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Digital-Based Public Service Innovation from the Perspective of Public Sector Financial Management

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Abstract
Digital transformation in the public sector has created significant opportunities to reform the way governments deliver services to society while simultaneously managing public finances. This study aims to analyze how digital-based public service innovation interacts with public sector financial management practices in Indonesia. Using a qualitative approach through a systematic literature review, this research integrates various theories and recent empirical findings related to e-government, digital financial governance, and New Public Management. The findings indicate that the digitalization of public services, implemented through platforms such as SIPD, SAKTI, SPAN, and various other e-government applications, significantly improves spending efficiency, budget transparency, accountability in public fund management, and the quality of public services. Nevertheless, the study also identifies several critical barriers that hinder the optimization of this transformation, including disparities in digital infrastructure across regions, low human resource competencies, fragmentation of information systems, and weak cybersecurity regulations. The integration model constructed in this study offers an analytical framework for understanding the relationship between digital service innovation and accountable financial management, with concrete policy implications for bureaucratic reform in Indonesia.

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1. INTRODUCTION

The wave of digital transformation that has swept across nearly every aspect of human life this decade has also touched the realm of government and public services. It's more than just a shift in media. from paper to screen, from counter to application This transformation touches the foundations of how the state interacts with its citizens and manages public resources as a whole. In Indonesia, accelerating government digitalization has become a national strategic agenda, marked by various regulations, from Presidential Regulation Number 95 of 2018 concerning the Electronic-Based Government System (SPBE) to various technical policies from the Ministry of Finance related to the digitalization of budget management. However, the extent to which this transformation has truly transformed the quality of public services and the efficiency of state financial management remains a question that requires in-depth study.

Theoretically, the relationship between digitalization and public sector financial management has been widely discussed within the framework of New Public Management (NPM) and Good Governance. NPM, as outlined by Hood (1991) and further developed by Dunleavy et al. (2021), essentially encourages the adoption of market-based management principles within government bureaucracies. where efficiency, accountability, and

responsiveness are the primary benchmarks. Digitalization, within this framework, is seen as a strategic enabler that can accelerate the achievement of these NPM principles through process automation, increased information transparency, and reduced administrative transaction costs (Cordella & Tempini, 2021). Meanwhile, the Good Governance perspective emphasizes that information technology is not only a tool for efficiency but also an instrument of democratization. which enables citizens to access information, participate in planning processes, and monitor the use of public funds more effectively.

Unfortunately, most existing research, both in Indonesia and globally, tends to examine the digitalization of public services and public sector financial management as separate domains. Studies on e-government generally focus on aspects of technology adoption, user satisfaction, and the transformation of administrative processes, without delving into the direct implications for state financial governance (Huda & Santoso, 2022). Furthermore, research on public financial management often analyzes instruments such as performance-based budgeting, accrual accounting, and risk-based auditing without explicitly linking them to the digital infrastructure that underpins their implementation (Mahmudi, 2021). This analytical gap serves as both the starting point and the primary contribution of this research.

The objectives of this study are: first, to map the development of digital-based public service innovations in Indonesia along with the policy framework that supports them; second, to analyze how these innovations interact with and impact public sector financial management practices; third, to identify inhibiting factors that limit the effectiveness of digital transformation in the context of state financial governance; and fourth, to formulate an integrative model that can serve as a guide for digital-based bureaucratic reform in Indonesia. By integrating these two domains into one analytical framework, this study is expected to provide conceptual contributions as well as concrete and operational policy implications.

2. RESEARCH METHODS

The research method used in the study "Digital-Based Public Service Innovation from a Public Sector Financial Management Perspective" is a qualitative method with a literature study approach (library research). This approach was chosen because the research focuses on examining concepts, theories, policies, and various previous research findings related to digital-based public service innovation and public sector financial management. Research data was obtained from secondary sources in the form of scientific books, national and international journals, academic articles, laws and regulations, government documents, and official publications of related institutions relevant to the research theme. Data collection techniques were carried out through a process of identification, selection, classification, and analysis of various literature related to the digitalization of public services, financial transparency, accountability, budget efficiency, and electronic-based governance. Data analysis was conducted descriptively and qualitatively by interpreting and comparing various theories and research findings to obtain a comprehensive understanding of the role of digital innovation in improving the effectiveness of public services and the quality of public sector financial management. Through this method, the research is expected to produce a conceptual synthesis and provide academic contributions to the development of modern, transparent, and efficient public service governance oriented towards the management of state and regional finances.

3. RESULTS AND DISCUSSION (12 Pt)

3.1 The Landscape of Digital Public Service Innovation in Indonesia

Over the past decade, Indonesia has made significant progress in its government digitalization agenda. The most important regulatory foundation in this regard is

Presidential Regulation No. 95 of 2018 concerning the Electronic-Based Government System (SPBE), which explicitly establishes the vision of realizing an efficient, effective, transparent, and accountable bureaucracy through the integrated application of information and communication technology. SPBE serves as a policy umbrella that integrates various digitalization initiatives that previously operated partially and uncoordinated across various ministries/institutions and local governments (Huda & Santoso, 2022).

In terms of public services, various digital platforms have been launched and continue to be developed. The Public Service Mall (MPP), now available in digital format, allows the public to access more than 700 types of services from various agencies in a single integrated portal. The LAPOR! (People's Online Aspiration and Complaints Service) The application, managed by the Ministry of Administrative and Bureaucratic Reform (PANRB), has become a digital-based complaints channel accessed by millions of citizens annually. Meanwhile, integrated service portals such as SATU DATA Indonesia and the Regional Government Information System (SIPD) serve as a digital data infrastructure that supports evidence-based decision-making at all levels of government (Ministry of National Development Planning/Bappenas, 2022).

However, a more critical evaluation reveals that this progress has not been evenly distributed and still faces various structural limitations. The UN's e-Government Development Index (EGDI) survey (2022) ranked Indonesia 77th out of 193 countries, a position that reflects relative progress but also indicates the still large gap with digitally advanced countries such as Denmark, Finland, and South Korea. More worrying is the sharp disparity between major cities in Java and remote areas outside Java: a study by the Ministry of Communication and Information Technology (2023) found that more than 12,500 villages in Indonesia remain in a state of blank spots. without adequate internet access, so that digital service initiatives become an illusion for millions of citizens in the region.

Another dimension that often goes unnoticed is the aspect of digital inclusion. Digital-based public service innovation is only meaningful if citizens have the capacity to access and utilize it. Statistics Indonesia (BPS) data (2023) shows that Indonesia's digital literacy index only reached 3.54 on a scale of 5, with significant variations based on age group, education level, and geographic location. The elderly, those with low education, and residents in underdeveloped areas are most vulnerable to being marginalized from the benefits of digitalized public services. This situation forces policymakers to consider approaches that not only encourage digitalization but also ensure alignment with groups most in need of government services (Pradana & Wicaksono, 2021).

3.2 Transformation of Public Sector Financial Management through Digitalization

Public sector financial management, which includes budget planning, implementation of the APBN/APBD, administration, reporting, and accountability of state finances, has undergone fundamental changes with the introduction of various integrated information systems. The Indonesian Ministry of Finance has developed an ambitious information system architecture: the State Treasury and Budget System (SPAN) for cash and treasury management, the Agency-Level Financial Application System (SAKTI) for budget management at the work unit level, and the Regional Government Information System (SIPD) managed by the Ministry of Home Affairs for regional finances. These systems collectively form a digital ecosystem for public

financial management that, if run optimally, has the potential to revolutionize the accountability and transparency of state fund management (Ministry of Finance of the Republic of Indonesia, 2023).

The advantage of these systems lies not only in the speed of data processing, but also in their ability to produce a comprehensive, real-time audit trail. In manual regimes, detection of budget irregularities often only occurs through external audits conducted months after the transaction takes place. This is more than enough time for corrupt practices to flourish. With an integrated digital system, every financial transaction is automatically recorded, timestamped, and accessible to various levels of supervisors, from direct superiors to the inspectorate and up to the Supreme Audit Agency (BPK). simultaneously and sustainably (Mahmudi, 2021). The transparency inherent in this system acts as a structural corruption prevention mechanism, not just one that relies on individual morality.

Performance-based budgeting, which has been a national policy since the post-1999 state financial reforms, has gained much more substantive meaning with the support of digital infrastructure. Before digitalization, collecting and processing work unit performance data took months and was vulnerable to manipulation. With the SAKTI system and its integrated performance dashboard, budget executives can monitor the realization of outputs and outcomes in real time and compare them with targets set in the Renstra and RKP (Government Work Plan). This enables more responsive budget decision-making. including mid-year budget reallocation if underperforming programs are found, which was previously almost impossible to do in a manual system (Deddi Nordiawan & Hertianti, 2020).

From a public accountability perspective, digitalization has also transformed the relationship between the government and citizens as principals in a principal-agent relationship. Budget transparency portals such as APBN KiTa, OM-SPAN (Online Monitoring SPAN), and various regional budget dashboards allow citizens to independently access budget information without the need to submit a formal request. This represents a paradigmatic shift: from reactive transparency (information only disclosed upon request) to proactive and sustainable transparency (Prabowo & Haryanto, 2020). A study by Transparency International Indonesia (2022) shows that regions that actively implement budget transparency dashboards are more likely to receive an Unqualified Opinion (WTP) from the Supreme Audit Agency (BPK) in subsequent financial audits, indicating a positive correlation between digital transparency and the quality of financial management.

An equally important but often overlooked aspect is the digitalization of government procurement of goods and services. The Electronic Procurement System (SPSE), better known as e-procurement, managed by the Government Procurement Policy Agency (LKPP), has been empirically proven to reduce procurement costs, shorten processing times, and lower the corruption risk index in government tenders. A 2022 study by LKPP reported that e-procurement results in an average of 15-20% government spending efficiency compared to conventional procurement, with cumulative efficiencies reaching trillions of rupiah annually. Beyond cost savings, e-procurement opens up healthier competition by enabling more vendors. including MSMEs to participate in government procurement without geographical and administrative barriers.

3.3 Critical Barriers to Public Sector Digital Transformation

Behind this rather encouraging narrative of progress, there are several critical obstacles which, if not addressed systematically, have the potential to limit or even make it worse, the effectiveness of public sector digital transformation. Identifying these barriers is crucial not only for academic purposes but also as a basis for realistic, evidence-based policy recommendations.

The first and most fundamental obstacle is the still-severe fragmentation of information systems. Although the government has developed various information systems, in reality, these systems are not yet fully integrated. A study by Nugroho and Prasetyo (2022) found that at the regional level alone, the average district/city operates more than 50 different applications, each developed by a different agency, with different databases, and often in incompatible data formats. This situation creates what practitioners often refer to as "digital islands." Isolated systems that cannot communicate with each other prevent information from flowing smoothly from one stage of the process to the next. The Ministry of Communication and Information Technology (2023) itself acknowledged that Indonesia has more than 27,000 government applications operating separately, a figure that reflects the extraordinary inefficiency in the development and maintenance of government information systems.

The second obstacle is the far-from-adequate human resource capacity. Digital transformation is not just about hardware and software procurement; it is primarily about human transformation. A 2022 survey by the National Civil Service Agency (BKN) found that only around 34% of civil servants (ASN) possess digital competencies above a basic level, while less than 5% possess technical expertise in data analytics, cybersecurity, or information systems development. This competency gap is critical: sophisticated digital systems will yield no benefits if their operators and institutional users lack the skills to utilize them optimally. Even more worrying, the distribution of these competencies is highly uneven. concentrated in central ministries/institutions and regional governments in Java. Meanwhile, local governments outside Java still have a severe shortage of digital human resources.

The third obstacle that requires serious attention is cybersecurity and data protection. As the digitalization of public services and finances continues to expand, the risk of cyberattacks on government infrastructure is also increasing exponentially. The National Cyber and Crypto Agency (BSSN, 2023) reported a 47% increase in cyberattacks against government agencies during 2022, with increasingly sophisticated methods ranging from ransomware to advanced persistent threats (APT). The National Data Center data breach incident in mid-2024 served as a painful reminder that investment in digital infrastructure without commensurate investment in cybersecurity poses a systemic risk that can massively undermine public trust (Wijaya, 2024). In the context of public financial management, leaked or manipulated financial data can result in incalculable state losses and even destabilize fiscal stability.

The fourth obstacle stems from inadequate regulation and standardization. Although the SPBE regulatory framework exists, its implementation remains unclear, particularly regarding interoperability standards between systems, the legal framework for digital signatures in state financial documents, and accountability mechanisms in the event of system failures. There is also the absence of a comprehensive personal data protection law. Before the ratification of the PDP Law in 2022 and the transition period for its implementation also became a significant obstacle in the development of digital public services that process sensitive citizen data (Habibi & Kurniawan, 2023).

3.4 Integration Model: Digital Innovation and Accountable Public Financial Management

Based on the analysis of opportunities and obstacles above, this study constructs an integrative model that illustrates how digital-based public service innovation should interact with public sector financial management to produce accountable, efficient, and public interest-oriented governance. This model is built on four interconnected pillars.

The first pillar is Integrated and Inclusive Digital Infrastructure. No sustainable digital transformation can be achieved without a strong infrastructure foundation. This includes: a broadband telecommunications network that extends to remote areas (including through the Palapa Ring program and satellite-based connectivity), secure and redundant government data centers, an interoperability platform that enables various application systems to communicate using uniform standards, and a digital identity infrastructure that serves as the basis for citizen authentication when accessing services. In the context of financial management, this infrastructure must be able to support real-time, secure, and auditable financial data flows from the smallest work unit level to the national consolidation level (Ministry of Finance of the Republic of Indonesia, 2023).

The second pillar is an Integrated and Transparent Financial Information System. This is the core of the proposed integrative model. An ideal financial information system should be able to connect the entire budget cycle. starting from planning (Renja/RKP/RKPD), budgeting (RKA-K/L, RAPBN/RAPBD), implementation (SPM, SP2D), administration, reporting, and accountability within a seamless digital ecosystem. SPAN and SAKTI at the central level, and SIPD at the regional level, are steps toward this architecture, but they still need to be strengthened with stronger integration mechanisms, particularly between central and regional systems. Furthermore, these systems should generate built-in transparency reports that are publicly accessible in real time, not just internal reports for audit purposes (Prabowo & Haryanto, 2020).

The third pillar is Human Resource and Institutional Capacity Development. No matter how sophisticated a digital system is, its effectiveness is ultimately determined by the quality of the people who operate and manage it. This model framework emphasizes the need for substantial and sustained investment in: (1) digital competency training for civil servants at all levels, with curricula tailored to specific roles and responsibilities; (2) recruitment of digital talent into the public sector through flexible and competitive channels; (3) building an organizational culture that values innovation, dares to experiment, and is unafraid of change; and (4) developing the capacity of supervisory institutions. BPK, BPKP, Inspectorate are to conduct digital audits that not only check procedural compliance but also assess the effectiveness and security of financial information systems (Habibi & Kurniawan, 2023).

The fourth pillar is an Adaptive Regulatory and Governance Framework. Digital transformation requires regulations that not only follow but also anticipate and guide technological developments. This means developing regulations that are sufficiently specific to provide legal certainty, yet sufficiently flexible to accommodate unpredictable innovations. In the context of public finance, this includes, among other things: a clear legal framework for electronic signatures and digital financial documents, mandatory cybersecurity standards for all government financial information systems, clear accountability mechanisms in the event of system failures

resulting in state losses, and regulations on the use of data analytics and artificial intelligence (AI) in financial audits and oversight processes (BSSN, 2023).

This integrative model is neither linear nor sequential, but rather cyclical and adaptive: the performance of the four pillars needs to be evaluated periodically, and the results used for continuous improvement. A feedback mechanism that connects user experience, financial performance data, audit results, and academic input is an equally important component in ensuring that the public sector's digital transformation is truly responsive to citizen needs and accountability demands (Nugroho & Prasetyo, 2022).

3.5 Comparative Study: Lessons from Digitally Advanced Countries

To broaden the analytical perspective, it is important to compare Indonesia's experience with countries that have advanced further along the path of public sector digital transformation. Estonia is often cited as a global benchmark in this regard: with a population of only 1.3 million, Estonia has successfully migrated over 99% of its public services to digital platforms, including state budget management, tax declarations, voting, and access to medical records. Key to Estonia's success is consistent early investment in digital identity infrastructure (e-ID), an interoperability platform (X-Road), and a culture of public trust in digital systems built through transparency and citizen engagement (Cordella & Tempini, 2021).

South Korea, with a scale more comparable to Indonesia, offers more relevant lessons. The Digital Government Initiative launched by the Korean government in 2020 successfully integrated more than 5,000 government systems into five core platforms in less than three years. Key factors for its success include strong and consistent political leadership, significant investment in digital human resource training for civil servants, stringent technology standardization, and intensive collaboration between government, academia, and the technology industry (UN, 2022). Korea also excels in its use of big data analytics to proactively detect anomalies in budget spending—a capability currently far beyond Indonesia's reach.

From the experiences of these two countries, there are several lessons that Indonesia can adapt. First, successful digital transformation always starts with a strong foundation of digital identity. This is something Indonesia needs to accelerate through the integration of NIK, NPWP, and various other population identifiers into a single, interoperable digital ecosystem. Second, platform standardization and consolidation. not application proliferation must be a key principle of government digitalization policy. Third, investing in public trust through data security and transparency is not simply an ethical choice, but rather a prerequisite for successful digital service adoption (Pradana & Wicaksono, 2021). These lessons provide important comparative context for assessing the position and direction of Indonesia's public sector digitalization policy going forward.

3.6 Implications for Bureaucratic Reform and Budget Policy

From the overall analysis above, several urgent and operational policy implications can be identified. First, the government needs to adopt a "consolidation before expansion" strategy in developing government information systems: rather than continuously adding new applications, priority should be given to the integration and standardization of existing systems. The One Data Indonesia initiative should be strengthened with a stronger mandate and clear sanctions for agencies that do not meet interoperability standards. The government's plan to develop a centralized Government Technology (GovTech) Indonesia, as announced in late 2023, is a very appropriate step (Ministry of National Development Planning/Bappenas, 2022).

Second, in the context of financial management, accelerating the implementation of digital-based accrual accounting at all levels of government must be a priority. which recognizes income and expenses when the transaction occurs, not when cash is received or disbursed, provides a far more accurate and comprehensive financial picture than the cash accounting still dominant in most local governments. Without the support of a robust information system, the transition to accrual accounting is nearly impossible (Mahmudi, 2021). This reaffirms the inextricable link between digitalization and government accounting reform.

Third, protection for digital whistleblowers needs to be strengthened. One of the greatest potential impacts of the digitalization of government finances is the potential for digital evidence of budget fraud to emerge, making it more easily accessible to well-intentioned parties within the bureaucracy. Without adequate legal protection for whistleblowers, the potential of this data-based oversight will not be fully realized. Strengthening whistleblower protection regulations in the context of digital financial reporting is an integral complement to the public finance digitalization agenda (Habibi & Kurniawan, 2023). Fourth, collaboration between the government, universities, and the private sector in building a digital talent ecosystem needs to be intensified, including through a state budget financing scheme prioritized for developing the digital capacity of civil servants in the most disadvantaged regions.

4. CONCLUSIONS

This study has critically synthesized the current literature on digital-based public service innovation and public sector financial management in Indonesia, successfully constructing an integrative model that connects the two domains within a cohesive analytical framework. The main conclusion that can be drawn from this study is that the digitalization of public services and government financial management reform are not two separate, parallel agendas, but rather two sides of the same bureaucratic reform coin. whose success can only be achieved together, not sectorally.

Empirical evidence consistently demonstrates that the implementation of integrated financial information systems such as SPAN, SAKTI, and SIPD has resulted in significant improvements in spending efficiency, financial transaction processing speed, the quality of government financial reports, and the accessibility of budget information to the public. On the service side, digital platforms that integrate various government services have been shown to increase public satisfaction and reduce service transaction costs. These findings confirm the relevance of the New Public Management and Good Governance frameworks in explaining the relationship between digitalization and improved public sector performance.

However, this study also confirms that superficial digital transformation simply digitizes existing processes without changing the underlying incentive and governance structures. It is not enough to produce meaningful change. Information system fragmentation, human resource capacity gaps, cybersecurity vulnerabilities, and regulatory inconsistencies are structural barriers that cannot be addressed through technological solutions alone. Holistic reform is needed. touching on human, institutional, regulatory, and technological aspects simultaneously so that the potential for digital transformation of the public sector can be fully realized.

For future research agendas, this study recommends: (1) longitudinal research that quantitatively measures the impact of financial information system implementation on regional financial governance indicators; (2) comparative studies between regions that analyze the determinants of success and failure of financial digitalization implementation

in the highly diverse Indonesian context; (3) exploration of the potential of artificial intelligence and big data analytics in budget anomaly detection and fiscal risk prediction; and (4) research on the impact of public service digitalization on citizen trust in government as an intermediary variable between governance quality and political legitimacy. These research agendas will strengthen the knowledge base needed to design public sector digitalization policies that are truly targeted and have a transformative impact.

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