

THE PROVISION OF A TEMPORARY NATIONAL DATA CENTER AS A REFLECTION OF BOUNDED RATIONALITY IN THE ELECTRONIC BASED GOVERNMENT SYSTEM (SPBE)

Mohamad Nur Syamsi Rizal¹, Sidik Pramono²

¹Faculty of Administrative Sciences, Universitas Indonesia

²Faculty of Administrative Sciences, Universitas Indonesia

E-mail: mnr1z4loofficial@gmail.com¹

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Abstract

This research explores the implementation of Indonesia digital governance policies, particularly the Electronic-Based Government System, One Data Policy, and the development of The National Data Center (NDC) and The Temporary National Data Center (TNDC). Drawing on the theoretical framework of Bounded Rationality the analysis highlights how the government's decision-making process adapts to constraints of limited resources, information asymmetry, and administrative complexity. The findings indicate that while the establishment of a permanent NDC remains the ideal solution for achieving full data integration and security, pragmatic approaches such as the TNDC scheme have enabled continued digital transformation in the public sector. The integration of government data has improved transparency, accountability, and inter-agency coordination, thereby enhancing the efficiency and responsiveness of public services. Regulatory frameworks including Presidential Regulations No. 95/2018, No. 39/2019, and No. 27/2022 have provided a robust institutional foundation to ensure data governance, cybersecurity, and citizen trust. By this research Indonesia incremental approach demonstrates how adaptive policy strategies can effectively advance digital transformation amid institutional and infrastructural limitations.

Keywords: *Data Integration, Government, Infrastructure, Public Policy*

INTRODUCTION

Digital transformation has emerged as a central pillar in the modernization of governance amid globalization and rapid technological advancement. Digitalization enables governments to optimize resource management, enhance information accessibility, and accelerate data-driven decision-making. Dunleavy et al. (2020) argue that digital governance not only reshapes governmental operations but also fosters adaptive and responsive governance models aligned with societal needs. Through the adoption of digital technologies, public services can be accessed more efficiently, reducing dependence on traditional bureaucratic systems that are often slow and convoluted. Governments worldwide increasingly recognize digitalization as a crucial strategy to address complex administrative challenges. As Mergel et al. (2019) emphasize, digitalization allows governments to proactively address social, economic, and political issues while strengthening transparency and accountability. Beyond technical innovation, digital transformation accelerates policy-making and public service management. Cloud-based infrastructures, inter-agency data-sharing mechanisms, and digital platforms for citizen participation enable faster and more accurate decision-making. This development resonates with the principles of *new public governance*, which highlight openness, public involvement, and technological utilization to enhance efficiency (Cordella & Paletti, 2019). Thus, digital transformation represents not merely a technical adjustment but an integral component of bureaucratic modernization oriented toward effectiveness, efficiency, and transparency. Bureaucratic reform has become a strategic agenda in improving governmental performance. Digitalization plays a pivotal role in reducing bureaucratic barriers, simplifying administrative procedures, and enhancing service quality. Osborne and Brown (2020) note that hierarchical bureaucracies often struggle to adapt to contemporary demands, making digitalization a key instrument to accelerate reform and overcome rigid administrative structures. One major benefit of digitalization is the reduction

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of manual administrative burdens. Integrated electronic systems allow public services to be delivered more quickly, efficiently, and without geographical constraints. Hood and Margetts (2021) highlight that digital bureaucracy reduces complexity, eliminates inefficiencies, and improves citizen access to responsive services. Moreover, digitalization enhances transparency by enabling governments to provide open information, facilitate real-time policy monitoring, and minimize misuse of authority. Schedler and Summermatter (2020) underscore that digitalization fosters accountability and citizen participation, transforming bureaucratic reform into an inclusive and participatory governance effort.

The National Data Center (NDC) plays a strategic role in supporting governmental digital transformation. As reliance on technology-based services grows, governments require secure and integrated data infrastructures to ensure efficiency and safeguard public information. Lindgren et al. (2019) emphasize that the NDC enables centralized storage, management, and processing of data, thereby enhancing the reliability of digital public services. Effective NDC management reduces redundancy, ensures secure access, and strengthens public trust in government. Hitlin and Shutava (2022) argue that reliable and transparent data management contributes significantly to public confidence in digital governance. Consequently, policies supporting NDC development must encompass regulatory frameworks, cybersecurity measures, and interoperability standards to prevent data fragmentation and improve service efficiency.

Technology also functions as a catalyst for efficiency, transparency, and accessibility in public services. Data storage and analytics infrastructures allow governments to optimize resources and respond more rapidly to societal needs. Kuziemski and Misuraca (2020) highlight that digitalization enhances decision-making accuracy and reduces corruption risks through automation and data-driven monitoring. Twizeyimana and Andersson (2019) further stress that the public value of e-government lies not only in efficiency but also in equitable access to services, ensuring inclusivity for citizens in both urban and remote areas. National data integration is essential to accelerate administrative processes and prevent fragmentation across government agencies. Without integration, dispersed data often leads to duplication, inconsistencies, and administrative delays. Arundel, Bloch, and Ferguson (2019) emphasize the importance of national data integration in supporting effective evidence-based policymaking. Interoperability among agencies facilitates collaboration in addressing complex issues such as health, education, and social welfare. Torfing and Sørensen (2019) argue that open and accessible data enhances service effectiveness and stakeholder engagement. Thus, policies must establish interoperability standards, security protocols, and transparent access mechanisms.

LITERATURE REVIEW

The regulation of national data centers has developed rapidly across various countries in response to increasing cybersecurity threats and the growing need for personal data protection. The European Union has adopted the General Data Protection Regulation (GDPR), which obliges all organizations, including governments, to store and manage data under strict security standards and to ensure that citizens' personal data is not misused (Hoofnagle & Van Der Sloot, 2019). In the United States, regulations such as the Federal Information Security Management Act (FISMA) and the Cloud First Policy have been implemented to promote security and efficiency in governmental data management. In Asia, China and India have introduced data localization policies requiring citizens' data to be stored in domestic data centers to prevent access by foreign entities (Hanemann, Huotari, & Kratz, 2019). This reflects a global trend in which many countries increasingly consider data sovereignty as part of their national security strategies.

In Indonesia, regulations governing national data storage are stipulated in the Personal Data Protection Law (UU PDP) and the Satu Data Indonesia policy, both of which aim to ensure that governmental data is securely managed and integrated domestically. To accelerate governmental digitalization, Indonesia has enacted several regulations supporting the implementation of the Electronic-Based Government System (SPBE), the Satu Data Indonesia initiative, and the development of the National Data Center (PDN). A fundamental regulation underpinning digital transformation is Presidential Regulation No. 95 of 2018 on SPBE, which seeks to enhance governmental effectiveness and efficiency through the use of information technology. This regulation emphasizes the importance of cross-agency information system integration, cybersecurity strengthening, and data utilization to support evidence-based policymaking (Ministry of Communication and Informatics, 2020). Complementing this, Presidential Regulation No. 39 of 2019 on Satu Data Indonesia was introduced to optimize data management, ensuring accuracy, timeliness, structure, and accessibility across agencies. This regulation establishes metadata standards, system interoperability, and the roles of data custodians and producers in managing cross-sector governmental information (Bappenas, 2019). Additionally, Ministerial Regulation of Administrative and

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Bureaucratic Reform No. 5 of 2020 provides guidelines for managing risks in SPBE implementation, including technical, policy, and digital security challenges. As part of efforts to build more efficient digital government infrastructure, the government also issued Ministerial Regulation of Communication and Informatics No. 5 of 2021, which governs the operation of the PDN. This regulation aims to consolidate governmental data storage into a single integrated system to improve efficiency and security (Ministry of Communication and Informatics, 2021). In line with this, Presidential Regulation No. 132 of 2022 on the National SPBE Architecture establishes the technical framework for interoperability in digital governance systems to ensure coordination and efficiency in public sector data management. To safeguard governmental data, Indonesia enacted Law No. 27 of 2022 on Personal Data Protection (UU PDP), which regulates individual rights over personal data and the obligations of electronic system providers to ensure its security (House of Representatives of the Republic of Indonesia, 2022). Strategically, the SPBE Master Plan 2020–2024 provides comprehensive guidance on the development of digital governance systems, including strengthening Satu Data Indonesia policies and building more resilient technological infrastructure to improve the quality of electronic public services.

Collectively, these regulations underscore Indonesia's commitment to building a more effective, transparent, and integrated digital governance ecosystem. The implementation of SPBE and Satu Data Indonesia not only enhances administrative efficiency but also accelerates data-driven decision-making and strengthens public trust in digital governance. The establishment of the PDN is expected to serve as a cornerstone in ensuring the security and reliability of governmental data, while simultaneously reinforcing cybersecurity resilience amid escalating digital threats. Nevertheless, challenges remain, including infrastructure readiness, capacity-building for human resources in information technology, and compliance by government agencies with established regulations. Therefore, synergy among government, the private sector, and society is essential to ensure that digital governance policies operate optimally and deliver significant benefits for national development.

This study occupies a unique and strategic position in the discourse on digital data infrastructure in Indonesia, as it integrates technical, institutional, developmental, and governance dimensions into a comprehensive public policy analysis framework. Unlike the study entitled *One Data Indonesia: A Retrospective Analysis of Data Interoperability in Declaring Regional Planning and Development* (Ramadhan, Suhendra, & Yohanitas, 2023), which examined the implementation of the Satu Data Indonesia initiative in the context of regional development planning and highlighted challenges of data fragmentation and interoperability, this research specifically investigates the decision-making process behind the adoption of interim data infrastructure as a manifestation of bounded rationality in the implementation of governmental digital policy. In other words, this study moves beyond the issue of interoperability by critically analyzing the rationale behind the government's choice of temporary leasing models for data infrastructure amid resource and regulatory constraints, thereby adding a dimension of policy choice theory to the discourse on national data integration.

Furthermore, this study builds upon the work *The Influence of Groupthink and Bounded Rationality in Decision-Making on Public Policy* (Permana & Wening, 2023), which explored how cognitive limitations and group dynamics influence decision-making in public policy contexts. While their focus was on cognitive processes within policymaking teams, this study applies the concept of bounded rationality to analyze structural and institutional decision-making related to the development of national data center infrastructure within Indonesia's digital governance framework. Thus, this research contributes theoretically by linking bounded rationality not only to individual cognitive biases but also to institutional policy strategies. In this context, policymakers' choice of the interim National Data Center (PDNS) approach is understood as a pragmatic compromise under resource and regulatory constraints, bridging behavioral public policy theory with strategic decision-making in the management of large-scale national digital infrastructure.

METHOD

This study employs a qualitative research design within a public policy analysis framework, relying primarily on secondary data. This method was chosen because public policy is inherently multidimensional and requires comprehensive interpretation of official documents, regulations, and institutional practices. A qualitative approach enables the researcher to explore policy dynamics more deeply through the analysis of diverse sources, including government decisions, institutional reports, academic publications, and other relevant literature (Creswell, 2014). The study is grounded in secondary data, which provides broad contextual insights into the policy environment without necessitating direct primary data collection through surveys or interviews. Data were collected through an extensive literature review, examining materials relevant to the policies under investigation. Secondary sources include legal and regulatory documents, reports from governmental and independent institutions, as well as

scholarly works published in accredited journals. Policy documents analyzed in this study serve as the legal and procedural foundation of the examined policies, while supporting literature—such as empirical studies and policy evaluations—offers additional perspectives on implementation, challenges, and impacts (Neuman, 2014). In addition, tertiary references such as policy glossaries and legal databases were utilized to clarify terminology and conceptual frameworks employed in the analysis. For data analysis, the study applies descriptive-qualitative techniques aimed at systematically interpreting and categorizing information from multiple sources. Through this process, recurring themes, policy patterns, and inter-institutional relationships were identified. To ensure validity and reliability, the study adopts a triangulation strategy, comparing and verifying findings across different sources, including literature reviews, institutional policy documents, and prior empirical research (Patton, 2015). This analytical approach enables the study to provide a deeper understanding of policy implementation and its broader implications, while presenting evidence-based findings that can serve as a foundation for policy refinement and future decision-making.

RESULTS AND DISCUSSION

Interim Infrastructure as Bounded Rationality

Herbert Simon's theory of bounded rationality explains that decision-makers, including governments, do not have access to perfect information or unlimited resources. As a result, they cannot always achieve the optimal solution but instead settle for decisions that are "good enough" or satisficing (Hertwig & Kozyreva, 2021). In practice, public policy decisions are often constrained by limited time, restricted access to relevant information, and administrative or technical barriers. For instance, in implementing digital policies such as the Electronic-Based Government System (SPBE) and the development of the National Data Center (PDN), the government must weigh economic considerations, infrastructure readiness, and cybersecurity threats before determining the most realistic course of action.

Faced with these constraints, the Indonesian government adopted an alternative approach through the establishment of the Interim National Data Center (PDNS), utilizing existing private data center facilities under a leasing scheme. This strategy represents an adaptive step to overcome technical and financial challenges in developing a permanent PDN. Ideally, the government could immediately construct a fully integrated PDN with high security standards. However, in practice, challenges such as budget limitations, weak inter-ministerial coordination, and technical difficulties in harmonizing existing systems hinder implementation (Bappenas, 2019). Consequently, rather than waiting for the completion of a permanent PDN, the government pragmatically adopted the PDNS scheme to accelerate digitalization while preparing infrastructure for a more mature transition. Although a permanent PDN remains the optimal solution for enhancing data integration and security, its realization is constrained by high investment costs and complex regulatory requirements. Budgetary limitations force the government to pursue gradual development and explore alternatives such as public-private partnerships. Leasing existing facilities through PDNS allows government agencies to store data in secure environments without waiting for the permanent PDN to be completed. This approach aligns with Presidential Regulation No. 132 of 2022 on the National SPBE Architecture, which emphasizes interoperability and flexibility in managing digital governance systems.

Regulatory challenges also complicate PDN development. While the Personal Data Protection Law (UU PDP) provides a clearer legal framework for data security, compliance remains uneven across governmental and private actors. Moreover, data localization requirements mandating domestic storage of citizens' data pose difficulties in collaborating with global cloud providers whose infrastructure is often located abroad. In response, the government adopted a phased approach, leveraging PDNS as a transitional solution to sustain digitalization while awaiting full readiness of permanent infrastructure. In line with Simon's bounded rationality, the government's choice reflects satisficing behavior: opting for a "good enough" solution under resource and regulatory constraints. While the ideal solution is a permanent PDN, interim leasing through PDNS enables continuity of digital governance with adequate security standards (Hertwig & Kozyreva, 2021; Van Ooijen, Welby, & Ubaldi, 2019). This strategy is supported by regulatory frameworks such as Presidential Regulation No. 95 of 2018 on SPBE and Presidential Regulation No. 39 of 2019 on *Satu Data Indonesia*, which promote integrated digital governance. However, technical challenges—including data standard disparities and infrastructure limitations prevent immediate implementation. Thus, Ministerial Regulation No. 5 of 2021 on PDN operations provides a realistic pathway for interim adoption, while Law No. 27 of 2022 on Personal Data Protection ensures compliance with national security standards (Kominfo, 2021; Bappenas, 2019).

Pragmatic Choices in Public Policy

By adopting a phased approach through PDNS, the government sustains digital transformation policies without being hindered by delays in permanent PDN construction. This decision reflects bounded rationality, wherein policymakers adjust solutions to prevailing conditions to achieve practically optimal outcomes. Supported by existing regulations, PDNS is expected to serve as an effective short-term solution while preparing for a more integrated permanent PDN. Moving forward, continuous evaluation of this strategy is essential to ensure a smooth transition toward secure, efficient, and centralized national data management, thereby strengthening Indonesia’s digital governance (Kuziemski & Misuraca, 2020; Rosenbloom, Kravchuk, & Clerkin, 2022).

Table 1 Adoption of Interim National Data Center (PDNS) by Ministries, Agencies, and Regional Governments (2020–2024)

Year	Total Institutions (K/L/D)	Percentage Using PDNS	Number of Institutions Using PDNS
2020	219	0%	0
2021	219	35%	77
2022	296	47%	139
2023	347	55%	191
2024	385	61%	235

Source: (Ministry of Communications and Digital Affairs, 2019)

Empirical data further illustrate this pragmatic adoption. Between 2020 and 2024, the percentage of ministries, agencies, and regional governments (K/L/D) utilizing PDNS increased significantly. In 2020, no institutions had adopted PDNS. By 2021, 35% of 219 institutions had begun using it. This figure rose to 47% of 296 institutions in 2022, 55% of 347 institutions in 2023, and 61% of 385 institutions in 2024. This upward trend demonstrates the government’s success in encouraging agencies to adopt cloud computing services, thereby enhancing efficiency in data management and information security within digital governance systems. The consolidation of data through PDNS represents a strategic step to avoid redundancy and accelerate public service delivery. Previously, data were stored separately across ministries and agencies with varying standards, hindering interoperability and slowing access. PDNS enables integrated data management, ensuring real-time access to uniform information across institutions. This not only improves administrative efficiency but also accelerates accurate data-driven decision-making and strengthens inter-agency coordination for more responsive and transparent public services.

Data Integration as the Final Outcome

Data integration plays a critical role in enhancing transparency in public policy and improving service efficiency. With interconnected systems, governments can ensure that decisions are based on accurate, consistent, and accessible information for all stakeholders. Pomaza-Ponomarenko et al. (2020) argue that data-driven digital administration strengthens governmental accountability by providing more open information to citizens. Policies such as *Satu Data Indonesia*, regulated under Presidential Regulation No. 39 of 2019, aim to integrate data across institutions to reduce redundancy and improve decision-making effectiveness. Transparent and verifiable data reduce risks of manipulation and corruption, thereby increasing public trust in state institutions. Beyond transparency, integrated data systems accelerate public service delivery. Matheus, Janssen, and Janowski (2021) highlight that data-driven digital administration reduces waiting times and ensures information accuracy, enabling faster and more effective services in areas such as healthcare, civil registration, and social assistance. In Indonesia, this acceleration is reinforced by Presidential Regulation No. 95 of 2018 on SPBE, which mandates digital adoption across government institutions to optimize service delivery. Integrated data also enhances inter-agency coordination, enabling more responsive and targeted public services. For example, in social assistance programs, integration between the Ministry of Social Affairs and the Civil Registration Agency ensures accurate beneficiary targeting and prevents duplication. Sofyani, Riyadh, and Fahlevi (2020) found that information technology adoption in governance not only improves transparency and accountability but also optimizes budget and human resource management. Thus, integrated data systems contribute not only to transparency but also to the acceleration and quality improvement of public services delivered to citizens.

CONCLUSION

In conclusion, Indonesia's experience illustrates the importance of adaptive governance in achieving sustainable digital transformation. Guided by the principle of bounded rationality, the government has pursued pragmatic policies that balance ambition with feasibility, most notably through the adoption of the Temporary National Data Center (TNDC) as an interim solution while preparing for the establishment of a permanent National Data Center (NDC). This strategy has been instrumental in promoting data integration across ministries, agencies, and local governments, thereby enhancing transparency, strengthening evidence-based policymaking, and improving the efficiency of public service delivery. Nevertheless, challenges remain in ensuring regulatory compliance, reinforcing cybersecurity infrastructure, and building human resource capacity. Sustaining progress requires continuous evaluation and collaboration among government, the private sector, and civil society. By maintaining policy coherence and technological adaptability, Indonesia can advance toward a more secure, transparent, and data-driven public administration system that supports long-term national development goals.

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