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The Mediating Role of Digital Innovation in the Relationship between Digital Culture, Digital Leadership, Digital Transformation, and Organizational Performance: A Study of Indonesian Army

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Authors' contributions

This work was carried out in collaboration among all authors. Author MEWH conceptualized the research, designed the methodology, analyzed the data, and wrote the initial draft of the manuscript. Author BU contributed to data collection, reviewed the literature, and provided critical revisions to the manuscript. Author AF assisted with data analysis, interpretation of results, and manuscript revisions. All authors read and approved the final manuscript.

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ABSTRACT

Aims: This study aimed to examine the role of digital innovation in mediating the influence of organizational digital culture, digital leadership, and digital transformation on organizational performance in Indonesian Army Hospitals (*Rumah Sakit TNI Angkatan Darat – RS TNI AD*).

Study Design: A quantitative research design was employed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) approach.

Place and Duration of Study: The study was conducted in Type C RS TNI AD hospitals across Indonesia, with data collection carried out between December 2023 and February 2024.

Methodology: A total of 123 upper- and middle-level managers from Type C RS TNI AD hospitals were selected using purposive sampling. Data were gathered through a structured online questionnaire. SEM analysis was conducted using SmartPLS 3.0 software, and the Sobel test was used to assess the mediating effect of digital innovation.

Results: The findings revealed that digital leadership, digital transformation, and digital innovation each had a significant positive effect on organizational performance. Digital transformation also had a strong positive effect on digital innovation. However, organizational digital culture and digital leadership did not significantly influence digital innovation, nor did they show significant indirect effects on performance through innovation. Only digital innovation was found to mediate the relationship between digital transformation and organizational performance.

Conclusion: This study contributes to the Resource-Based View (RBV) theory by demonstrating how intangible digital capabilities particularly digital transformation and innovation positively impact organizational performance, even within highly structured environments like military hospitals. It offers important insights for scholars and practitioners on implementing digital strategies in complex public healthcare systems. The findings emphasize the critical role of digital transformation in fostering innovation and enhancing performance. Future research should expand the sample to other types of military hospitals to improve the generalizability of results.

Keywords: *Organizational digital culture; digital leadership; digital transformation; digital innovation; organizational performance.*

1. INTRODUCTION

Hospitals in Indonesia were generally classified into two categories: Government Hospitals and Private Hospitals. A distinctive category within Government Hospitals was the TNI Hospital, which operated under military command and incorporated military structures into its healthcare management. Among these, the Indonesian Army Hospital (RS TNI AD) was the most prevalent and geographically distributed, serving both military personnel and the general public. Beyond healthcare, RS TNI AD played a critical role in national defense preparedness (Setyawan et al., 2019), making its organizational performance particularly strategic.

This study made an important contribution to the literature by investigating how digital innovation acted as a mediating mechanism between digital leadership, digital transformation, digital culture, and organizational performance in the underexplored context of military hospitals. Unlike civilian healthcare institutions, military hospitals faced unique structural, cultural, and

operational constraints that could limit the effectiveness of digital initiatives. Understanding how these digital constructs interacted in such rigid environments was critical not only for expanding theoretical insights but also for offering practical solutions to enhance institutional performance in high-stakes public sectors.

This research filled a significant gap by applying the Resource-Based View (RBV) framework to demonstrate how intangible digital capabilities could be converted into tangible performance improvements even in bureaucratic and centralized organizational systems like RS TNI AD.

Over the years, RS TNI AD experienced a rise in patient volumes, indicating public trust and growing demand for its services. However, this growth was not accompanied by stable financial performance. Reports showed fluctuating revenues and inconsistent income patterns across fiscal periods, reflecting deeper operational inefficiencies. These included rigid bureaucratic systems, limited technological

integration, and difficulties in responding adaptively to external changes a common issue in military-run institutions.

Furthermore, RS TNI AD faced various complex challenges in maintaining sustainable performance. These included the need to improve operational efficiency, adopt modern healthcare technologies, enhance the quality of human resources (HR), and adapt to dynamic healthcare regulations. One critical challenge was the implementation of technology-based strategies such as hospital management information systems, which were expected to improve service efficiency and support data-driven decision-making. However, budgetary constraints, outdated infrastructure, and a lack of digitally competent personnel often hindered successful adoption (Putri et al., 2023).

Given these conditions, RS TNI AD had to adopt a comprehensive and strategic approach to overcome organizational and technological barriers, especially amid intensifying competition with public and private hospitals. A growing body of research emphasized the strategic importance of organizational digital culture (Binsar et al., 2024; Mollah et al., 2024; Shin et al., 2023) and digital transformation (Al-Ayed et al., 2023; Surahman et al., 2023) as drivers of performance enhancement in healthcare organizations.

Despite these findings, most prior studies focused on civilian healthcare institutions. Very few examined how such factors operated in military hospital environments, where centralized authority, strict hierarchy, and mission-oriented priorities might influence how digital strategies were adopted and implemented. This represented a significant research gap, as it remained unclear whether conclusions drawn from civilian contexts applied to the unique structure and constraints of military hospitals such as RS TNI AD.

Additionally, previous empirical research reported inconsistent results regarding the impact of digital culture, leadership, and transformation on organizational performance suggesting the need to explore mediating mechanisms that could better explain these relationships. One such mechanism was digital innovation, which was defined as the development of new or improved processes, services, or solutions enabled by digital technology to enhance efficiency, agility, and competitiveness (Mayasari, 2023).

The theoretical foundation for this study was the Resource-Based View (RBV) (Barney, 1991) which posited that unique, valuable, and hard-to-replicate internal resources such as digital capabilities and leadership formed the basis for sustainable competitive advantage. In this view, digital innovation served as a strategic resource that transformed leadership and cultural readiness into tangible performance outcomes (Kumar et al., 2024).

Therefore, this study addressed the following problem statement: How did digital innovation mediate the impact of organizational digital culture, digital leadership, and digital transformation on organizational performance in the context of RS TNI AD? By investigating this question, the study aimed to provide practical insights for hospital leaders particularly in military contexts seeking to leverage digital strategies for sustained performance improvement under institutional and operational constraints.

2. MATERIALS

2.1.1 Resource-Based View (RBV)

This study uses the Resource-Based View (RBV) as the foundation for understanding the factors influencing Organizational Performance. This theory explains that the value and advantages of a company are created from the resources it possesses. Barney (1991) stated that assets, capabilities, organizational processes, and knowledge allow companies to formulate strategies to improve efficiency and effectiveness. To gain sustainable competitive advantage, companies must possess resources that are valuable, rare, non-substitutable, and difficult to imitate (Papadopoulos et al., 2020). RBV helps managers understand competencies as the main assets supporting business performance. The main focus of RBV is on resources that are difficult to buy or transfer, requiring expertise and organizational transformation in processes and culture (Barney 1991). Thus, RBV serves as a framework to analyze how resources support sustainable organizational performance.

2.1.2 Organizational performance

Organizational Performance is considered the core of strategic management (Schendel & Hofer, 1979). Organizational performance is defined as the achievement of business objectives through the interaction between

strategy, resources, and capabilities, measured by comparing the organization with its main competitors and representing the company's relative strength (Teguh et al., 2022). Organizational performance is a commonly used metric in organizational settings (Mikalef et al., 2021) with literature providing various metrics and frameworks for assessing company performance. According to Al-Ayed et al (2023), organizational performance is measured from several perspectives, including the financial perspective, internal processes perspective, customer satisfaction perspective, and learning perspective. All of these aspects are identified as reflecting overall organizational performance. Therefore, this study adopts the measurement of organizational performance based on the research conducted by Al-Ayed et al (2023).

2.1.3 Organizational digital culture

Organizational Digital Culture can be conceptualized by adapting the definition from Deshpande and Webster (1989) as a set of shared assumptions and understandings about the functioning of the organization in a digital context. The core of organizational culture consists of a combination of artifacts; observable, tangible attributes that can be seen, heard, or felt when entering a new culture; values or beliefs; norms, standards, and moral principles that can be perceived through interviews and questionnaires; and underlying assumptions – concepts that are unacknowledged and assumed, which can be indirectly gathered through behavioral observations (Martínez-Caro et al., 2020; Masunka et al., 2022).

2.1.4 Digital leadership

Digital Leadership is a modern concept involving the use of digital platforms that dictate and influence employee behavior to achieve organizational strategic goals (Sheninger, 2019). Digital leadership is conceptualized as a combination of transformational leadership and digital skills (Mollah et al., 2024), enabling the organization to face dynamic environmental challenges and capture emerging opportunities through digital evaluation (Ismail et al., 2023). Digital leadership is a blend of leadership skills involving innovative and disruptive leadership through digital attitudes, including digital awareness and experience (Niu et al., 2022).

2.1.5 Digital transformation

The term digital transformation is widely recognized in today's society (Hausberg et al., 2019) as a transition toward technology-based digital systems. Based on the study by (Maroufkhani et al., 2022), digital transformation is defined as new developments in the use of artifacts, systems, and digital symbols within and around organizations. Digital transformation is generally viewed as the extensive use of digital technologies to enhance organizational performance and operational efficiency. Essentially, organizations use digital technology to improve their traditional value creation pathways and maintain competitiveness in the market (Vial, 2019). Successful digital transformation, which leads to enhanced operational performance, requires organizations to innovate with digital technology by applying significant changes in their processes and business models, as well as adopting strategies and policies that facilitate this transformation (Maroufkhani et al., 2022).

2.1.6 Digital innovation

Digital innovation is generally defined as the creation of market offerings, processes, or business models that result from the use of digital technology. This definition encompasses various innovation outcomes, such as new products, platforms, services, customer experiences, and other value pathways that are made possible through the use of digital technologies and digital processes (Khin & Ho, 2019). In this study, digital innovation is contextualized into innovative digital solutions that transform products, services, and businesses of other organizations. Therefore, digital innovation is defined as the development of new products, services, or solutions using digital technology. The digital technologies used in innovation have been identified by (Urbinati et al., 2020) as Big Data, Internet of Things (IoT), Cloud Computing, Augmented Reality (AR) and Virtual Reality (VR), Artificial Intelligence (AI), and Cyber-Physical Systems.

a. Conceptual Framework and Hypothesis Development

The research framework can be illustrated in the following relationship diagram:

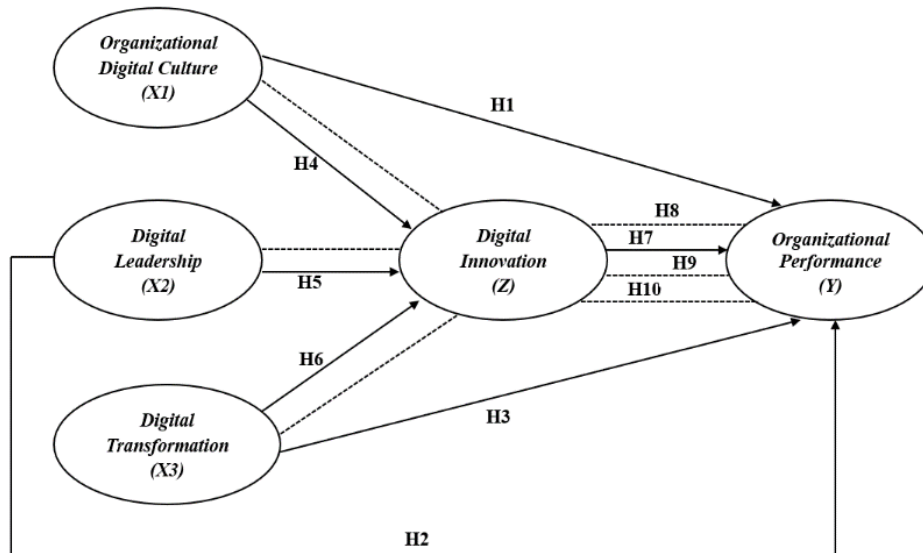


Fig. 1. Conceptual Framework

i. The Influence of Organizational Digital Culture on Organizational Performance

Organizational Digital Culture refers to the digital values adopted by an organization to cope with rapid environmental changes (Martínez-Caro et al., 2020; Aggarwal, 2024). This culture affects patient satisfaction, operational efficiency, and staff development, which in turn positively impacts organizational performance (Fadly et al., 2023; Rusdian & Akmaludin, 2023). Digital culture also supports collaboration, agility, and organizational revenue (Grover et al., 2022; Kumar et al., 2024; Reinhardt et al., 2020). Therefore, Organizational Digital Culture has a positive effect on organizational performance.

Based on this discussion, the research hypothesis proposed is as follows:

H1: There is a positive influence of Organizational Digital Culture on Organizational Performance.

ii. The Influence of Digital Leadership on Organizational Performance

Digital Leadership involves the strategic skills of leaders in utilizing digital technology to create value for the organization (Abbu et al., 2022; Mollah et al., 2024). Digital leadership encompasses the ability and culture to utilize digital technology to create organizational value (Mollah et al., 2024), which can drive cultural changes, innovation, and performance improvement as organizations transition from

traditional systems. Digital leaders play a crucial role in driving innovation, making strategic decisions, and significantly improving organizational performance (Gunawan et al., 2023; Mollah et al., 2024).

Based on this discussion, the research hypothesis proposed is as follows:

H2: There is a positive influence of Digital Leadership on Organizational Performance.

iii. The Influence of Digital Transformation on Organizational Performance

Digital Transformation significantly enhances organizational performance through operational efficiency, value creation, and innovation in services and products (Huang et al., 2023; Martínez-Caro et al., 2020). This transformation supports business growth, international competitiveness, and responsiveness to rapidly changing customer needs (Berghaus, 2017; Vo et al., 2024). By utilizing digital technology, organizations can optimize business processes, increase efficiency, productivity, and growth in performance (Huang et al., 2023) while also enhancing organizational resilience (La Sala et al., 2024).

Based on this discussion, the research hypothesis proposed is as follows:

H3: There is a positive influence of Digital Transformation on Organizational Performance.

iv. The Influence of Digital Innovation on Organizational Performance

Digital Innovation has a positive impact on organizational performance as it drives the emergence of new products, services, and more efficient business strategies (Fang & Liu, 2024; Kurilova & Antipov, 2020). Digital innovation enhances competitiveness and enables organizations to achieve long-term profitability and sustainability (Kohli & Melville, 2019; Zhen et al., 2021).

Based on this discussion, the research hypothesis proposed is as follows:
H4: There is a positive influence of Digital Innovation on Organizational Performance.

v. The Influence of Organizational Digital Culture on Digital Innovation

Digital Culture is regarded as an essential element of modern organizations (Muller et al., 2019) and is closely related to creativity in digital innovation (Elia et al., 2021; Ferreira et al., 2019), which includes the application of new techniques to solve problems. Digital innovation itself is the result of adopting digital technology, encompassing the development of new products, services, business processes, and business models (Hund et al., 2021). Research indicates that digital culture positively impacts digital innovation (Muller et al., 2019; Zhen et al., 2021), enabling organizations to generate high levels of innovation (Cohen et al., 2021).

Based on this discussion, the research hypothesis proposed is as follows:

H5: There is a positive influence of Organizational Digital Culture on Digital Innovation.

vi. The Influence of Digital Leadership on Digital Innovation

The rapid development of technology demands digital transformation as a necessity for organizations, yet it often faces resistance from employees (Samuel & Anita, 2023). The effectiveness of digital leadership depends significantly on the role of employees in accepting and driving transformation, requiring leaders to actively involve them in the change process (Hussain et al., 2018). Significant changes, such as the transition to digital work practices, have not been fully addressed due to

unclear roles and insufficient resources (Liao, 2017), but digital leadership can provide a solution. Weber et al. (2019) propose the role of "network enablers" as key players, where leaders build strong relationships and foster cohesive teamwork, especially in virtual environments (Bartsch et al., 2020). Organizations with strong digital leadership can build both domestic and global collaborative networks (Mihardjo et al., 2019) and drive internal and external coordination (Chen, 2023; Eberl & Drews, 2021), thus strengthening digital innovation. Therefore, the stronger the digital leadership in an organization, the higher the level of digital innovation.

Based on this discussion, the research hypothesis proposed is:

H6: There is a positive influence of Digital Leadership on Digital Innovation.

vii. The Influence of Digital Transformation on Digital Innovation

Digital transformation empowers companies to enhance digitalization, replace low-value elements with data, enrich innovation resources, improve efficiency, and reduce costs and risks of innovation (Peng & Tao, 2022; J. Yu et al., 2022; Y. Yu et al., 2021). Digital transformation impacts operations, organizational structure, human resource management, and resource allocation, ultimately driving corporate innovation (Lokuge et al., 2019; Zhao et al., 2023). The innovative culture created through digital transformation encourages experimentation, learning, and adaptation to market changes (Hoorani et al., 2023).

Based on this discussion, the research hypothesis proposed is:
H7: There is a positive influence of Digital Transformation on Digital Innovation.

viii. The Influence of Organizational Digital Culture on Organizational Performance Mediated by Digital Innovation

Through technological advancements and digital business activities, organizational culture evolves into digital organizational culture, a set of shared values and understanding for managing business activities digitally (Zhen et al., 2021). This culture drives adaptation to technology and data-driven decision-making, playing a crucial role in creating digital innovation, which is a key to organizational

performance success. Organizational cultures that support collaboration and outcomes have been shown to enhance innovation and performance, particularly in the healthcare sector (Putri et al., 2023). Therefore, the effective implementation of digital culture will lead to sustainable digital innovation and positively impact organizational performance. Based on this discussion, the research hypothesis proposed is:

H8: There is a positive influence of Organizational Digital Culture on Organizational Performance mediated by Digital Innovation.

ix. The Influence of Digital Leadership on Organizational Performance Mediated by Digital Innovation

Digital leadership is reflected in a leader's ability to use real-time data, integrate technologies like AI, and drive automation to enhance efficiency and create new business opportunities (L. Fang, 2023). Digital leadership brings a new paradigm by merging technology with traditional innovation processes for broader outcomes. Digital innovation plays a critical mediating role linking digital leadership with company performance, where digital innovation enhances efficiency, product differentiation, and organizational performance.

Based on this discussion, the research hypothesis proposed is:

H9: There is a positive influence of Digital Leadership on Organizational Performance mediated by Digital Innovation.

x. The Influence of Digital Transformation on Organizational Performance Mediated by Digital Innovation

Digital transformation refers to significant changes in business processes through the use of digital technology to create higher value. Organizations integrating digital technology into their operations gain an advantage in responding to changes and improving performance (Kane et al., 2015). In the healthcare context, the use of information technology accelerates product and service refinement, increases competitiveness, and enhances quality (Hess et al., 2016). Research shows that digital transformation fosters innovation in healthcare services and hospital management, improving efficiency and service quality (Kurniawan et al., 2021; Surya Darmawan & Laksono, 2021).

Based on this discussion, the research hypothesis proposed is:

H10: There is a positive influence of Digital Transformation on Organizational Performance mediated by Digital Innovation.

3. METHODOLOGY

This research employed a quantitative approach with a cross-sectional design to examine the relationships between digital organizational culture, digital leadership, digital transformation, digital innovation, and organizational performance in Type C Indonesian Army Hospitals (RS TNI AD). The cross-sectional design was chosen to capture organizational perceptions and behaviors at a specific point in time, which is suitable for exploring the structural relationships among variables without requiring longitudinal tracking particularly relevant in a high-turnover and operationally intense military hospital context.

3.1 Population and Sampling

The unit of analysis in this study is individuals specifically upper- and middle-management personnel of Type C RS TNI AD across Indonesia. The population consisted of 162 leaders across 33 hospitals.

The sampling technique used was purposive sampling, selected for its appropriateness in identifying respondents who have relevant experience and decision-making authority in digitalization initiatives. The inclusion criteria were:

- Managerial-level personnel (including heads of departments or units),
- Minimum one year of service in their current role,
- Involvement or oversight in digital operations, transformation efforts, or administrative modernization.

The exclusion criteria were:

- Non-managerial staff,
- Temporary or inactive personnel,
- Respondents who did not complete the questionnaire fully or who failed consistency checks.

A total of 123 valid responses were obtained, exceeding the minimum requirement of 116 based on the rule of 10 times the number of indicators in the most complex construct (Hair et al., 2019). Data collection was conducted between December 2023 and February 2024 via a structured online questionnaire using Google Forms.

3.2 Ethical Considerations

Prior to data collection, ethical clearance was obtained from the [insert official ethics board name or indicate "relevant military health authority"]. All participants were informed about the purpose of the study, and informed consent was obtained digitally. Respondents were assured of the confidentiality and anonymity of their responses, and participation was voluntary without any coercion or consequence for refusal.

3.3 Instrument Development, Validity, and Reliability

The questionnaire was adapted from previously validated instruments and contextualized to the environment of RS TNI AD. A content validity check was carried out by three experts in healthcare management and digital transformation. A pilot test was conducted with 15 respondents (excluded from the main analysis), resulting in minor wording adjustments for clarity.

Construct reliability was assessed using Cronbach's Alpha and Composite Reliability (CR). All constructs exceeded the threshold of 0.70 for both values, indicating good internal consistency. Convergent validity was confirmed through Average Variance Extracted (AVE) values exceeding 0.50, and discriminant validity was verified using the Fornell-Larcker criterion and HTMT ratios, consistent with the requirements for PLS-SEM analysis.

3.4 Variables and Measurements

The study investigated five main constructs:

- **Independent Variables:**
 - Organizational Digital Culture (ODC)
 - Digital Leadership (DL)
 - Digital Transformation (DT)

- **Mediating Variable:**
 - Digital Innovation (DI)
- **Dependent Variable:**
 - Organizational Performance (OP)

Each construct was measured using multiple indicators derived from literature:

- **ODC (X1):** 4 indicators (e.g., team collaboration, technology-oriented values)
- **DL (X2):** 6 indicators (e.g., digital risk awareness, reducing resistance to change)
- **DT (X3):** 5 indicators (e.g., digital process adoption, service efficiency)
- **DI (Z):** 6 indicators (e.g., system enhancement, tech-based service development)
- **OP (Y):** 15 indicators across four dimensions financial, internal process, customer satisfaction, and learning & growth

All items were measured using a **5-point Likert scale**, where:

- **1 = Strongly Disagree**
- **2 = Disagree**
- **3 = Neutral**
- **4 = Agree**
- **5 = Strongly Agree**

This scale was chosen for its effectiveness in capturing perceptions and attitudes in a structured quantitative format.

3.5 Data Analysis

The data were analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) method, executed through SmartPLS 3.0 software. This method is appropriate given the study's exploratory nature, the presence of latent constructs, and the moderate sample size.

The proposed model includes two structural equations:

1. $OP = \beta_1 ODC + \beta_2 DL + \beta_3 DT + \beta_4 DI + \varepsilon_1$
2. $DI = \alpha_1 ODC + \alpha_2 DL + \alpha_3 DT + \varepsilon_2$

Where:

- **OP** = Organizational Performance
- **ODC** = Organizational Digital Culture

- DL = Digital Leadership
- DT = Digital Transformation
- DI = Digital Innovation
- β, α = path coefficients
- ϵ = residual errors

The significance of direct and indirect effects was assessed using bootstrapping (5,000 samples), and mediation was confirmed via Sobel tests, with supporting results reported in the “Results and Discussion” section.

4. RESULTS AND DISCUSSION

This study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.0 to test the hypothesized relationships among constructs, based on data collected from 123 valid responses. The data were obtained through a structured online questionnaire distributed to eligible upper- and

middle-management leaders of Type C RS TNI AD between December 2023 and February 2024. All respondents met predefined inclusion criteria including managerial status and involvement in digital initiatives ensuring the sample reflected the study’s strategic focus. Ethical clearance and informed consent procedures were followed, in accordance with institutional protocols applicable to military healthcare settings.

Each item was measured using a 5-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree, designed to capture respondents’ perceptions, attitudes, and evaluations on digital leadership, innovation, transformation, culture, and performance. Reliability and validity of the instrument were confirmed prior to analysis, with all constructs demonstrating Cronbach’s Alpha > 0.70 and acceptable AVE values, indicating satisfactory measurement quality.

Results of Hypothesis Testing: Direct and Indirect Effects

Table 1. Direct effects hypothesis testing results

Hypothesis	Coefficient (β)	P-Value	Conclusion
H1: There is a positive influence of Digital Organizational Culture on Organizational Performance	0.167	0.080	Not Supported
H2: There is a positive influence of Digital Leadership on Organizational Performance	0.219	0.037	Supported
H3: There is a positive influence of Digital Transformation on Organizational Performance	0.303	0.009	Supported
H4: There is a positive influence of Digital Innovation on Organizational Performance	0.253	0.024	Supported
H5: There is a positive influence of Organizational Digital Culture on Digital Innovation	0.083	0.229	Not Supported
H6: There is a positive influence of Digital Leadership on Digital Innovation	0.120	0.139	Not Supported
H7: There is a positive influence of Digital Transformation on Digital Innovation	0.701	0.000	Supported

Table 2. Indirect effects (mediating role of digital innovation)

Hypothesis	Coefficient (β)	P-Value	Conclusion
H8: There is a positive influence of Organizational Digital Culture on Organizational Performance mediated by Digital Innovation	0.021	0.280	Not Supported
H9: There is a positive influence of Digital Leadership on Organizational Performance mediated by Digital Innovation	0.030	0.179	Not Supported
H10: There is a positive influence of Digital Transformation on Organizational Performance mediated by Digital Innovation	0.177	0.028	Supported

Source: Data Processed using SmartPLS (2024)

4.1 Discussion

H1 – Organizational Digital Culture (ODC) → Organizational Performance (OP):

The absence of a significant relationship indicates that in military hospitals such as RS TNI AD, a formalized digital culture alone is insufficient to influence performance. This may be due to rigid hierarchical command structures and limited flexibility for bottom-up innovation highlighting the need for adaptive cultural transformation that aligns digital values with operational realities.

H2 – Digital Leadership (DL) → OP:

Supported by the findings, this relationship affirms that **leaders with digital competencies** can directly enhance performance, particularly by streamlining decision-making, motivating innovation, and aligning digital strategies with mission priorities. This confirms prior studies (e.g., Shin et al., 2023; Mollah et al., 2024).

H3 – Digital Transformation (DT) → OP:

A strong and significant effect was observed, underscoring that well-executed transformation initiatives—such as integrated information systems, automation, and digital workflows—positively influence performance outcomes, particularly in increasing efficiency and responsiveness during military operations.

H4 – Digital Innovation (DI) → OP:

Digital innovation plays a direct role in performance enhancement, especially through improved clinical support systems, faster data access, and better patient service models. This aligns with Kohli & Melville (2019), confirming that innovation acts as a performance catalyst in healthcare settings.

H5 & H6 – ODC/DL → DI (Not Supported):

These insignificant results may suggest that neither culture nor leadership alone stimulates innovation unless supported by systemic enablers such as flexible policies, infrastructure, and personnel empowerment. In military hospitals, top-down control may stifle experimentation or lateral collaboration necessary for innovation emergence.

H7 – DT → DI:

A robust relationship confirms that digital transformation facilitates innovation by

introducing digital tools and processes that reshape operations. Hospitals that modernize their systems create fertile ground for innovative practices to take root.

Mediation Effects (H8–H10)

H8 & H9 (Not Supported):

Digital innovation does not mediate the effects of ODC or DL on OP. This suggests that while culture and leadership contribute directly, they do not automatically translate into innovation-led performance gains. This finding reflects systemic rigidity in military healthcare, where cultural and leadership shifts may not immediately permeate technological innovation without structural support.

H10 – DT → DI → OP (Supported):

This confirms that digital transformation not only drives innovation but also improves performance indirectly through it. Successful transformation provides the necessary infrastructure and momentum for innovation to occur, reinforcing its strategic centrality in military hospital modernization.

Based on the hypothesis testing results in this study, out of the ten hypotheses proposed, five were found to be statistically significant (supported), while five were not supported. The detailed discussion of each result is as follows:

a. The Influence of Organizational Digital Culture on Organizational Performance

The results indicate that organizational digital culture does not significantly influence organizational performance. This suggests that even though digital culture is implemented within the organization, it is not sufficient to directly improve organizational performance. This finding reflects that despite efforts to foster digital culture, the impact on organizational performance may remain minimal, especially in the context of RS TNI AD Type C. The unique characteristics of RS TNI AD, such as a hierarchical organizational structure and highly procedural operational systems, hinder the optimal implementation of digital culture. This is in line with the findings of Puliwarna et al. (2023), who explained that organizational digital culture requires a space for innovation and collaboration, which is often obstructed by rigid military command systems. As a result, even though digital culture has been applied, its impact on performance can be limited without internal

readiness that aligns with this cultural shift. This result supports earlier findings reported by (Digital et al., 2024; Ferdian & Rahmawati, 2019; S. N. Putri et al., 2024; Rusdian & Akmaludin, 2023).

b. The Influence of Digital Leadership on Organizational Performance

The results show that digital leadership has a significant and positive impact on organizational performance. This indicates that digital leadership, which includes a leader's ability to guide, leverage technology, and encourage innovation within the organization, directly contributes to improving organizational performance. Digital leadership can stimulate creativity among individuals and align personal values with organizational values, ultimately resulting in higher organizational performance (Zhu et al., 2022). This is highly relevant in military hospitals, which are required to continuously innovate in providing medical services and conducting operational activities efficiently. The shift from traditional systems to more modern, technology-based systems in RS TNI AD Type C has a significantly positive impact on organizational performance, particularly when led by individuals with strong digital leadership skills. Competent digital leaders can drive cultural changes that are more adaptive and innovative, and enhance operational efficiency in hospital settings. This finding aligns with the studies of (Mollah et al., 2024; Saddique et al., 2023; Senadjki et al., 2024; Shin et al., 2023; Vo et al., 2024).

c. The Influence of Digital Transformation on Organizational Performance

The results indicate that digital transformation has a significant and positive impact on organizational performance in RS TNI AD. Digital transformation drives the growth of activities and enhances the potential for performance improvement (Martínez-Caro et al., 2020). In the context of TNI AD, digital transformation supports operational optimization by reducing manual barriers, accelerating medical information access, and facilitating the tracking of medical logistics. Furthermore, this technology enables faster and more accurate data-driven decision-making, both for administrative and clinical purposes. With digital transformation, the hospital is also able to provide more responsive and adaptive services in emergency situations, such as disaster response or military operations.

This finding is consistent with previous research conducted by Al-Ayed (2023), Mollah et al. (2024), Vo et al. (2024), and Senadjki (2024).

d. The Influence of Digital Innovation on Organizational Performance

The results show that Digital Innovation has a significant and positive influence on Organizational Performance in RS TNI AD. This finding is consistent with the theoretical concept that digital innovation impacts organizational performance by enabling the creation of new processes, services, and products supported by technology (Kohli & Melville, 2019). Digital innovation allows the organization to accelerate decision-making, respond to customer or user needs more quickly, and optimize existing resources. Moreover, digital innovation strengthens the organization's ability to adapt rapidly to market changes and create solutions that are more aligned with technological advancements. Therefore, the more digital innovation is implemented effectively in an organization, the higher its performance in terms of productivity, efficiency, and organizational results.

e. The Influence of Organizational Digital Culture on Digital Innovation

The results indicate that Organizational Digital Culture does not have a significant influence on Digital Innovation in RS TNI AD. In other words, although digital culture has been implemented within the organization, it does not directly drive digital innovation in the hospital. Although organizational digital culture is generally considered an important foundation for the success of digital innovation, the results suggest that in the context of RS TNI AD Type C, this influence is not proven to be significant. In other words, the existing digital culture in this military hospital does not directly encourage the practice of digital innovation. This condition indicates that the presence of digital culture has not yet been an effective factor in driving the creation or development of technology-based innovations. This finding aligns with research conducted by (Bentlage et al., 2014; Felizzola, 2023; Saebah & Merthayasa, 2024; Zhang et al., 2021).

f. The Influence of Digital Leadership on Digital Innovation

The results show that Digital Leadership does not have a significant influence on Digital

Innovation in RS TNI AD. Although the leaders in this organization may have adopted the principles of digital leadership, the results show that this has not directly driven digital innovation in the hospital. This finding indicates that the presence of leaders with high digital capabilities does not necessarily have a direct impact on the creation of digital innovation within the organization. This is consistent with the findings of Inayah et al (2024), who state that digital leadership does not significantly influence digital innovation.

g. The Influence of Digital Transformation on Digital Innovation

The results show that Digital Transformation has a significant and positive influence on Digital Innovation in RS TNI AD. This finding indicates that the digital transformation processes implemented in this hospital have successfully encouraged the adoption of digital innovation. In the context of RS TNI AD, digital transformation has allowed the hospital to adopt new technologies, creating space for the development of new ideas and experimentation with more efficient technologies. This transformation process enables the hospital to adapt more rapidly to changing medical needs and operational challenges. Therefore, the success of digital transformation in RS TNI AD directly contributes to enhancing digital innovation within the organization. This finding is supported by research by (X. Fang & Liu, 2024; Hu et al., 2024; Li et al., 2023).

h. The Influence of Organizational Digital Culture on Organizational Performance Mediated by Digital Innovation

The results indicate that Digital Innovation does not mediate the influence of Organizational Digital Culture on Organizational Performance. In other words, although RS TNI AD has implemented a digital culture within the organization, this is not sufficient to drive digital innovation that would improve organizational performance. One of the main factors causing the inefficacy of this mediation role is the organizational culture's tendency to be rigid and centralized, as is common in military institutions. Such a culture focuses on strict adherence to procedures and operational stability, which often leaves little room for innovative initiatives to develop. Therefore, the failure of digital innovation to mediate the relationship between digital culture and organizational performance in

RS TNI AD is due to various internal barriers, such as a rigid organizational structure, limited resource allocation, lack of support from management, and resistance to change at the operational level.

i. The Influence of Digital Leadership on Organizational Performance Mediated by Digital Innovation

The results show that Digital Innovation does not mediate the influence of Digital Leadership on Organizational Performance. In other words, although RS TNI AD leaders possess strong digital leadership qualities and support the implementation of technology, this is not sufficient to drive organizational performance improvements through digital innovation. The absence of a mediation role from digital innovation clarifies that innovation has not become the main channel for improving organizational performance. Instead, performance improvement is more influenced by direct leadership focusing on operational efficiency and optimization of administrative processes. This suggests that in the context of military hospitals, digital leadership tends to be used to strengthen existing systems' stability rather than drive the creation of new value through transformational digital innovations. Even though digital leadership has been implemented, the organization has not yet fully established an ecosystem that supports sustainable digital innovation.

j. The Influence of Digital Transformation on Organizational Performance Mediated by Digital Innovation

The results of the study indicate that **Digital Innovation** successfully mediates the influence of **Digital Transformation** on **Organizational Performance**. This finding reflects the importance of the digital transformation process carried out at the hospital, as it plays a crucial role in driving **digital innovation**, which in turn enhances the organization's performance. In other words, when digital transformation is optimally applied, it not only introduces technological changes but also facilitates innovations that directly contribute to improving hospital performance. Previous research supports the notion that digital transformation contributes to increased organizational digital innovation, which positively impacts performance, as shown by (Hess et al., 2016; Sebastian et al., 2017).

5. CONCLUSION

This study explored the mediating role of digital innovation in the relationship between organizational digital culture, digital leadership, and digital transformation on organizational performance within Type C Indonesian Army Hospitals (RS TNI AD). The findings revealed that digital transformation and digital innovation have both direct and indirect significant effects on organizational performance, while digital leadership also positively affects performance, albeit not through innovation. In contrast, organizational digital culture did not significantly influence either digital innovation or organizational performance, indicating structural and cultural limitations in hierarchical institutions.

From a managerial standpoint, these findings carry important implications. Leaders of military or similarly bureaucratic institutions must recognize that digital transformation is not merely a technology upgrade, but a strategic enabler that fosters innovation and drives performance. Managers are encouraged to move beyond symbolic support for digital leadership or culture and instead invest in enabling systems, infrastructure, and cross-functional collaboration that allow innovation to take root and evolve. Digital transformation efforts should be aligned with operational realities, supported by flexible policies, empowered teams, and a clear innovation roadmap.

This research is particularly important for the scientific community as it provides empirical insights into how digital constructs interact in a highly structured, public sector setting. In the modern age, digital leadership, digital transformation, and digital innovation are essential levers for organizational agility and sustained performance. Understanding these dynamics in constrained environments, such as military hospitals, offers valuable lessons for both developed and developing countries undergoing public sector digitalization. Moreover, this study expands the application of the Resource-Based View (RBV) by demonstrating how intangible digital capabilities when properly supported can yield tangible performance outcomes even in rigid institutional frameworks.

For future research, we recommend exploring digital innovation as a *moderated mediator*, influenced by contextual factors such as organizational readiness, leadership support, or

environmental dynamism. Further comparative studies across hospital types (e.g., Type A, B, and C) or between military and civilian healthcare institutions could enhance external validity and reveal context-specific strategies for effective digital transformation.

In conclusion, this study affirms that in the digital era, organizational growth, resilience, and competitive advantage especially in complex healthcare systems are largely dependent on how well digital leadership, transformation, and innovation are integrated and operationalized. This research offers both theoretical enrichment and actionable insights for practitioners aiming to modernize public service delivery through sustainable digital initiatives.

CONSENT

All participants were informed about the purpose of the study, and informed consent was obtained digitally.

ETHICAL APPROVAL

This study received ethical clearance from the relevant military health authority responsible for overseeing research within the Indonesian Army Hospital (RS TNI AD) system. All participants were informed about the purpose and procedures of the study, and digital informed consent was obtained prior to participation. Respondents were assured of the confidentiality and anonymity of their responses. Participation was entirely voluntary, with no coercion or negative consequences for refusal.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors hereby declare that no generative artificial intelligence (AI) tools, including but not limited to large language models (e.g., ChatGPT, Copilot) or text-to-image generators, were used in the writing, editing, data analysis, or figure generation processes of this manuscript. All content was solely produced by the authors without AI assistance.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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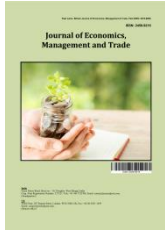
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The Mediating Role of Digital Innovation in the Relationship between Digital Culture, Digital Leadership, Digital Transformation, and Organizational Performance: A Study of Indonesian Army

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Authors' contributions

This work was carried out in collaboration among all authors. Author MEWH conceptualized the research, designed the methodology, analyzed the data, and wrote the initial draft of the manuscript. Author BU contributed to data collection, reviewed the literature, and provided critical revisions to the manuscript. Author AF assisted with data analysis, interpretation of results, and manuscript revisions. All authors read and approved the final manuscript.

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ABSTRACT

Aims: This study aimed to examine the role of digital innovation in mediating the influence of organizational digital culture, digital leadership, and digital transformation on organizational performance in Indonesian Army Hospitals (*Rumah Sakit TNI Angkatan Darat – RS TNI AD*).

Study Design: A quantitative research design was employed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) approach.

Place and Duration of Study: The study was conducted in Type C RS TNI AD hospitals across Indonesia, with data collection carried out between December 2023 and February 2024.

Methodology: A total of 123 upper- and middle-level managers from Type C RS TNI AD hospitals were selected using purposive sampling. Data were gathered through a structured online questionnaire. SEM analysis was conducted using SmartPLS 3.0 software, and the Sobel test was used to assess the mediating effect of digital innovation.

Results: The findings revealed that digital leadership, digital transformation, and digital innovation each had a significant positive effect on organizational performance. Digital transformation also had a strong positive effect on digital innovation. However, organizational digital culture and digital leadership did not significantly influence digital innovation, nor did they show significant indirect effects on performance through innovation. Only digital innovation was found to mediate the relationship between digital transformation and organizational performance.

Conclusion: This study contributes to the Resource-Based View (RBV) theory by demonstrating how intangible digital capabilities particularly digital transformation and innovation positively impact organizational performance, even within highly structured environments like military hospitals. It offers important insights for scholars and practitioners on implementing digital strategies in complex public healthcare systems. The findings emphasize the critical role of digital transformation in fostering innovation and enhancing performance. Future research should expand the sample to other types of military hospitals to improve the generalizability of results.

Keywords: *Organizational digital culture; digital leadership; digital transformation; digital innovation; organizational performance.*

1. INTRODUCTION

Hospitals in Indonesia were generally classified into two categories: Government Hospitals and Private Hospitals. A distinctive category within Government Hospitals was the TNI Hospital, which operated under military command and incorporated military structures into its healthcare management. Among these, the Indonesian Army Hospital (RS TNI AD) was the most prevalent and geographically distributed, serving both military personnel and the general public. Beyond healthcare, RS TNI AD played a critical role in national defense preparedness (Setyawan *et al.*, 2019), making its organizational performance particularly strategic.

This study made an important contribution to the literature by investigating how digital innovation acted as a mediating mechanism between digital leadership, digital transformation, digital culture, and organizational performance in the underexplored context of military hospitals. Unlike civilian healthcare institutions, military hospitals faced unique structural, cultural, and

operational constraints that could limit the effectiveness of digital initiatives. Understanding how these digital constructs interacted in such rigid environments was critical not only for expanding theoretical insights but also for offering practical solutions to enhance institutional performance in high-stakes public sectors.

This research filled a significant gap by applying the Resource-Based View (RBV) framework to demonstrate how intangible digital capabilities could be converted into tangible performance improvements even in bureaucratic and centralized organizational systems like RS TNI AD.

Over the years, RS TNI AD experienced a rise in patient volumes, indicating public trust and growing demand for its services. However, this growth was not accompanied by stable financial performance. Reports showed fluctuating revenues and inconsistent income patterns across fiscal periods, reflecting deeper operational inefficiencies. These included rigid bureaucratic systems, limited technological

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integration, and difficulties in responding adaptively to external changes a common issue in military-run institutions.

Furthermore, RS TNI AD faced various complex challenges in maintaining sustainable performance. These included the need to improve operational efficiency, adopt modern healthcare technologies, enhance the quality of human resources (HR), and adapt to dynamic healthcare regulations. One critical challenge was the implementation of technology-based strategies such as hospital management information systems, which were expected to improve service efficiency and support data-driven decision-making. However, budgetary constraints, outdated infrastructure, and a lack of digitally competent personnel often hindered successful adoption (Putri *et al.*, 2023).

Given these conditions, RS TNI AD had to adopt a comprehensive and strategic approach to overcome organizational and technological barriers, especially amid intensifying competition with public and private hospitals. A growing body of research emphasized the strategic importance of organizational digital culture (Binsar *et al.*, 2024; Mollah *et al.*, 2024; Shin *et al.*, 2023) and digital transformation (Al-Ayed *et al.*, 2023; Surahman *et al.*, 2023) as drivers of performance enhancement in healthcare organizations.

Despite these findings, most prior studies focused on civilian healthcare institutions. Very few examined how such factors operated in military hospital environments, where centralized authority, strict hierarchy, and mission-oriented priorities might influence how digital strategies were adopted and implemented. This represented a significant research gap, as it remained unclear whether conclusions drawn from civilian contexts applied to the unique structure and constraints of military hospitals such as RS TNI AD.

Additionally, previous empirical research reported inconsistent results regarding the impact of digital culture, leadership, and transformation on organizational performance suggesting the need to explore mediating mechanisms that could better explain these relationships. One such mechanism was digital innovation, which was defined as the development of new or improved processes, services, or solutions enabled by digital technology to enhance efficiency, agility, and competitiveness (Mayasari, 2023).

The theoretical foundation for this study was the Resource-Based View (RBV) (Barney, 1991) which posited that unique, valuable, and hard-to-replicate internal resources such as digital capabilities and leadership formed the basis for sustainable competitive advantage. In this view, digital innovation served as a strategic resource that transformed leadership and cultural readiness into tangible performance outcomes (Kumar *et al.*, 2024).

Therefore, this study addressed the following problem statement: How did digital innovation mediate the impact of organizational digital culture, digital leadership, and digital transformation on organizational performance in the context of RS TNI AD? By investigating this question, the study aimed to provide practical insights for hospital leaders particularly in military contexts seeking to leverage digital strategies for sustained performance improvement under institutional and operational constraints.

2. MATERIALS

2.1.1 Resource-Based View (RBV)

This study uses the Resource-Based View (RBV) as the foundation for understanding the factors influencing Organizational Performance. This theory explains that the value and advantages of a company are created from the resources it possesses. Barney (1991) stated that assets, capabilities, organizational processes, and knowledge allow companies to formulate strategies to improve efficiency and effectiveness. To gain sustainable competitive advantage, companies must possess resources that are valuable, rare, non-substitutable, and difficult to imitate (Papadopoulos *et al.*, 2020). RBV helps managers understand competencies as the main assets supporting business performance. The main focus of RBV is on resources that are difficult to buy or transfer, requiring expertise and organizational transformation in processes and culture (Barney 1991). Thus, RBV serves as a framework to analyze how resources support sustainable organizational performance.

2.1.2 Organizational performance

Organizational Performance is considered the core of strategic management (Schendel & Hofer, 1979). Organizational performance is defined as the achievement of business objectives through the interaction between

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strategy, resources, and capabilities, measured by comparing the organization with its main competitors and representing the company's relative strength (Teguh et al., 2022). Organizational performance is a commonly used metric in organizational settings (Mikalef et al., 2021) with literature providing various metrics and frameworks for assessing company performance. According to Al-Ayed et al (2023), organizational performance is measured from several perspectives, including the financial perspective, internal processes perspective, customer satisfaction perspective, and learning perspective. All of these aspects are identified as reflecting overall organizational performance. Therefore, this study adopts the measurement of organizational performance based on the research conducted by Al-Ayed et al (2023).

2.1.3 Organizational digital culture

Organizational Digital Culture can be conceptualized by adapting the definition from Deshpande and Webster (1989) as a set of shared assumptions and understandings about the functioning of the organization in a digital context. The core of organizational culture consists of a combination of artifacts; observable, tangible attributes that can be seen, heard, or felt when entering a new culture; values or beliefs; norms, standards, and moral principles that can be perceived through interviews and questionnaires; and underlying assumptions – concepts that are unacknowledged and assumed, which can be indirectly gathered through behavioral observations (Martínez-Caro et al., 2020; Masunka et al., 2022).

2.1.4 Digital leadership

Digital Leadership is a modern concept involving the use of digital platforms that dictate and influence employee behavior to achieve organizational strategic goals (Sheninger, 2019). Digital leadership is conceptualized as a combination of transformational leadership and digital skills (Mollah et al., 2024), enabling the organization to face dynamic environmental challenges and capture emerging opportunities through digital evaluation (Ismail et al., 2023). Digital leadership is a blend of leadership skills involving innovative and disruptive leadership through digital attitudes, including digital awareness and experience (Niu et al., 2022).

2.1.5 Digital transformation

The term digital transformation is widely recognized in today's society (Hausberg et al., 2019) as a transition toward technology-based digital systems. Based on the study by (Maroufkhani et al., 2022), digital transformation is defined as new developments in the use of artifacts, systems, and digital symbols within and around organizations. Digital transformation is generally viewed as the extensive use of digital technologies to enhance organizational performance and operational efficiency. Essentially, organizations use digital technology to improve their traditional value creation pathways and maintain competitiveness in the market (Vial, 2019). Successful digital transformation, which leads to enhanced operational performance, requires organizations to innovate with digital technology by applying significant changes in their processes and business models, as well as adopting strategies and policies that facilitate this transformation (Maroufkhani et al., 2022).

2.1.6 Digital innovation

Digital innovation is generally defined as the creation of market offerings, processes, or business models that result from the use of digital technology. This definition encompasses various innovation outcomes, such as new products, platforms, services, customer experiences, and other value pathways that are made possible through the use of digital technologies and digital processes (Khin & Ho, 2019). In this study, digital innovation is contextualized into innovative digital solutions that transform products, services, and businesses of other organizations. Therefore, digital innovation is defined as the development of new products, services, or solutions using digital technology. The digital technologies used in innovation have been identified by (Urbinati et al., 2020) as Big Data, Internet of Things (IoT), Cloud Computing, Augmented Reality (AR) and Virtual Reality (VR), Artificial Intelligence (AI), and Cyber-Physical Systems.

a. Conceptual Framework and Hypothesis Development

The research framework can be illustrated in the following relationship diagram:

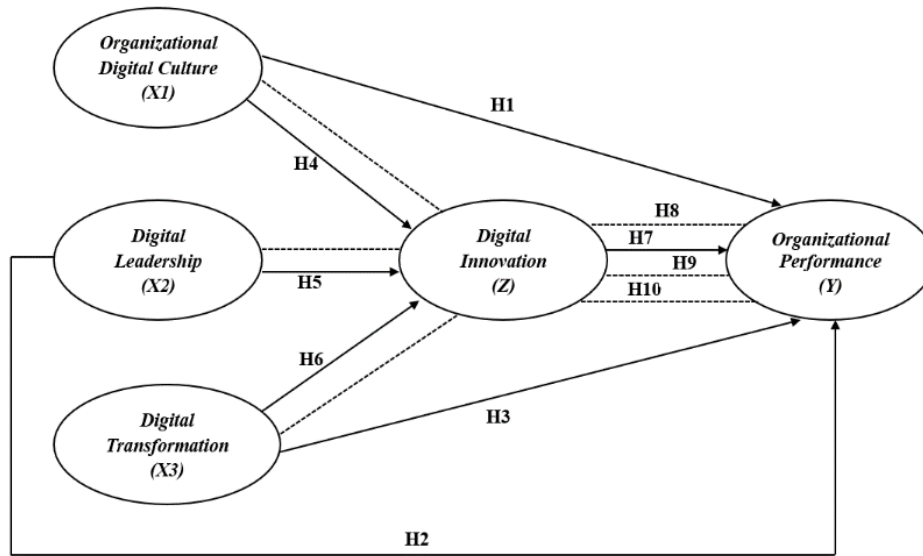


Fig. 1. Conceptual Framework

i. The Influence of Organizational Digital Culture on Organizational Performance

Organizational Digital Culture refers to the digital values adopted by an organization to cope with rapid environmental changes (Martínez-Caro et al., 2020; Aggarwal, 2024). This culture affects patient satisfaction, operational efficiency, and staff development, which in turn positively impacts organizational performance (Fadly et al., 2023; Rusdian & Akmaludin, 2023). Digital culture also supports collaboration, agility, and organizational revenue (Grover et al., 2022; Kumar et al., 2024; Reinhardt et al., 2020). Therefore, Organizational Digital Culture has a positive effect on organizational performance.

Based on this discussion, the research hypothesis proposed is as follows:

H1: There is a positive influence of Organizational Digital Culture on Organizational Performance.

ii. The Influence of Digital Leadership on Organizational Performance

Digital Leadership involves the strategic skills of leaders in utilizing digital technology to create value for the organization (Abbu et al., 2022; Mollah et al., 2024). Digital leadership encompasses the ability and culture to utilize digital technology to create organizational value (Mollah et al., 2024), which can drive cultural changes, innovation, and performance improvement as organizations transition from

traditional systems. Digital leaders play a crucial role in driving innovation, making strategic decisions, and significantly improving organizational performance (Gunawan et al., 2023; Mollah et al., 2024).

Based on this discussion, the research hypothesis proposed is as follows:

H2: There is a positive influence of Digital Leadership on Organizational Performance.

iii. The Influence of Digital Transformation on Organizational Performance

Digital Transformation significantly enhances organizational performance through operational efficiency, value creation, and innovation in services and products (Huang et al., 2023; Martínez-Caro et al., 2020). This transformation supports business growth, international competitiveness, and responsiveness to rapidly changing customer needs (Berghaus, 2017; Vo et al., 2024). By utilizing digital technology, organizations can optimize business processes, increase efficiency, productivity, and growth in performance (Huang et al., 2023) while also enhancing organizational resilience (La Sala et al., 2024).

Based on this discussion, the research hypothesis proposed is as follows:

H3: There is a positive influence of Digital Transformation on Organizational Performance.

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iv. The Influence of Digital Innovation on Organizational Performance

Digital Innovation has a positive impact on organizational performance as it drives the emergence of new products, services, and more efficient business strategies (Fang & Liu, 2024; Kurilova & Antipov, 2020). Digital innovation enhances competitiveness and enables organizations to achieve long-term profitability and sustainability (Kohli & Melville, 2019; Zhen et al., 2021).

Based on this discussion, the research hypothesis proposed is as follows: H4: There is a positive influence of Digital Innovation on Organizational Performance.

v. The Influence of Organizational Digital Culture on Digital Innovation

Digital Culture is regarded as an essential element of modern organizations (Muller et al., 2019) and is closely related to creativity in digital innovation (Elia et al., 2021; Ferreira et al., 2019), which includes the application of new techniques to solve problems. Digital innovation itself is the result of adopting digital technology, encompassing the development of new products, services, business processes, and business models (Hund et al., 2021). Research indicates that digital culture positively impacts digital innovation (Muller et al., 2019; Zhen et al., 2021), enabling organizations to generate high levels of innovation (Cohen et al., 2021).

Based on this discussion, the research hypothesis proposed is as follows:

H5: There is a positive influence of Organizational Digital Culture on Digital Innovation.

vi. The Influence of Digital Leadership on Digital Innovation

The rapid development of technology demands digital transformation as a necessity for organizations, yet it often faces resistance from employees (Samuel & Anita, 2023). The effectiveness of digital leadership depends significantly on the role of employees in accepting and driving transformation, requiring leaders to actively involve them in the change process (Hussain et al., 2018). Significant changes, such as the transition to digital work practices, have not been fully addressed due to

unclear roles and insufficient resources (Liao, 2017), but digital leadership can provide a solution. Weber et al. (2019) propose the role of "network enablers" as key players, where leaders build strong relationships and foster cohesive teamwork, especially in virtual environments (Bartsch et al., 2020). Organizations with strong digital leadership can build both domestic and global collaborative networks (Mihardjo et al., 2019) and drive internal and external coordination (Chen, 2023; Eberl & Drews, 2021), thus strengthening digital innovation. Therefore, the stronger the digital leadership in an organization, the higher the level of digital innovation.

Based on this discussion, the research hypothesis proposed is:

H6: There is a positive influence of Digital Leadership on Digital Innovation.

vii. The Influence of Digital Transformation on Digital Innovation

Digital transformation empowers companies to enhance digitalization, replace low-value elements with data, enrich innovation resources, improve efficiency, and reduce costs and risks of innovation (Peng & Tao, 2022; J. Yu et al., 2022; Y. Yu et al., 2021). Digital transformation impacts operations, organizational structure, human resource management, and resource allocation, ultimately driving corporate innovation (Lokuge et al., 2019; Zhao et al., 2023). The innovative culture created through digital transformation encourages experimentation, learning, and adaptation to market changes (Hoorani et al., 2023).

Based on this discussion, the research hypothesis proposed is: H7: There is a positive influence of Digital Transformation on Digital Innovation.

viii. The Influence of Organizational Digital Culture on Organizational Performance Mediated by Digital Innovation

Through technological advancements and digital business activities, organizational culture evolves into digital organizational culture, a set of shared values and understanding for managing business activities digitally (Zhen et al., 2021). This culture drives adaptation to technology and data-driven decision-making, playing a crucial role in creating digital innovation, which is a key to organizational

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performance success. Organizational cultures that support collaboration and outcomes have been shown to enhance innovation and performance, particularly in the healthcare sector (Putri et al., 2023). Therefore, the effective implementation of digital culture will lead to sustainable digital innovation and positively impact organizational performance. Based on this discussion, the research hypothesis proposed is:

H8: There is a positive influence of Organizational Digital Culture on Organizational Performance mediated by Digital Innovation.

ix. The Influence of Digital Leadership on Organizational Performance Mediated by Digital Innovation

Digital leadership is reflected in a leader's ability to use real-time data, integrate technologies like AI, and drive automation to enhance efficiency and create new business opportunities (L. Fang, 2023). Digital leadership brings a new paradigm by merging technology with traditional innovation processes for broader outcomes. Digital innovation plays a critical mediating role linking digital leadership with company performance, where digital innovation enhances efficiency, product differentiation, and organizational performance.

Based on this discussion, the research hypothesis proposed is:

H9: There is a positive influence of Digital Leadership on Organizational Performance mediated by Digital Innovation.

x. The Influence of Digital Transformation on Organizational Performance Mediated by Digital Innovation

Digital transformation refers to significant changes in business processes through the use of digital technology to create higher value. Organizations integrating digital technology into their operations gain an advantage in responding to changes and improving performance (Kane et al., 2015). In the healthcare context, the use of information technology accelerates product and service refinement, increases competitiveness, and enhances quality (Hess et al., 2016). Research shows that digital transformation fosters innovation in healthcare services and hospital management, improving efficiency and service quality (Kurniawan et al., 2021; Surya Darmawan & Laksono, 2021).

Based on this discussion, the research hypothesis proposed is:

H10: There is a positive influence of Digital Transformation on Organizational Performance mediated by Digital Innovation.

3. METHODOLOGY

This research employed a quantitative approach with a cross-sectional design to examine the relationships between digital organizational culture, digital leadership, digital transformation, digital innovation, and organizational performance in Type C Indonesian Army Hospitals (RS TNI AD). The cross-sectional design was chosen to capture organizational perceptions and behaviors at a specific point in time, which is suitable for exploring the structural relationships among variables without requiring longitudinal tracking particularly relevant in a high-turnover and operationally intense military hospital context.

3.1 Population and Sampling

The unit of analysis in this study is individuals specifically upper- and middle-management personnel of Type C RS TNI AD across Indonesia. The population consisted of 162 leaders across 33 hospitals.

The sampling technique used was purposive sampling, selected for its appropriateness in identifying respondents who have relevant experience and decision-making authority in digitalization initiatives. The inclusion criteria were:

- Managerial-level personnel (including heads of departments or units),
- Minimum one year of service in their current role,
- Involvement or oversight in digital operations, transformation efforts, or administrative modernization.

The exclusion criteria were:

- Non-managerial staff,
- Temporary or inactive personnel,
- Respondents who did not complete the questionnaire fully or who failed consistency checks.

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A total of 123 valid responses were obtained, exceeding the minimum requirement of 116 based on the rule of 10 times the number of indicators in the most complex construct (Hair et al., 2019). Data collection was conducted between December 2023 and February 2024 via a structured online questionnaire using Google Forms.

3.2 Ethical Considerations

Prior to data collection, ethical clearance was obtained from the [insert official ethics board name or indicate "relevant military health authority"]. All participants were informed about the purpose of the study, and informed consent was obtained digitally. Respondents were assured of the confidentiality and anonymity of their responses, and participation was voluntary without any coercion or consequence for refusal.

3.3 Instrument Development, Validity, and Reliability

The questionnaire was adapted from previously validated instruments and contextualized to the environment of RS TNI AD. A content validity check was carried out by three experts in healthcare management and digital transformation. A pilot test was conducted with 15 respondents (excluded from the main analysis), resulting in minor wording adjustments for clarity.

Construct reliability was assessed using Cronbach's Alpha and Composite Reliability (CR). All constructs exceeded the threshold of 0.70 for both values, indicating good internal consistency. Convergent validity was confirmed through Average Variance Extracted (AVE) values exceeding 0.50, and discriminant validity was verified using the Fornell-Larcker criterion and HTMT ratios, consistent with the requirements for PLS-SEM analysis.

3.4 Variables and Measurements

The study investigated five main constructs:

- **Independent Variables:**
 - Organizational Digital Culture (ODC)
 - Digital Leadership (DL)
 - Digital Transformation (DT)

- **Mediating Variable:**
 - Digital Innovation (DI)
- **Dependent Variable:**
 - Organizational Performance (OP)

Each construct was measured using multiple indicators derived from literature:

- **ODC (X1):** 4 indicators (e.g., team collaboration, technology-oriented values)
- **DL (X2):** 6 indicators (e.g., digital risk awareness, reducing resistance to change)
- **DT (X3):** 5 indicators (e.g., digital process adoption, service efficiency)
- **DI (Z):** 6 indicators (e.g., system enhancement, tech-based service development)
- **OP (Y):** 15 indicators across four dimensions financial, internal process, customer satisfaction, and learning & growth

All items were measured using a **5-point Likert scale**, where:

- **1 = Strongly Disagree**
- **2 = Disagree**
- **3 = Neutral**
- **4 = Agree**
- **5 = Strongly Agree**

This scale was chosen for its effectiveness in capturing perceptions and attitudes in a structured quantitative format.

3.5 Data Analysis

The data were analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) method, executed through SmartPLS 3.0 software. This method is appropriate given the study's exploratory nature, the presence of latent constructs, and the moderate sample size.

The proposed model includes two structural equations:

1. $OP = \beta_1 ODC + \beta_2 DL + \beta_3 DT + \beta_4 DI + \epsilon_1$
2. $DI = \alpha_1 ODC + \alpha_2 DL + \alpha_3 DT + \epsilon_2$

Where:

- **OP** = Organizational Performance
- **ODC** = Organizational Digital Culture

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- DL = Digital Leadership
- DT = Digital Transformation
- DI = Digital Innovation
- β, α = path coefficients
- ϵ = residual errors

The significance of direct and indirect effects was assessed using bootstrapping (5,000 samples), and mediation was confirmed via Sobel tests, with supporting results reported in the “Results and Discussion” section.

4. RESULTS AND DISCUSSION

This study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.0 to test the hypothesized relationships among constructs, based on data collected from 123 valid responses. The data were obtained through a structured online questionnaire distributed to eligible upper- and

middle-management leaders of Type C RS TNI AD between December 2023 and February 2024. All respondents met predefined inclusion criteria including managerial status and involvement in digital initiatives ensuring the sample reflected the study’s strategic focus. Ethical clearance and informed consent procedures were followed, in accordance with institutional protocols applicable to military healthcare settings.

Each item was measured using a 5-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree, designed to capture respondents’ perceptions, attitudes, and evaluations on digital leadership, innovation, transformation, culture, and performance. Reliability and validity of the instrument were confirmed prior to analysis, with all constructs demonstrating Cronbach’s Alpha > 0.70 and acceptable AVE values, indicating satisfactory measurement quality.

Results of Hypothesis Testing: Direct and Indirect Effects

Table 1. Direct effects hypothesis testing results

Hypothesis	Coefficient (β)	P-Value	Conclusion
H1: There is a positive influence of Digital Organizational Culture on Organizational Performance	0.167	0.080	Not Supported
H2: There is a positive influence of Digital Leadership on Organizational Performance	0.219	0.037	Supported
H3: There is a positive influence of Digital Transformation on Organizational Performance	0.303	0.009	Supported
H4: There is a positive influence of Digital Innovation on Organizational Performance	0.253	0.024	Supported
H5: There is a positive influence of Organizational Digital Culture on Digital Innovation	0.083	0.229	Not Supported
H6: There is a positive influence of Digital Leadership on Digital Innovation	0.120	0.139	Not Supported
H7: There is a positive influence of Digital Transformation on Digital Innovation	0.701	0.000	Supported

Table 2. Indirect effects (mediating role of digital innovation)

Hypothesis	Coefficient (β)	P-Value	Conclusion
H8: There is a positive influence of Organizational Digital Culture on Organizational Performance mediated by Digital Innovation	0.021	0.280	Not Supported
H9: There is a positive influence of Digital Leadership on Organizational Performance mediated by Digital Innovation	0.030	0.179	Not Supported
H10: There is a positive influence of Digital Transformation on Organizational Performance mediated by Digital Innovation	0.177	0.028	Supported

Source: Data Processed using SmartPLS (2024)

4.1 Discussion

H1 – Organizational Digital Culture (ODC) → Organizational Performance (OP):

The absence of a significant relationship indicates that in military hospitals such as RS TNI AD, a formalized digital culture alone is insufficient to influence performance. This may be due to rigid hierarchical command structures and limited flexibility for bottom-up innovation highlighting the need for adaptive cultural transformation that aligns digital values with operational realities.

H2 – Digital Leadership (DL) → OP:

Supported by the findings, this relationship affirms that **leaders with digital competencies** can directly enhance performance, particularly by streamlining decision-making, motivating innovation, and aligning digital strategies with mission priorities. This confirms prior studies (e.g., Shin et al., 2023; Mollah et al., 2024).

H3 – Digital Transformation (DT) → OP:

A strong and significant effect was observed, underscoring that well-executed transformation initiatives—such as integrated information systems, automation, and digital workflows—positively influence performance outcomes, particularly in increasing efficiency and responsiveness during military operations.

H4 – Digital Innovation (DI) → OP:

Digital innovation plays a direct role in performance enhancement, especially through improved clinical support systems, faster data access, and better patient service models. This aligns with Kohli & Melville (2019), confirming that innovation acts as a performance catalyst in healthcare settings.

H5 & H6 – ODC/DL → DI (Not Supported):

These insignificant results may suggest that neither culture nor leadership alone stimulates innovation unless supported by systemic enablers such as flexible policies, infrastructure, and personnel empowerment. In military hospitals, top-down control may stifle experimentation or lateral collaboration necessary for innovation emergence.

H7 – DT → DI:

A robust relationship confirms that digital transformation facilitates innovation by

introducing digital tools and processes that reshape operations. Hospitals that modernize their systems create fertile ground for innovative practices to take root.

Mediation Effects (H8–H10)

H8 & H9 (Not Supported):

Digital innovation does not mediate the effects of ODC or DL on OP. This suggests that while culture and leadership contribute directly, they do not automatically translate into innovation-led performance gains. This finding reflects systemic rigidity in military healthcare, where cultural and leadership shifts may not immediately permeate technological innovation without structural support.

H10 – DT → DI → OP (Supported):

This confirms that digital transformation not only drives innovation but also improves performance indirectly through it. Successful transformation provides the necessary infrastructure and momentum for innovation to occur, reinforcing its strategic centrality in military hospital modernization.

Based on the hypothesis testing results in this study, out of the ten hypotheses proposed, five were found to be statistically significant (supported), while five were not supported. The detailed discussion of each result is as follows:

a. The Influence of Organizational Digital Culture on Organizational Performance

The results indicate that organizational digital culture does not significantly influence organizational performance. This suggests that even though digital culture is implemented within the organization, it is not sufficient to directly improve organizational performance. This finding reflects that despite efforts to foster digital culture, the impact on organizational performance may remain minimal, especially in the context of RS TNI AD Type C. The unique characteristics of RS TNI AD, such as a hierarchical organizational structure and highly procedural operational systems, hinder the optimal implementation of digital culture. This is in line with the findings of Puliwarna et al. (2023), who explained that organizational digital culture requires a space for innovation and collaboration, which is often obstructed by rigid military command systems. As a result, even though digital culture has been applied, its impact on performance can be limited without internal

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readiness that aligns with this cultural shift. This result supports earlier findings reported by (Digital *et al.*, 2024; Ferdian & Rahmawati, 2019; S. N. Putri *et al.*, 2024; Rusdian & Akmaludin, 2023).

b. The Influence of Digital Leadership on Organizational Performance

The results show that digital leadership has a significant and positive impact on organizational performance. This indicates that digital leadership, which includes a leader's ability to guide, leverage technology, and encourage innovation within the organization, directly contributes to improving organizational performance. Digital leadership can stimulate creativity among individuals and align personal values with organizational values, ultimately resulting in higher organizational performance (Zhu *et al.*, 2022). This is highly relevant in military hospitals, which are required to continuously innovate in providing medical services and conducting operational activities efficiently. The shift from traditional systems to more modern, technology-based systems in RS TNI AD Type C has a significantly positive impact on organizational performance, particularly when led by individuals with strong digital leadership skills. Competent digital leaders can drive cultural changes that are more adaptive and innovative, and enhance operational efficiency in hospital settings. This finding aligns with the studies of (Mollah *et al.*, 2024; Saddique *et al.*, 2023; Senadjki *et al.*, 2024; Shin *et al.*, 2023; Vo *et al.*, 2024).

c. The Influence of Digital Transformation on Organizational Performance

The results indicate that digital transformation has a significant and positive impact on organizational performance in RS TNI AD. Digital transformation drives the growth of activities and enhances the potential for performance improvement (Martínez-Caro *et al.*, 2020). In the context of TNI AD, digital transformation supports operational optimization by reducing manual barriers, accelerating medical information access, and facilitating the tracking of medical logistics. Furthermore, this technology enables faster and more accurate data-driven decision-making, both for administrative and clinical purposes. With digital transformation, the hospital is also able to provide more responsive and adaptive services in emergency situations, such as disaster response or military operations.

This finding is consistent with previous research conducted by Al-Ayed (2023), Mollah *et al.* (2024), Vo *et al.* (2024), and Senadjki (2024).

d. The Influence of Digital Innovation on Organizational Performance

The results show that Digital Innovation has a significant and positive influence on Organizational Performance in RS TNI AD. This finding is consistent with the theoretical concept that digital innovation impacts organizational performance by enabling the creation of new processes, services, and products supported by technology (Kohli & Melville, 2019). Digital innovation allows the organization to accelerate decision-making, respond to customer or user needs more quickly, and optimize existing resources. Moreover, digital innovation strengthens the organization's ability to adapt rapidly to market changes and create solutions that are more aligned with technological advancements. Therefore, the more digital innovation is implemented effectively in an organization, the higher its performance in terms of productivity, efficiency, and organizational results.

e. The Influence of Organizational Digital Culture on Digital Innovation

The results indicate that Organizational Digital Culture does not have a significant influence on Digital Innovation in RS TNI AD. In other words, although digital culture has been implemented within the organization, it does not directly drive digital innovation in the hospital. Although organizational digital culture is generally considered an important foundation for the success of digital innovation, the results suggest that in the context of RS TNI AD Type C, this influence is not proven to be significant. In other words, the existing digital culture in this military hospital does not directly encourage the practice of digital innovation. This condition indicates that the presence of digital culture has not yet been an effective factor in driving the creation or development of technology-based innovations. This finding aligns with research conducted by (Bentlage *et al.*, 2014; Felizzola, 2023; Saebah & Merthayasa, 2024; Zhang *et al.*, 2021).

f. The Influence of Digital Leadership on Digital Innovation

The results show that Digital Leadership does not have a significant influence on Digital

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Innovation in RS TNI AD. Although the leaders in this organization may have adopted the principles of digital leadership, the results show that this has not directly driven digital innovation in the hospital. This finding indicates that the presence of leaders with high digital capabilities does not necessarily have a direct impact on the creation of digital innovation within the organization. This is consistent with the findings of Inayah et al (2024), who state that digital leadership does not significantly influence digital innovation.

g. The Influence of Digital Transformation on Digital Innovation

1

The results show that Digital Transformation has a significant and positive influence on Digital Innovation in RS TNI AD. This finding indicates that the digital transformation processes implemented in this hospital have successfully encouraged the adoption of digital innovation. In the context of RS TNI AD, digital transformation has allowed the hospital to adopt new technologies, creating space for the development of new ideas and experimentation with more efficient technologies. This transformation process enables the hospital to adapt more rapidly to changing medical needs and operational challenges. Therefore, the success of digital transformation in RS TNI AD directly contributes to enhancing digital innovation within the organization. This finding is supported by research by (X. Fang & Liu, 2024; Hu et al., 2024; Li et al., 2023).

h. The Influence of Organizational Digital Culture on Organizational Performance Mediated by Digital Innovation

The results indicate that Digital Innovation does not mediate the influence of Organizational Digital Culture on Organizational Performance. In other words, although RS TNI AD has implemented a digital culture within the organization, this is not sufficient to drive digital innovation that would improve organizational performance. One of the main factors causing the inefficacy of this mediation role is the organizational culture's tendency to be rigid and centralized, as is common in military institutions. Such a culture focuses on strict adherence to procedures and operational stability, which often leaves little room for innovative initiatives to develop. Therefore, the failure of digital innovation to mediate the relationship between digital culture and organizational performance in

RS TNI AD is due to various internal barriers, such as a rigid organizational structure, limited resource allocation, lack of support from management, and resistance to change at the operational level.

i. The Influence of Digital Leadership on Organizational Performance Mediated by Digital Innovation

The results show that Digital Innovation does not mediate the influence of Digital Leadership on Organizational Performance. In other words, although RS TNI AD leaders possess strong digital leadership qualities and support the implementation of technology, this is not sufficient to drive organizational performance improvements through digital innovation. The absence of a mediation role from digital innovation clarifies that innovation has not become the main channel for improving organizational performance. Instead, performance improvement is more influenced by direct leadership focusing on operational efficiency and optimization of administrative processes. This suggests that in the context of military hospitals, digital leadership tends to be used to strengthen existing systems' stability rather than drive the creation of new value through transformational digital innovations. Even though digital leadership has been implemented, the organization has not yet fully established an ecosystem that supports sustainable digital innovation.

j. The Influence of Digital Transformation on Organizational Performance Mediated by Digital Innovation

The results of the study indicate that Digital Innovation successfully mediates the influence of Digital Transformation on Organizational Performance. This finding reflects the importance of the digital transformation process carried out at the hospital, as it plays a crucial role in driving digital innovation, which in turn enhances the organization's performance. In other words, when digital transformation is optimally applied, it not only introduces technological changes but also facilitates innovations that directly contribute to improving hospital performance. Previous research supports the notion that digital transformation contributes to increased organizational digital innovation, which positively impacts performance, as shown by (Hess et al., 2016; Sebastian et al., 2017).

5. CONCLUSION

This study explored the mediating role of digital innovation in the relationship between organizational digital culture, digital leadership, and digital transformation on organizational performance within Type C Indonesian Army Hospitals (RS TNI AD). The findings revealed that digital transformation and digital innovation have both direct and indirect significant effects on organizational performance, while digital leadership also positively affects performance, albeit not through innovation. In contrast, organizational digital culture did not significantly influence either digital innovation or organizational performance, indicating structural and cultural limitations in hierarchical institutions.

From a managerial standpoint, these findings carry important implications. Leaders of military or similarly bureaucratic institutions must recognize that digital transformation is not merely a technology upgrade, but a strategic enabler that fosters innovation and drives performance. Managers are encouraged to move beyond symbolic support for digital leadership or culture and instead invest in enabling systems, infrastructure, and cross-functional collaboration that allow innovation to take root and evolve. Digital transformation efforts should be aligned with operational realities, supported by flexible policies, empowered teams, and a clear innovation roadmap.

This research is particularly important for the scientific community as it provides empirical insights into how digital constructs interact in a highly structured, public sector setting. In the modern age, digital leadership, digital transformation, and digital innovation are essential levers for organizational agility and sustained performance. Understanding these dynamics in constrained environments, such as military hospitals, offers valuable lessons for both developed and developing countries undergoing public sector digitalization. Moreover, this study expands the application of the Resource-Based View (RBV) by demonstrating how intangible digital capabilities when properly supported can yield tangible performance outcomes even in rigid institutional frameworks.

For future research, we recommend exploring digital innovation as a *moderated mediator*, influenced by contextual factors such as organizational readiness, leadership support, or

environmental dynamism. Further comparative studies across hospital types (e.g., Type A, B, and C) or between military and civilian healthcare institutions could enhance external validity and reveal context-specific strategies for effective digital transformation.

In conclusion, this study affirms that in the digital era, organizational growth, resilience, and competitive advantage especially in complex healthcare systems are largely dependent on how well digital leadership, transformation, and innovation are integrated and operationalized. This research offers both theoretical enrichment and actionable insights for practitioners aiming to modernize public service delivery through sustainable digital initiatives.

CONSENT

All participants were informed about the purpose of the study, and informed consent was obtained digitally.

ETHICAL APPROVAL

This study received ethical clearance from the relevant military health authority responsible for overseeing research within the Indonesian Army Hospital (RS TNI AD) system. All participants were informed about the purpose and procedures of the study, and digital informed consent was obtained prior to participation. Respondents were assured of the confidentiality and anonymity of their responses. Participation was entirely voluntary, with no coercion or negative consequences for refusal.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The authors hereby declare that no generative artificial intelligence (AI) tools, including but not limited to large language models (e.g., ChatGPT, Copilot) or text-to-image generators, were used in the writing, editing, data analysis, or figure generation processes of this manuscript. All content was solely produced by the authors without AI assistance.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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