

Dynamic Capabilities in Digital Transformation: Unpacking the Mediated Effects of IS Integration on Managerial Agility and Decision Speed

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Received : September 8, 2025

Accepted : October 7, 2025

Published : October 31, 2025

Citation: Ikbal, M. (2025). Dynamic Capabilities in Digital Transformation: Unpacking the Mediated Effects of IS Integration on Managerial Agility and Decision Speed. *Data: Journal of Information Systems and Management*, 3 (4), 227-239.

ABSTRACT: This study examines how information system (IS) integration affects managerial decision speed in Indonesian public and private sector organizations. Using survey data from 185 organizations and structural equation modeling, we test a mediation model involving system quality, organizational agility, and big data analytics capability (BDAC). Results show that IS integration directly accelerates decision speed and indirectly strengthens it through the three mediators. Private sector firms benefit more due to higher digital readiness and flexible structures, while environmental turbulence further shapes outcomes. The study contributes by extending IS success theory with dynamic capabilities and highlighting sector-specific strategies for digital transformation. Findings emphasize that successful digital transformation requires not only technical solutions but also cultural, structural, and strategic alignment.

Keywords: Information System Integration, Decision Speed, System Quality, Organizational Agility, Big Data Analytics Capability, Digital Transformation, Indonesia.



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INTRODUCTION

Digital technologies are transforming managerial and operational practices across organizations. In Indonesia, digital transformation is a strategic priority, yet IS integration remains uneven across sectors. Private firms increasingly embed digital systems, while SMEs struggle with integration and public institutions face bureaucratic inertia. This contrast highlights a research gap: limited understanding of how sectoral differences and organizational mechanisms shape the link between IS integration and decision speed. Addressing this gap is crucial in emerging economies marked by volatility and uncertainty (Sidabutar & Siswanto, 2024; Troise et al., 2022).

The strategic importance of digital transformation is further highlighted by its capacity to enhance organizational responsiveness, particularly in turbulent environments where customer expectations and market dynamics evolve rapidly. Numerous studies affirm that digital capabilities significantly improve organizational performance by enhancing efficiency, reducing operational costs, and fostering competitive advantage (Adama & Okeke, 2024; Nasiri et al., 2020). Digital systems, when integrated effectively, enable the streamlining of workflows and facilitate

interdepartmental collaboration, which, in turn, enhances customer satisfaction and organizational adaptability (Besio et al., 2024).

From a theoretical perspective, several frameworks underpin the relationship between IS integration and decision performance. The Resource Based View (RBV) posits that strategic resources such as IS are central to achieving sustained competitive advantage (Currie et al., 2024; Zada et al., 2022). Complementing this, the Dynamic Capabilities Framework emphasizes an organization's ability to integrate, build, and reconfigure internal and external competencies in response to environmental changes (Kwiotkowska, 2024). Together, these perspectives suggest that robust IS integration can elevate decision making capabilities by enhancing the organization's capacity to sense, adapt, and respond to internal and external stimuli.

One of the key benchmarks of Indonesia's digital governance maturity is the SPBE Index, which assesses the extent to which public sector organizations have adopted digital systems to improve service delivery and administrative efficiency. A higher SPBE score indicates progress in digital integration; however, gaps in implementation and accessibility, especially in less developed regions, remain a challenge (Palad, 2023). The SPBE framework offers a strategic lens through which policymakers and researchers can track the evolution of digital governance and identify replicable best practices (Teng et al., 2022).

Despite the growing corpus of literature affirming the benefits of IS integration, notable gaps persist. Most existing studies focus on sector specific or organization level case studies, leaving the comparative dynamics between public and private sectors largely unexplored (Novelidhawaty et al., 2023). Additionally, many analyses overlook contextual factors such as institutional culture and socio economic variables that influence the success of digital transformation initiatives (Khurniawan et al., 2024; Warner & Wäger, 2019). This oversight limits the generalizability of findings and highlights the need for empirical research that accounts for sectoral variations and the broader national context.

This study addresses these gaps by exploring the mediating mechanisms that link IS integration to managerial decision speed, focusing on three key constructs: information/system quality, organizational agility, and big data analytics capability. These mediators are posited to influence the extent to which IS integration translates into faster, more effective decision making. By employing a multi sectoral survey design and utilizing Structural Equation Modeling (SEM PLS), this research contributes to a more nuanced understanding of digital transformation dynamics in Indonesia.

The objective of this study is to validate a multi path mediation model that explicates how IS integration improves decision speed across different organizational contexts. The novelty lies in the sectoral comparison and the inclusion of multiple mediators, which provides richer insights into the organizational conditions that enhance digital integration outcomes. The findings are expected to inform both academic discourse and practical strategies, particularly for leaders seeking to navigate the complexities of digital transformation in emerging economies.

METHOD

This study employs a quantitative research design to examine the relationship between information system (IS) integration and managerial decision speed, mediated by three organizational mechanisms: information/system quality, organizational agility, and big data analytics capability (BDAC). The approach integrates validated measurement instruments and structural equation modeling to ensure methodological rigor and analytical robustness.

A cross sectional survey methodology was selected to capture perceptions from a diverse sample of public and private sector organizations in Indonesia. The rationale lies in understanding cross sectoral differences in IS integration maturity and its implications on decision making speed. A stratified random sampling strategy was employed based on two classification frameworks: the IDX IC (11 industry sectors) for private firms and SPBE Index categorization for public institutions.

IS integration was measured through a multi dimensional scale encompassing data flow, system interoperability, and strategic alignment, using Likert scale instruments adapted from Rai et al. (2006) and Sheko & Spaho (2018). The measurement integrates both functional and technical dimensions of integration, reflecting practices advocated in Capability Maturity Models (Karaev, 2023).

Mediating variables included:

- **Information/System Quality:** Assessed using constructs from the Information Systems Success Model (ISSM), capturing reliability, accuracy, performance, and user satisfaction.
- **Organizational Agility:** Measured via responsiveness, flexibility, and adaptive capability, drawing on the Agile Capability Scale (Hair et al., 2017).
- **BDAC:** Evaluated using the Business Analytics Capability Scale (BACS), incorporating data management, analytical competence, and strategic alignment.

The outcome variable, Managerial Decision Speed, was gauged through perception based items adapted from Baum & Wally (2003) and Eisenhardt (1989), focusing on the time taken from issue identification to decision implementation.

A total of 185 valid responses were collected using online and paper based surveys. Key organizational attributes such as size, centralization, formalization, and environmental turbulence (market/technology) were included as control variables to account for confounding influences.

Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS SEM). This approach is suitable for testing complex mediation models and handling small to medium sized samples without strict normality assumptions (Hair et al., 2019). The analysis comprised two phases:

1. Measurement Model Evaluation: Reliability (Cronbach's alpha and composite reliability), convergent validity (Average Variance Extracted), and discriminant validity (Fornell Larcker criteria).
2. Structural Model Evaluation: Estimation of path coefficients, bootstrapping for significance testing, and mediation effect assessments.

The selection of SEM PLS is justified by its robustness in estimating simultaneous relationships and assessing mediation paths, especially in exploratory settings where theoretical models are still evolving (Hair & Sarstedt, 2019; Kang, 2022). Furthermore, SEM PLS has proven effective in multi sectoral IS research (Putra & Nasution, 2024), allowing for comprehensive modeling of latent constructs and direct/indirect effects.

All measurement instruments used have undergone prior validation and demonstrated strong psychometric properties. Multi item scales ensured content validity, while pretesting and expert reviews enhanced instrument clarity and contextual fit. Reliability thresholds (e.g., CR > 0.70, AVE > 0.50) were applied to determine model adequacy, ensuring internal consistency and construct validity across the sample.

In summary, this methodology provides a robust foundation for empirically examining the mediating mechanisms through which IS integration influences managerial decision making speed. It also ensures that findings are generalizable across a broad spectrum of Indonesian organizational settings.

RESULT AND DISCUSSION

Sectoral analysis shows that finance and technology firms achieve higher IS integration and faster decision speed, reflecting greater innovation pressures and digital maturity. In contrast, government institutions report lower scores, underscoring structural and cultural barriers. Larger organizations display stronger integration due to greater IT resources. These findings suggest that decision speed is influenced not only by technology adoption but also by sectoral context and organizational capacity. This trend aligns with findings from Aziz et al. (2024) and Zhang & Ramayah (2024), emphasizing that sectors exposed to greater innovation pressures tend to adopt integrated systems that accelerate managerial responsiveness.

Table 1: Sectoral Mean Scores for Key Constructs

Sector	IS Integration	Decision Speed	Info/System Quality	Agility	BDAC
Technology	6.1	6.0	5.8	5.9	6.0
Finance	5.9	5.8	6.0	5.6	5.4
Manufacturing	5.6	5.3	5.4	4.9	4.7
Logistics	5.7	5.5	5.6	5.2	5.1
Government	4.8	4.6	5.3	4.7	4.5

Macroeconomic indicators and digital maturity metrics further contextualize sectoral performance. Organizations situated in high growth sectors or within digitally advanced environments demonstrate greater IS performance outcomes, corroborating observations by Bhatti et al. (2022) and Tian et al. (2023). Technology readiness also plays a decisive role, with banking and telecom sectors leading adoption while healthcare and education progress at a slower rate (Rahman et al., 2024). Larger organizations also displayed stronger IS integration, attributable to more extensive IT resources and infrastructures (Shaikh et al., 2024).

Measurement Model Evaluation

To ensure construct validity, confirmatory factor analysis (CFA) was performed. Reliability was confirmed via Cronbach's alpha and composite reliability (CR), with all constructs exceeding the 0.70 threshold (Hair et al., 2019). Convergent validity was established through Average Variance Extracted (AVE) values > 0.50 , and factor loadings surpassed 0.70 for all items, meeting standards outlined by Kang (2022) and Munir et al. (2022).

Discriminant validity was verified using the Fornell Larcker criterion and cross loading analysis. Additionally, Heterotrait Monotrait (HTMT) ratios were below 0.85, indicating adequate separation among constructs (Lozada et al., 2023). This robust validation process reinforces the measurement model's appropriateness for mediation analysis within a multi sectoral context.

Structural Model Testing

The structural model revealed significant paths confirming all hypothesized relationships. IS integration had a strong direct effect on decision speed ($\beta = 0.41$, $p < 0.001$), consistent with empirical findings from Wamba et al. (2017). Mediation analysis demonstrated the influence of system quality ($\beta = 0.36$), agility ($\beta = 0.29$), and BDAC ($\beta = 0.33$) on the integration–decision speed relationship, supporting theories proposed by Magableh et al. (2024).

Table 2. Structural Model Path Coefficients

Pathway	Coefficient (β)	p Value
IS Integration $\rightarrow$ Decision Speed	0.41	<0.001
IS Integration $\rightarrow$ Info/System Quality	0.52	<0.001
Info/System Quality $\rightarrow$ Decision Speed	0.36	<0.001
IS Integration $\rightarrow$ Agility	0.45	<0.001
Agility $\rightarrow$ Decision Speed	0.29	0.001
IS Integration $\rightarrow$ BDAC	0.50	<0.001
BDAC $\rightarrow$ Decision Speed	0.33	<0.001

These mediators provide distinct pathways: system quality improves data reliability and usability; agility enhances operational responsiveness; and BDAC accelerates sense making in dynamic environments (T. Feng & Sheng, 2023). Collectively, these insights validate the theoretical model and underscore the criticality of complementary capabilities.

Multi group Analysis (Sectoral Differences)

Comparative analysis between public and private organizations highlighted stronger integration to decision effects in the private sector, attributed to higher autonomy and faster digital adoption (Pathak, 2024; Tariq et al., 2024).

Table 3. Public vs Private Sector Comparison (Selected Paths)

Pathway	Public β	Private β	Difference	Significance
IS Integration → Decision Speed	0.29	0.45	0.16	$p < 0.05$
Info/System Quality → Decision Speed	0.21	0.41	0.20	$p < 0.05$
Agility → Decision Speed	0.19	0.35	0.16	$p < 0.05$
BDAC → Decision Speed	0.24	0.39	0.15	$p < 0.05$

Sectoral nuances were evident: FMCG and finance demonstrated rapid decision cycles supported by agile systems, whereas healthcare faced delays due to regulatory complexity (Ciacchi & Penco, 2023).

Environmental turbulence moderated IS integration outcomes, with dynamic sectors experiencing amplified performance benefits (Makhdoom et al., 2024; Naz et al., 2023). Multi group analysis confirmed that digital strategies must be sector specific. Public institutions require reform driven IS frameworks, while private firms should focus on continuous innovation and agile infrastructures. This strategic alignment ensures IS investments yield maximum decision making advantage in varied operational settings.

Sector Specific Integration Strategies

The findings of this study affirm the critical role of information system (IS) integration in enhancing managerial decision speed across sectors. However, this relationship is far from monolithic; instead, it is mediated through multifaceted organizational mechanisms that differ based on contextual realities. The variations in sectoral environments ranging from regulatory requirements to operational priorities highlight the necessity of developing tailored IS integration strategies that are customized to meet specific sector needs. For instance, in highly regulated sectors such as finance and healthcare, integration strategies must incorporate strict compliance protocols and robust data governance frameworks to ensure adherence to privacy regulations and data security standards (Waring et al., 2018). These industries tend to prioritize stability, risk mitigation, and long term traceability.

In contrast, industries such as retail, logistics, and manufacturing where consumer responsiveness and operational efficiency are paramount require more flexible and adaptive IS strategies. These sectors often benefit from lightweight, modular integration systems that enable rapid iteration and support agile responses to shifting market demands (D. Feng, 2024). Furthermore, public sector institutions operating under unique bureaucratic structures and accountability frameworks face a different set of challenges. Here, the focus of IS integration is on improving transparency, interdepartmental coordination, and service delivery through platforms like e government systems (Wu, 2024). In these contexts, organizational culture and workforce digital readiness are essential success factors. Training programs, change management efforts, and employee centric system design play crucial roles in facilitating adoption (Datta & Mete, 2024). The implication is clear: IS integration must be strategic and sector sensitive, not merely technical or infrastructural.

Role of Mediating Mechanisms

The study reinforces that IS integration alone does not guarantee faster or more informed decision making. Rather, it is through mediating organizational mechanisms specifically system quality, agility, and big data analytics capability (BDAC) that integration translates into real performance outcomes. High quality systems ensure that data is accurate, accessible, and timely, enabling effective managerial interpretation and execution. Agility, both operational and strategic, allows organizations to pivot quickly in response to external disruptions or internal insights. BDAC, meanwhile, empowers firms to derive actionable intelligence from vast datasets, enhancing strategic foresight.

Organizations that nurture data driven cultures are better equipped to leverage these mediators. Such cultures emphasize not only the use of data but also the development of skills, processes, and mindsets that value experimentation, responsiveness, and continual learning. This suggests practical imperatives: investing in leadership development programs that foster digital fluency, encouraging the formation of cross functional innovation teams, and embedding learning loops into daily workflows (Baidoshvili et al., 2021). Aligning digital initiatives with these enablers ensures that IS integration efforts yield tangible value rather than becoming underutilized or isolated technological investments.

Theoretical Implications

Theoretically, this study extends IS success models by integrating dynamic capabilities theory, showing that digital transformation requires organizations to sense, seize, and reconfigure resources. BDAC emerges not merely as a technical tool but as a strategic capability mediating decision speed. This reconceptualization invites future research on additional mediators such as innovation capacity and digital leadership. Emerging trends like post-pandemic hybrid work, AI, predictive analytics, and ESG integration further reinforce that IS success is intertwined with resilience, sustainability, and ethics. Together, these insights position IS integration within broader debates on strategic renewal and societal well-being.

In this model, BDAC becomes more than a technological function it is a dynamic competency. Its role in mediating decision speed positions it as a strategic driver of transformation, not just an outcome or operational tool. This reconceptualization challenges researchers to rethink how IS success is measured and how digital capabilities are operationalized in empirical models. Future work should explore additional mediators such as innovation capacity, digital leadership, and change readiness to further refine these theoretical frameworks.

Alignment with Emerging Trends

The post 2020 landscape has accelerated the adoption of digital tools in response to crisis induced disruptions, particularly during the COVID 19 pandemic. This shift has catalyzed new research trajectories focused on resilience, remote operations, and real time responsiveness. Hybrid models of work and production combining physical and digital infrastructures are now becoming standard in many sectors. Technologies like digital twins, AI, machine learning, and predictive analytics have transitioned from experimental to essential, playing a growing role in enabling proactive and adaptive decision making (Perno et al., 2022; Santiso, 2022).

Furthermore, sustainability concerns have led to the integration of Environmental, Social, and Governance (ESG) principles into digital transformation strategies. This convergence marks a new frontier where technology not only enhances performance but also supports ethical, inclusive, and sustainable outcomes. Researchers are increasingly adopting multidisciplinary lenses to explore how IS integration intersects with strategic management, governance, and societal well being (Anaya et al., 2023). This broadens the relevance of IS studies, positioning them within global conversations about digital ethics, equity, and environmental stewardship.

Implications for Research and Practice

For scholars, the study underscores the need for multi dimensional, context sensitive models that account for sectoral, cultural, and temporal variables. Mediation analysis should continue to explore how IS integration is translated into decision and performance outcomes through mechanisms beyond traditional constructs. Longitudinal designs, sector specific case studies, and cross country comparisons could enrich understanding and strengthen generalizability.

For practitioners, the message is equally nuanced. Success in IS integration is not achieved solely by adopting the latest technology, but by creating conditions where that technology can be fully leveraged. This means investing in systems that are interoperable and user friendly, cultivating talent with digital competencies, and fostering a culture that embraces innovation and data driven decision making. Leaders should recognize integration as a journey, not a destination one that evolves alongside technological, organizational, and societal change. Ultimately, this study reinforces that digital transformation is a strategic and human centered endeavor, best pursued with adaptive frameworks that bridge vision and execution.

CONCLUSION

This study demonstrates that IS integration significantly improves managerial decision speed in Indonesian organizations, with system quality, agility, and BDAC serving as critical mediators. Sectoral differences reveal that private firms gain stronger benefits due to flexible structures and higher digital readiness, while public institutions continue to face bureaucratic challenges. The findings extend IS success theory by integrating dynamic capabilities, showing that performance outcomes depend not only on technical infrastructure but also on organizational enablers

Practically, the study highlights that successful digital transformation requires more than adopting new systems. Organizations must foster data-driven cultures, invest in digital leadership, and align integration strategies with sector-specific needs. Future research should examine additional mediators and adopt longitudinal designs to capture evolving dynamics. Ultimately, IS integration

is a strategic and people-centered process that links technology with agility, innovation, and sustainable decision-making.

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