JURNAL PUSTAKA MANAJEMEN
Vol. 6 No. 1 (2026) 6-12 E ISSN : 2809-8145
JURNAL PUSAT AKSES KAJIAN MANAJEMEN

GENERATIVE AI IN STRATEGIC MANAGEMENT: TRANSFORMING BUSINESS MODELS FOR SUSTAINABLE VALUE CREATION

Salamiah Muhd Kulal[1], Chua Pei Sze[2], Xu Zijian[3]
[1]Twintech University College of Technology, Selangor, Malaysia
[2,3] University Malaysia Computer Science and Engineering
[1]salamiah.kulal@twintech.edu.my

Abstract

The integration of generative artificial intelligence (AI) into strategic management has emerged as a critical driver of business model innovation and sustainable value creation. This study examines PETRONAS's comprehensive digital transformation framework, focusing on how generative AI technologies are strategically implemented to enhance decision-making processes and drive sustainable business outcomes. Through a qualitative case study methodology utilizing secondary data from publicly available sources, this research analyzes PETRONAS's AI-driven initiatives, including the revolutionary Jom AI (J.AI) platform launched in July 2023. The findings reveal that PETRONAS's strategic implementation of generative AI has significantly enhanced knowledge discovery capabilities, operational efficiency, and sustainable value creation. The study contributes to the literature by providing empirical evidence of how large Malaysian corporations can successfully integrate generative AI into their strategic management practices while maintaining focus on environmental, social, and governance (ESG) objectives. The research demonstrates that generative AI, when strategically implemented within a robust governance framework, serves as a catalyst for sustainable business model transformation in the energy sector.

Keyword : *generative AI, strategic management, digital transformation, sustainable value creation, business model innovation*

1. Introduction

The global energy sector faces unprecedented challenges requiring innovative approaches to strategic management and sustainable value creation. As organizations navigate the complexities of digital transformation, the integration of artificial intelligence (AI) technologies, particularly generative AI, has emerged as a critical strategic imperative (Brynjolfsson & McAfee, 2017). The Malaysian energy sector, led by national oil corporation PETRONAS, presents a unique context for examining how generative AI can be leveraged for strategic management and sustainable business model innovation.

Despite significant investments in digital transformation initiatives, many large corporations in Malaysia continue to face challenges in effectively aligning AI tools, especially generative AI, with sustainable value creation objectives (Davenport & Ronanki, 2018). While PETRONAS has announced various digital transformation initiatives and achieved recognition for its AI-driven knowledge discovery projects, winning the 2024 ASEAN Enterprise Innovation Award (AIBP, 2024), there remains limited academic insight into how

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026

generative AI specifically contributes to managerial decision-making and sustainable business model innovation within Malaysian corporate settings.

This study addresses the critical gap in understanding the strategic implementation of generative AI within Malaysian corporations by examining PETRONAS's comprehensive digital transformation framework. PETRONAS emerged as a winner in the 2024 ASEAN Enterprise Innovation Award for its AI-driven knowledge discovery project, highlighting the significance of more than 40% of submissions involving artificial intelligence or machine learning technologies. The research investigates how PETRONAS integrates generative AI into its strategic management processes and evaluates the impact on sustainable business outcomes.

Literature Review

1.1 Theoretical Foundations

The theoretical foundation for this study rests upon Dynamic Capabilities Theory (Teece, 2007) and the Technology-Organization-Environment (TOE) Framework (Tornatzky & Fleischer, 1990). Dynamic Capabilities Theory provides a lens for understanding how organizations adapt and reconfigure their resources in rapidly changing technological environments, particularly relevant for examining PETRONAS's strategic AI implementation. The TOE Framework offers a comprehensive approach to evaluating the internal and external factors influencing AI adoption in organizational contexts.

Teece's (2007) Dynamic Capabilities Theory emphasizes three key capabilities: sensing opportunities and threats, seizing opportunities, and reconfiguring resources. These capabilities are particularly relevant for understanding how PETRONAS leverages generative AI to enhance strategic decision-making and create sustainable value. The theory suggests that organizations with superior dynamic capabilities can better navigate technological disruptions and maintain competitive advantage (Teece et al., 1997).

The TOE Framework complements this theoretical foundation by providing a structured approach to analyzing AI adoption factors across technological, organizational, and environmental dimensions (Baker, 2012). This framework is particularly valuable for understanding the complex interplay of factors that influence successful generative AI implementation in large corporations like PETRONAS.

1.2 Literature Gap and Research Positioning

Current literature reveals several critical gaps in understanding generative AI's role in strategic management. First, most existing studies focus on AI applications in operations or marketing rather than strategic management contexts (Chen et al., 2021). Second, there is a notable lack of Malaysian-based case studies demonstrating AI-driven sustainable business model transformation (Ahmad & Rahman, 2023). Third, PETRONAS's pioneering AI initiatives, including the innovative J.AI platform, remain underexplored in academic literature despite their practical significance.

Recent studies have examined AI's role in operational efficiency (Kumar & Singh, 2022) and marketing applications (Liu et al., 2023), but comprehensive analysis of generative AI's strategic impact on sustainable value creation remains limited. The gap is particularly pronounced in the context of Southeast Asian energy corporations, where cultural, regulatory, and market factors create unique implementation challenges and opportunities.

1.3 Research Questions and Objectives

This study addresses the following research questions:

RQ1: How does PETRONAS integrate generative AI into strategic decision-making processes?

RQ2: What impact does generative AI have on PETRONAS's sustainable business model transformation?

The corresponding research objectives are:

RO1: To examine the application of generative AI in PETRONAS's strategic management practices.

RO2: To assess the relationship between AI integration and sustainable business outcomes at PETRONAS.

1.4 Research Hypotheses

Based on the theoretical framework and literature review, this study proposes the following hypotheses:

H1: The use of generative AI in strategy development positively influences sustainable value creation at PETRONAS.

H2: There is a significant relationship between AI maturity and strategic agility in PETRONAS's operations.

2. Methodology

2.1 Research Approach

This study employs a qualitative case study methodology, utilizing PETRONAS as a single-case purposive sampling approach. The case study method is particularly appropriate for examining complex organizational phenomena and understanding "how" and "why" questions related to contemporary events (Yin, 2018). The research

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026

design focuses on document analysis and thematic content analysis to provide comprehensive insights into PETRONAS's generative AI implementation.

2.2 Data Collection Strategy

Data collection relies exclusively on secondary data from publicly available sources, consistent with desk research methodology. Primary data collection through interviews or surveys was not conducted, ensuring the research remains based on accessible public information. The data collection strategy encompasses multiple sources to enable triangulation and enhance validity.

a. Document Analysis: Official sustainability and innovation reports from PETRONAS covering the period 2021-2024 form the core data source. Additional documents include digital transformation roadmaps, ESG-driven strategy reports, and AI governance frameworks.
b. Media and News Analysis: Comprehensive review of news articles from reputable sources including The Edge, Bernama, and international business publications covering PETRONAS's AI initiatives.
c. Corporate Communications: Analysis of LinkedIn posts from PETRONAS Digital, press releases, and corporate statements related to AI implementation and digital transformation.
d. External Benchmarking Reports: Industry reports from consulting firms such as EY and Deloitte examining AI-readiness in Malaysia's oil and gas sector.

2.3 Analysis Method

Thematic content analysis was employed to identify patterns and themes related to generative AI implementation and sustainable value creation. The analysis process involved:

a. Initial Coding: Systematic coding of all collected documents to identify relevant themes
b. Pattern Recognition: Identification of recurring patterns related to AI strategy, implementation, and outcomes
c. Thematic Development: Development of comprehensive themes linking AI implementation to strategic management and sustainability
d. Validation: Cross-referencing findings across multiple data sources to ensure reliability

2.4 Validation and Reliability

Triangulation through multiple public sources enhances the validity of findings. The study's reliability is strengthened by focusing exclusively on publicly available information, ensuring reproducibility and transparency in the research process.

3. Case Study Analysis: PETRONAS Digital Transformation Framework

3.1. PETRONAS Digital Transformation Overview

PETRONAS has positioned itself as a leader in digital transformation within Malaysia's energy sector. The corporation's digital strategy encompasses comprehensive AI integration across multiple operational domains, with particular emphasis on knowledge management, operational efficiency, and sustainable value creation.

The July 2023 launch of Jom AI (J.AI) revolutionized knowledge discovery with AI-powered tools like J.AI Chat and J.AI Search, integrating over 700,000 documents and significantly reducing knowledge discovery time. This initiative represents a paradigm shift in how PETRONAS approaches information management and strategic decision-making.

The company's digital transformation journey accelerated significantly during the COVID-19 pandemic. According to Chief Digital Officer Aadrin Azly, PETRONAS compressed a collaboration program that was supposed to last two years within three months during the pandemic, demonstrating the velocity of change underpinned by digital transformation in the energy industry.

3.1 Generative AI Implementation Strategy

PETRONAS's approach to generative AI implementation demonstrates strategic alignment with business objectives and sustainability goals. The implementation strategy encompasses several key dimensions:

Knowledge Management Revolution: The J.AI platform represents PETRONAS's most significant generative AI initiative. The platform integrates over 700,000 documents comprising drawings, multimedia, and various document types, enabling AI-powered knowledge discovery through tools like J.AI Chat and J.AI Search. This comprehensive knowledge base supports strategic decision-making by providing rapid access to critical information and insights.

Strategic Partnerships for AI Enhancement: PETRONAS has signed strategic memoranda of understanding focusing on enhancing technical capabilities in artificial intelligence, machine learning, and generative AI technologies, with partnerships aimed at integrating cutting-edge solutions. These partnerships demonstrate the company's commitment to staying at the forefront of AI technology adoption.

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026

AI-Driven Sustainability Initiatives: In August 2023, PETRONAS partnered with AIQ to develop AI solutions that may potentially accelerate the energy transition and drive sustainability across energy operations on a global scale. This partnership underscores the company's strategic focus on leveraging AI for sustainable value creation.

3.3 Impact on Strategic Decision-Making Processes

The integration of generative AI has fundamentally transformed PETRONAS's strategic decision-making processes. The J.AI platform has reduced knowledge discovery time from hours to minutes, enabling faster and more informed strategic decisions. This transformation is particularly significant in the energy sector, where rapid decision-making can have substantial operational and financial implications.

The AI-driven knowledge discovery system enables strategic leaders to access comprehensive historical data, technical documentation, and operational insights instantly. This capability supports evidence-based decision-making and enhances the quality of strategic choices across the organization.

3.4 Sustainable Business Model Transformation

PETRONAS's generative AI implementation directly contributes to sustainable business model transformation through several mechanisms:

Operational Efficiency Enhancement: AI-driven optimization reduces resource consumption and operational waste, contributing to environmental sustainability objectives. AI is enabling PETRONAS to reimagine sustainability at scale, with smart energy solutions, digitalization, and AI serving as essential components of their sustainable energy future strategy.

Energy Transition Acceleration: The strategic partnership with AIQ specifically targets AI solutions for energy transition acceleration. This focus demonstrates how generative AI supports PETRONAS's broader sustainability strategy and energy transition objectives.

ESG Integration: The company's AI initiatives are closely aligned with ESG objectives, ensuring that technological advancement supports broader sustainability goals. PETRONAS is making progress in meeting its near-term target of capping emissions at 49.5 million tCO2e by 2024 in domestic operations, demonstrating commitment to emissions-abated solutions.

3.5 Quantitative Outcomes and Performance Metrics

While specific quantitative metrics for J.AI implementation are not publicly disclosed, available data suggests significant operational improvements:

Cost Efficiency: PETRONAS's finding and development costs stood at $14.7 per barrel of oil equivalent in 2024, with potential for further optimization through AI-driven technologies. AI implementation contributes to cost reduction through enhanced operational efficiency and optimized resource allocation.

Knowledge Discovery Efficiency: The J.AI platform has dramatically reduced knowledge discovery time, with users able to access relevant information from over 700,000 documents within minutes rather than hours. This improvement directly translates to enhanced decision-making speed and quality.

Financial Performance: PETRONAS's total assets increased to RM798.6 billion as of June 30, 2024, against RM773.3 billion as of December 31, 2023, with shareholders' equity increasing to RM443.9 billion. While multiple factors contribute to financial performance, digital transformation initiatives including AI implementation support operational efficiency and strategic value creation.

4. Discussion and Analysis

4.1 Strategic AI Integration Framework

The analysis reveals that PETRONAS has developed a comprehensive framework for integrating generative AI into strategic management processes. This framework encompasses four key dimensions: technology infrastructure, organizational capabilities, governance structures, and sustainability alignment.

Technology Infrastructure: PETRONAS has invested significantly in developing robust AI infrastructure, evidenced by the J.AI platform's capability to process and analyze over 700,000 documents. This infrastructure provides the foundation for strategic AI applications across the organization.

Organizational Capabilities: The company has developed internal capabilities for AI implementation and management, supported by strategic partnerships that enhance technical expertise. The rapid adaptation during COVID-19 demonstrates organizational agility and readiness for digital transformation.

Governance Structures: PETRONAS has established governance frameworks for responsible AI implementation, ensuring alignment with ESG objectives and regulatory requirements. The recognition received through industry awards suggests effective governance and implementation practices.

Sustainability Alignment: The integration of AI initiatives with sustainability objectives demonstrates strategic coherence and long-term value creation focus. The partnership with AIQ specifically targets sustainability outcomes through AI innovation.

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026

4.2 Implications for Dynamic Capabilities Theory

The findings provide strong support for Dynamic Capabilities Theory's relevance in understanding AI-driven strategic transformation. PETRONAS demonstrates all three dynamic capabilities identified by Teece (2007):

Sensing: The company has effectively identified opportunities for AI application in knowledge management and strategic decision-making, as evidenced by the J.AI platform development.

Seizing: PETRONAS has successfully captured AI opportunities through strategic partnerships, infrastructure investment, and platform development.

Reconfiguring: The organization has reconfigured its knowledge management processes and decision-making structures to leverage AI capabilities effectively.

4.3 TOE Framework Analysis

The Technology-Organization-Environment Framework provides insights into factors influencing PETRONAS's successful AI adoption:

Technology Factors: Advanced AI technologies, including generative AI capabilities, provide the technical foundation for strategic implementation. The integration of over 700,000 documents demonstrates technological sophistication.

Organizational Factors: Strong leadership commitment, evidenced by C-suite involvement and strategic priority allocation, supports successful AI adoption. The company's digital transformation culture facilitates AI integration.

Environmental Factors: Industry pressure for digital transformation, regulatory support for innovation, and competitive dynamics create a favorable environment for AI adoption in Malaysia's energy sector.

4.4 Sustainable Value Creation Mechanisms

The analysis identifies several mechanisms through which generative AI contributes to sustainable value creation at PETRONAS:

Efficiency Enhancement: AI-driven optimization reduces resource consumption and operational waste, contributing directly to environmental sustainability.

Decision Quality Improvement: Enhanced access to information and analytics improves strategic decision quality, leading to better long-term outcomes.

Innovation Acceleration: AI capabilities accelerate innovation in sustainable energy solutions and business model development.

Stakeholder Value Creation: Improved operational efficiency and sustainability performance create value for multiple stakeholders, including shareholders, employees, and society.

5. Conclusions and Implications

5.1 Key Findings

This study provides empirical evidence of how generative AI can be strategically implemented to drive sustainable value creation in large Malaysian corporations. The key findings include:

Strategic Integration Success: PETRONAS has successfully integrated generative AI into strategic management processes through the J.AI platform, demonstrating significant improvements in knowledge discovery and decision-making efficiency.

Sustainability Alignment: The company's AI initiatives are closely aligned with sustainability objectives, supporting energy transition and ESG goals through strategic partnerships and targeted applications.

Dynamic Capabilities Enhancement: Generative AI implementation has enhanced PETRONAS's dynamic capabilities, particularly in sensing opportunities and reconfiguring resources for competitive advantage.

Organizational Transformation: The AI implementation has facilitated broader organizational transformation, improving agility and responsiveness to market changes.

5.2 Theoretical Contributions

This research contributes to existing literature in several ways:

Dynamic Capabilities Theory Extension: The study extends Dynamic Capabilities Theory by demonstrating how generative AI can enhance organizational capabilities for strategic transformation.

TOE Framework Application: The research applies the TOE Framework to AI adoption in the Malaysian energy sector, providing insights into contextual factors influencing successful implementation.

Sustainable Value Creation Model: The study develops a model linking generative AI implementation to sustainable value creation through multiple pathways including efficiency enhancement, innovation acceleration, and stakeholder value creation.

5.3 Practical Implications

The findings offer several practical implications for organizations considering generative AI implementation:

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026

Strategic Alignment Importance: Successful AI implementation requires clear alignment with organizational strategy and sustainability objectives.

Infrastructure Investment: Significant investment in AI infrastructure and capabilities is necessary for realizing strategic benefits.

Partnership Strategy: Strategic partnerships can accelerate AI capability development and enhance implementation success.

Governance Framework: Robust governance structures ensure responsible AI implementation and stakeholder value creation.

5.4 Limitations and Future Research

This study has several limitations that present opportunities for future research:

Single Case Design: The focus on PETRONAS as a single case limits generalizability. Future research should examine AI implementation across multiple Malaysian corporations.

Secondary Data Limitation: Reliance on publicly available secondary data may limit depth of analysis. Future research could incorporate primary data collection for deeper insights.

Longitudinal Analysis: The study provides a snapshot of AI implementation. Longitudinal research could examine the evolution of AI impact over time.

Quantitative Analysis: Future research could incorporate quantitative analysis to measure specific performance impacts of AI implementation.

5.5 Recommendations

Based on the findings, several recommendations emerge for organizations and policymakers:

For Organizations:

a. Develop comprehensive AI strategies aligned with sustainability objectives
b. Invest in robust AI infrastructure and organizational capabilities
c. Establish strong governance frameworks for responsible AI implementation
d. Pursue strategic partnerships to accelerate AI capability development

For Policymakers:

a. Support industry AI adoption through favorable regulatory frameworks
b. Encourage public-private partnerships in AI development
c. Promote AI education and capability development initiatives
d. Foster innovation ecosystems supporting AI advancement

References

[1] Ahmad, S., & Rahman, M. (2023). Digital transformation in Malaysian corporations: Challenges and opportunities. *Malaysian Management Journal*, 15(2), 45-62.
[2] ASEAN Innovation Business Platform. (2024, September 9). PETRONAS and Axiata win 2024 ASEAN enterprise innovation award, showcasing projects on AI-driven knowledge discovery and cybersecurity innovation. *AIBP Press Release*. https://www.aibp.sg/articles/press-release-petronas-and-axiata-win-2024-asean-enterprise-innovation-award
[3] Baker, J. (2012). The technology–organization–environment framework. In Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), *Information systems theory* (pp. 231-245). Springer.
[4] Brynjolfsson, E., & McAfee, A. (2017). *The business of artificial intelligence*. Harvard Business Review Press.
[5] Chen, L., Wang, H., & Liu, S. (2021). Artificial intelligence in strategic management: A systematic review. *Strategic Management Journal*, 42(8), 1532-1565.
[6] ClimateTechReview. (2025, May 28). PETRONAS leverages AI to accelerate a sustainable energy future. https://climatetechreview.com/petronas-leverages-ai-to-accelerate-a-sustainable-energy-future/
[7] Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, 96(1), 108-116.
[8] Digital News Asia. (2021, May 18). For Petronas, digital transformation targets their own people first. https://www.digitalnewsasia.com/business/petronas-digital-transformation-targets-their-own-people-first
[9] Kumar, A., & Singh, R. (2022). AI-driven operational efficiency in energy sector: A comprehensive analysis. *Energy Management Review*, 18(3), 78-95.
[10] Liu, X., Zhang, Y., & Chen, W. (2023). Marketing applications of artificial intelligence: Current trends and future directions. *Journal of Marketing Technology*, 11(4), 123-140.
[11] PETRONAS. (2023). *Integrated report 2023*. https://www.petronas.com/sites/default/files/uploads/content/2024/PETRONAS-Integrated-Report-2023.pdf
[12] PETRONAS. (2023, August 9). PETRONAS and AIQ partner to develop AI solutions for a more sustainable energy industry on a global scale. *Media Release*. https://www.petronas.com/media/media-releases/petronas-and-aiq-partner-develop-ai-solutions-more-sustainable-energy-industry
[13] PETRONAS. (2024). PETRONAS accelerates energy transition strategy with a diverse portfolio to drive future growth. *Media Release*. https://www.petronas.com/media/media-releases/petronas-accelerates-energy-transition-strategy-diverse-portfolio-drive-future
[14] PETRONAS. (2024). PETRONAS doubles-down on financial resilience in 2023 amid market volatility. *Media Release*. https://www.petronas.com/media/media-

releases/petronas-doubles-down-financial-resilience-2023-amid-market-volatility
[15] PETRONAS. (2024). PETRONAS recognised for tech-digital transformation initiatives. *Media Release*. https://www.petronas.com/media/media-releases/petronas-recognised-tech-digital-transformation-initiatives
[16] Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319-1350.
[17] Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
[18] TechNode Global. (2024, November 8). Malaysia's Petronas enhances E&P technology with two new MOUs. https://technode.global/2024/11/08/malaysias-petronas-enhances-ep-technology-with-two-new-mous/
[19] Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
[20] Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.

Submitted : 06-05-2026 | Reviewed : 07-05-2026 | Accepted : 26-06-2026