DIGITAL TRANSFORMATION AND FIRM PERFORMANCE IN 2025: THE MEDIATING ROLE OF BUSINESS MODEL INNOVATION AND MODERATING EFFECTS OF GENERATIVE AI AND SUSTAINABILITY (ASEAN CONTEXT)

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Abstract:

This study aims to explore how digital transformation (DT) translates into firm performance (FP) in 2025, addressing inconsistent empirical findings by emphasizing the mediating role of business model innovation (BMI) and moderating effects of generative AI (GenAI) and sustainability orientation (SO). Drawing on dynamic capability theory, institutional theory, and value co-creation theory, a conceptual framework is developed with internal, industry, and institutional factors as contextual boundaries. BMI acts as a crucial bridge linking DT to FP; GenAI strengthens the DT-BMI relationship, while SO enhances the BMI-FP link. Contextual factors (e.g., regulatory environments, digital intensity) further shape these relationships. Theoretically, it extends DT research by integrating GenAI and sustainability into dynamic capability and institutional perspectives. Practically, it offers insights for ASEAN firms to balance technological adoption with adaptive business models.

Keywords:

Digital Transformation, Business Model Innovation, Firm Performance, Dynamic Capabilities Theory, Generative AI, Sustainability Orientation, ASEAN Context

Introduction

By 2025, digital transformation (DT) is no longer an optional strategy but an existential requirement for firms across sectors. Global DT spending reached USD 2.1 trillion in 2023 and is projected to surge to USD 4.4 trillion by 2028, driven by generative AI adoption, cloud-native architectures, and sustainability mandates across industries (IDC, 2024). Across industries, frontrunners such as Tesla, Alibaba, and ByteDance have shown that digital ecosystems, fuelled by AI and platform-based business models, can create exponential value. In contrast, many traditional firms continue to struggle with rising transformation costs, limited digital talent, and increasingly complex regulatory landscapes.

This divergence raises a pressing question: why does digital transformation translate into performance gains for some firms but not others?

Emerging evidence suggests that technology adoption alone does not ensure improved outcomes. Despite the surge in DT investments, empirical findings on its performance impact remain fragmented—some studies report positive returns (Verhoef et al., 2021), while others highlight "digital fatigue" or cost overruns (Bailenson, 2021; Haag & Eckhardt, 2024). Al-Ayed et al. (2023) and Shen et al. (2025) note that prior research often overlooks the "missing link" between DT and FP: business model innovation (BMI). Foss & Saebi (2017) and Teece (2016) argue that BMI is the mechanism that transforms digital capabilities into sustainable value propositions, yet few studies integrate this with 2025's frontier drivers (GenAI and sustainability; Cui, 2025; Gindert & Müller, 2025). Additionally, ASEAN and other emerging economies face unique challenges (regulatory diversity, resource constraints) that have not been fully addressed in existing frameworks (World Bank, 2019; Bindeeba et al., 2025), leaving managers without context-specific guidance.

To address these gaps, this study develops a conceptual framework to examine the DT-BMI-FP relationship in 2025. Specifically, it argues that:
1. DT impacts FP both directly (but inconsistently) and indirectly;
2. BMI mediates the DT-FP relationship by enabling value capture;
3. GenAI strengthens the DT-BMI link, while SO enhances the BMI-FP link;
4. Institutional and industry contexts moderate these relationships.

The contribution of this paper is threefold. First, it advances dynamic capability theory by positioning BMI as the "reconfiguration capability" that translates DT into performance. Second, it integrates GenAI and sustainability into DT research, addressing 2025's business realities. Third, it provides practical implications for ASEAN firms, where regulatory and resource constraints demand adaptive strategies.

Literature Review and Theoretical Foundation

Digital Transformation and Performance: A Mixed Relationship
Digital transformation (DT) refers to the integration of advanced digital technologies such as artificial intelligence, cloud computing, Internet of Things (IoT), blockchain, and analytics into organizational processes, strategies, and value creation models (Vial, 2019). Numerous studies show that DT can improve efficiency, reduce transaction costs, enhance customer engagement, and open new market opportunities (Verhoef et al., 2021; Chen et al., 2022). In manufacturing, Industry 4.0 adoption has been linked with supply chain resilience and process optimization

(Qader et al., 2022). In services, digital platforms have expanded customer reach and enabled personalization at scale.

However, empirical evidence remains inconsistent. Some studies highlight significant returns from DT investments, while others reveal limited or even negative impacts, particularly when implementation costs outweigh short-term gains (Putra, 2022). A "J-curve" effect is often observed, where firms face high upfront costs, talent shortages, and organizational inertia before realizing long-term benefits (Teece et al., 2016). Additionally, firms that adopt digital tools without aligning strategy or organizational culture may experience digital fatigue, cybersecurity risks, and underutilization of technology (Bailenson, 2021; Brynjolfsson & Hitt, 2000; Haag & Eckhardt, 2024).

This suggests that DT does not guarantee performance improvements; instead, outcomes depend on the extent to which firms integrate technologies into coherent strategies that enable value creation and capture. This inconsistent relationship between DT and FP—driven by upfront costs, cultural resistance, and misalignment—leads to **Proposition 1 (H1)**: Digital Transformation has a positive but inconsistent direct relationship with Firm Performance.

Business Model Innovation as Mediator

Business Model Innovation (BMI) involves reconfiguring value propositions, revenue streams, and delivery mechanisms to adapt to changing environments (Foss & Saebi, 2017). A systematic review by van Tonder et al. (2024) confirmed BMI as the critical mediator between DT and FP: digital technologies only create potential value unless embedded within new business models.

For example, Kanbach et al. (2024) showed GenAI enhances customer personalization, but firms realize value only if they design BMI such as subscription models or AI-as-a-service. Similarly, von Garrel & Jahn (2023) noted blockchain improves logistics transparency, but competitive advantage arises only when integrated into trust-based platforms or carbon-credit ecosystems. In ASEAN, BMI is even more critical: resource constraints force firms to experiment with mobile-first channels or platform-based partnerships to leverage DT (World Bank, 2019). This leads to **Proposition 2 (H2)**: Business Model Innovation mediates the relationship between Digital Transformation and Firm Performance.

Theoretical Foundation

To develop a robust framework, this study draws on three theories:

1. **Dynamic Capability Theory (DCT)**: Teece et al. (2016) argue firms need to "sense" opportunities, "seize" resources, and "reconfigure" capabilities to leverage DT. DT provides sensing (e.g., data analytics) and seizing (e.g., cloud adoption) capabilities, while BMI embodies reconfiguration—adapting structures to translate technology into performance.
2. **Institutional Theory**: Wang (2025) notes 2025's ESG regulations, data sovereignty laws, and AI ethics frameworks shape DT strategies. Institutional factors (e.g., ASEAN's data localization laws) can enable or constrain BMI, depending on alignment with organizational capabilities.
3. **Value Co-Creation Theory**: Ramaswamy & Ozcan (2018) emphasize digital ecosystems require co-creation with stakeholders. BMI enables this—e.g., open innovation platforms or customer data-driven design—while GenAI and sustainability amplify collaborative value.

Contingency Factors in 2025
The DT-BMI-FP relationship is moderated by four factors:

1. **Internal factors**: Van Tonder et al. (2023) found leadership commitment, digital talent, and agile governance determine whether DT leads to BMI. A risk-averse culture may resist innovation, while cross-functional teams accelerate it.
2. **Industry factors**: Ning & Yao (2023) noted digital intensity varies—high-tech/finance firms rely on DT for competitiveness, while agriculture/manufacturing face uneven adoption. Ecosystem maturity also influences BMI outcomes.
3. **Institutional factors**: In ASEAN, cross-border digital trade rules and ESG reporting frameworks shape DT-BMI alignment (World Bank, 2019). For example, data localization laws limit cloud strategies, while green incentives favor sustainable BMI.
4. **Frontier drivers (GenAI and SO)**: Gindert & Müller (2025) showed GenAI accelerates BMI ideation and testing, while Zhou et al. (2023) found SO aligns BMI with stakeholder expectations (regulators, investors).

GenAI's role in accelerating DT-to-BMI translation leads to **Proposition 3 (H3)**: The positive effect of Digital Transformation on Business Model Innovation is strengthened by Generative AI adoption. SO's role in enhancing BMI-to-FP legitimacy leads to **Proposition 4 (H4)**: The positive effect of Business Model Innovation on Firm Performance is stronger when firms demonstrate a high Sustainability Orientation.

Together, institutional and industry factors act as boundary conditions that shape the strength of DT-BMI-FP relationships. This leads to **Proposition 5 (H5)**: Institutional and industry contexts moderate the relationships within the framework, such that firms in supportive institutional environments (e.g., regulatory sandboxes) and high-digital-intensity industries realize stronger effects of DT and BMI on performance.

Conceptual Framework and Propositions

Framework Overview
Building on the literature, the framework proposes:

Direct effect: DT has a positive but inconsistent impact on FP (due to cost overruns or misalignment; Al-Ayed et al., 2023) → Proposition 1.
Mediating effect: BMI translates DT's technological potential into value-capturing strategies (e.g., GenAI-driven revenue models) → Proposition 2.
Moderating effects: GenAI strengthens DT-BMI (faster ideation), while SO enhances BMI-FP (stakeholder legitimacy) → Propositions 3, 4.
Contextual moderation: Institutional/industry factors (e.g., regulatory support, digital intensity) amplify these effects → Proposition 5.

Propositions

    Proposition 1 (Direct Effect):
Digital Transformation has a positive but inconsistent direct relationship with Firm Performance.

Rationale: DT provides foundational capabilities (e.g., analytics), but cost overruns, cultural resistance, or misalignment often limit performance gains (Al-Ayed et al., 2023; Teece et al., 2016).

Proposition 2 (Mediating Role of BMI):

Business Model Innovation mediates the relationship between Digital Transformation and Firm Performance.

Rationale: DT only creates potential value; BMI reconfigures it into viable strategies (e.g., AI-as-a-service) that drive FP (Chen & Kim, 2023; van Tonder et al., 2024).

Proposition 3 (Moderating Role of GenAI):

The positive effect of Digital Transformation on Business Model Innovation is strengthened by Generative AI adoption.

Rationale: GenAI accelerates ideation, personalization, and testing, enabling faster translation of DT into innovative BMI (Gindert & Müller, 2025; Kanbach et al., 2024).

### Proposition 4 (Moderating Role of Sustainability Orientation):

The positive effect of Business Model Innovation on Firm Performance is stronger when firms demonstrate a high Sustainability Orientation.

Rationale: 2025's ESG mandates reward sustainable BMI (e.g., circular models), increasing stakeholder trust and long-term FP (Zhou et al., 2023; Cui, 2025).

Proposition 5 (Contextual Moderation):

Institutional and industry contexts moderate the relationships within the framework, such that firms in supportive institutional environments (e.g., regulatory sandboxes) and high-digital-intensity industries realize stronger effects of DT and BMI on performance.

Rationale: Infrastructure readiness, regulatory support, and ecosystem maturity reduce BMI barriers, amplifying DT's impact (Bindeeba et al., 2025; Ghobakhloo & Iranmanesh, 2021).

Conceptual Model Diagram
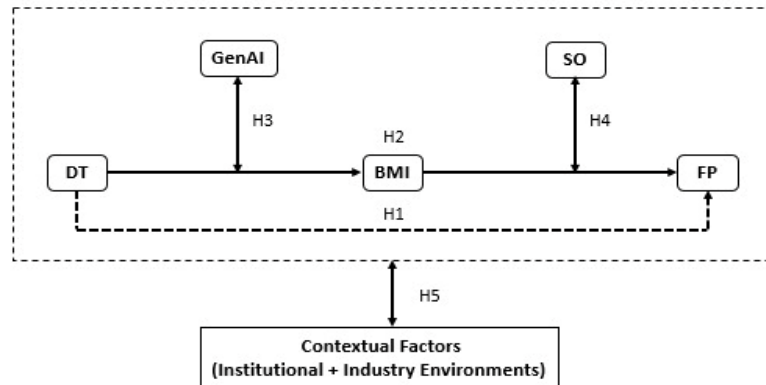
Figure 1: Conceptual Model Diagram

Source: The Author

The diagram's core relationships are explained as follows:

1. DT → FP (dashed arrow): Direct but inconsistent effect—DT provides tools (e.g., cloud) but requires BMI for consistent performance.
2. DT → BMI → FP (solid arrows): Mediating pathway—BMI reconfigures DT capabilities into value-capturing models (e.g., GenAI-driven personalization → subscription revenue).
3. GenAI (moderator): Strengthens DT → BMI by reducing experimentation costs and accelerating ideation (Gindert & Müller, 2025).
4. Sustainability Orientation (moderator): Enhances BMI → FP by aligning models with ESG expectations (Zhou et al., 2023).
5. Contextual Boundaries: Institutional (regulatory support) and industry (digital intensity) factors surround the framework, amplifying or weakening relationships (World Bank, 2019; Bindeeba et al., 2025).

Theoretical Contributions
This framework advances three literature strands:

1. Dynamic Capability Theory: It identifies BMI as the "reconfiguration capability" missing from prior DT research (Teece et al., 2016). By linking DT (sensing/seizing) to BMI (reconfiguration) and FP, it explains why DT outcomes are inconsistent.
2. Institutional Theory: It integrates 2025's ESG pressures and regulatory diversity (e.g., ASEAN's data laws) as contextual moderators, extending Wang (2025)'s work on institutional fit.
3. Value Co-Creation Theory: It shows GenAI and sustainability reshape BMI into collaborative models (e.g., open innovation platforms), supplementing Ramaswamy & Ozcan (2018)'s focus on stakeholder engagement.

Discussion and Implications

Managerial Implications
For ASEAN firms, the findings highlight that DT investments must be paired with BMI:

1. Prioritize BMI Experimentation: Use pilot projects (e.g., GenAI-driven chatbots for customer service) and sandboxes to test new value propositions. For example, Indonesian SMEs could adopt mobile-first payment models to leverage DT without high costs (Putra, 2022).
2. Integrate GenAI for BMI: Leverage GenAI not just for automation (e.g., inventory management) but for creative BMI—e.g., dynamic pricing or AI-designed products (Kanbach et al., 2024).
3. Align BMI with Sustainability: Design circular models (reuse/recycle) or ESG-linked revenue streams (e.g., carbon credits) to attract investors and comply with ASEAN's green mandates (Zhou et al., 2023).
4. Build Agile Governance: Cultivate digital talent and cross-functional teams to reduce cultural resistance to BMI (Van Tonder et al., 2023).

Policy and Regional Implications (ASEAN)
Policymakers should address ASEAN's unique challenges:

1. Create Regulatory Sandboxes: Harmonize data localization and AI governance rules to reduce BMI barriers (World Bank, 2019). For example, Malaysia's Digital Economy Blueprint could include cross-border sandboxes for fintech BMI.
2. Empower SMEs: Provide digital upskilling programs and innovation vouchers to help SMEs adopt BMI (Van Tonder et al., 2024). Thailand's SME Digital Transformation Fund could prioritize GenAI-BMI training.
3. Strengthen Regional Ecosystems: Harmonize e-commerce and ESG reporting frameworks to amplify BMI across supply chains. The ASEAN Digital Economy Framework Agreement (DEFA) could include sustainability standards for BMI.

Limitations and Directions for Future Research
This study has three limitations:

1. Conceptual Nature: The framework is theoretical; future research should test it empirically (e.g., surveys of ASEAN firms) to validate propositions.
2. Technological Evolution: Emerging technologies (quantum computing, Web3) may alter DT-BMI dynamics beyond 2025, requiring updates to the framework.
3. Contextual Boundaries: The model focuses on ASEAN; findings may differ in advanced economies with mature digital ecosystems (e.g., Europe, North America).

Future research could:

1. Conduct longitudinal studies to capture the "J-curve" of DT-BMI-FP relationships.
2. Explore cross-industry differences (e.g., manufacturing vs. services) in BMI effectiveness.
3. Investigate how GenAI and sustainability interact to shape BMI (e.g., AI-driven carbon tracking).

Conclusion

This study develops a conceptual framework to explain how DT translates into FP in 2025, emphasizing BMI as the core mediator and GenAI/SO as moderators. The central argument is that DT alone does not guarantee performance—firms must reconfigure digital capabilities into innovative business models, while aligning with GenAI-driven efficiency and sustainability-driven legitimacy.

For ASEAN firms, this means balancing technological adoption with context-specific BMI: leveraging mobile-first channels, GenAI ideation, and ESG alignment to overcome resource constraints and regulatory diversity. The framework contributes to theory by bridging the DT-FP gap and to practice by offering actionable strategies for digital competitiveness in 2025.

Acknowledgements

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