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Development of the Indonesian Government's Digital Transformation

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Abstract: Digital transformation has been the center of attention in efforts to modernize government in Indonesia in the last decade. This article documents the evolution and impact of the Indonesian government's digital transformation initiatives from 2010 to 2024. The Indonesian government has taken significant steps in encouraging the adoption of information and communication technology (ICT) to improve administrative efficiency, increase openness, and provide easier and faster access to public services. Key initiatives include the development of an e-government platform that provides online services from various government departments and agencies, as well as the implementation of an integrated data management system to improve evidence-based decision-making. In addition, Indonesia has also moved towards further digitalization by utilizing big data to formulate public policies that are more effective and responsive to the needs of the community. The national digital infrastructure being developed, such as the Palapa Ring, is an important foundation in supporting equitable internet connectivity across the country, facilitating digital inclusion in remote and urban areas. However, this digital transformation process is also faced with a number of challenges, including data security, technology accessibility in remote areas, and the readiness of human resources to adopt new technologies. This article also highlights the government's efforts to build people's capacity to utilize digital technology effectively through training and education programs. Overall, the Indonesian government's digital transformation has had a significant impact in improving administrative efficiency and transparency, as well as expanding access to public services. This article concludes by evaluating the opportunities and challenges ahead, as well as the broader implications of digital transformation on public participation and inclusive economic growth in this digital era.

Keywords: Digital transformation, Government of Indonesia, E-government, Technological Innovation

INTRODUCTION

Various studies show that Indonesia has the potential to become a world economic power by 2045, where one of the keys is the mastery of digital technology. If Indonesia is able to take advantage of digitalization in the economic sector, the Gross Domestic Product (GDP) is estimated to increase to Rp 22,500 trillion (compared to GDP growth without digital transformation). With such a large GDP value, Indonesia will rank 5-7 in the world's highest GDP, with an estimated per capita income of US$ 20-23 thousand in 2045. Digital government (*e-government*) is one of the main pillars that supports the achievement of the vision of Digital Indonesia 2045.

Source: Ministry of Communication and Information of the Republic of Indonesia, 2024

Figure 1. Digital Indonesia Vision Framework 2045

The government's digital transformation begins with the e-government policy regulated in Presidential Instruction Number 3 of 2003 concerning National Policies and Strategies for *e-Government* Development. Then it developed into an Electronic-Based Government System, as regulated in Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems.

The Electronic-Based Government System (SPBE) aims to create high government bureaucratic performance and quality public services. A high-performance bureaucracy has the following characteristics: integrative, dynamic, transparent, and innovative. First, an **integrative** bureaucracy prioritizes strategic collaboration between government agencies and other stakeholders to share resources and build strength in carrying out government duties and functions. Second, a dynamic bureaucracy can quickly respond to changes in strategic environmental conditions by building government business processes dynamically both within and between government agencies. Third, a transparent bureaucracy is a must to build trust and legitimacy of the government in the eyes of the public. With a transparent bureaucracy, the government shows its seriousness in working for the public interest, understanding public needs, and monitoring and evaluating government performance. Fourth, an innovative bureaucracy can provide space to develop faster, easier, and cheaper services. The SPBE initiative is also driven by technological developments such as *mobile internet, cloud computing, internet of things, big data analytics*, and *artificial intelligence*.

This article aims to analyze the development of the government's digital transformation, the results of the evaluation and audit of the implementation of SPBE, the challenges in the implementation of SPBE, and the opportunities for improvement.

METHOD

This article is written using a qualitative approach. The data collected and processed to support the writing of this article comes from various secondary sources. The data collected and analyzed are intended to be described in order to answer the purpose of writing the article. Various data collected were analyzed using qualitative data analysis techniques.

RESULTS AND DISCUSSION

Concept and Paragdigma *of E-Government* in Indonesia

Global dynamics are happening in information and communication technology. Governments around the world recognize the importance of *e-Government*. According to *the World Bank*, *e-Government* is the use of information technology by government agencies, which can transform the government's relationship with the public, the business world, and other government agencies. Technology in *e-government* can serve various purposes, including: improving public services, improving business-industry relationships, empowering people through access to knowledge, and improving government management.

In simple terms*, e-government* is an information and communication technology used by government institutions, Kumar & Sinha, 2007). Information technology applied in e-government, especially the internet, can improve government services to the community, increase government interaction with business actors and industries, empower the community through improved access to information, and more efficient governance. Other benefits of *e-government* are reduced corruption, increased transparency, convenience, revenue growth, and cost reduction (*World Bank*, 2015).

In several countries around the world, e-Government has become a priority for government administration reform. In 2008, out of 192 UN representatives, 179 stated that the e-Government system has been included in the list of top priorities of governments around the world (UN, 2008). E-Government is increasingly being applied around the world to minimize costs, improve services to the community, and increase productivity and effectiveness at the global, regional, national, and local levels.

There are four types of interaction between the government and stakeholders in e-government, namely:

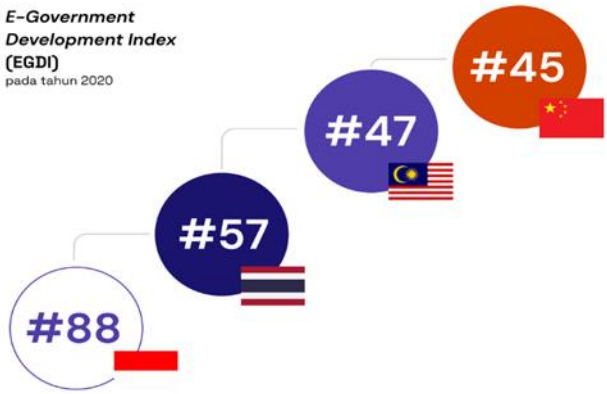
a. government-to-citizen (G2C): the provision of electronic/online services by government agencies to the community, such as payment of taxes/PNBP, issuance of ID cards/driver's licenses/permits, etc.
b. government-to-business (G2B): the provision of public services to the business sector through electronic/online channels. This interaction allows the exchange of electronic data between the government and the business sector, e.g. electronic procurement of goods/services, import/export services of goods, customs services, etc.).
c. government-to-government (G2G): the exchange of data and information electronically/online within Government entities or between government entities through secure communication networks.

d. Government-to-employee (G2E): interaction from government institutions to their employees through government management information systems (e.g. human resource information systems).

E-Government is one of the government's tools in improving the delivery of government services to citizens, the business world, and other government institutions. E-government also allows citizens, businesses, and other government agencies to interact with each other.

After the reform movement in 1998, the demand for better services echoed and became a paradigm for the Indonesian government. In order to improve public services, the government then issued Law No. 25/2009 on Public Services, which mandates a national public service information system. The information system contains all public service information from the organizer at each level, and must be available to the public in an open and easily accessible manner. Referring to these provisions, many local governments initially identified the implementation of e-Government only in the form of local government websites. The government must improve the development of e-government, especially in terms of infrastructure, human resources, applications, regulations, and socialization among the government and the public, to improve the quality of e-Government development in Indonesia (Erhan et al. al., 2017; Farida et al., 2020; Mi'rojul & Novy Setia Yunas, 2016; Jaya, 2001; Suhardi et al., 2015; Syaifullah, 2015; Wahid, 2004).

The implementation of *e-government* or SPBE by government institutions (both central and regional) has provided opportunities for improving the quality of public services and transparency in the administration of government. However, when compared to other countries, Indonesia still has to catch up in the provision of quality public services. In 2020, Indonesia ranked 73rd in the Government Effectiveness Index. Meanwhile, in terms of *the E-Government Development Index* (EGDI), in 2020, Indonesia was ranked 88th out of 193 countries. This position is below Thailand (ranked 57th), Malaysia (ranked 47th), and China (ranked 45th).



Source: Ministry of Communication and Information of the Republic of Indonesia

Summarized from several literatures, the *key success factors* of government digital transformation are: (1) policies and regulations; (2) digital leadership; (3) collaboration between sectors; (4) digital mindset/attitude/culture; (5) digital infrastructure and technology; (6) electronic/online public services; (7) information management system; (8) data disclosure; (9) human resource capability; (10) research and innovation; (11) community involvement.

Community involvement is an important element of governance today, which can improve policymaking and strategy at all levels of government, as well as strengthen accountability and

public service delivery. The United Nations (UN) agrees that good governance focuses on quality public consultation and stakeholder participation at all levels of government. Dialogue and expansion of public participation can improve the quality of government decision-making both at the regional and national levels. While there is a lack of technical infrastructure, financial capital, and public administration capacity in efforts to implement e-government in developing countries, innovations in programs and technologies will help overcome these barriers. The utilization of the growth potential of the ICT sector – among others in the trade, industry, and service sectors – is closely related to the government's digital transformation towards e-government (Ebrahim & Irani, 2005; Griffin & Trevorrow, 2014; Management, 2010).

Development of Government Digital Transformation Policy and Governance (SPBE)

The government has issued a number of regulations regarding SPBE, including the following:

a. Presidential Instruction No. 3 of 2003 concerning National Policies and Strategies for e-Government Development;
b. Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems;
c. Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform (PermenPANRB) Number 5 of 2018 concerning SPBE Evaluation Guidelines;
d. Regulation of the Minister of Home Affairs (Permendagri) Number 70 of 2019 concerning Regional Government Information Systems;
e. Presidential Regulation No. 39 of 2019 concerning One Indonesian Data
f. PANRB Ministerial Regulation No. 59/2020 concerning Monitoring and Evaluation of SPBE
g. Presidential Regulation No. 132 of 2022 concerning Electronic-Based Government System Architecture
h. PANRB Ministerial Guidelines No. 6/2023 concerning Procedures for Monitoring and Evaluation of SPBE Evaluation.

According to Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems, the Electronic-Based Government System (SPBE) is a government implementation that utilizes information and communication technology to provide services to SPBE users, which includes central agencies, local governments, civil servants, individuals, communities, business actors, and other parties. SPBE services include: (a) electronic-based government administration/internal bureaucratic services; (b) electronic-based public services. The use of data and information in SPBE prioritizes the use of data and information/interoperability between central agencies and/or local governments. The interoperability of e-government information systems is influenced by many factors, including administrative support, consistent policies, competence in the IT field, protection and privacy, IT infrastructure, and confidence to use the services provided by the e-Government system. The main goal of interoperability in e-government is to sharpen business processes in providing similar services through cooperation between government agencies (Sulehat & Taib, 2016).

Referring to Presidential Regulation No. 95/2018, SPBE's vision is "The realization of an integrated and comprehensive electronic-based government system to achieve high-performance bureaucracy and public services". To achieve this vision, SPBE's mission is: (1) structuring and strengthening the organization and integrated governance of SPBE; (2) developing electronic-based public services that are integrated, comprehensive, and reach the wider community; (3) building an integrated, safe, and reliable ICT foundation; and (4) building competent and

innovative ICT-based human resources. The SPBE strategic plan consists of 2 stages, namely the SPBE foundation construction stage (2018-2022) and the SPBE development stage (2023-2025).

Table 1. SPBE Foundation Construction (2018-2022) and SPBE Development Phase (2023-2025)

	SPBE Foundation Construction Stage (2018-2022)	SPBE Development Phase (2023-2025)
Focus	Strengthening SPBE governance, SPBE infrastructure, and SPBE acceleration	Improving the quality of SPBE that is responsive and adaptive to the needs of SPBE service users.
Expected achievements	a. SPBE Architecture Information System, National SPBE Architecture, Central Agencies, and local governments. b. National SPBE Coordination Team, Central Agencies, and local governments c. meso and micro policies that support the implementation of Presidential Regulation 95/2018. d. evaluation of the National SPBE, Central Agencies, and local governments. e. user needs and satisfaction surveys; f. Public Service, Government Administration, and National Data Portal g. the application of SPBE to the integration of planning, budgeting, procurement of government goods and services, performance accountability, monitoring and evaluation, staffing, archiving, and public complaints; h. management of SPBE Services; i. SPBE Infrastructure; j. information security systems; and k. SPBE technical competency standards.	a. SPBE Service portal based on artificial intelligence and big data; b. improving the quality of broadband networks and intra-government networks; c. increase the number of SPBE Services according to user needs; d. improving the quality of information security; and e. increasing the capacity of SPBE human resources.

Results of SPBE Performance Assessment and Evaluation

a. Audit of SPBE Management by the Indonesian Financial Audit Agency

BPK in 2020 carried out a performance audit on SPBE Management at the Ministry of Home Affairs, 4 provincial governments, 19 district governments, and 11 city governments, namely as follows:

Table 2. Audit of SPBE Management

Provincial Government	Regency Government		City Government
1. Bangka Belitung Islands Provincial Government 2. Riau Provincial Government 3. Central Java Provincial Government 4. DKI Jakarta Provincial Government.	1. Pemkab Mojokerto 2. Pemkab Natuna; 3. Aceh Tamiang Regency Government 4. West Aceh Regency Government; 5. South Tapanuli Regency Government; 6. Pesawaran Regency Government;	10. Batanghari Regency Government 11. Banyuwangi Regency Government 12. Blitar Regency Government 13. Pacitan Regency Government 14. Kendal Regency Government 15. Pemkab Sukoharjo	1. Pemkot Cilegon 2. Pemkot Banda 3. Pemkot Metro 4. Prabumulih City Government 5. Lubuk Linggau City Government 6. Pekanbaru City Government; 7. Payaukumbuh City Government 8. Magelang City Government;

7. Kepahiang Regency Government; 8. Central Bengkulu Regency Government; 9. Central Bangka Regency Government	16. Pemkab Kulon Progo 17. Purwakarta Regency Government 18. West Bandung Regency Government 19. Sumedang Regency Government	9. Surakarta City Government; 10. Pekalongan City Government 11. Pemkot Cilegon

The purpose of the audit is to assess the effectiveness of SPBE management in the implementation of government administration. The objectives of the audit include: (1) SPBE governance; (2) SPBE infrastructure development; (3) development of SPBE applications and services; (4) monitoring and evaluation of SPBE carried out by the Regional Government. The results of the audit show achievements and areas that need improvement in the management of SPBE by the local government. In general, the main issues/problems of SPBE management in local governments are as follows:

1) SPBE Governance:
   a) The strategic plan for the development and implementation of SPBE in the regions has not been aligned with the National SPBE Master Plan.
   b) Regulations/policies in the context of developing and accelerating the implementation of SPBE are not complete/integrated/not in line with higher policies/regulations.
   c) The plan and budget for the development and acceleration of SPBE implementation are not comprehensive.
   d) The SPBE Coordination Team at the local government level has not been optimal in carrying out its duties and functions.
2) SPBE Infrastructure:
   a) Data centers in the local government are not in accordance with the Indonesian National Standard (SNI) / have not received consideration for operational feasibility and security.
   b) The intra-government network has not reached all units/work units/has not received operational feasibility and security.
   c) The connecting system of public application services has not been optimally connected/has not had considerations for operability and security/has not been optimally utilized.
   d) The provision of ICT infrastructure has not been optimal/not according to needs/has not been well coordinated.
3) Applications and Services
   a) Planning and Application Development to Support the Implementation of SPBE is Inadequate
   b) The use of applications in administrative services has not met all the needs of the local government/
   c) Government administration services have not been user-oriented/integrated/unsustainable to support the achievement of SPBE goals.
   4) Monitoring and evaluation

a) SPBE monitoring by the local government has not been optimal/not in accordance with the applicable guidelines/has not been well planned/has not been carried out periodically.
b) The results of the monev have not been properly communicated to relevant stakeholders.
c) The local government has not been optimal in following up on the results of the SPBE monev.

b. Monitoring and Evaluation of SPBE by the Ministry of PANRB

The Ministry of PANRB has published the results of the monitoring and evaluation of SPBE in 2022 as outlined in the Decree of the Minister of PANRB No. 108/2023 concerning the Results of Monitoring and Evaluation of SPBE in Central Agencies and Regional Governments in 2022. Monitoring and evaluation are carried out with reference to PANRB Ministerial Regulation No. 59/2020 concerning SPBE Monitoring and Evaluation. In 2022, monitoring was carried out in 451 central agencies and local governments, while evaluations were carried out in 103 central agencies and local governments.

There are 4 domains for assessing the maturity level of SPBE, namely: (1) SPBE internal policy; (2) SPBE governance; (3) SPBE management; (4) SPBE services. Furthermore, the index value representing the maturity level of SPBE implementation is categorized into the following predicates:

No.	Nilai Indeks	Predikat
1	4,2 – 5,0	Memuaskan
2	3,5 – < 4,2	Sangat Baik
3	2,6 – < 3,5	Baik
4	1,8 – < 2,6	Cukup
5	< 1,8	Kurang

The results of SPBE monitoring on 451 agencies show that only 15 agencies (or 3%) received the title of Very Good. This means that there are still many obstacles in the implementation of SPBE in Indonesia, not in accordance with the criteria set by the Ministry of PANRB, with the hope that SPBE can realize clean, effective, transparent, and accountable governance as well as quality and reliable public services.

Table 3. The results of the SPBE Monitoring in 2022 are as follows:

It	Category	Number of Institutions	Scale Index	Highest Index	Lowest Index
A.	**Central Agency**				
1.	Government department	25	2,26 – 3,86	**Kemendikbuds (3,86)**	Ministry of Religion (2,26)
2.	Non-Ministerial Government Institutions	14	2,00 – 3,57	State Administration Institutions (3.57)	National Counter-Terrorism Agency (2.00)
3.	State apparatus (State Intelligence Agency)	1	3,13	N/A	N/A
4.	Cabinet Secretariat	1	2,30	N/A	N/A
5.	Secretary General of State Institutions	8	1,80 – 2,95	DPR (2,95)	Constitutional Court (1.80)
6.	Other Agencies (Pancasila Ideology Development Agency)	1	2,32	N/A	N/A
7.	Public Broadcasting Institutions	2	2,01 – 2,09	TVRI (2,09)	RRI (2,01)

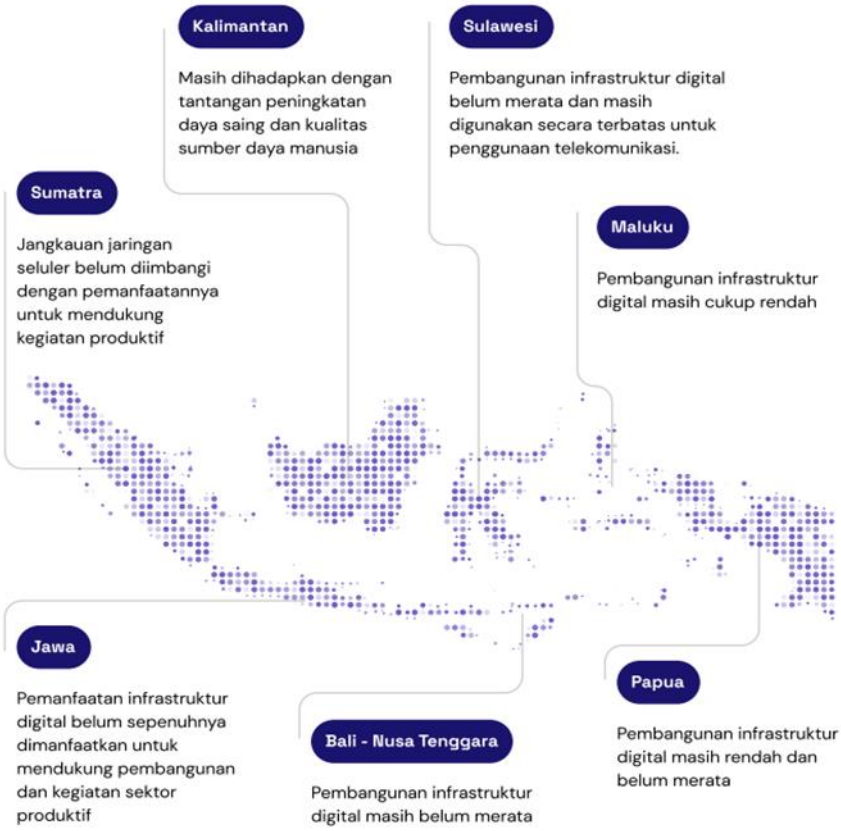
It	Category	Number of Institutions	Scale Index	Highest Index	Lowest Index
8.	Non-Structural Institutions	15	1,08 – 3,31	ASN Commission (3.31)	Prosecutor's Commission (1.08)
B.	**Government**				
1.	Aceh	11	1,59 – 3,15	Banda Aceh City Government (3,15)	Sabang City Government (1.59)
2.	North Sumatra	25	1,49 – 3,32	Deli Serdang Regency Government (3,32)	Asahan Regency Government (1.49)
3.	Riau	8	2,12 – 3,00	Riau Provincial Government (3.00)	Kep Meranti Regency Government (2,12)
4.	Riau Islands	6	1,85 – 2,85	Batam City Government (2.85)	Anambas and Tanjung Pinang Regency Governments (1.85)
5.	West Sumatra	19	1,91 – 3,48	South Coast Regency Government (3.48)	Pasaman Regency Government (1,91)
6.	Jambi	12	1,50 – 3,04	Batang Hari Regency Government (3.04)	Bungo Regency Government (1.50)
7.	South Sumatra	15	1,53 – 2,91	Pemkab Muara Enim (2,91)	North Musi Rawas Regency Government (1.53)
8.	Bangka Belitung Islands	8	1,85 – 3,02	Belitung Regency Government (3.02)	Bangka Regency Government (1.85)
9.	Bengkulu	10	1,55 – 3,11	Bengkulu Provincial Government (3,11)	Lebong Regency Government (1.55)
10	Lampung	11	1,50 – 3,37	Lampung Provincial Government (3.37)	Bandar Lampung City Government (1.50)
11	DKI Jakarta (DKI Jakarta Provincial Government)	1	3,67	N/A	N/A
12	West Java	25	1,71 – 3,84	Sumedang Regency Government (3.84)	Bekasi Regency Government (1.71)
13	Banten	9	2,01 – 3,03	Banten Provincial Government (3.03)	Pemkot Cilegon (2.01)
14	D.In Yogyakarta	3	2,62 – 3,19	Pemkab Sleman (3,19)	Gunungkidul Regency Government (2.62)
15	Jawa Tengah	30	2,13 – 3,73	**Surakarta City Government (3.73)**	Semarang Regency Government (2,13)
16	Jawa Timur	36	1,89 – 3,69	Surabaya City Government (3.69)	Bangkalan Regency Government (1.89)
17	West Kalimantan	13	1,03 – 3,42	West Kalimantan Provincial Government (3.42)	Sintang Regency Government (1.03)
18	Central Kalimantan	11	1,42 – 2,38	East Kotawaringin Regency Government (2.38)	North Barito Regency Government (1.42)
19	South Kalimantan	11	2,00 – 3,31	Banjarmasin City Government (3,31)	Tabalong Regency Government (2.00)
20	East Kalimantan	9	1,81 – 3,05	Balikpapan City Government (3.05)	West Kutai Regency Government (1.81)
21	North Kalimantan	3	1,98 -2,32	Bulungan Regency Government (2,32)	North Kalimantan Provincial Government (1.98)
22	North Sulawesi	13	1,51 – 2,74	Bolaang Mongondow Regency Government (2.74)	North Minahasa Regency Government (1.51)
23	Gorontalo	4	2,03 – 2,59	Gorontalo City Government (2.59)	Gorontalo Regency Government (2.03)
24	Central Sulawesi	7	1,76 – 2,26	Central Sulawesi Provincial Government (2.26)	Palu City Government (1.76)
25	South Sulawesi	19	1,81 – 2,93	North Luwu Regency Government (2.93)	Bulukumba Regency Government (1,81)

It	Category	Number of Institutions	Scale Index	Highest Index	Lowest Index
26	Southeast Sulawesi	8	1,38 – 3,15	Kolaka Regency Government (3,15)	Baubau City Government (1.38)
27	West Sulawesi	4	1,90 – 3,58	Polewali Mandar Government (3.58)	Mamuju Regency Government (1.90)
28	Bali	7	2,16 – 3,68	Denpasar City Government (3.68)	Pemkab Karangasem (2,16)
29	West Nusa Tenggara	9	1,20 – 3,24	Pemprov NTB (3,24)	Dompu Regency Government (1,20)
30	East Nusa Tenggara	18	1,14 – 3,35	NTT Provincial Government (3.35)	The Devil (1:14)
31	Maluku	4	1,75 – 2,24	Ambon City Government (2.24)	West Seram Bag Regency Government (1.75)
32	North Maluku	3	1,71 – 2,47	North Maluku Provincial Government (2.47)	Tidore Islands City Government (1.71)
33	Papua Barat	7	1,16 – 2,10	West Papua Provincial Government (2,10)	Kaimana Regency Government (2,16)
34	Papua	5	1,39 – 2,61	Jayapura Regency Government (2.61)	Pemkab Keerom (1,39)

Challenges of SPBE Implementation

a. The government has issued a number of policies and regulations related to e-government/digital government/SPBE. Likewise, each government institution has prepared plans and strategic steps to implement SPBE in accordance with its duties and functions. There are various obstacles in implementing the strategic plan that has been prepared. This is because there **is no** effective synergy and synchronization between parties involved in the planning process and the implementation of policies/plans that have been prepared. Keep in mind that digital transformation is a *cross-sectoral* process, requiring synergy and consolidation of policies and steps between institutions. To date, there are more than 17 *masterplans* and *roadmaps* in the digital field, which contain policy directions, goals, and digital transformation strategies that need to be synchronized.

b. Limited technological infrastructure. Reliable infrastructure for *e-government services* is not evenly distributed in all regions, especially in rural areas. In addition, the level of technological sophistication that varies between regions also makes it difficult to develop and use *e-government services*. There is a disparity in conditions between large islands in Indonesia related to the development of digital technology.



Source: Ministry of Communication and Information of the Republic of Indonesia. Vision of Digital Indonesia 2045, p. 43.

Indicator	Jawa	Bali – Nusa Tenggara	Kalimantan	Sulawesi	Maluku	Papua
4G network coverage	97,83%	78,52	44,24 %	52,45%	36.78% (below the national average of 65.57%)	25,66 %
Fiber optic network (for all sub-districts)	98,28%	50.10% (Bali 95.86%; NTB 64.16%; NTT 75.57%)	61,23%	62,76%	13,23%	13,23%
Average mobile broadband internet speed	Jakarta: 19.63 Mbps Central Java: 14.43 Mbps	Bali: 25.34 Mbps Nusa Tenggara: 15 Mbps	17,3 Mbps	15,78 Mbps	12,25 Mbps	16,34 Mbps
5G Network	There are 24 locations: Jabodetabek, Bandung, Semarang, Surabaya, Yogyakarta, Solo.	There are 7 locations: Denpasar, Badung, Ubud, Central Lombok, West Lombok, Sumbawa.	It is in 4 locations: Tarakan, Banjarmasin, Samarinda, Balikpapan	Only in Makassar and Morowali (metropolitan cities and industrial centers)	Not yet facilitated	Only in Mimika (the mining hub of Papua)
ICT Development Index	6,45 Central Java: 5.56	Bali: 6.49 NTB: 5,39 NTT: 5	5,90	5,65	Maluku: 5.65	4.41 (lowest in Indonesia)

Indicator	Jawa	Bali – Nusa Tenggara	Kalimantan	Sulawesi	Maluku	Papua
	East Java: 5.55				Volume: 5.03	
Indonesia Digital Society Index	44,10 (DKII: 47,98; Caste: 39,42)	Bali: 47.96 NTB: 40,41 NTT: 32.55	35 (highest in East Kalimantan 45.06 and lowest in Central Kalimantan 35.38)	34,49	Maluku: 36.48 Alcohol: 20.90	West Papua: 34.49 Papua: 33.69

Source; Ministry of Communication and Information of the Republic of Indonesia. Vision of Digital Indonesia 2045

c. HR capabilities to manage e-government, including planning, development, operations, and *project management* of digital systems.
d. Many government applications have not been integrated and there is a lack of interoperability of various e-government systems and applications. The government has around 24,000 applications used in government institutions, both central and regional, where most of these applications are not integrated. The problem is even more complex with the lack of data integrity, where there are 2,700 data servers spread across government institutions due to the absence of a national data center. Meanwhile, there are no SPBE system and application standards, making it difficult to interoperability of various e-government systems and applications. A poorly integrated system can hinder the exchange of data and information between government institutions, leading to data duplication, and inefficient government administration processes.
e. Cybersecurity. Cybersecurity breaches often occur, but the legal basis for cybersecurity has not yet been established (because it requires comprehensive discussions and agreements between stakeholders). Another challenge is the way silos in government institutions work in solving *cyber security* problems, making it difficult to develop a comprehensive data security system.
f. Data transparency and accountability. The data provided to the public will spread so that it is not clear about its originality, therefore it is necessary to pay attention to data transparency and accountability. The government needs to ensure public access to data/information, as well as the validity of the data presented. The availability of public data is a *value* that can be utilized by various parties.
g. Data protection and privacy. Although Indonesia currently has a Personal Data Protection Law, data leaks still occur frequently. According to the 2022 Q3 Survey, Indonesia is the country with the third most data leak cases (after Russia and France), with more than 13 million cases, with the most attacks on government websites. Data leaks give rise to distrust from the public to the government because of threats to personal data security.

CONCLUSION

SPBE as a form of government digital transformation in Indonesia has great potential to improve the efficiency and quality of public services, although it still faces various challenges. One of the factors that determines its success is the right policies and regulations, digital leadership, collaboration between sectors, adequate technological infrastructure, and human resource capabilities. Some of the opportunities to improve the implementation of SPBE in Indonesia are:

a. Synchronize policies and increase the synergy of all *stakeholders* in implementing policies/strategic plans for government digital transformation. The process of determining the direction of government digital transformation policies and strategies also needs the involvement of various parties including the central government, local governments, the private sector, academics, experts, and non-governmental organizations.
b. Establish a national data center that integrates data and information from all government institutions, both central and regional, and ensures interoperability between data.
c. Accelerate the discussion and ratification of cyber security regulations nationally.
d. Improving technology infrastructure throughout Indonesia.
e. Strengthening the capacity of human resources in the field of technology.

In the development and implementation of SPBE, the government must implement *a whole-of-government approach*. The formation of the SPBE Coordination Team is a good first step, but the complexity and high cost of coordination (policies, standards, and implementation) are one of the factors hindering the success of SPBE. The government needs to adopt *a whole-of-government* approach to realize digital government, which is spearheaded and coordinated by institutions that play a role and are authorized to carry out cross-ministry/agency supervision. The government also needs to have the ability or form an institution tasked with accelerating the implementation of cross-sector digital services, as well as supporting/providing digital service training in specific sectors.

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