

Analysis of the Influence of Digital Business Strategy and Artificial Intelligence Adoption Intensity on Firm Performance: The Mediating Role of Disclosure-Based Organizational Culture

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Abstract: *This study examines the empirical impact of Digital Business Strategy (DBS) and Artificial Intelligence Adoption Intensity (AIAI) on firm performance (measured via Return on Assets - ROA), together with the mediating role of disclosure-based organizational culture (OCDI). Grounded in the Resource-Based View (RBV) and Dynamic Capabilities Theory, the investigation addresses the "IT productivity paradox" in emerging tech markets by conceptualizing organizational culture as a pivotal internal transformation mechanism. Utilizing a balanced panel dataset of tech-sector firms listed on the Indonesia Stock Exchange (IDX) spanning 2021–2025 (25 firm-year observations), variable metrics were constructed using quantitative content analysis of annual reports, sustainability disclosures, and audited financial statements. Panel regression modeling (Fixed Effects and Common Effects) combined with firm-block bootstrap indirect effect testing revealed that both DBS ($\beta = 0.412, p < 0.05$) and AIAI ($\beta = 0.385, p < 0.05$) exert positive direct effects on organizational culture. Furthermore, organizational culture significantly enhances ROA ($\beta = 0.298, p < 0.05$) and partially mediates the relationship between digital strategies, AI adoption, and corporate financial performance. The findings confirm that technological and strategic investments require cultural alignment and organizational capabilities to deliver sustained economic value.*

Keywords: Digital Business Strategy, Artificial Intelligence Adoption, Organizational Culture, Return on Assets, Resource-Based View, Dynamic Capabilities, Panel Data, Indonesia Stock Exchange

1. Introduction

The global digital transformation has fundamentally altered the competitive landscape across industries, compelling enterprises to integrate emerging digital technologies directly into core operations, strategic decision-making, and value creation architectures.² With the rapid evolution of Artificial Intelligence (AI), companies no longer rely purely on conventional business strategies; rather, they are forced to orchestrate data-driven, automated, and predictive processes to maintain competitive advantages.³ For publicly listed corporations, technological adaptability is paramount, as organizational performance is evaluated not only by immediate profitability, but also by operational efficiency, capital efficiency, long-term growth, and shareholder value creation.⁴

In strategic management literature, the Resource-Based View (RBV) posits that digital infrastructure, analytical capabilities, human capital competencies, and organizational routines regarding AI deployment constitute strategic assets capable of generating sustained competitive advantage—provided they are valuable, rare, inimitable, and non-substitutable (VRIN).⁵ Concurrently, Dynamic Capabilities Theory emphasizes that owning advanced technologies is insufficient; organizations must continuously sense technological opportunities, seize investments, and reconfigure internal structures, business processes, and cultural norms.⁶

However, a significant gap remains between capital

expenditures in digital transformation/AI systems and the realization of financial performance a modern iteration of the classic "IT productivity paradox."⁷ While firms listed on the Indonesia Stock Exchange (IDX) have substantially escalated technology investments, empirical evidence on whether and how these deployments yield superior Return on Assets (ROA) remains inconclusive. Existing literature predominantly relies on cross-sectional perception-based survey data and treats technology adoption as a binary variable (user vs. non-user), neglecting the nuances of adoption intensity and the internal organizational pathways that translate technology into financial performance.⁸

This study fills this empirical and theoretical gap by investigating the impact of Digital Business Strategy (DBS) and Artificial Intelligence Adoption Intensity (AIAI) on firm performance (ROA), while evaluating the mediating role of disclosure-based organizational culture (OCDI) among technology sector firms listed on the IDX over the 2021–2025 period.

2. Literature Review & Hypotheses Development

2.1 Resource-Based View and Dynamic Capabilities Framework

The Resource-Based View (RBV) conceptualizes the firm as a bundle of tangible and intangible resources and capabilities.⁹ In the digital era, technological assets such as

AI algorithms and cloud infrastructure are increasingly commoditized; hence, sustained competitive advantage stems from the firm's unique capability to integrate technology with managerial routines, organizational learning, and corporate culture.¹⁰ Dynamic Capabilities Theory extends RBV by articulating three core routines: *sensing* (identifying AI opportunities), *seizing* (allocating digital capital investments), and *transforming/reconfiguring* (realigning organizational structures and culture to support data-driven decision-making).¹¹

2.2 Digital Business Strategy, AI Adoption, and Organizational Culture

Digital Business Strategy (DBS) represents the fusion of IT strategy and overarching business strategy, spanning four dimensions: scope, scale, speed, and sources of value creation.¹² As firms formulate comprehensive digital strategies, they reshape organizational values, encouraging cross-functional collaboration, transparency, and continuous learning.¹³ Similarly, higher Artificial Intelligence Adoption Intensity (AIAD) reflecting the breadth and depth of AI integration across operational functions drives a transition toward a data-driven culture, innovation orientation, and decentralized adaptability.¹⁴

H1: Digital Business Strategy (DBS) positively influences disclosure-based organizational culture.

H2: Artificial Intelligence Adoption Intensity (AIAD) positively influences disclosure-based organizational culture.

2.3 Organizational Culture and Firm Performance

Organizational culture provides the normative framework that guides employee behavior, decision-making quality, and operational efficiency.¹⁵ Drawing on Denison's organizational culture framework (involvement, consistency, adaptability, mission), a robust culture aligns operational execution with strategic goals, thereby enhancing resource utilization efficiency and driving Return on Assets (ROA).¹⁶

H3: Disclosure-based organizational culture positively influences Return on Assets (ROA). H4: Digital Business Strategy (DBS) positively influences Return on Assets (ROA).

H5: Artificial Intelligence Adoption Intensity (AIAD) positively influences Return on Assets (ROA).

2.4 The Mediating Role of Organizational Culture

Technological assets and digital strategies do not automatically convert into accounting profitability without internal organizational alignment.¹⁷ Organizational culture serves as the missing link/mediating mechanism through which digital orientation and AI capabilities are institutionalized into daily operational routines, resulting in reduced friction, superior innovative output, and improved asset efficiency.¹⁸

H6: Organizational culture mediates the relationship between Digital Business Strategy and ROA. H7: Organizational culture mediates the relationship between AI Adoption Intensity and ROA.

3. Research Methodology

3.1 Sample and Data Panel Structure

The research sample comprises publicly traded technology sector companies listed on the Indonesia Stock Exchange (IDX) that met the purposive sampling criteria: continuous listing during 2021–2025, availability of complete annual reports, sustainability reports, corporate governance disclosures, and audited financial statements. The resulting balanced panel structure consists of 5 technology enterprises observed over 5 consecutive years, yielding $N = 25$ firm-year observations (ATIC, MTDL, PTSN, NFCX, ZYRX).

3.2 Variable Measurement & Content Analysis

Primary independent and mediating variables were operationalized through quantitative content analysis using a standardized 0–3 scoring rubric (0 = no disclosure; 1 = general statement/intent; 2 = concrete implementation/program; 3 = measurable outcomes/targets):

- 1) **Digital Business Strategy Index (DBSI):** Evaluated across 6 dimensions derived from Bharadwaj et al. (2013) (digital scope, scale, speed, value creation, process integration, and digital governance).
- 2) **AI Adoption Intensity Index (AIAD):** Evaluated across 8 dimensions (functional breadth, integration depth, cloud/data infrastructure, AI applications, AI talent/training, technology investment/partnerships, AI governance/ethics, and operational impact).
- 3) **Organizational Culture Disclosure Index (OCDI):** Adapted from Denison's framework across 4 dimensions (Involvement, Consistency, Adaptability, Mission).

Index scores were normalized using the formula:

$$Index_{it} = \sum Score_{jit} / (S_{max} \times n)$$

Firm Performance was measured objectively using Return on Assets (ROA = Net Income / Total Assets). Firm Size (SIZE = Ln Total Assets), Financial Leverage (LEV = Debt / Equity), and Revenue Growth (GROWTH) were included as control variables.

3.3 Econometric Modeling

To test the hypothesized relationships while accounting for firm heterogeneities, panel data regression models were formulated:

$$OCDI_{it} = \alpha_0 + \alpha_1 DBSI_{it} + \alpha_2 AIAD_{it} + \gamma Controls_{it} + \mu_i + \varepsilon_{it}$$

$$ROA_{it} = \beta_0 + \beta_1 DBSI_{it} + \beta_2 AIAD_{it} + \beta_3 OCDI_{it} + \gamma Controls_{it} + \mu_i + \varepsilon_{it}$$

Mediation effects were formally evaluated using firm-block bootstrapping with 5,000 resamples to calculate bias-corrected 95% confidence intervals for the indirect paths ($\alpha_1 \times \beta_3$ and $\alpha_2 \times \beta_3$).

4. Empirical Results

4.1 Descriptive Statistics

Table 1 presents the summary statistics for all study

variables across the 25 firm-year observations.

Table 1: Descriptive Statistics of Research Variables (N = 25)

Variable	Mean	Std. Dev.	Min	Max
Digital Business Strategy Index (DBSI)	0.612	0.145	0.333	0.889
AI Adoption Intensity Index (AIAI)	0.485	0.178	0.167	0.833
Organizational Culture Disclosure Index (OCDI)	0.574	0.132	0.312	0.812
Return on Assets (ROA)	0.068	0.042	0.011	0.154
Firm Size (SIZE)	28.412	1.120	26.850	30.210
Leverage (LEV)	0.842	0.315	0.245	1.450
Growth (GROWTH)	0.115	0.088	-0.042	0.285

4.2 Model Diagnostics & Estimation Results

Model selection diagnostics (Chow Test, Hausman Test, and Lagrange Multiplier Test) indicated that the Fixed Effects Model (FEM) was optimal for the Organizational

Culture (OCDI) model (Chow $p < 0.01$), while the Common Effects Model (CEM/Pooled OLS) was chosen for the ROA model based on parsimonious panel criteria. Diagnostic checks confirmed no critical multicollinearity issues ($VIF < 3.50$).

Table 2: Panel Regression Estimation Results

Independent Variables	Model 1: OCDI (Fixed Effects)	Model 2: ROA (Common Effects)
DBSI (Digital Business Strategy)	0.412** (0.134)	0.078* (0.038)
AIAI (AI Adoption Intensity)	0.385** (0.128)	0.065* (0.032)
OCDI (Organizational Culture)	—	0.298** (0.085)
SIZE	0.021 (0.045)	0.005 (0.008)
LEV	-0.084 (0.052)	-0.024* (0.011)
GROWTH	0.112 (0.078)	0.042* (0.018)
R-squared / Adj R-squared	0.742 / 0.615	0.584 / 0.445
F-statistic (p-value)	8.45 (0.001)	4.21 (0.008)

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$.

4.3 Mediation / Indirect Effect Analysis

To assess Hypotheses H6 and H7, firm-block bootstrap resampling (5,000 replications) was conducted. Results

summarized in Table 3 demonstrate that organizational culture significantly mediates the impact of both DBS and AIAI on firm ROA, as zero is excluded from the 95% confidence intervals.

Table 3: Bootstrap Indirect Effect Test Results

Indirect Path	Indirect Coeff ($\alpha\beta$)	Bootstrap Std. Err.	95% Confidence Interval	Mediation Decision
DBS $\rightarrow$ OCDI $\rightarrow$ ROA (H6)	0.1228	0.0452	[0.0345, 0.2215]	Partial Mediation (Supported)
AIAI $\rightarrow$ OCDI $\rightarrow$ ROA (H7)	0.1147	0.0418	[0.0310, 0.2082]	Partial Mediation (Supported)

5. Discussion

The empirical findings lend robust support to all seven hypothesized relationships. First, the positive direct effects of Digital Business Strategy ($\beta = 0.412$, $p < 0.01$) and AI Adoption Intensity ($\beta = 0.385$, $p < 0.01$) on organizational culture (H1 and H2) confirm that strategic digital intentionality and deep AI execution act as powerful catalysts for internal cultural transformation. When enterprises integrate AI models and cloud architecture into their operations, workplace norms inherently shift toward continuous learning, agility, data literacy, and cross-functional coordination.¹⁹

Second, the significant impact of organizational culture on ROA ($\beta = 0.298$, $p < 0.01$, H3) underscores the economic value of cultural capital. In alignment with Denison's culture model, a corporate culture characterized by high involvement, consistency, adaptability, and mission alignment directly mitigates agency costs, operational bottlenecks, and execution risks, translating directly into enhanced asset profitability.²⁰

Crucially, the confirmation of H6 and H7 establishes

organizational culture as a critical mediating conduit. Direct technology deployment yields modest financial gains ($\beta = 0.078$ and $\beta = 0.065$), but its full economic potential is unlocked when technology transforms internal organizational culture. This finding offers a resolution to the "IT productivity paradox" within emerging market tech sectors: digital strategies and AI adoption enhance corporate financial performance primarily by building an agile, data-driven organizational culture.²¹

6. Conclusion & Implications

6.1 Theoretical & Managerial Implications

This study advances digital strategic management literature by bridging the Resource-Based View (RBV) and Dynamic Capabilities Theory within an emerging market context. Theoretically, it demonstrates that technological investments (AI) and strategic postures (DBS) are insufficient in isolation; their conversion into accounting profits (ROA) requires the mediating dynamic capability of cultural transformation. Methodologically, the paper demonstrates the utility of applying quantitative content analysis to annual corporate disclosures for capturing

intangible strategic constructs.

For corporate executives and board directors, the results indicate that digital transformation budgets must not be allocated strictly to software procurement and hardware infrastructure. Management must actively cultivate an organizational culture that promotes data-driven decision-making, continuous reskilling, and collaborative experimentation. Without cultural alignment, technology investments risk generating low capital returns.

6.2 Limitations and Future Research

This study acknowledges limitations regarding its sample scope, consisting of 25 firm-year observations across 5 listed tech enterprises on the IDX. While econometric techniques (fixed effects, parsimonious controls, block bootstrapping) ensured mathematical validity, future studies should extend the dataset across broader industrial sectors (e.g., banking, manufacturing) and longer longitudinal horizons.

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