

The Role of Electronic-Based Government System (SPBE) in Indonesia's Digital Government Era

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ABSTRACT

The Electronic-Based Government System (SPBE) has emerged as a central pillar in Indonesia's digital transformation agenda, serving as a framework to improve transparency, efficiency, and accountability in public administration. This study employs a Systematic Literature Review (SLR) approach to synthesize findings from existing research on SPBE implementation, its challenges, and its impact on governance. Using 50 of the most relevant publications sourced from academic databases and the Consensus research platform, the study identifies key progress areas and persistent barriers. The findings reveal that SPBE contributes significantly to administrative efficiency, public service innovation, and citizen engagement. However, implementation disparities, cybersecurity vulnerabilities, and digital literacy gaps continue to hinder its full realization. This paper highlights the need for inclusive policy refinement, capacity building, and collaborative governance to sustain Indonesia's digital government transformation.

Keywords: SPBE, digital governance, public administration, transparency, Indonesia.

INTRODUCTION

The Electronic-Based Government System (SPBE) has become a cornerstone of Indonesia's digital transformation agenda, aiming to modernize governance, enhance public service delivery, and foster transparency and accountability. SPBE leverages information and communication technology (ICT) to streamline administrative processes, reduce corruption, and improve citizen engagement across central and regional government levels (Gumilang & Nugraha, 2021; Hidayati & Srmoeljanto, 2023; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Lindquist, 2022; Marliani, 2024; Ningtyas *et al.*, 2023; Rozas *et al.*, 2022; Sistem *et al.*, 2023).

Presidential Regulation Number 95 of 2018 and its subsequent updates provide the legal and architectural framework for SPBE, mandating integration, efficiency, and citizen-centric services (Gumilang & Nugraha, 2021; Israyudin *et al.*, 2025; Jumhur & Doly, 2024; Ningtyas *et al.*, 2023). While SPBE has driven significant improvements in service accessibility, efficiency, and transparency, its implementation faces persistent challenges, including infrastructure disparities, digital literacy gaps, cybersecurity risks, and uneven maturity across regions (Erizal *et al.*, 2022; Hidayah & Almadani, 2022; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Lindquist, 2022; Putra & Dhanuarta, 2021).

The literature highlights both the transformative potential of SPBE and the need for ongoing policy refinement, capacity building, and inclusive digital strategies to ensure sustainable and equitable digital governance in Indonesia (Erizal *et al.*, 2022; Gumilang & Nugraha, 2021; Hidayah & Almadani, 2022; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Lindquist, 2022; Marliani, 2024; Ningtyas *et al.*, 2023; Sistem *et al.*, 2023).

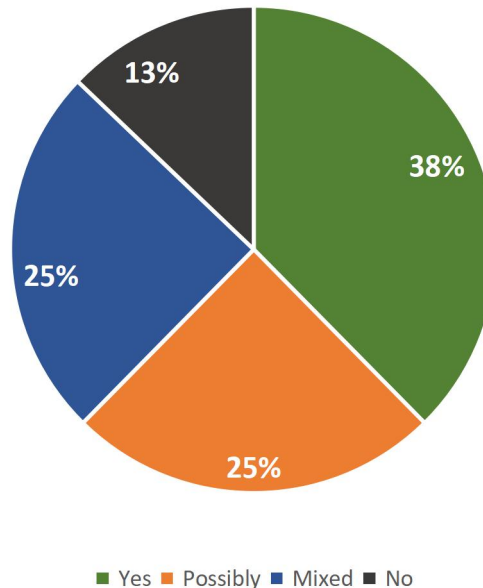


Figure 1: Implementation of SPBE in Indonesias

Source: Data processed by the author (2025)

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Institutional setting

The implementation of SPBE in Indonesia is guided by Presidential Regulation Number 95 of 2018 and coordinated by the Ministry of Administrative and Bureaucratic Reform (PANRB), with support from Ministry of Communication and Information Technology and Ministry of National Development Planning/National Development Planning Agency. These institutions oversee policy formulation, technical guidance, and monitoring to ensure interoperability and accountability across agencies.

The framework reflects Indonesia's effort to build a unified and transparent digital governance system. However, differences in institutional capacity, human resources, and infrastructure among regions still hinder full integration. Strengthening coordination and capacity building remains essential to achieving effective nationwide SPBE implementation.

Agency theory

Agency Theory provides a foundational lens for analyzing the implementation of the Electronic-Based Government System (SPBE) in Indonesia. Within the public administration context, this theory explains how information asymmetry between government actors (as agents) and citizens (as principals) can be minimized through the use of transparent digital systems. SPBE, by design, enables real-time access to data, digital documentation, and traceable decision-making processes—mechanisms that collectively strengthen accountability and public oversight (Israyudin *et al.*, 2025; Jumhur & Doly, 2024).

Through the adoption of SPBE, the Indonesian government enhances vertical and horizontal accountability by making information flows more symmetrical. For instance, the integration of e-budgeting, e-procurement, and digital service portals reduces the discretion

of bureaucratic intermediaries and limits opportunities for corruption, aligning with the agency theory premise that effective monitoring and information systems improve governance outcomes (Ivanna *et al.*, 2024; Sistem *et al.*, 2023).

Furthermore, SPBE's emphasis on transparency and auditability allows citizens and oversight bodies to access performance metrics and service evaluations, fostering a governance environment based on evidence and trust. Thus, SPBE operationalizes the principles of Agency Theory by leveraging ICT to ensure that public officials act in accordance with the interests of the public as the ultimate principal.

Based on the theoretical framework and literature synthesis, the following hypotheses are proposed:

H1: SPBE implementation positively influences government efficiency and transparency.

H2: Regional differences in infrastructure and institutional capacity significantly affect SPBE maturity levels.

METHODS

A comprehensive literature review was conducted using the Consensus Deep Search platform, which aggregates over 170 million research papers from sources such as Semantic Scholar and PubMed. The search strategy included targeted queries on SPBE's role, implementation, challenges, and impact in Indonesia, resulting in 999 papers identified, 577 screened, 473 deemed eligible, and the top 50 most relevant papers included in this review.

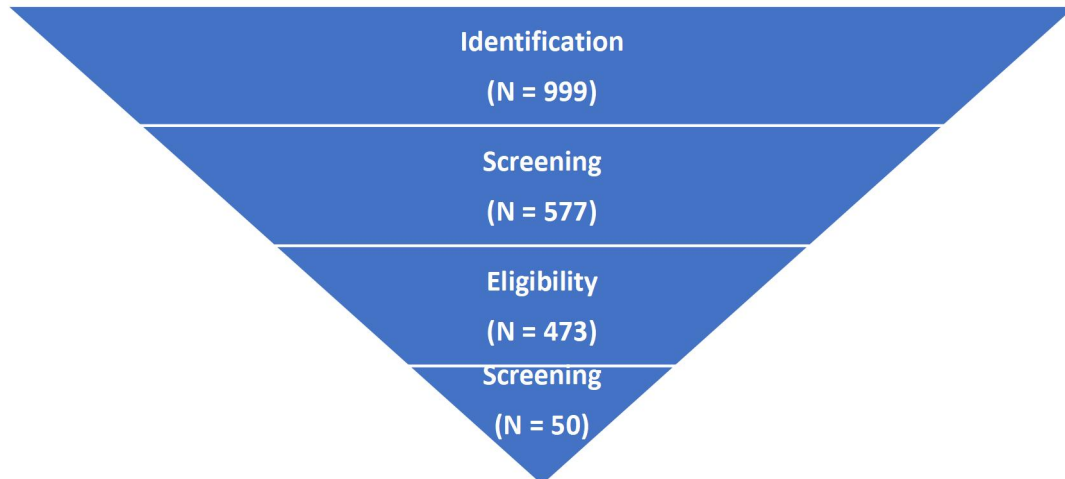


Figure 2: Flow diagram of the SPBE literature search and selection process.

Source: Data processed by the author (2025)

Eight unique search groups were used, covering foundational concepts, implementation models, challenges, interdisciplinary perspectives, and adjacent topics to ensure a holistic review.

RESULTS

Policy Framework and Strategic Objectives

SPBE is anchored in Presidential Regulation Number 95 of 2018 and subsequent regulations, which set out principles of effectiveness, integration, efficiency, accountability,

interoperability, and security (Gumilang & Nugraha, 2021; Israyudin *et al.*, 2025; Jumhur & Doly, 2024; Ningtyas *et al.*, 2023; Sistem *et al.*, 2023). The policy narrative emphasizes SPBE as a strategic solution for data integration, cybersecurity, and improved public service efficiency, with key actors including the Ministry of Administrative and Bureaucratic Reform, Ministry of National Development Planning/National Development Planning Agency, and Ministry of Communication and Information Technology (Gumilang & Nugraha, 2021; Israyudin *et al.*, 2025; Jumhur & Doly, 2024; Ningtyas *et al.*, 2023).

Impact on Public Service Delivery

SPBE has led to notable improvements in public service accessibility, efficiency, and transparency. Digital platforms and integrated portals (e.g., INA Digital, regional service websites) have reduced physical barriers, streamlined administrative processes, and increased citizen satisfaction (Erizal *et al.*, 2022; Hidayati & Srimoeljanto, 2023; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Pratama *et al.*, 2024; Rinayuhani *et al.*, 2025; Sistem *et al.*, 2023). SPBE supports two-way communication, complaint handling, and participatory governance, aligning with good governance principles (Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Rinayuhani *et al.*, 2025; Sistem *et al.*, 2023; Suhita *et al.*, 2023).

Implementation Challenges and Maturity

Despite progress, SPBE implementation is uneven across regions, with maturity levels varying due to infrastructure gaps, limited ICT human resources, regulatory delays, and digital literacy disparities (Erizal *et al.*, 2022; Hidayah & Almadani, 2022; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Lindquist, 2022; Marlioni, 2024; Putra & Dhanuarta, 2021). Cybersecurity remains a critical concern, with recurring data breaches and the need for robust information security management (Hidayah & Almadani, 2022; Israyudin *et al.*, 2025; Lindquist, 2022; Yeremias *et al.*, 2024). The literature also notes sectoral egos, suboptimal inter-agency coordination, and the need for more detailed technical guidance (Farida & Firmansyah, 2023; Israyudin *et al.*, 2025; Lindquist, 2022; Lisdiana *et al.*, 2024).

Innovation, Collaboration, and Future Directions

SPBE fosters innovation in public administration, enabling paperless offices, virtual workspaces, and smart city initiatives (Aulia & Permana, 2024; Hidayati & Srimoeljanto, 2023; Maulana *et al.*, 2024; Noer & Hidayat, 2024; Yuhefizar *et al.*, 2019). Collaborative governance, public-private partnerships, and community-based support networks are highlighted as key enablers for successful digital transformation, especially in rural and local contexts (Aulia & Permana, 2024; Isfihani *et al.*, 2024; Maulana *et al.*, 2024; Yuliana & Hasibuan, 2022).

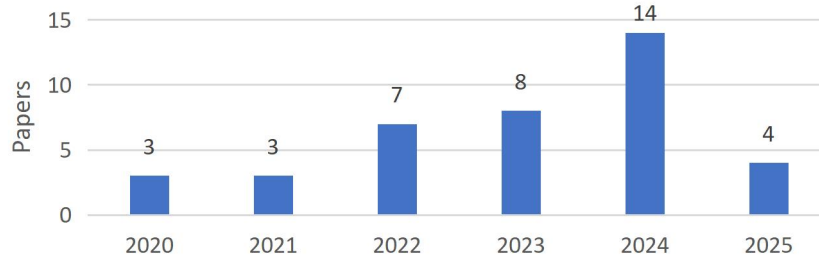


Figure 3: Timeline of key SPBE research and implementation milestones in Indonesia.

Source: Data processed by the author (2025)

As illustrated in Figure 3, SPBE research publications increased steadily over time. Table 1 further details the authors and journals associated with each publication year.

Table 1. Authors and Journals by Year of SPBE Research Publications

Year	Papers	Author/Journal
2020	3	(Rizal <i>et al.</i> ; La Adu; Senshaw & Twinomurinsi;
2021	3	Putra & Dhanuarta; Gumilang & Nugraha; Hanifa & Noviaristanti)
2022	7	(Erizal <i>et al.</i> ; Rozas <i>et al.</i> ; Farida & Firmansyah; Hidayah & Almadani; Dwitawati; Yuliana & Hasibuan; Lindquist)
2023	8	(Maghfiroh <i>et al.</i> ; Hidayati & Srmoeljanto; Suhita <i>et al.</i> ; Ragani <i>et al.</i> ; Ningtyas <i>et al.</i> ; Sistem <i>et al.</i> ; Farida & Firmansyah; La Adu)
2024	14	(Fardiah <i>et al.</i> ; Supriadi <i>et al.</i> ; Maulana <i>et al.</i> ; Lisdiana <i>et al.</i> ; Yeremias <i>et al.</i> ; Ivanna <i>et al.</i> ; Pratama <i>et al.</i> ; Jumhur & Doly; Arpandi <i>et al.</i> ; Aulia & Permana; Marliani; Noer & Hidayat; Bujung <i>et al.</i> ; Isfihani <i>et al.</i> ;
2025	4	Israyudin <i>et al.</i> ; Implementation of E-Government in Regional Administration of West Nusa Tenggara Province-Indonesia. <i>Pakistan Journal of Criminology.</i> ; Rinayuhani <i>et al.</i> ; Makatur <i>et al.</i>)

Source: Data processed by the author (2025)

Building on the annual distribution of studies, Table 2 highlights the authors and journals most frequently cited or involved in SPBE research from 2021 to 2025.

Table 2. Authors & journals that appeared most frequently in the included papers.

Type	Name	Papers
Author	Gerry Firmansyah	(Lisdiana <i>et al.</i> , 2024; Farida & Firmansyah, 2023; Senshaw & Twinomurinsi, 2020; Hanifa & Noviaristanti, 2021)
Author	S. Gumilang	(Gumilang & Nugraha, 2021; Dwitawati, 2022; Bujung <i>et al.</i> , 2024)
Author	Riyan Israyudin	(Israyudin <i>et al.</i> , 2025)
Journal	<i>Jurnal Ilmiah Merpati (Menara Penelitian Akademika Teknologi Informasi)</i>	(Rozas <i>et al.</i> , 2022; La Adu, 2023)
Journal	<i>JIPi (Jurnal Ilmiah Penelitian dan</i>	(Gumilang & Nugraha, 2021; Bujung <i>et al.</i> ,

Source: Data processed by the Author (2025)

Research Gaps

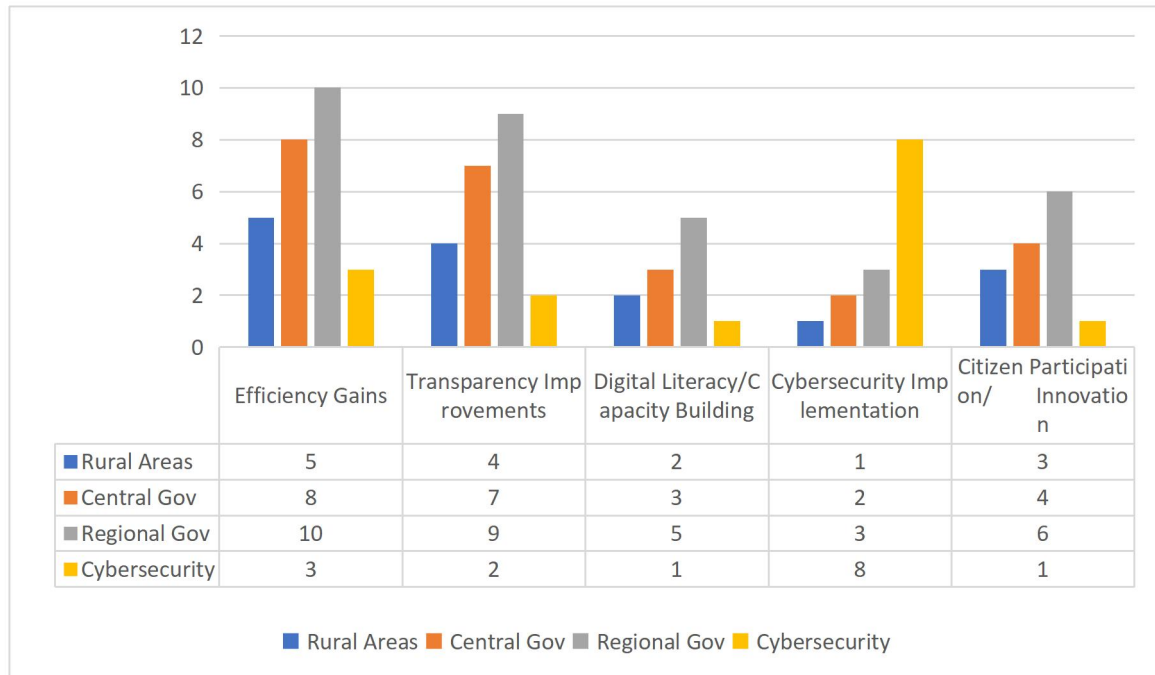


Figure 4. Matrix of Research Coverage on SPBE

Source: Data processed by the author (2025)

Figure 4 illustrates the distribution of SPBE research coverage across different institutional and regional contexts. The results show that studies related to efficiency gains and transparency improvements dominate the literature, particularly in regional and central government settings. Meanwhile, topics such as digital literacy/capacity building and citizen participation remain less explored, especially in rural areas. The lowest research intensity appears in the field of cybersecurity, indicating a significant gap that requires further academic and policy attention. Overall, the findings highlight uneven research focus across SPBE dimensions, emphasizing the need for more inclusive and balanced investigations.

DISCUSSION

Explanation of Discussion 1

The research demonstrates that SPBE is a transformative force in Indonesian governance, driving efficiency, transparency, and innovation in public service delivery (Erizal *et al.*, 2022; Hidayati & Srmoeljanto, 2023; Israyudin *et al.*, 2025; Ivanna *et al.*, 2024; Jumhur & Doly, 2024; Ningtyas *et al.*, 2023; Pratama *et al.*, 2024; Rinayuhani *et al.*, 2025; Sistem *et al.*, 2023; Suhita *et al.*, 2023). The legal and architectural frameworks provide a solid foundation, but successful implementation depends on institutional readiness, human resource development, and inclusive digital strategies (Erizal *et al.*, 2022; Israyudin *et al.*, 2025; Jumhur & Doly, 2024; Lindquist, 2022; Marliani, 2024; Putra & Dhanuarta, 2021).

Persistent challenges—such as infrastructure disparities, cybersecurity risks, and digital literacy gaps—underscore the need for ongoing investment, capacity building, and policy refinement (Hidayah & Almadani, 2022; Israyudin *et al.*, 2025; Lindquist, 2022; Marliani, 2024; Putra & Dhanuarta, 2021; Yeremias *et al.*, 2024).

The literature also highlights the importance of collaborative governance, community engagement, and adaptive innovation to ensure that SPBE benefits are equitably distributed across Indonesia's diverse regions (Aulia & Permana, 2024; Isfihani *et al.*, 2024; Maulana *et al.*, 2024; Yuliana & Hasibuan, 2022).

Explanation of Discussion 2

Table 3. Claims and Evidence Table

Claim	Evidence Strength	Reasoning	Papers
SPBE improves efficiency and transparency in government services	Evidence strength: Strong (9/10)	Supported by multiple case studies, policy analyses, and empirical evaluations across regions.	(Israyudin <i>et al.</i> , 2025; Jumhur & Doly, 2024; Ivanna <i>et al.</i> , 2024; Sistem <i>et al.</i> , 2023; Erizal <i>et al.</i> , 2022; Ningtyas <i>et al.</i> , 2023; Marliani, 2024)
SPBE implementation is uneven, with maturity gaps across regions	Evidence strength: Strong (8/10)	National and regional assessments show significant disparities in SPBE index and readiness.	(Israyudin <i>et al.</i> , 2025; Jumhur & Doly, 2024; Erizal <i>et al.</i> , 2022; Putra & Dhanuarta, 2021; Marliani, 2024; Rizal <i>et al.</i> , 2020; Bujung <i>et al.</i> , 2024)
Cybersecurity and data protection are persistent challenges	Evidence strength: Moderate (7/10)	Recurring data breaches and low information security maturity are documented in audits and evaluations.	(Israyudin <i>et al.</i> , 2025; Yeremias <i>et al.</i> , 2024; Hidayah & Almadani, 2022; Lindquist, 2022; Farida & Firmansyah, 2023)
SPBE fosters innovation and citizen participation	Evidence strength: Moderate (7/10)	Evidence of new digital platforms, participatory services, and smart city initiatives in multiple regions.	(Hidayati & Srimoeljanto, 2023; Noer & Hidayat, 2024; Yuhefizar <i>et al.</i> , 2019; Maulana <i>et al.</i> , 2024; Aulia & Permana, 2024; Yuliana & Hasibuan, 2022; Isfihani <i>et al.</i> , 2024)
Digital literacy and infrastructure gaps hinder SPBE effectiveness	Evidence strength: Moderate (6/10)	Studies highlight digital divide, limited ICT skills, and infrastructure disparities, especially in rural areas.	(Israyudin <i>et al.</i> , 2025; Ivanna <i>et al.</i> , 2024; Erizal <i>et al.</i> , 2022; Putra & Dhanuarta, 2021; Marliani, 2024; Yuliana & Hasibuan, 2022; Isfihani <i>et al.</i> , 2024)
Policy and regulatory frameworks require ongoing refinement	Evidence strength: Moderate (5/10)	Some ambiguity and lack of technical guidance noted; need for more detailed and adaptive regulations.	(Israyudin <i>et al.</i> , 2025; Lisdiana <i>et al.</i> , 2024; Farida & Firmansyah, 2023; Lindquist, 2022; Gumilang & Nugraha, 2021; Senshaw & Twinomurinzi, 2020)

Source: Data processed by the author (2025)

Table 3 summarize the key claims and supporting evidence derived from the reviewed studies. The strongest and most consistent findings indicate that SPBE significantly enhances government efficiency and transparency, though implementation maturity remains uneven across regions. Moderate evidence supports the view that SPBE encourages innovation and citizen participation, yet challenges in cybersecurity, digital literacy, and infrastructure continue to hinder optimal outcomes. Furthermore, while policy and regulatory frameworks have provided a strong foundation, ongoing refinement and technical guidance are required to sustain long-term digital transformation and ensure equitable implementation.

CONCLUSION

SPBE has played a pivotal role in Indonesia's digital government transformation, delivering measurable gains in efficiency, transparency, and public service innovation. However, realizing its full potential requires addressing persistent challenges in infrastructure, human resources, cybersecurity, and regulatory clarity. Ongoing collaboration, capacity building, and inclusive digital strategies are essential for sustainable and equitable digital governance. In summary, SPBE is a transformative driver of digital governance in Indonesia, but its success depends on addressing persistent gaps and fostering inclusive, secure, and innovative public service ecosystems.

Based on the systematic review, several research gaps remain open for future studies on SPBE implementation in Indonesia. First, further investigation is needed to understand how SPBE implementation can be optimized in rural and remote regions, where infrastructure and digital literacy challenges persist. Second, future research should explore the most effective models for improving cybersecurity maturity in SPBE, particularly in addressing data protection and system resilience. Finally, the issue of citizen participation and trust in digital public services requires deeper examination, as building public engagement is crucial for the long-term success and legitimacy of SPBE initiatives.

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