

Digital Transformation in Public Administration: Challenges and Opportunities in Indonesian Government Agencies

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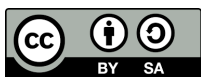
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Abstract: The digital transformation of public administration represents a critical pathway toward modernizing governance, enhancing service delivery, and improving transparency in Indonesian government agencies. This study examines the current state of digital transformation initiatives across various levels of government in Indonesia, identifying key challenges and opportunities in implementing digital technologies within bureaucratic structures. Through a convergent parallel mixed-methods design combining surveys of 245 government officials from 32 agencies and in-depth interviews with 28 digital transformation leaders, this research reveals that while Indonesian government agencies have made significant progress, substantial barriers remain including limited digital infrastructure in remote regions, resistance to organizational change, insufficient digital literacy among civil servants, and inadequate legal frameworks. The overall mean maturity score was 2.87 (SD = 0.74), placing the average agency in the 'developing' category, with only 6% reaching the 'optimizing' level. The study identifies critical success factors: strong leadership commitment ($\beta = 0.38$, $p < 0.001$), citizen-centric design, comprehensive change management, and effective public-private partnerships. Findings indicate that successful digital transformation requires not merely technological adoption but fundamental organizational restructuring and cultural shifts toward data-driven decision-making and collaborative governance. Policy recommendations address digital infrastructure investment, human capital development, governance reform, and shared platform utilization. This research contributes to theoretical understanding of digital government in developing nations and provides practical guidance for policymakers navigating the complexities of public sector digitalization.

Keywords: Administrative Reform; Bureaucratic Innovation; Digital Governance; Digital Transformation; Public Administration.

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1. Introduction

In the contemporary era of rapid technological advancement, digital transformation has emerged as an imperative rather than an option for public administration worldwide. The integration of digital technologies into governmental operations promises to revolutionize how public services are delivered, how citizens engage with government, and how bureaucratic processes function. For Indonesia, the world's fourth most populous nation with over 275 million citizens spread across 17,000 islands, digital transformation presents both extraordinary opportunities and formidable challenges (United Nations, 2024).

The Indonesian government has demonstrated strong commitment to digital transformation through initiatives such as the Making Indonesia 4.0 roadmap, the National Digital Literacy Movement (GNLD), and the One Data Indonesia policy. Presidential Regulation No. 95 of 2018 concerning Electronic-Based Government Systems (SPBE) established the legal foundation for comprehensive digital transformation across all government agencies. The Ministry of Administrative and Bureaucratic Reform has prioritized bureaucratic reform through digitalization as a key strategy for improving public service quality and governmental efficiency.

Despite these progressive policies, implementation remains uneven across different regions and governmental levels. Metropolitan areas such as Jakarta, Surabaya, and Bandung have achieved notable success in digital service delivery, whereas rural and remote regions continue to struggle with basic digital infrastructure. The 2022 SPBE Maturity Assessment revealed that only 23% of central government agencies achieved a 'good' maturity level, while the majority remained at 'developing' or 'defined' stages (Ministry of Administrative and Bureaucratic Reform, 2023).

This study draws upon multiple theoretical perspectives. The Digital Government Maturity Model provides a framework for assessing progression from basic digitization to fully integrated, data-driven governance across five stages: emerging presence, enhanced presence, interactive presence, transactional presence, and networked presence. Institutional Theory (DiMaggio & Powell, 1983) explains why government organizations face particular challenges in adopting digital technologies, as public institutions operate within highly regulated environments and deeply embedded organizational cultures that impede rapid transformation.

The Technology Acceptance Model (TAM) and its public sector extensions (Davis, 1989; Venkatesh et al., 2003) illuminate factors influencing civil servants' adoption of digital technologies, including perceived usefulness, ease of use, organizational support, and social influence. New Public Management (NPM) theory emphasizes efficiency, accountability, and citizen-centric service delivery as core objectives that digital transformation should advance, guiding assessment of whether digitalization efforts genuinely improve public value (Hood, 1991; Moore, 1995).

This research aims to comprehensively examine digital transformation in Indonesian public administration by assessing the current state and maturity level of digital transformation across Indonesian government agencies, identifying the primary challenges and barriers that hinder effective implementation, exploring opportunities and enabling factors that facilitate successful digital transformation, and developing evidence-based recommendations for policymakers and administrators.

2. Literature Review

Digital Transformation in Public Sector: Global Perspectives

Digital transformation in the public sector has evolved significantly over the past three decades. Early e-government initiatives in the 1990s focused primarily on digitizing information dissemination. By the 2000s, emphasis shifted toward enabling online transactions. Contemporary digital transformation represents a more fundamental reimagining of government operations, leveraging artificial intelligence, big data analytics, cloud computing, and blockchain to create more agile, responsive, and citizen-centric governance systems (Mergel et al., 2019; Gil-Garcia et al., 2018).

International research identifies common characteristics of leading nations: robust digital infrastructure, comprehensive legal frameworks, strong political commitment, sustained investment in digital literacy, and effective multi-sector collaboration (United Nations, 2024). Case studies offer valuable lessons: Estonia's X-Road demonstrates interoperable government systems; Singapore's Smart Nation illustrates comprehensive strategic planning; Denmark's emphasis on user experience highlights citizen-centric approaches. These examples underscore that successful transformation requires coordinated attention across technological, organizational, and human dimensions.

Digital Government in Developing Countries

Research on digital government in developing nations reveals distinct challenges: limited ICT infrastructure, inadequate funding, shortage of technical expertise, low digital literacy, and weak institutional capacity (Heeks, 2017; Alrawabdeh, 2014). However, developing countries also possess unique opportunities leapfrogging traditional development stages, high mobile phone penetration enabling mobile-first services, young digitally native populations, and increasing international support for digital development (Twizeyimana & Andersson, 2019). Success stories from Rwanda, Kenya, and India demonstrate that strategic digital transformation can accelerate development outcomes.

Indonesian Context: E-Government Evolution

Indonesia's e-government journey began in earnest with Presidential Instruction No. 6 of 2001 on Telematics Development. Subsequent milestones include the national broadband plan (2014-2019) and the launch of the Online Single Submission (OSS) system for business licensing. The current policy framework is anchored in Presidential Regulation No. 95 of 2018, which mandates SPBE implementation across all agencies, establishing standards for digital architecture, data governance, information security, and service delivery (Government of Indonesia, 2018).

Critical Success Factors and Barriers

Academic literature identifies leadership and governance as paramount success factors, with executive commitment and clear strategic vision consistently associated with positive outcomes (Cordella & Paletti, 2019; Janowski, 2015). Human and organizational factors receive increasing attention: digital literacy development, change management capabilities, and performance management aligned with digital objectives all influence implementation success. Common barriers include legacy systems, siloed organizational structures, insufficient funding, regulatory rigidity, privacy concerns, and the digital divide (Bekkers et al., 2011; Lindgren & van Veenstra, 2018).

3. Research Methodology

Research Design

This study employs a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018), integrating quantitative and qualitative approaches to provide comprehensive understanding of digital transformation in Indonesian government agencies. Both data streams were collected concurrently (January–September 2024) and analyzed independently before integration during interpretation. This design is appropriate given the complexity of digital transformation phenomena and the need to triangulate broad patterns with deep contextual insights.

Sampling and Participants

Quantitative Sample

Using stratified random sampling, 32 government agencies were selected to represent diversity across organizational type (ministries, non-ministerial agencies, provincial governments, district/city governments), geographical location (Java, Sumatra, Kalimantan, Sulawesi, and Eastern Indonesia), and organizational size. Within each agency, respondents were identified through coordination with Human Resources departments. Inclusion criteria required at least one year of experience and direct involvement in digital service delivery or transformation projects. Of 350 survey invitations distributed, 245 complete responses were received (70% response rate).

Qualitative Sample

Purposive sampling identified 28 key informants: Chief Information Officers or equivalent (n=12), digital transformation project managers (n=8), SPBE coordinators (n=5), and external consultants supporting government digitalization (n=3). Selection emphasized depth of experience, diversity of organizational contexts, and representation of both successful implementations and challenging cases.

Data Collection Instruments

Survey Instrument

A structured questionnaire was developed based on established e-government maturity frameworks and adapted to the Indonesian context. The survey comprised five sections: organizational characteristics and demographics; digital transformation maturity assessment using a modified UN E-Government Development Index; technological infrastructure and capabilities; organizational and human resource factors; and perceived challenges and enablers. The maturity assessment evaluated six dimensions using 5-point Likert scales. Pilot testing with 30 officials yielded Cronbach's alpha values of 0.78–0.91 across dimensions.

Interview Protocol

Semi-structured interviews explored participants' experiences regarding digital transformation processes, challenges encountered and strategies employed, role of leadership and organizational culture, impacts on service delivery, and recommendations for advancing transformation. Interviews were conducted in Indonesian, lasted 60–90 minutes, and were audio-recorded with participant consent.

Data Analysis

Survey data were analyzed using SPSS version 27. Maturity scores were calculated per dimension and aggregated into an overall maturity index; agencies were categorized into four levels: emerging (<2.0), developing (2.0–2.99), defined (3.0–3.99), and optimizing (≥ 4.0). ANOVA and regression examined relationships between organizational characteristics and maturity. Interview recordings were transcribed verbatim, then analyzed using Braun and Clarke's (2006) thematic analysis in NVivo 14. Two researchers independently coded a subset to establish intercoder reliability ($\alpha = 0.82$).

Ethical Considerations

This research received institutional ethics approval. All participants provided informed consent, and participation was voluntary. Agency and individual identities are protected through de-identification and aggregation. Special attention was given to power dynamics, with researchers emphasizing confidentiality and independence from government authorities to encourage candid responses.

4. Findings and Results

Current State of Digital Transformation

Maturity Level Assessment

Analysis of survey data reveals considerable variation in digital transformation maturity across Indonesian government agencies. The overall mean maturity score was 2.87 (SD = 0.74), placing the average agency at the upper end of the 'developing' category. Table 1 presents maturity scores across all six assessed dimensions.

Table 1. Digital Transformation Maturity Scores by Dimension (n = 245).

Maturity Dimension	Mean Score	SD	Category
Digital Strategy & Governance	3.12	0.82	Defined
Digital Infrastructure	2.68	0.91	Developing
Digital Services & Applications	2.94	0.76	Developing
Data & Information Management	2.45	0.88	Developing
Digital Security & Privacy	3.05	0.69	Defined
Organizational Capacity	2.76	0.84	Developing
Overall Maturity	2.87	0.74	Developing

Distribution analysis shows that 18% of agencies (n=44) remain at the emerging level, 47% (n=115) are developing, 29% (n=71) have reached the defined level, and only 6% (n=15) achieve optimizing status. Notably, all optimizing agencies are either central government ministries or provincial governments in Java, highlighting significant geographical and institutional disparities.

Variations by Organization Type and Location

ANOVA results reveal statistically significant differences in maturity scores across organizational types ($F = 12.34$, $p < 0.001$). Central government ministries demonstrated the highest mean maturity ($M = 3.21$, $SD = 0.68$), followed by provincial governments ($M = 2.98$, $SD = 0.71$), non-ministerial agencies ($M = 2.76$, $SD = 0.69$), and district/city governments ($M = 2.52$, $SD = 0.78$). Geographical analysis shows pronounced regional disparities: agencies in Java averaged 3.18, significantly higher than Sumatra (2.74), Kalimantan (2.61), Sulawesi (2.68), and Eastern Indonesia (2.43), primarily reflecting infrastructure availability and proximity to national digital development initiatives.

Key Challenges in Digital Transformation

Infrastructure and Technical Challenges

Infrastructure limitations emerged as the most frequently cited challenge, rated as 'significant' or 'very significant' by 82% of respondents. Interview participants elaborated that inadequate bandwidth and unreliable internet connectivity in many regions severely constrain digital service delivery. One district government official explained: "We developed excellent online services, but citizens in remote villages cannot access them because internet signals are unstable or completely unavailable." Legacy systems present another major barrier: many agencies operate outdated information systems that cannot integrate with modern platforms, creating data silos. Additionally, 67% of respondents reported insufficient technical support and maintenance capacity.

Human Resource and Competency Gaps

Limited digital literacy among civil servants constitutes a critical constraint, identified by 78% of respondents. Qualitative data revealed that many employees, particularly those nearing retirement, struggle with basic digital skills and resist learning new systems. One ministry CIO observed: "We can buy the best technology, but if our people cannot or will not use it, transformation fails. The human element is our biggest challenge." Shortage of specialized ICT personnel compounds this problem, as government salary structures and employment regulations make it difficult to compete with private sector compensation.

Organizational Culture and Resistance to Change

Organizational culture emerged as a pervasive challenge, with 71% of respondents perceiving significant resistance from mid-level managers who view digital transformation as threatening their authority or job security. Participants described bureaucratic cultures characterized by risk aversion, hierarchical decision-making, and preference for established procedures. One participant noted: "Our organizational DNA is about following rules and avoiding mistakes. Digital transformation requires experimentation and accepting failures as learning opportunities. These mindsets are incompatible." Resistance manifested as passive non-compliance, overt opposition, and subtle undermining through incomplete information provision to digital systems.

Governance, Coordination, and Resource Constraints

Fragmented governance structures hamper coordinated digital transformation: despite the SPBE mandate for integrated systems, many agencies develop isolated solutions without adequate interoperability consideration, resulting in duplicated efforts and incompatible systems. Unclear accountability whether ICT departments, program units, or agency leadership bears primary responsibility creates under-investment as digital transformation becomes "everyone's job but no one's priority." Budget constraints compound these issues: while 89% acknowledged leadership rhetoric supporting digitalization, only 43% reported receiving adequate budgetary allocations. Procurement regulations further impede transformation through lengthy processes; one participant lamented: "We spent 18 months procuring a system that was already outdated when finally implemented."

Opportunities and Enabling Factors

Strong Leadership Commitment

Agencies achieving higher maturity levels consistently demonstrated strong executive commitment. Regression analysis confirmed that leadership support significantly predicted maturity scores ($\beta = 0.38, p < 0.001$), independent of organizational size or location. Effective leaders articulated clear digital visions, allocated commensurate resources, personally championed digital initiatives, held managers accountable for progress, and modeled digital adoption through their own practices. One provincial government secretary stated: "Our governor treats digital transformation as a strategic priority equal to infrastructure development or economic growth. This consistent commitment from the top makes all the difference."

Citizen-Centric Design Approaches

Agencies adopting user-centered design methodologies involving citizens and frontline staff in system development achieved higher satisfaction and adoption rates. Effective approaches included user research to understand citizen needs, prototyping and testing solutions before full deployment, and iterative improvement based on feedback. One district that redesigned its business licensing system using citizen journey mapping saw application completion rates increase from 34% to 87% within six months, with the project manager noting that success came from redesigning around citizens' mental models rather than internal administrative logic.

Strategic Partnerships and Change Management

Successful transformations often leveraged partnerships with technology companies, academic institutions, and civil society organizations, providing expertise, technology, and resources that agencies could not independently mobilize. Effective partnerships featured clear governance, knowledge transfer mechanisms, and gradual capability internalization. Agencies that treated digital transformation as organizational change investing equally in change management and technical implementation achieved more sustainable results. Comprehensive change management included extensive communication, employee

involvement in planning, systematic training, celebration of early wins, and establishment of change champions throughout the organization.

Leveraging Shared Digital Infrastructure

Rather than building all capabilities independently, successful agencies strategically leveraged existing national digital infrastructure: the national single sign-on system for citizen authentication, the government cloud (G-CLOUD) for hosting applications, standardized APIs for inter-agency data exchange, and national payment gateways. Regression analysis showed agencies extensively utilizing shared infrastructure achieved maturity scores 0.45 points higher on average than those developing isolated solutions ($p < 0.01$), while also benefiting from reduced costs and accelerated timelines.

Impact of Digital Transformation

Survey respondents reported various positive impacts. In service delivery, 68% of respondents perceived substantial improvement in service speed, 72% reported enhanced accessibility, and 61% observed increased citizen satisfaction. Concrete examples include one district reducing average land certificate issuance from 47 to 12 days, and one ministry enabling 94% of routine requests to be handled entirely online. Internally, digital automation freed substantial staff time one provincial government calculated savings of approximately 2,400 staff hours monthly previously spent on paper document management. Fifty-six percent of respondents reported reduced corruption vulnerabilities through digital audit trails and transparency. However, only 34% reported systematic use of data analytics for decision-making, indicating substantial unrealized potential for data-driven governance.

5. Discussion

Interpretation of Key Findings

This research reveals that Indonesian government agencies are at a critical juncture in their digital transformation journeys. While the overall 'developing' maturity level represents progress from earlier e-government initiatives, substantial gaps remain before achieving integrated, data-driven, citizen-centric governance. The significant variation across agencies and regions underscores that digital transformation is not progressing uniformly but creating new forms of inequality in governmental capacity.

The findings confirm that digital transformation is fundamentally an organizational challenge rather than a technological one. The strongest predictor of success was leadership commitment and change management capability, not technology investment. The persistence of infrastructure challenges in remote regions also highlights limitations of technology-led strategies: digital transformation risks deepening geographical disparities if underlying infrastructure inequalities remain unaddressed, confirming that digital initiatives must be coupled with foundational connectivity investments.

Theoretical and Practical Implications

Theoretical Contributions

This research extends digital government theory by demonstrating how institutional contexts shape transformation processes. Challenges reflect fundamental tensions between bureaucratic organizational logic emphasizing stability, hierarchy, and rule-following and digital transformation requirements for agility, collaboration, and experimentation. Successfully navigating these tensions requires institutional entrepreneurs who bridge traditional and digital paradigms (DiMaggio & Powell, 1983; Battilana & Casciaro, 2012). The findings also contribute to understanding technology adoption in developing country contexts, demonstrating that contextualized approaches accounting for local conditions, capabilities, and cultures are essential rather than simple technology transfer models.

Practical Recommendations for Policymakers

- a. Accelerate digital infrastructure development by prioritizing reliable broadband connectivity to underserved regions as a foundation for digital services;
- b. Invest in human capital through comprehensive civil service digital literacy programs and career pathways for ICT professionals in government;
- c. Strengthen governance frameworks by clarifying institutional responsibilities and establishing cross-agency coordination mechanisms;
- d. Reform procurement processes to accommodate agile technology development while maintaining integrity safeguards;

- e. Promote shared infrastructure platforms and incentivize their adoption to improve interoperability and reduce duplication.

Practical Recommendations for Agency Leaders

- a. Secure sustained executive commitment through clear digital visions aligned with organizational missions;
- b. Adopt user-centered design methodologies ensuring digital solutions address actual citizen and employee needs;
- c. Invest substantially in change management with the same rigor applied to technical implementation;
- d. Build strategic partnerships to access capabilities that cannot be developed internally;
- e. Start with achievable wins to build momentum and demonstrate feasibility before pursuing comprehensive transformation.

Study Limitations

Several limitations warrant acknowledgment. The cross-sectional design captures digital transformation at a single point in time, limiting understanding of dynamic processes and trajectories. The sample, while substantial and diverse, was not randomly selected, potentially biasing results toward more digitally engaged organizations. Citizen perspectives on digital transformation impacts were not directly assessed. Maturity assessment relied substantially on self-report measures subject to social desirability bias, though triangulation with qualitative data mitigates this concern.

Future Research Directions

- a. Longitudinal studies tracking digital transformation trajectories over multiple years to assess sustainability;
- b. Comparative research across national contexts to identify how institutional and economic factors shape transformation;
- c. Investigation of emerging technologies AI, blockchain, IoT in public administration contexts;
- d. Research examining digital transformation's distributional effects on different citizen groups to inform equity-oriented policies.

6. Conclusion

Digital transformation represents both an imperative and an opportunity for Indonesian public administration. This research demonstrates that while Indonesian government agencies have made meaningful progress, substantial work remains to realize the full potential of digital government. The challenges identified are formidable but not insurmountable: infrastructure gaps, capacity constraints, organizational resistance, and coordination difficulties can be addressed through sustained commitment, strategic investment, and comprehensive change management.

Digital transformation must be understood not as a destination but as an ongoing journey requiring continuous adaptation and learning. Technology evolution ensures that today's solutions become tomorrow's legacy systems; sustainable transformation requires building organizational capabilities for perpetual innovation rather than one-time modernization. Critically, this research affirms that successful digital transformation requires not merely technological adoption but fundamental organizational restructuring and cultural shifts the human and organizational dimensions prove as consequential as the technical.

As Indonesia pursues its development ambitions, digital government will play an increasingly central role in delivering public services, fostering economic growth, and enabling citizen participation in governance. Through sustained commitment, strategic investment, and comprehensive approaches recognizing digital transformation's multifaceted nature, Indonesian government agencies can progressively advance toward more efficient, transparent, and citizen-centric governance in the digital age.

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