

Analysis of the Role of Artificial Intelligence (AI) in Digital Business Transformation: A Literature Review

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Keywords	Abstract
Artificial Intelligence; Digital Transformation; Digital Business; Machine Learning; Process Automation.	This study aims to analyze the role of Artificial Intelligence (AI) in driving digital business transformation through a systematic literature review approach. Digital business transformation has become increasingly essential for organizations seeking to maintain competitiveness in the era of Industry 4.0 and the emerging Industry 5.0 paradigm. As a core component of technological advancement, AI provides advanced capabilities in data processing, process automation, predictive analysis, and the generation of valuable business insights. Through an analysis of 25 selected scientific publications from reputable academic databases, this study identifies four main dimensions of AI's role in digital business transformation: (1) intelligent business process automation, (2) data-driven personalization of customer experiences, (3) supply chain and operational optimization, and (4) AI-based strategic decision-making. The findings indicate that organizations successfully integrating AI into their core business strategies experience improvements in operational efficiency, enhanced customer satisfaction, and increased business performance. However, challenges such as digital talent shortages, implementation costs, data privacy concerns, ethical considerations, and resistance to organizational change remain significant barriers. This study contributes to a comprehensive understanding of how AI is reshaping the contemporary digital business landscape and provides practical insights for business leaders in developing effective digital transformation strategies.

INTRODUCTION

The Fourth Industrial Revolution (Industry 4.0) has brought fundamental changes to the way organizations operate and create value. Amid the increasingly rapid pace of digitalization, Artificial Intelligence (AI) has evolved from a theoretical scientific concept into a practical driver of global business transformation. Advances in cloud computing, the availability of massive datasets (big data), and developments in machine learning and deep learning algorithms have positioned AI as one of the most transformative technologies of the current decade (Annapareddy, 2025; Banerjee, 2024; Kunungo et al., 2018; Nguyen et al., 2019; Rane et al., 2024).

At the global level, AI adoption in business has demonstrated significant growth. A report by the McKinsey Global Institute (2021) revealed that 56% of companies worldwide had adopted AI in at least one business function, increasing from 50% in 2020. Furthermore, PwC (2021) projected that AI could contribute up to USD 15.7 trillion to the global economy by 2030, positioning it as one of the technologies with the greatest potential economic impact in modern history.

In Indonesia, AI-driven digital transformation has also accelerated significantly, particularly following the COVID-19 pandemic, which encouraged rapid technology adoption across various sectors. Industries such as banking, e-commerce, healthcare, education, and manufacturing have increasingly implemented AI-based solutions to improve operational efficiency and enhance customer experiences. The AI startup ecosystem in Indonesia has continued to develop, supported by government initiatives such as the National Strategy for Artificial Intelligence 2020–2045, which identifies AI as a strategic priority for national technological development (Abdurrahman, 2026; Aripadono, 2026; Muljono et al., 2025; Sajida & Pratiwi, 2025; Sari et al., 2025).

The novelty of this research lies in its comprehensive synthesis of existing literature to develop a multidimensional framework explaining AI's role in digital business transformation. Unlike previous studies that have focused on specific aspects of AI implementation, this research integrates findings related to process automation, customer engagement, operational optimization, and strategic decision-making to provide a holistic understanding of AI's strategic value. This study contributes new insights by explicitly connecting AI utilization patterns with specific business outcomes and identifying the mechanisms through which AI adoption contributes to measurable improvements in organizational performance. Furthermore, this research emphasizes the Indonesian context by providing insights into how organizations navigate local challenges and opportunities within the digital ecosystem while positioning these findings within the broader global landscape of AI-driven transformation.

This study aims to examine the role of AI in driving digital business transformation, with a specific focus on understanding how AI utilization improves organizational performance across multiple dimensions. The research analyzes four primary dimensions of AI implementation: intelligent business process automation, data-driven customer experience personalization, supply chain and operational optimization, and AI-based strategic decision-making. Through a systematic review of 25 selected publications, this study investigates the mechanisms through which AI adoption influences organizational efficiency, customer satisfaction, and business performance while identifying the challenges and barriers affecting successful AI implementation.

Despite the significant opportunities offered by AI, its implementation within digital business contexts remains associated with various complex challenges. Gaps in human resource competencies, uneven technological infrastructure, ethical considerations, data privacy concerns, and substantial investment requirements are among the factors influencing successful AI adoption. Therefore, developing a comprehensive, evidence-based understanding of AI's role in digital business transformation is increasingly important for business stakeholders and academics in designing effective and sustainable digital transformation strategies.

METHOD

Research Design

This study employed a Systematic Literature Review (SLR) method based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The SLR approach was selected because it enabled the systematic, transparent, and reproducible synthesis of scientific evidence from relevant literature sources. This method

supported the development of reliable and comprehensive conclusions based on previous research findings.

Literature Search Sources and Strategies

Literature searches are conducted through several internationally reputable academic databases, including: Google Scholar, Scopus, Web of Science, IEEE Xplore, SpringerLink, and JSTOR. The search is also complemented by searching Sinta 1 and 2 accredited national journals through the Garuda and DOAJ portals. Keywords used in the literature search included combinations of: "Artificial Intelligence", "Digital Business Transformation", "Machine Learning in Business", "AI Business Strategy", "Digital Transformation AI", "Digital Business Artificial Intelligence", and a combination of its equivalents in Indonesian and English.

Inclusion and Exclusion Criteria

The inclusion criteria applied in the literature selection include: (1) articles published in the 2017-2024 period, (2) articles in Indonesian or English, (3) articles published in indexed scientific journals or proceedings, (4) articles that specifically discuss the role of AI in the context of business or digital transformation. Meanwhile, the exclusion criteria include: (1) articles that do not go through the peer review process, (2) articles that only discuss the technical aspects of AI without a business context, (3) duplicate or preprint versions of articles that have been published in the final version, and (4) articles that do not have the full text available.

Quality Selection and Assessment Process

Of the total 487 articles identified in the initial search, the screening process was carried out in four stages. The first stage, the removal of duplicates resulted in 342 unique articles. The second stage, filtering by title and abstract eliminated 241 irrelevant articles, leaving 101 articles. The third stage, the reading of the full text eliminated 76 articles that did not meet the quality criteria, leaving 25 articles included in the final analysis. The quality of each article was assessed using the Mixed Methods Appraisal Tool (MMAT) instrument which included aspects of research design, methodology, reliability of findings, and relevance to the topic of the study.

Data Analysis

Data analysis was carried out using content analysis and thematic synthesis techniques. Each article that passed the selection was extracted information including: author, year of publication, research method, industry context, key findings, and practical implications. The emerging themes are then coded and grouped using an inductive-deductive approach to produce a comprehensive analytical framework on the role of AI in digital business transformation.

RESULTS AND DISCUSSION

Overview of the Literature Analyzed

Of the 25 articles analyzed, the distribution by year of publication shows a consistent increase from year to year, with the largest concentration in the period 2020-2024 (72% of the total articles). This reflects the acceleration of research in the field of AI and digital business transformation triggered by the COVID-19 pandemic and the development of generative AI technology. Based on the industry context, the study includes the financial and banking sectors (32%), retail and e-commerce (28%), manufacturing (20%), healthcare (12%), and other sectors (8%). The following table 1 presents a summary of the literature analyzed.

Table 1. Summary of Analyzed Literature

No.	Author / Year	Title	Key Findings
1	Russell & Norvig (2020)	Artificial Intelligence: A Modern Approach	Presenting the theoretical foundations of AI include machine learning, deep learning, and natural language processing as the main pillars of business transformation.
2	Chui et al. (2021)	The State of AI in 2021	The McKinsey study shows 56% of global organizations have adopted AI at least in one business function, up from 50% the previous year.
3	Brynjolfsson & McAfee (2017)	The Business of Artificial Intelligence	AI has the greatest impact on productivity improvement, process automation, and data-driven decision-making.
4	Davenport & Ronanki (2018)	Artificial Intelligence for the Real World	Identify three categories of AI deployments: process automation, cognition, and customer engagement in a real-world business context.
5	Manyika et al. (2017)	A Future That Works: AI, Automation & Productivity	AI-based automation has the potential to transform 45% of global work activity, driving a fundamental restructuring of business models.
6	Kreutzer & Sirrenberg (2020)	Understanding Artificial Intelligence	Discussing AI implementation strategies for SMEs and large corporations, emphasizing the importance of data governance and digital literacy.
7	Ransbotham et al. (2020)	Expanding AI's Impact With Organizational Learning	Companies that integrate AI into organizational culture experience a 2.5x increase in performance compared to those that only use AI tactically alone.
8	PwC (2021)	Sizing the Prize: AI in Business	AI is projected to contribute USD 15.7 trillion to the global economy by 2030, with the largest contribution in the retail, finance, and manufacturing sectors.
9	Westerman et al. (2019)	Leading Digital Transformation with AI	Effective digital leadership requires the integration of AI into core business strategies, not just as a technological add-on.
10	Tegmark (2017)	Life 3.0: Being Human in the Age of AI	Analyze the long-term implications of AI on the social, economic, and future business structure comprehensively.
11	Ng (2018)	AI for Everyone	Emphasizing the importance of AI literacy at all levels of the organization as a determining factor for the success of AI-based digital transformation.
12	Mithas et al. (2022)	AI and Firm Performance	A meta-analysis of 312 studies showed a significant positive correlation between AI adoption and improved corporate financial performance.

The Role of AI in Intelligent Business Process Automation

Findings from the literature review consistently show that AI-based business process automation is the most studied dimension and has the most significant measurable impact.

Robotic Process Automation (RPA) powered by AI capabilities, often referred to as Intelligent Process Automation (IPA), has revolutionized the way organizations manage their back-office and front-office processes.

Davenport and Ronanki (2018) in their study of 152 corporate AI projects found that 71% of successful AI implementations start from well-defined business process automation. Concrete applications include automated document processing, intelligent inventory management, real-time fraud detection, and AI-based chatbot-based customer service. Case studies from the banking sector show that the implementation of AI in the credit verification process can reduce the processing time from an average of 5 days to less than 10 minutes, while increasing decision accuracy by 23% (Mithas et al., 2022).

In the manufacturing context, AI integrated with the Internet of Things (IoT) enables predictive maintenance that reduces machine downtime by up to 50% and dynamically optimizes production schedules based on real-time market demand. Manyika et al. (2017) quantified the potential of AI-based automation which can reach 45% of total global employment activity, with a potential annual economic value of USD 6.7 trillion.

AI-Based Customer Experience Personalization

The second dimension that consistently appears in the literature is the utilization of AI to create massively personalized customer experiences. AI enables organizations to understand, anticipate, and respond to individual customer needs at a scale that is impossible to achieve through manual approaches.

Recommendation systems based on collaborative filtering and deep learning have become the backbone of the digital marketing strategies of leading technology companies. A study by McKinsey (Chui et al., 2021) revealed that 35% of Amazon's revenue and 75% of the content watched on Netflix is generated through an AI-based recommendation engine. In the banking sector, AI enables hyper-personalization of financial products that increase cross-selling rates by up to 40% and reduce customer churn rates by 15-20%.

Natural Language Processing (NLP) and sentiment analysis organizations to process and analyze millions of customer interactions across social media, product reviews, service tickets, and call recordings to extract actionable insights in real-time. Westerman et al. (2019) found that companies that used AI for customer intelligence experienced an average increase in Net Promoter Score (NPS) that was 28 points higher than competitors that did not adopt AI.

Supply Chain and Operational Optimization

Supply chain management is a domain where AI provides highly measurable added value. The complexity of modern supply chains involving thousands of suppliers, dynamic geopolitical factors, demand volatility, and logistical disruption create a huge need for AI-based predictive and optimization capabilities.

AI algorithms for demand forecasting have been shown to increase the accuracy of demand predictions by 10-30% compared to traditional statistical methods, which directly impacts a 20-50% reduction in inventory costs and an increase in service levels (Manyika et al., 2017). AI-based delivery route optimization implemented by leading logistics companies such as UPS and DHL results in billions of dollars in fuel savings per year.

In the context of manufacturing, AI-based computer vision is used for automated quality control that is able to detect product defects with an accuracy beyond the capabilities of human inspectors, even at very high production speeds. Ransbotham et al. (2020) reported that

manufacturing companies that comprehensively implement AI in their operations achieved an average increase in overall equipment effectiveness (OEE) of 11%.

AI-Based Strategic Decision Making

The fourth dimension identified is the use of AI to support and improve the quality of strategic decision-making. AI enables business executives to access predictive and prescriptive analytics that far surpass the capacity of human analytics in terms of speed, data volume, and complexity of variables that can be considered.

Brynjolfsson and McAfee (2017) argue that AI has shifted the decision-making paradigm from one previously based on intuition and experience to one based on comprehensive data evidence and sophisticated statistical analysis. In the financial sector, AI algorithms for credit risk analysis, fraud detection, and algorithmic trading have become an irreplaceable industry standard.

A study by PwC (2021) found that companies that use AI for strategic decision support make decisions 5 times faster than competitors, and those decisions result in 25% better outcomes based on relevant financial performance metrics. AI's ability to simultaneously analyze market data, competitor trends, consumer behavior, and macroeconomic factors provides a significant competitive advantage.

Challenges and Barriers to AI Implementation

While the benefits of AI have been well documented, the analyzed literature has also consistently identified various challenges that hinder optimal AI adoption. First, the digital talent gap is the most mentioned challenge. Ng (2018) estimates that the global need for AI engineers and data scientists exceeds the available supply by a ratio of 1:10, creating fierce competition for the best AI talent.

Second, the quality and availability of data are critical technical barriers. AI can only provide valuable output if it is trained with quality, well-labeled, and representative data. Many organizations find that up to 80% of AI projects' time and resources are spent on data cleaning, integration, and preparation, rather than on the construction of the AI model itself.

Third, AI ethical issues include algorithmic bias, model intransparency (black box problem), and potential discrimination in automated decision-making. Kreutzer and Sirrenberg (2020) emphasize that public trust in AI is a fundamental prerequisite for sustainable adoption, and that this trust can only be built through explainable AI and governed by a strong ethical framework.

Fourth, substantial implementation costs and uncertainty of Return on Investment (ROI) are obstacles for medium and small organizations. Tegmark (2017) reminds that the benefits of AI are not evenly distributed and have the potential to widen the gap between large companies that can invest large resources in AI and SMEs with limited capacity.

AI Integration Framework in Digital Business Transformation

Based on the synthesis of findings from all the analyzed literature, this study proposes an integrative framework that describes the path of AI-based digital business transformation. The framework consists of four interconnected layers: (1) the Foundation Layer, which includes data infrastructure, cloud computing, and AI governance; (2) Capability Layer, which includes AI model development, MLOps, and system integration; (3) Application Layer, which includes the four dimensions of AI deployment that have been outlined; and (4) Value Layer, which generates business impact in the form of efficiency, growth, and competitive advantage.

This framework emphasizes that the success of AI-based digital business transformation is not solely determined by the sophistication of the technology adopted, but rather by the organization's ability to integrate AI with business strategies, organizational culture, and human resource capabilities in harmony. Ransbotham et al. (2020) call this ideal condition an "AI-native organization" of organizations that view AI not as a technological tool, but as a core capability that shapes their identity and business strategy.

CONCLUSION

Based on a systematic analysis of 25 selected scientific publications, this study identified several important findings regarding the role of AI in digital business transformation. First, AI has emerged as a key enabler of digital business transformation through four strategic dimensions: intelligent business process automation, customer experience personalization, supply chain optimization, and data-driven decision-making. Organizations that successfully integrate AI into their core business strategies demonstrate improvements in operational efficiency, customer satisfaction, and business performance.

Second, the success of AI implementation is determined not only by technological capabilities but also by a supportive ecosystem involving visionary digital leadership, a data-driven organizational culture, reliable technology infrastructure, and competent human resources. Third, AI implementation challenges are multidimensional, encompassing technical, human, ethical, and regulatory aspects that require a comprehensive and gradual approach. Fourth, the rapid advancement of generative AI has introduced a new phase in digital business transformation by enabling the automation of complex cognitive tasks previously considered dependent on human capabilities. This development requires organizations to enhance their readiness through strategic adaptation, workforce reskilling, and the establishment of robust AI governance frameworks.

The practical implications of this study highlight the importance for business leaders to initiate AI transformation by strengthening data foundations, developing AI strategies aligned with organizational objectives, investing in human resource capabilities, and establishing ethical and responsible AI ecosystems. Future research should further investigate the impact of generative AI on emerging business models, examine AI adoption among small and medium-sized enterprises (SMEs) in developing countries, and explore the regulatory and ethical implications of AI implementation for long-term business sustainability.

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