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Cross-Institutional Digitalisation and the Digi-Service Bubble Pitfalls in Public Sector Transformation in Indonesia

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Abstract

Digitalisation has emerged as a dominant trend in public service delivery, often regarded as a means to reduce costs, improve accessibility and contribute to Sustainable Development Goal (SDG) 9 on Industry, Innovation and Infrastructure. However, as institutions adopt digital service models, critical questions remain regarding the urgency, effectiveness and potential shortcomings of such reforms. This study examines Indonesia's public sector amid a wave of digital reforms, exploring the broader implications of cross-institutional digitalisation through the concept of the digi-service bubble. This refers to a condition where the pace of digital adoption exceeds the capacity for strategic planning and meaningful implementation. Data were collected via online surveys involving 50 participants, complemented by in-depth interviews with 20 informants. The research investigates public perceptions of digital services, particularly in relation to their necessity, accessibility and practical effects on everyday governance interactions. The findings highlight three key patterns. First, there is broad consensus on the importance of digitalisation. Second, perceptions vary based on educational background. Third, fragmented digital infrastructure remains a challenge, leading to redundancy and inefficient resource allocation. While digital transformation in public services is broadly supported, long-term success depends on strategic coordination, inclusivity and coherent policymaking. The study underscores the need for integrated digital infrastructure, widespread digital literacy and transparency in governance. These factors are vital to avoiding inefficient or poorly implemented digital initiatives, which typify the digi-service bubble.

Keywords: *Cross-Institutional Digitalisation; Digi-Service Bubble; Public Services*

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Introduction

Digitalisation in public services has become a central agenda in public administration reform across various parts of the world (Dunleavy, 2005; Haug et al., 2024), as promoted by the Sustainable Development Goals (SDGs) and driven by the Covid-19 pandemic, which necessitated limited physical interactions (Agostino et al., 2021; Burlea-Schiopoiu et al., 2023; Moser-Plautz & Schmidthuber, 2023). Advances in information and communication technology (ICT) have encouraged governments to adopt digital systems to enhance efficiency, effectiveness, and transparency in public service delivery (Alvarenga et al., 2020; Plimmer et al., 2022; Sun & Medaglia, 2019). E-government, or digital government, has become a fundamental instrument in bureaucratic modernisation, enabling faster, more accurate, and more accountable interactions between government and citizens (Carpini, 2020). At present, the integration of technological infrastructure—commonly referred to as digitalisation—positions traditional bureaucratic mechanisms as outdated, being characteristically slow and inflexible (Enang, 2023; Mu & Wang, 2022). In other words, digitalisation facilitates data-driven decision-making, accelerates inter-institutional information flow, and improves service delivery efficiency (Bryson & Edwards, 2017; Iyamu et al., 2021; Nadezhina & Avduevskaia, 2021).

In Indonesia, digitalisation efforts have been shaped by numerous national policies, including the Masterplan for the Acceleration and Expansion of Indonesia's Economic Development and the National Medium-Term Development Plan, which explicitly promote digitalisation as a key strategy in governance transformation. Furthermore, legal instruments such as Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System have established a formal foundation for the implementation of digital technologies in public services.

Digitalisation, as a transformative phenomenon, not only revolutionises public administration but also drives broader economic and social change. As Schwab (2016) observes, digitalisation lies at the heart of the Fourth Industrial Revolution, reshaping work processes, communication methods, and resource management. In the public sector, e-government initiatives streamline administrative procedures, enhance transparency and accountability, and foster citizen participation (Borst & Blom, 2021; Chen & Aklikokou, 2020; Gil-Garcia et al., 2018; Hawrysz & Maj, 2017; Nimer et al., 2022). Simultaneously, the private sector benefits through process automation, innovation in products and services, and increased productivity (Ding et al., 2023; Tóth-Pajor et al., 2023), thereby contributing to the growth of a knowledge-based economy (Di Ubaldo & Siedschlag, 2021; Pereira & Bamel, 2021).

Historically, public administration relied on established governmental structures, as conceptualised by Locke, to maintain order and implement policy (Harris, 2023). In contrast, modern governance theory—advanced by scholars such as Eriksson and Andersson (2024), as well as Ferlie and Osborne (2002)—highlights the need for dynamic, collaborative networks that integrate technology and innovation. Traditional, top-down hierarchical models are increasingly being replaced by more decentralised and

flexible approaches that leverage digital tools to enable more responsive decision-making.

Schwab (2016) further emphasises that digitalisation not only transforms administrative processes but also reconfigures public infrastructure, catalysing economic growth and improving service delivery. The fusion of technologies such as artificial intelligence, the Internet of Things (IoT), and big data analytics has disrupted conventional administrative systems, resulting in more transparent, efficient, and citizen-oriented governance. By eliminating bureaucratic delays and enabling real-time data exchange, digitalisation fosters inclusivity and improves access to essential services (Richter et al., 2018). This aligns with SDG 9, which advocates for resilient, innovative, and inclusive infrastructure to support sustainable development. This study addresses four key dimensions: the urgency of digitalisation, the level of digital literacy among citizens, the availability of connectivity, and the adequacy of supporting infrastructure.

However, the success of digitalisation in public services depends not only on technological infrastructure but also on governance quality, human resource preparedness, and the cultural acceptance of digital practices within bureaucratic and societal contexts (Cassia et al., 2020; Gbadegesin et al., 2021; Iqbal et al., 2020; Rasul & Rogger, 2018). Therefore, a comprehensive study of public sector digitalisation is essential, particularly in relation to "services," which constitute the core mandate of government institutions as both regulators and service providers.

The proliferation of digital initiatives in Indonesian public services has not been without criticism. The existence of over 27,000 fragmented applications (Nugraheny & Ihsanuddin, 2024) with overlapping or dissimilar functions, and an investment of IDR 6.2 trillion (Yanwardhana, 2024b) into digitalisation, have raised concerns about inefficiencies and emerging risks. These developments give rise to the central question of this study: "Is digitalisation truly necessary for the Indonesian people?" This question encompasses the broader challenges related to disparities in access to digital knowledge, connectivity, and the availability of digital ecosystem infrastructure. The study introduces the concept of a digi-service bubble, drawing a parallel with the historical dotcom bubble.

In public services, all citizens are users, while digitalisation constitutes an organisational transformation aimed at improving service delivery. Therefore, digital public services must address the interests and needs of all users—or at least the general public—while ensuring ease of access. Within this context, an evaluation-based study is crucial to determine whether digital transformation is genuinely warranted by current user needs. This research departs from prior evaluations that focus solely on existing users (i.e., within public offices), by incorporating perspectives from potential users as well. In doing so, it aims to critically assess whether digitalisation initiatives align with the actual needs of Indonesian citizens.

Globally, developed countries benefit from strong digital infrastructures and widespread digital literacy, which facilitate efficient public service delivery. In contrast, countries in the Global South face challenges related to digital inequity and varied levels of institutional preparedness. By comparing global standards with local realities, this

study offers insights that are not only relevant to Indonesia but also applicable to other emerging economies navigating similar digital transformation complexities.

The rapid expansion of digital public services in Indonesia has introduced complex challenges that extend beyond technological deployment. The fragmented implementation of thousands of digital platforms has raised concerns about redundancy, inefficiency, and the emergence of a digi-service bubble, even as digitalisation continues to promise enhanced efficiency, transparency, and civic engagement. This mirrors the dotcom bubble of the early 2000s, where uncoordinated and overly ambitious digital investments led to unsustainable outcomes. In Indonesia, these issues are compounded by disparities in digital literacy, limited connectivity, and inadequate infrastructure—casting doubt on whether current digitalisation strategies truly serve the population's needs.

These challenges carry significant implications for sustainable development. In particular, the tension between rapid digital transformation and ineffective service delivery is closely linked to Sustainable Development Goal (SDG) 9. SDG 9—Industry, Innovation and Infrastructure—advocates for resilient, inclusive digital infrastructure that fosters economic growth and innovation. However, the observed fragmentation in service provision suggests that the existing infrastructure may be inadequate to support long-term development. Without effective coordination, ongoing digitalisation efforts risk undermining public trust in governmental institutions.

Research Methods

The primary research question addressed in this study is: *"Is digitalisation urgently needed for Indonesians?"* A quantitative–narrative approach was employed to explore this question. The data collection instruments were specifically designed to reflect four key dimensions: the perceived urgency of digitalisation, levels of digital knowledge, connectivity availability, and the adequacy of digital infrastructure and facilities.

Table 1 presents the measurement framework developed for this study, detailing the key variables and their corresponding survey items used to evaluate digitalisation within Indonesian public services. The table organises constructs such as the urgency of digitalisation, digital literacy, internet connectivity, and infrastructure adequacy, with each variable operationalised through specific questions. These constructs are grounded in the principles of New Public Management (NPM), which emphasises efficiency, innovation, and decentralised governance, as well as e-government theory, which advocates for enhanced transparency and accountability through the use of digital platforms (Eriksson & Andersson, 2024; Ferlie & Osborne, 2002). Furthermore, the framework incorporates insights from digital transformation literature, particularly Schwab's (2016) analysis of the Fourth Industrial Revolution, and governance literature that distinguishes between traditional bureaucratic systems and modern, multi-stakeholder governance models (Locke et al., 1990; Ziyang & Shan, 2021).

Table 1. Instrumentation for the Data Collection Process
Source: Processed by the authors (2024)

Aspect	Questions	Code
Urgency of Digitalisation	To what extent do you believe digitalisation is necessary for daily life in Indonesia? (Scale: 1 to 10)	UD1
	What are the main challenges you face due to the lack of digitalisation in Indonesia? (Options: Limited access to education; Difficulty accessing government services; Limited job opportunities in digital sectors; Inadequate public transport integration; Security concerns)	UD2
	In which sectors should digitalisation be prioritised in Indonesia? (Options: Education; Healthcare; Public services; Transportation; Fintech)	UD3
Digital Knowledge	How confident are you in using digital platforms for work, study, or daily activities? (Scale: 1 to 10)	DK1
	Have you received any formal or informal digital literacy training? (1 = Yes; 0 = No)	DK2
	Which digital skills do you think Indonesians most need to improve? (Options: Basic digital literacy; Cybersecurity awareness; E-commerce/telemarketing)	DK3
Connectivity	How frequently do you experience internet connectivity issues in your area? (Scale: 1 to 10)	CN1
	What best describes your primary internet access? (Options: Mobile data; Home Wi-Fi; Public Wi-Fi)	CN2
	How do internet connectivity issues affect your daily activities (e.g., work, study, communication)? (Scale: 1 to 10)	CN3
Infrastructure Adequacy	Do you consider Indonesia's current digital infrastructure to be sufficient? (Scale: 1 to 10)	IAD1
	Which digital infrastructure improvement do you consider most urgent in Indonesia? (Options: Faster connectivity; Broader public access; Affordable pricing; Cybersecurity)	IAD2

Data were collected through an online survey of 500 respondents, complemented by open-ended online interviews with 20 informants. These informants comprised three scholars from public administration departments, two social media influencers (Instagram celebrities), and 15 residents from urban slum areas. This mixed-method

strategy allowed for a deeper understanding of citizens' perceptions regarding the necessity and relevance of digitalisation in public services.

Quantitative data were analysed using descriptive statistics and mean comparisons based on educational background. To enrich the analysis, narrative inquiry was applied to the interview data, enabling a more nuanced exploration of respondents' lived experiences and attitudes toward digital transformation in the Indonesian public sector.

Results and Discussion

Findings and Analysis of Digitalisation Perceptions and Infrastructure Gaps

Out of 538 responses collected, a total of 500 valid responses were analysed, with 7% excluded due to incomplete data. All respondents were aged over 17 years, meeting the minimum age requirement for holding a national identification card and, therefore, assumed to be eligible users of public services.

Overall, the findings reveal a moderate level of agreement among respondents regarding the necessity of digitalisation in public services. The average score for the perceived urgency of digitalisation was 5.99 on a 10-point scale, while accessibility to digital services scored 5.96. In contrast, the perceived basic necessity to access digital platforms was considerably lower, at 4.22, and the adequacy of existing infrastructure received a modest average score of 5.04.

When asked about priority sectors for digital transformation, transportation emerged as the most challenging area, followed by increasing concern for the digitalisation of healthcare services. While the majority of respondents identified themselves as digitally literate, they also consistently highlighted cybersecurity awareness as a critical precondition for any digitalisation initiatives in the public sector.

Descriptive Analysis of Digitalisation Trends and Perceptions

Descriptive analysis was conducted using the mean for variables UD1, DK1, CN1, CN3, and IAD1, while the mode was used to identify the most frequently selected responses for UD2, UD3, DK2, DK3, CN2, and IAD2. This approach allowed for a clearer understanding of overall respondent tendencies in terms of both intensity and preference.

Table 2. Descriptive Analysis for Each Item
Source: Processed by the authors (2024)

Items	Data Trend	Description
UD1	Mean: 5.992 Skewness: -0.484 Kurtosis: -0.650	The majority of respondents perceive digitalisation as highly necessary for daily life in Indonesia, with a slight skew toward stronger agreement. The flat distribution suggests diverse opinions, but the trend leans toward recognising the importance of digitalisation.

UD2	Most: Integrative transportation Least: Limited job opportunities in digital sectors	Respondents identify integrative transportation as the most significant challenge caused by the lack of digitalisation. This suggests that digital solutions for public transportation are seen as critical. Limited job opportunities in digital sectors are perceived as less pressing.
UD3	Most: Healthcare Least: Education	Healthcare is seen as the sector most in need of digitalisation, likely due to the potential for telemedicine, electronic health records, and improved healthcare access. Education is perceived as the least prioritised, which may reflect a lack of awareness about the potential benefits of digital tools in this sector.
DK1	Mean: 5.968 Skewness: -0.683 Kurtosis: -0.665	Respondents generally feel confident using digital platforms, with a skew toward higher confidence levels. However, the flat distribution indicates variability in confidence levels, suggesting that while many are confident, some still struggle.
DK2	Most: 1 (n = 399)	A significant portion of respondents (399) have received some form of digital literacy training, indicating that efforts to improve digital skills are reaching a sizable portion of the population.
DK3	Most: Cybersecurity awareness Least: E-commerce/telemarketing	Cybersecurity awareness is seen as the most critical skill to improve, reflecting concerns about online safety and data protection. E-commerce/telemarketing skills are perceived as less urgent; these skills might already be relatively developed or less prioritised compared to cybersecurity.
CN1	Mean: 4.22 Skewness: 0.118 Kurtosis: -1.166	Respondents experience moderate to frequent internet connectivity issues, with a slight skew toward more frequent problems. The flat distribution indicates variability in experiences, with some areas facing more severe connectivity challenges than others.
CN2	Most: Mobile data Least: Home Wi-Fi	Mobile data is the most common form of internet access, highlighting the reliance on cellular networks. Home Wi-Fi is the least common, suggesting limited infrastructure for fixed broadband in many areas.
CN3	Mean: 7.082 Skewness: -0.101 Kurtosis: -1.282	Internet connectivity issues have a significant impact on daily activities, with a slight skew toward higher disruption. The flat

		distribution indicates that the severity of the impact varies widely among respondents.
IAD1	Mean: 5.044 Skewness: 0.003 Kurtosis: -1.302	Opinions on the sufficiency of Indonesia's digital infrastructure are divided, with a mean slightly above the midpoint.
IAD2	Most: Cybersecurity Least: Broader public connection	Cybersecurity is seen as the most urgent area for improvement, reflecting concerns about data protection and online safety. Broader public connection is perceived as less urgent, possibly because most respondents use mobile connections instead of public networks.

Table 2 summarises the overall data trends along with a descriptive interpretation of respondents' perceptions, based on the scores or dominant responses associated with each item.

Means Comparison: Accessibility in the Digital Era

A mean comparison analysis was conducted to examine differences in perceptions across various educational backgrounds. The initial assumption posited that education may serve as a barrier to accessibility in the digital landscape. Table 3 presents the results of the mean comparison test for each item.

Table 3. Means Comparison Based on Education Level
Source: Processed by the authors (2024)

Aspect	Item	F-Value	Significance (Sig.)
Urgency of digitalisation	UD1	3.198	0.013*
	UD2	1.064	0.374
	UD3	2.443	0.046*
Digital knowledge	DK1	1.601	0.173
	DK2	0.461	0.764
	DK3	0.767	0.547
Connectivity	CN1	0.942	0.439
	CN2	0.888	0.471
	CN3	0.766	0.548
Infrastructure Adequacy	IAD1	0.196	0.940
	IAD2 – Priority	0.753	0.556
	IAD2 – Least	1.853	0.118

*Significance at $p < .05$; items meeting this threshold were subjected to post hoc analysis.

Significant differences ($p < .05$) were observed for UD1 (perceived urgency of digitalisation) and UD3 (sectoral prioritisation of digitalisation). These items were subsequently subjected to post hoc analysis to identify differences across specific educational levels.

The post hoc results for UD1 revealed a statistically significant difference between respondents with secondary school education and those with a baccalaureate degree ($p = .03$). The mean difference of -0.681 indicates that respondents with a baccalaureate degree rated the urgency of digitalisation higher than their secondary school counterparts.

These findings suggest that educational background influences perceptions of digitalisation, particularly regarding its urgency and prioritisation in public sectors. As such, policymakers are encouraged to develop tailored digital literacy programmes that address the specific needs of different educational groups in order to bridge this perceptual gap.

Understanding the Impacts of Digitalisation on Public Service Delivery

The data highlight that Indonesia's digital transformation is not merely a technological advancement but a critical necessity for enhancing efficiency across multiple sectors. To address this, both the government and private sector must act swiftly to ensure equitable access to digital services (digi-services) and fulfil the goals underpinning digitalisation (Arnaboldi et al., 2015; Gile et al., 2022). A key finding is the urgent need for nationwide digital literacy programmes targeting both general and technical skills (Alvarenga et al., 2020). The development and deployment of technology in public services must reflect the capabilities and expectations of its end users—the public (Ouakouak et al., 2020; Weerakkody et al., 2017). At this stage, digitalisation should not be the immediate priority; instead, improving digital literacy should take precedence.

As digital services continue to expand, Indonesia must prioritise broadband infrastructure development and the optimisation of mobile internet. Government policies should incentivise investment in telecommunications infrastructure while ensuring affordability for lower-income communities (Abiad et al., 2016). Reliable and widespread internet access is a cornerstone of an inclusive digital ecosystem in which public services can operate effectively. In parallel, increasing incidents of data breaches involving public systems underscore the need to strengthen cybersecurity before expanding digital service delivery.

Importance of Government Digital Services

The digitalisation of government services, or digi-service, is a relatively new phenomenon for many Indonesians when accessing public services. In an era where technology is deeply embedded in everyday life, citizens increasingly expect public services to offer the same ease and efficiency as those in the private sector (Iyamu et al., 2021b; Tariverdi et al., 2023). Effective implementation of digi-services is essential for improving the efficiency and accessibility of public administration (Dal Mas et al., 2019).

However, as noted by several interview respondents, this transformation must be carefully managed to avoid fragmentation and confusion.

The issue of application proliferation and its impact on user experience is well documented. Anthopoulos et al. (2016) explain that the development of multiple disconnected digital platforms often leads to inefficiencies and dissatisfaction. Similarly, Gil-Garcia et al. (2018) highlight the importance of interoperability and integration to ensure a seamless user experience.

While digital transformation is widely recognised as a catalyst for administrative efficiency and improved citizen engagement (Bloomberg, 2018; Iyamu et al., 2021; Philip, 2021), the absence of a unified strategy can result in redundant systems and fragmented service delivery (Mergel et al., 2019). These findings support respondent concerns, reinforcing the importance of a cohesive national digital strategy. Accessibility must also be central to this transformation—digi-services must be inclusive and universally usable.

Accessibility poses particular challenges in diverse societies. Prakasa et al. (2020) note that digital exclusion often stems from disparities in digital literacy and access. Rodríguez-Abitia and Bribiesca-Correa (2021), along with Yigitbasioglu et al. (2023), emphasise the need for inclusive service design that accommodates users with varying levels of digital proficiency. Collectively, these studies suggest that equitable access and usability should be core principles in digital service design.

Another Dotcom Bubble?

The study reveals a significant perceptual gap between respondents with secondary education and those with baccalaureate degrees, particularly in relation to the perceived urgency of digitalisation. This suggests that younger, more digitally engaged populations—future primary users of digi-services—attach greater importance to digital service platforms.

The rapid growth of digital platforms has raised speculation about a potential resurgence of a dotcom-like bubble, which this study refers to as the digi-service bubble. The original dotcom bubble of the late 1990s and early 2000s was characterised by speculative investment and overvaluation, ultimately resulting in widespread collapse. Although the modern digital economy is more structured, overdependence on fragmented digital platforms without strategic alignment or profitability frameworks poses systemic risks. As Floridi (2024) notes, "the hype may fade, but the loss remains."

A lack of rigorous evaluation in digital government initiatives is a major concern. Haug et al. (2024) and Lazuardi et al. (2021) stress the necessity of robust evaluation mechanisms to prevent redundancy and inefficiency. Without such frameworks, digital services risk becoming disjointed and underutilised, echoing the failures of unsustainable tech ventures during the original dotcom era (Quinn & Turner, 2023).

Moreover, digital exclusion is exacerbated by high data costs and limited connectivity—especially among lower-income communities. Fragmented systems further marginalise users, limiting their ability to fully benefit from digital platforms and deepening existing inequalities.

Bridging the Digital Divide for Sustainable Growth

One of the most significant barriers to Indonesia's digital transformation is the uneven distribution of digital infrastructure. As of 2020, digital penetration reached only 78.18% of the population (BPS, 2021), and Indonesia ranked 76th globally in the Network Readiness Index among ASEAN nations (The Jakarta Post, 2020). Sustainable Development Goal 9 (SDG 9) advocates for resilient infrastructure, inclusive and sustainable industrialisation, and innovation that benefits all segments of society. However, Indonesia faces structural challenges due to its archipelagic geography and unequal human development indicators.

Urban centres may benefit from high-speed connectivity and seamless access, but rural and remote areas continue to face obstacles such as unreliable internet, inadequate infrastructure, and limited technological resources. This disparity contributes to a digital divide that restricts equitable access to digital public services and perpetuates socio-economic inequality.

To overcome these challenges, Indonesia must move toward digital maturity, which goes beyond infrastructure and includes institutional integration and user adoption (Westerman et al., 2014). Even the most sophisticated digital platforms may fail if they are not embedded within supportive ecosystems that promote interoperability and trust.

In addition, dependence on imported technologies raises critical concerns regarding cybersecurity and data sovereignty. Recent incidents illustrate these vulnerabilities. In June 2024, Indonesia's Temporary National Data Centre (PDNS) in Surabaya was hit by a ransomware attack known as 'Brain Cipher', disrupting 282 public services, including immigration and airport operations (Kompas, 2025). In September 2024, the national tax agency investigated a data breach involving taxpayer identification numbers of millions of individuals—including President Joko Widodo and senior ministers (Yanwardhana, 2024a). These events underscore the urgent need to develop sovereign digital infrastructure before further expanding digital public services.

Conclusion

This study uncovers the dual nature of digitalisation in public services: while it can serve as a powerful tool for enhancing efficiency, it may also lead to inefficiencies if not implemented strategically. Digital governance must therefore be executed in a manner that is both inclusive and deliberate, ensuring that digital services are accessible, secure, and effectively integrated into public administration systems.

The data also reveal the potential risks of unchecked digitalisation, such as fragmented service delivery and the emergence of a digi-service bubble—a condition where overinvestment in digital platforms without adequate strategic planning results in inefficiencies and financial losses.

The findings suggest that policies for digital transformation should prioritise long-term sustainability, system interoperability, and equitable access to avoid reinforcing digital exclusion. In this context, future digital initiatives should be supported by robust

quantitative assessments, longitudinal studies on user adoption, and comparative analyses with other nations undergoing similar transitions.

Ultimately, this study underscores the urgent need for a balanced, well-regulated, and citizen-centric approach to digital governance. Future research should continue refining strategies that ensure digital transformation is aligned with both national priorities and the diverse development levels of local regions.

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