Pratiwi, I., Wildan Nuryanto, U., & Basrowi. (2024). Strengthening digital literacy in Indonesia: Collaboration, innovation, and sustainability education. *Social Sciences and Humanities Open, 10(August), 101100.* <https://doi.org/10.1016/j.ssaho.2024.101100>
- Ikhsan, R. B., Fernando, Y., Prabowo, H., Yuniarty, Gui, A., & Kuncoro, E. A. (2025). An empirical study on the use of artificial intelligence in the banking sector of Indonesia by extending the TAM model and the moderating effect of perceived trust. *Digital Business, 5(1), 100103.* <https://doi.org/10.1016/j.digbus.2024.100103>
- Jayeola, O., Sidek, S., Sanyal, S., Hasan, S. I., An, N. B., Mofoluwa Ajibade, S. S., & Phan, T. T. H. (2022). Government financial support and financial performance of SMEs: A dual

- sequential mediator approach. *Heliyon*, 8(11).
<https://doi.org/10.1016/j.heliyon.2022.e11351>
- Judijanto, L., Solapari, N., & Putra, I. (2024). An Analysis of the Gap Between Data Protection Regulations and Privacy Rights Implementation in Indonesia. *The Easta Journal Law and Human Rights*, 3(01), 20–29. <https://doi.org/10.58812/eslhr.v3i01>
- Kementrian Koordinator Bidang Perekonomian RI. (2022). *Government Program Support in Empowering MSMEs to Strengthen Regional Economic Stability*. Webpage. <https://www.ekon.go.id/publikasi/detail/3688/government-program-support-in-empowering-msmes-to-strengthen-regional-economic-stability>
- Kshetri, N. (2017). Blockchain's roles in strengthening cybersecurity and protecting privacy. *Telecommunications Policy*, 41(10), 1027–1038. <https://doi.org/https://doi.org/10.1016/j.telpol.2017.09.003>
- Latiep, I. F., Dewi, A. R. S., Syam, A., Halik, J. B., & Chakti, A. G. R. (2023). INOVASI BISNIS ONLINE. In B. Majid & H. Hardiyono (Eds.), *Chakti Pustaka Indonesia* (1st ed., Vol. 1). Chakti Pustaka Indonesia.
- Maguire, M., & Delahunt, B. (2017). Doing a Thematic Analysis: A Practical, Step-by-Step Guide for Learning and Teaching Scholars. *AISHE-J*, 3(Autumn 2017), 3135–3140. <http://ojs.aishe.org/index.php/aishe-j/article/view/335>
- Marisya, F., Marsinah, M., & Wahasusmiah, R. (2025). Fintech Developments in Indonesia : A Critical Multiperspective Analysis Review. *Journal of Management and Creative Business*, 3(1), 199–207. <https://doi.org/10.30640/jmcbus.v3i1.3599>
- Maspul, K. A., & Putri, N. K. (2025). Will Big Data and AI Redefine Indonesia 's Financial Future ? *Jurnal Bisnis Dan Komunikasi Digital*, 2(2), 1–21. <https://doi.org/10.47134/jbkd.v2i2.3739>
- Meidyasari, S. (2024). the Impact of Digital Economy on Economic. *Injury: Interdisciplinary Journal and Humanity*, 3(11), 777–783.
- Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A Step-by-Step Process of Thematic Analysis to Develop a Conceptual Model in Qualitative Research. *International Journal of Qualitative Methods*, 22(October), 1–18. <https://doi.org/10.1177/16094069231205789>
- Nguyen, T. H., Le, X. C., & Vu, T. H. L. (2022). An Extended Technology-Organization-Environment (TOE) Framework for Online Retailing Utilization in Digital Transformation: Empirical Evidence from Vietnam. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(4), 200. <https://doi.org/10.3390/joitmc8040200>
- Nur, A., Wijanarko, D., Solahuddin, A. D., Wibowo, H., & Maulana, H. H. (2024). ANALISIS PENERAPAN TEKNOLOGI KECERDASAN BUATAN (AI) DALAM INDUSTRI E-COMMERCE DI INDONESIA. *Kohesi: Jurnal Multidisiplin Saintek*, 4(11), 1–16. <https://ejournal.warunayama.org/kohesi>
- Odedina, C. (2023). Impact of Big Data on Marketing Strategy and Consumer Behavior Analysis in the Us. *SSRN Electronic Journal*, September. <https://doi.org/10.2139/ssrn.4520361>
- Oktaviani, C., Sugiyono, H., Pembangunan, U., Veteran, N., & Info, A. (2024). LEGAL RISK MITIGATION OF USING ARTIFICIAL INTELLIGENCE TECHNOLOGY IN DIGITAL. *Syiah Kuala Law Journal*, 8(3), 570–583. <https://jurnal.usk.ac.id/SKLJ/article/download/42542/22228>
- Oussous, A., Benjelloun, F. Z., Ait Lahcen, A., & Belfkih, S. (2018). Big Data technologies: A survey. *Journal of King Saud University - Computer and Information Sciences*, 30(4), 431–448. <https://doi.org/10.1016/j.jksuci.2017.06.001>
- Peretz-Andersson, E., Tabares, S., Mikalef, P., & Parida, V. (2024). Artificial intelligence implementation in manufacturing SMEs: A resource orchestration approach. *International Journal of Information Management*, 77(March), 102781. <https://doi.org/10.1016/j.ijinfomgt.2024.102781>
- Roreng, P. P., Halik, J. B., Halik, M. Y., & Irdawati. (2024). Systematic Literature Review : Kondisi Makroekonomi Indonesia Pasca Pandemi Covid-19 dan Prospek di Masa Mendatang. *MARIOBRE: Journal of Marketing Management and Innovative Business Review*, 2(2), 56–67.

- Sahetapy, H. Halik, M. Y. Sino, H. W. Bokaw, J. R. S. (2025). Big Data and Artificial Intelligence: Implications and Strategies for Business Development in Indonesia DOI 10.63416/mrb.v3i1.321
<https://ojsapaji.org/index.php/mariobre/article/view/306>
- Safitri, T. A. (2020). The Development of Fintech in Indonesia. *Advances in Social Science, Education and Humanities Research*, 436, 666–670.
<https://doi.org/10.2991/assehr.k.200529.139>
- Satwiko, B. S. (2021). Privacy and Data Protection: Indonesian Legal Framework. *Corporate and Trade Law Review (CTRL)*, 1(2), 98–118.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104(March), 333–339.
<https://doi.org/10.1016/j.jbusres.2019.07.039>
- Sollosy, M., & McInerney, M. (2022). Artificial intelligence and business education: What should be taught. *The International Journal of Management Education*, 20(3), 100720.
<https://doi.org/https://doi.org/10.1016/j.ijme.2022.100720>
- Soori, M., Arezoo, B., & Dastres, R. (2023). Artificial intelligence, machine learning and deep learning in advanced robotics, a review. *Cognitive Robotics*, 3(March), 54–70.
<https://doi.org/10.1016/j.cogr.2023.04.001>
- Soori, M., Jough, F. K. G., Dastres, R., & Arezoo, B. (2024). AI-Based Decision Support Systems in Industry 4.0, A Review. *Journal of Economy and Technology*.
<https://doi.org/10.1016/j.ject.2024.08.005>
- Subroto, V. K., Kusumajaya, R. A., Tumbur, W., & Tobing, M. L. (2024). The Business Model of the Mass Media Industry in the Era of Artificial Intelligence (AI) Development in Indonesia. *Journal of Management and Informatics (JMI)*, 3(2), 230–249.
<https://doi.org/10.27824/jmi.v3i2.31>
- Supriadi, A., Judijanto, L., Rizani, A., & Al-Amin. (2023). ECONOMIC TRANSFORMATION OF INDONESIA IN THE ERA OF DIGITAL 5.0: CHALLENGES AND OPPORTUNITIES. *International Journal of Economic Literature*, 1(2), 122–135.
- Suraji, R., Istianingsih, & Ali, H. (2024). Catalyzing Change: Unleashing the Power of Artificial Intelligence in Indonesian Business. *International Journal of Advanced Multidisciplinary*, 2(4), 952–961.
<https://doi.org/10.38035/ijam.v2i4.461>
- Susiang, M. I. N., Suryaningrum, D. A., Masliardi, A., Setiawan, E., & Abdillah, F. (2023). Enhancing Customer Experience through Effective Marketing Strategies: The Context of Online Shopping. *SEIKO : Journal of Management & Business*, 6(2), 437–447.
- Syafika, Y. Z., & Antonio, G. R. (2024). Impacts of the Technology Acceptance Model (Tam) on the Use of the Tiktok E-Commerce Application Among Indonesian Students. *UTSAHA: Journal of Entrepreneurship*, 3(2), 47–64.
<https://doi.org/10.56943/joe.v3i2.591>
- Tang, N. (2024). Leveraging Big Data and AI for Enhanced Business Decision- Making : Strategies , Challenges , and Future Directions. *Journal of Applied Economics and Policy Studies*, 11(October), 1–5.
<https://doi.org/10.54254/2977-5701/11/2024098>
- TechTarget. (2024). *What is AI? Artificial Intelligence explained.* Webpage.
<https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence>
- The SMERU Research Institute, Digital Pathways at University of Oxford, & Unescap. (2022). *Strategy Primer: Accelerating Digital Skills Development in Indonesia* (Paper No.1; February 2022, Issue 1). www.smeru.or.id.
- Triandini, E., Jayanatha, S., Indrawan, A., Werla Putra, G., & Iswara, B. (2019). Metode Systematic Literature Review untuk Identifikasi Platform dan Metode Pengembangan Sistem Informasi di Indonesia. *Indonesian Journal of Information Systems*, 1(2), 63.
<https://doi.org/10.24002/ijis.v1i2.1916>
- Yaiprasert, C., & Hidayanto, A. N. (2024). AI-powered ensemble machine learning to optimize cost strategies in logistics business. *International Journal of Information Management Data Insights*, 4(1), 100209.
<https://doi.org/10.1016/j.jjimei.2023.100209>
- Yusman, F., Mt, R., & Firman, Y. D. (2025). Leveraging AI for Strategic Decision-Making in Indonesia ' s National Defense Management. *PERSPEKTIF*, 14(1), 133–139.
<https://doi.org/10.31289/perspektif.v14i1.13396>
- Zhao, G., Xie, X., Wang, Y., Liu, S., Jones, P., &

Lopez, C. (2024). Barrier analysis to improve big data analytics capability of the maritime industry: A mixed-method approach. *Technological Forecasting and Social Change*, 203(March 2023), 123345. <https://doi.org/10.1016/j.techfore.2024.123345>