

## Evaluation of the Challenges of E-Government Implementation: Analysis of the E-Government Development Index in Indonesia

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### ABSTRAK

Perkembangan teknologi informasi yang pesat menjadi pendorong utama bagi dinamika signifikan dalam implementasi e-government. Penelitian ini bertujuan untuk menyajikan analisis tentang tantangan penerapan e-government di Indonesia. Penelitian ini menggunakan metode kuantitatif dengan menggunakan data sekunder. Hasil penelitian menunjukkan E-Government Development Index di Indonesia mencapai peringkat 77 pada 2022 dengan skor sub indeks yang baik: 0.76 untuk Online Service Index, 0.64 untuk Telecommunication Infrastructure Index, dan 0.74 untuk Human Capital Index. Kesimpulan dari penelitian ini menunjukkan bahwa beberapa Tantangan penerapan E-Government, yaitu kurangnya integrasi data, partisipasi masyarakat yang minim, serta kurangnya pemahaman terhadap aspek teknis dan keamanan informasi di kalangan Sumber Daya Manusia (SDM), khususnya Aparatur Sipil Negara (ASN). Berdasarkan masalah-masalah tersebut, ada beberapa implikasi penelitian untuk meningkatkan infrastruktur teknologi informasi yang lebih baik dan merata di seluruh wilayah Indonesia, yaitu: (1) memperluas aksesibilitas dan meningkatkan infrastruktur digital di Indonesia, (2) memberikan pendampingan dan pelatihan kepada setiap pemerintah daerah dan ASN tentang penggunaan dan manfaat teknologi dalam sistem pemerintahan untuk memberikan pelayanan publik yang optimal, dan (3) mendukung dan memprioritaskan integrasi Pusat Data Nasional untuk mengumpulkan seluruh data dari daerah, kementerian, dan lembaga secara nasional dalam satu Big Data.

### ABSTRACT

The rapid development of information technology is the main driver for significant dynamics in the implementation of e-government. This study aims to present an analysis of the challenges of implementing e-government in Indonesia. This study used quantitative methods using secondary data. The results showed that the E-Government Development Index in Indonesia reached rank 77 in 2022 with a good sub-index score: 0.76 for the Online Service Index, 0.64 for the Telecommunication Infrastructure Index, and 0.74 for the Human Capital Index. The conclusion of this study shows that some of the challenges of implementing E-Government, namely lack of data integration, minimal public participation, and lack of understanding of technical aspects and information security among Human Resources (HR), especially the State Civil Apparatus. Based on these problems, there are several research implications to improve information technology infrastructure better and more evenly distributed throughout Indonesia, namely: (1) expanding accessibility and improving digital infrastructure in Indonesia, (2) providing assistance and training to each local government and civil servants on the use and benefits of technology in the government system to provide optimal public services, and (3) support and prioritize the integration of the National Data Center to collect all data from regions, ministries, and institutions nationally in one Big Data.

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## INTRODUCTION

In the era of globalization and advances in information technology, digital governance plays a key role in the transformation of public administration, especially through the implementation of e-government (Wagola et al., 2023; MenpanRB, 2020; Arief, 2023). Countries in Southeast Asia, including Indonesia, have made digital governance a key focus to improve efficiency, transparency, and public services (Katharina, 2021; Gafar, 2017; Fakhrol Umam Hadi, 2023). E-government in developing countries faces challenges due to factors such as cost and lack of understanding of its potential (Ordiyasa, 2015). However, e-government has been developed to reform and transform governance, utilizing advances in information and communication technology (Jubaedah, 2020). The rapid development of information technology is the main driver for the significant dynamics in e-government in Indonesia (Amelia et al., 2021). This is emphasized in Law Number 25 of 2009 concerning the public's need for more efficient and effective public services through E-Government (Jopang, Zulfiah Larisu, 2023)

As the research studied by Siwi & Nawawi (2023); Sururi (2017); Fiqri (2024) The application of various technological innovations to modernize administrative processes has enabled the Indonesian government to adapt to the demands of the times and increase community engagement. Next, Puspitaningrum (2021) He also mentioned that to overcome the digital divide, the role of the state is very important, as seen in the case of South Africa, where the government plays an important role in reducing the digital divide through policies and infrastructure development. In addition, research from (Pratama, 2016) and (Nugraha, 2018) It also found the use of social media in e-Government 2.0 has been highlighted as a tool to enhance government-citizen interaction and shape the image of government in the digital age. This shows the government's commitment to developing digital governance, including E-Government, to improve public services and bureaucratic efficiency.

On the other hand, success is supported by effective governance policies and frameworks in institutions and governance in the development of Digital Government (Romayah et al., 2014; Kusuma et al., 2021; Bappenas, 2020). This shows that institutional and governance aspects have a crucial role in ensuring the successful implementation of E-Government.

Research Parsaorantua (2017) also stated that the implementation of E-Government policy in Indonesia not only includes understanding the dynamics of its development, but also identifying the challenges faced in the process. Further research conducted by Wirawan (2020) Confirming that the implementation of e-government in the future can run optimally, several important steps are needed. Among them, the preparation of solid legal regulations and adequate legal protection, increasing special education in the IT field to produce competent human resources, developing adequate infrastructure and media access, and building good character and work ethic for government apparatus.

Research Heriyanto (2022) It also affirms that the implementation of e-government provides various benefits, including increased transparency of governance, reduced corrupt practices, simplification of governance relationships, increased efficiency throughout government processes, efficiency in the use of space and time, well-organized information structures, and improved resource management, both in control and organization.

Based on searches from previous studies, it was found that these studies specifically examined the application of E-Government in the development of Digital Government and the important role of implementing e-government for future infrastructure development. Therefore, considering the importance of E-Government in infrastructure development in the future, the

author is interested in studying more deeply related to the challenges that are the problem of implementing E-Government in Indonesia.

## **Literature Review**

### **E-Government development index (EGDI)**

EGDI was developed by the United Nations (UN) and was first introduced in the World Public Sector Report 2001 (Adams & Paul, 2023). EGDI ranks countries based on scores obtained (Kabbar, 2021). The increase in EGDI is expected to reflect increased efficiency, transparency, and public participation in government processes (Bilal, 2017). E-government Development Index (EGDI) is an indicator used to evaluate the level of development and implementation of electronic government (e-government) in a country (Kabbar, 2021). E-government refers to information and communication technology (ICT) to improve government services, public participation, operational efficiency, and community participation (Olphert & Damodaran, 2007).

Armstrong (2005) suggested that governance in Southeast Asian countries needs to be improved to be more efficient in accordance with applicable governance rules. According to Lea and Stenson (2007), the government sector in South Asian transnational countries tends to be dominated by non-state pressure groups. Similar to research from Tanesia (2017) states that countries in the region have not been fully involved in the technical sophistication of government. Therefore, it emphasized the need to accelerate the development of innovative public services and increase the use of technology in various industrial sectors to improve government performance.

Younus (2023) revealed that public services in South Asia are still limited, especially those offered by the government, with some services difficult for people to access. Countries such as Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka ranked low in the 2022 EGDI. Schandl and West (2010) approach affirms the importance of Asia in the context of population, resources, and technology. Despite Asia's leading continent, there are significant differences between economic and technological growth in North and South Asia. Technology, especially Information and Communication Technology (ICT), is key to maximizing the use of resources, reducing inefficiencies, and improving company procedures. ICT innovation has also had a positive impact on the public sector, with the ICT sector enabling the operational efficiency of administrative units.

### **E-Government Development Index Impact On Governance**

An increase in EGDI could potentially lead to heightened government transparency due to more information being accessible to the public (Meuleman et al., 2022). Similarly, government accountability can be strengthened through the availability of electronically verifiable data and information (Wong & Welch, 2004).

E-government improves administrative efficiency by minimizing bureaucracy, speeding up the decision-making process, and reducing the level of corruption (MáclHová et al., 2018). Technology allows the automation of routine tasks, allowing government officials to focus on strategic decisions (Chun et al., 2010).

A high EGDI can strengthen community participation through online consultation, electronic voting, and participation in decision-making processes (Kneuer, 2016). Improving e-government public services can improve the quality and availability of

public services, reducing the time and cost needed by the public to access these services (Wahyu Sulistya et al., 2019).

**Table 1.**  
**E-government Development Index (EGDI) Taxonomy**

No.	Name/ Year	Theory	Insights	Result	Summarized Abstract
1	(Sukarno & Nurmandi, 2023)	E-Government Development Index (EGDI): Voice and Accountability, Political Stability and No Violence, Government Effectiveness, Quality Regulation, Rule of Law, Corruption Control	This research is about the impact of the E-Government Development Index (EGDI) on the World Governance Index (WGI) in Southeast Asian countries. It does not assess the evolution of EGDI in Southeast Asia.	EGDI has the greatest impact on government effectiveness and regulatory quality.	Study on the impact of EGDI on WGI in Southeast Asia
2	(Ivanova et al., 2023)	Government digital transformation, and analysis of EGDI methodology	This research is about improving the methodology of the UN e-Government Development Index (EGDI). It does not specifically analyze EGDI in Southeast Asia.	This study analyzed the methodology of the United Nations e-Government Development Index (EGDI).	The study analyzed the UN EGDI methodology and proposed improvements.
3	(Khairunnisa, A Nurmandi, I Muallidin, 2022)	E-Government Development Index (EGDI) dan E-Government Assessment pada website	This provided research does not assess the E-Government Development Index in Southeast Asia. It focuses on an analysis of open government implementation during the COVID-19 pandemic in Indonesia, Malaysia, and Singapore.	This paper analyzes the methodology of the United Nations e-Government Development Index (EGDI).	This provided research does not assess the E-Government Development Index in Southeast Asia. It focuses on an analysis of open government implementation during the COVID-19 pandemic in Indonesia, Malaysia, and Singapore.
4	(Tsebenko, O., Lukach, N., Zavada, Y., & Stadnichenko, 2022)	E-Government	The research provided is about assessing the development of e-government in Eastern Partnership countries. It does not provide information on the e-government development index in Southeast Asia.	Comprehensive analysis of e-government systems in Eastern Partnership countries	analysis of e-government systems in Eastern Partnership countries

5	(Wang, 2022)	E-Government Development Stage	The paper provided does not discuss the e-government Development Index in Southeast Asia. This paper focuses on evaluating the status of e-government development in Macao.	Proposed Evaluation Methods for E-government Development	Evaluation methods for e-government Stages and levels of development
6	(Gupta et al., 2020)	E-governance Model-related Literature, E-Governance Development Assessment-based Literature	The paper provided does not address the assessment of the E-Government Development Index in Southeast Asia.	UN EGD I is not suitable for regional assessment.	The paper provided does not address the assessment of the E-Government Development Index in Southeast Asia.
7	(Prakrit Silal, 2021)	E-government (E-GOV)	The answer to the question is not in the paper provided. This paper is about explaining state heterogeneity in the evolution of e-government based on a longitudinal analysis of states.	This paper analyzes the methodology of the United Nations e-Government Development Index (EGDI).	The answer to the question is not in the paper provided. This paper is about explaining state heterogeneity in the evolution of e-government based on a longitudinal analysis of states.
8	(Apriliyanti et al., 2021)	Institutional factors, Technological factors, Organizational factors and Leadership	The answer to the question is not in the paper provided. This paper is about analyzing the factors critical to the success of e-government programs in ASEAN member countries.	Factors contributing to the success of e-government programs in ASEAN member states include institutions, resources, leadership, organizational design, and cultural values.	Factors contributing to the success of e-government programs in ASEAN member states include institutions, resources, leadership, organizational design, and cultural values.
9	(Roziqin, A., Kismartini, Fajrina, A. N., Salahudin, & Sulistyaningsih, 2022)	Evaluation of the structure, conceptual evolution, and trends of Indonesian e-Government after related publications	The provided paper does not assess the evolution of the E-Government Development Index in Southeast Asia. It focuses on the development and trends of Indonesian e-government based on publications in the Scopus database.	The paper analyzes the methodology of the United Nations e-Government Development Index (EGDI).	The provided paper does not assess the evolution of the e-government Development Index in Southeast Asia. It focuses on the development and trends of Indonesian e-government based on publications in the Scopus database.

Source: Some Relevant Articles, (2023)

From this series of studies, it can be concluded that EGDI plays an important role in influencing government effectiveness, regulatory quality, and the success of e-government programs in various countries, including in Indonesia. In addition, research continues to be conducted to improve the EGDI methodology and governance development in Indonesia. Therefore, the

novelty of this study aims to understand and evaluate the Challenges of E-Government Implementation: Analysis of the E-Government Development Index in Indonesia for the improvement of information technology infrastructure that is still uneven throughout Indonesia.

## RESEARCH METHODS

This study used quantitative methods using secondary data. The secondary data used in this study from UN E-Government Knowledgebase data then used data from the E-Government Development Index (EGDI) and also used analysis of related scientific articles. The data collection is taken from E-Government Development Index (EGDI) 2016-2022 data, OSI Index, TII, HCI and Indonesia's position in the world and from E-Government Development Score (EGDI) 2022 data. Mathematically, EGDI is the result of a calculation that uses a weighted average of three normalized scores on three key dimensions of e-Government. These dimensions include: (1) quality and coverage of online services (known as OSI), (2) telecommunications infrastructure advancement (TII), and (3) human resource capacity (HCI). Each of these indices is a composite of various factors that can be investigated and analyzed independently (Nations, 2023)

$$\text{EGDI} = 1/3 [\text{OSI Normalized} + \text{HCI Normalized} + \text{TII Normalized}]$$

## RESULTS AND DISCUSSIONS

### E-Government Development Index (EGDI)

EGDI aims to measure and compare the development of e-government in Indonesia. Table 1 reveals the analysis of the E-Government Development Index between countries in Southeast Asia from 2016-2022.

**Table 1.**  
**Development of E-Government Development Index (EGDI) in Indonesia 2016-2022**

Country Name	E-GOVERNMENT DEVELOPMENT INDEX (EGDI)			
	2022	2020	2018	2016
Indonesia	0.72	0.66	0.53	0.45

Source: Data processed by the author (2023)

Table 1 shows that, in 2022, Indonesia's EGDI reached 0.72, an increase from 0.66 in 2020, 0.53 in 2018, and 0.45 in 2016. This increase reflects the Indonesian government's efforts to develop the e-government sector to improve public services and administrative efficiency. The improvement of EGDI Indonesia can mean that the government has succeeded in increasing public access to digital services, administrative transparency, and efficiency in public service delivery. The implementation of digitalization policies can cause this increase, better information technology infrastructure, and increased digital literacy among the public. This increase can be caused by the implementation of digitalization policies, better information technology infrastructure, and increased digital literacy among the public. However, despite the positive increase, it should still be noted that Indonesia's EGDI in 2022 has not reached an optimal level because according to Kencono (2023) EGDI in Indonesia has not reached optimal levels due to lack of Information and Communication Technology (ICT) infrastructure, significant impact of leadership, and challenges related to culture and working environment conditions. Further analysis can be carried out to identify specific areas within the e-government sector that require further attention. These include cyber security evaluations,

development of more user-friendly e-government platforms, and increased cooperation between the public and private sectors in support of e-government initiatives.

Overall, the improvement in Indonesia's EGDI is a positive indicator of the government's efforts to adopt information technology to improve the quality of public services. Nevertheless, it is necessary to continuously evaluate and improve to achieve higher e-government standards and provide maximum benefits to the community. The changes in EGDI scores reflect the evolution of electronic-based governance systems in individual countries and highlight the critical role of information technology in changing the landscape of public administration.

Furthermore, EGDI is calculated as a weighted average of three normalized scores on three main dimensions of e-government: (1) coverage and quality of online services (Online Service Index, OSI), (2) status of telecommunications infrastructure development (Telecommunication Infrastructure Index, TII), and (3) inherent human resources (Human Capital Index, HCI).

**Table 2.**  
**Index OSI, TII, HCI, and Indonesia's position in the world**

No	Information	2022	2020	2018	2016
1	E-Government Development Index (EGDI) Rating	77	88	107	116
2	Online Service Index (OSI)	0.76	0.68	0.57	0.36
3	Telecommunication Infrastructure Index (TII)	0.64	0.57	0.32	0.30
4	Human Capital Index (HCI)	0.74	0.73	0.69	0.68

Source: UN E-Government Indonesia Survey 2016-2022

Table 2 shows that Indonesia experienced a significant increase in the E-Government Development Index (EGDI) during 2016-2022. The performance of the Online Service Index (OSI), Telecommunication Infrastructure Index (TII), and Human Capital Index (HCI) indices showed a marked increase from 2016 to 2022. This increase has a positive impact on Indonesia's EGDI ranking, which reached the 77th position in 2022. More specifically, Indonesia managed to record a good score on the subindex, with OSI reaching a score of 0.76, TII reaching a score of 0.64, and HCI reaching a score of 0.74. The consistent improvement in these three sub-indices shows Indonesia's significant commitment and progress in developing E-Government infrastructure, online services, and human resources related to information technology. From this, according to Sudirman & Saidin (2022) that e-government has an important impact on sustainable development. E-government is also able to encourage public participation in governance processes (e-participation), which can increase opportunities to achieve sustainable development, especially in developing countries.

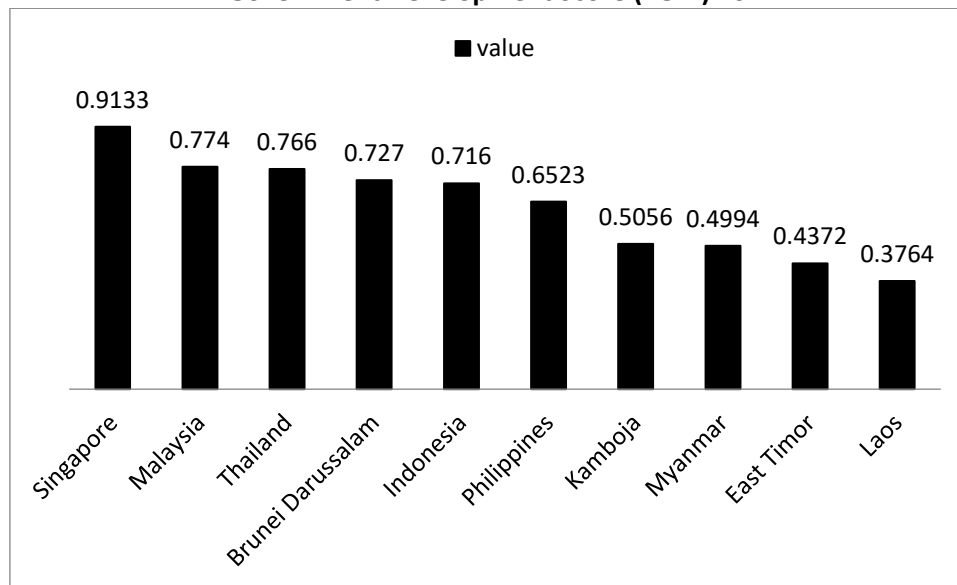
Not only that, but Indonesia also managed to rise 20 places on the E-Participation Index in 2022. From rank 57 in 2020, Indonesia managed to reach rank 37 in 2022 with a score of 0.71590. The score surpassed the world average (0.4450), the Asian Regional average (0.5024), and the Southeast Asia Regional average (0.5444). In the Southeast Asia region, Indonesia is now ranked fifth, ahead of Vietnam and the Philippines. In terms of the Open Government Data Index, Indonesia managed to obtain a score of 0.9014 on a scale of 0 to 1. It managed to enter the Very High Open Government Data Index (OGDI) Level group.

### **Implementation of E-Government in Indonesia**

This analysis begins by investigating the development of e-government in Southeast Asian countries during the 2022 period. The observed shift from traditional administrative

approaches towards the application of information technology is a major highlight. The evolution of e-government in the region reflects a significant transformation in governance, placing information technology as a key pillar for improving public services.

**Figure 1.**  
**E-Government Development Score (EGDI) 2022**



Source: United Nations (UN)

Figure 1 shows Indonesia's positive achievements in the e-government domain. According to the score, Indonesia managed to rank 5th in Southeast Asia as a country with the best electronic-based government system. Indonesia's E-Government Development Score (EGDI) in 2022 reached 0.7160 points out of a total of 1 point, thus placing it in 77th place globally. This achievement reflects the commitment of the Indonesian government in developing and adopting information technology to improve efficiency, accessibility, and transparency in the delivery of public services. This success can be attributed to the implementation of digitalization policies, investment in information technology infrastructure, and efforts to increase digital literacy among the public.

Although Indonesia achieved a positive rating, there is still room for improvement and improvement. Further analysis can be carried out to identify specific areas within the e-government sector that require further attention in order to achieve higher levels on a global scale. Improved coordination between the public and private sectors, as well as improved cyber security, can be a strategic focus to improve the quality of electronic-based government systems in the future. Overall, Indonesia's achievement in 5th place in Southeast Asia and 77th globally in EGDI is encouraging, showing positive developments in the digital transformation of the government sector. With continuous commitment and efforts, Indonesia can continue to improve its position in the global e-government realm to provide maximum benefits to society.

The UN survey methodology on the graph covers three main pillars, namely the coverage and quality of online services (Online Service Index, OSI), the status of telecommunications infrastructure development (Telecommunication Infrastructure Index, TII), and inherent human capital (Human Capital Index, HCI). These results provide a comprehensive picture of the ranking and development of e-government at the global level.



Efforts to advance e-government in 2022 in Indonesia meet a number of significant challenges. The E-Government Development Index (EGDI) data reflects several critical bottlenecks. One of the main challenges is the lack of data integration, where thousands of data are still scattered across various data centers and islands, hindering the realization of a unified national e-government. Meanwhile, the lack of public participation in using e-government services that the government has provided through Information and Communication Technology (ICT) is also an obstacle. In terms of Human Resources (HR), especially the State Civil Apparatus (ASN), there is still a lack of understanding of technical aspects and information security. Awareness about information security in some agencies is also still an issue that needs to be addressed.

Concrete steps are needed to achieve a full transformation towards effective and integrated e-government, including increasing data integration, increasing people's digital literacy, and engaging businesses and other relevant parties to respond and overcome challenges that are still faced.

One of the main challenges of implementing e-government in Indonesia is the fact that information technology infrastructure is still not evenly distributed throughout Indonesia (Wirawan, 2020). There is a gap in technological accessibility between urban and rural areas, which can limit people's participation in government services. There is a gap in technological accessibility between urban and rural areas, which can limit people's participation in electronic government services (Sarjito, 2023). In addition, aspects of data security and privacy are critical issues that need serious attention, considering the large amount of data collected and processed within e-government (Handika, 2017).

Furthermore, according to (Hasanah & Sukri, 2023), there are challenges related to the lack of digital literacy in some segments of society, which can hinder the acceptance and use of government online services. Increasing digital literacy needs to be a focus to ensure that people can understand and utilize this technology effectively. In addition, better coordination between various government agencies and relevant stakeholders needs to be improved to ensure alignment in implementing e-government.

Private sector participation and adequate financial support are also challenges, given the cost of implementing and maintaining sophisticated technological infrastructure. Therefore, the synergies between the government, the private sector, and civil society are essential to address these challenges (Afni, 2021; Irawan, 2013). By identifying and addressing these challenges, Indonesia can accelerate its transformation towards a more efficient, transparent, and public service-oriented government through e-government.

## CONCLUSIONS

This study discovered that Indonesia managed to record a significant improvement in the ranking of the E-Government Development Index (EGDI) from 2016 to 2022. This increase was reflected in the performance of the Online Service Index (OSI), Telecommunication Infrastructure Index (TII), and Human Capital Index (HCI) indices, which increased sharply during the period. The positive impact of this increase is reflected in Indonesia's EGDI ranking, which reached the 77th position in 2022, with commendable scores on their respective subindices: 0.76 for OSI, 0.64 for TII, and 0.74 for HCI.

As a result of this achievement, Indonesia managed to rank 5th as one of the countries with the best electronic-based government system in Southeast Asia. Despite this, there are still a number of challenges faced in 2022. These challenges include lack of data integration, minimal public participation, and lack of understanding of technical aspects and information security

among Human Resources (HR), especially the State Civil Apparatus (ASN). Based on these problems, there are several research implications to improve information technology infrastructure better and more evenly distributed throughout Indonesia, namely: (1) expanding accessibility and improving digital infrastructure in Indonesia, (2) providing assistance and training to each local government and civil servants on the use and benefits of technology in the government system to provide optimal public services, and (3) support and prioritize the integration of the National Data Center to collect all data from regions, ministries, and institutions nationally in one Big Data.

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