

E-Government Development: Catalysing Agile Governance Transformation in Indonesia

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Abstract

E-government is considered a crucial instrument for service transformation as it is believed to assist in achieving the government's objectives by functioning as a flexible digital service platform for development. Nevertheless, our understanding of its potential impact on governance remains limited, particularly regarding the advancements made in digital-based services for the public sector inside government and the resulting level of public satisfaction. This study examines the crucial significance of e-government in the restructuring of agile governance in Indonesia. Qualitative research methods are employed for this research. Data related to the E-Government Development Index (EGDI) are collected through the United Nations website. After successfully retrieving the data and presenting it in a suitable format, the authors analysed Indonesia's overall EGDI score and examined individual EGDI indicator levels. The findings show that the Indonesian government has accelerated the implementation of e-government, catalysing the digitalisation of governance and improving efficiency, transparency and public engagement. The report asserts that e-government can revolutionise governance in Indonesia, rendering it more agile and responsive. Nevertheless, a requirement remains to enhance and augment the e-government infrastructure and implement policies that foster digital inclusivity to bolster Indonesia's governance capabilities. By bolstering e-governance, the government will enhance its efficacy in addressing forthcoming crises and augment citizen participation in policy formulation.

Keywords: Agile Governance; Development; E-Government; Public Service

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Introduction

The digitisation and evolution of governance in the digital era are fundamentally altering the dynamics between entities such as public institutions and their stakeholders, namely citizens, in the context of policy formation (Höchtel et al., 2016; Marinică, 2020; Todoruț & Tselentis, 2018). 'E-government' is the term most commonly employed to describe this digital revolution, reflecting the shifting landscape of political processes (Koo, 2019; Marche & McNiven, 2003; Umbach & Tkalec, 2022). The concept of e-government has emerged as a transformative force in reshaping how citizens interact with their governments (Aminah & Saksono, 2021).

E30+Government represents a scheme integrating technology with governance, where bureaucratic services are combined with the speed and accessibility of the digital world (Liu & Yuan, 2015; Milakovich, 2012; Roblek et al., 2020). E-government is not just about convenience; it goes further in creating a government that is transparent and accountable (Cedric Bizimana, 2020; Halachmi & Greiling, 2013; Manenji & Marufu, 2016). For example, With the digitalisation of public records, government operations become an open book, reducing corruption and increasing trust (Adam & Fazekas, 2021; Ponti et al., 2021). Moreover, e-government revolutionises how government departments operate (Hujran et al., 2023; Milakovich, 2021). Feedback mechanisms and online forums invite public participation, making the government more responsive and democratic.

The implementation of e-government in Indonesia was prompted by significant transformations in the country's governance, transitioning from an authoritarian and centralised system to a more democratic one characterised by a more equitable distribution of power between the central government and autonomous provinces (Permana, 2023; Wagola et al., 2023). This modification promoted the formation of a government that is honest, open and efficient in adapting to new circumstances (Gracia & Casaló Ariño, 2015; Rose et al., 2015). The governance system has transitioned from a hierarchical structure to network-based organisational management, facilitating expedited decision-making and wider control (Kapucu & Hu, 2022; Rackwitz et al., 2021).

The implementation of e-government in Indonesia is driven by public demands for dependable, trustworthy, easily accessible interactive governmental services that cater to the needs of people across the country (Achmad et al., 2021; Adnan et al., 2021). Furthermore, the active engagement of the public in the development of state policies, with the government playing a role in facilitating public participation and dialogue, is also a significant motivating factor. Despite the government's efforts to enact numerous laws relating to information technology, the development of e-government applications in Indonesia has not yielded satisfactory outcomes (Bataineh & Abu-Shanab, 2016; de Carvalho Soares et al., 2022; Sandoval-Almazan & Gil-Garcia, 2012). Indonesia's e-government apps lag behind those of neighbouring countries such as Singapore and Malaysia (Afrizal & Wallang, 2021; Curtis et al., 2022). The delay is mostly caused by a lack of dedication toward bridging the digital gap with industrialised nations along with infrastructure obstacles and geographic constraints. While the legislation pertaining to e-government in Indonesia is rather extensive, the progress in this area is considerably

delayed in comparison to wealthy nations (Defitri, 2022; Farida et al., 2020; Hendri Wijaya, 2023).

One of the most prominent of many approaches to governance is the concept of agile governance, which adopts the principles of flexibility, responsiveness and collaboration from Agile software development methodologies into government structures and processes. This article explores the relationship between the digital transformation process in the Indonesian government and the concept of agile governance. In addition, this study reviews how the government's digital transformation practices improve the quality of public services and increase community involvement in the decision-making process. By understanding the relationship between digital transformation and agile governance, it is hoped that the full potential of information and communication technology (ICT) can be explored to create a more responsive, open and people-oriented government.

This study examines in depth the development of e-government in Indonesia in the context of the transition to more agile and responsive governance. In this context, the research explores how e-government has become a vital instrument in encouraging the establishment of responsive and effective governance. The research examines the utilisation of electronic-based government systems and how it intersects with government decision-making processes, moving from a hierarchical system to a network-based management system. The main focus will be on the e-government development index and some of its components and indicators. Furthermore, this study observes how e-government in Indonesia responds to public demands for reliable, trustworthy and accessible public services. Significant aspects of this study include online public engagement (e-participation) in policy formulation and how the government facilitates public participation and dialogue through digital platforms.

Several previous studies have raised the same theme as this research, such as Sukarno and Nurmandi (2023), who reviewed how the E-Government Development Index (EGDI) affects the Worldwide Governance Indicators Index in Southeast Asian Countries. In addition, some studies highlight the e-government issue of transparent government in Indonesia (Ismail et al., 2020; Sabani, 2020). Other studies have examined e-government implementation in Indonesia (Farida et al., 2020; Koniyo et al., 2021), both on a national scale (Biantoro et al., 2022; Farida & Lestari, 2021) and a local scale (Rachmawati & Fitriyanti, 2021). Several articles highlight experiences in the Global South, such as Joshi and Islam (2018), who described a government maturity model for sustainable e-government services from the perspective of developing countries. Furthermore, Weerawarana et al. (2013) highlight how the application of the Agile approach has positively impacted the procurement and implementation of e-government solutions in the country. Kyakulumbye et al. (2019) also explained that e-government projects should be at the core of service delivery in developing countries, particularly for those citizens who are socially and economically marginalised.

Although previous studies have explored e-government in Indonesia, a gap remains regarding the analysis of electronic-based service systems and their relationship to responsive service modes. This study fills that research gap by exploring questions

regarding the condition of e-service systems in Indonesia and the significance of e-government in restructuring agile governance. Based on these questions, this study analyses the dynamics of e-government development and agile governance in Indonesia. The results of this study are expected to provide new insights on how to improve e-service systems in Indonesia. In addition, the findings are also useful for policymakers in evaluating and designing digitalisation and agile governance strategies.

Research Methods

This qualitative study conducts an in-depth analysis of the E-Government System in Indonesia by investigating extensive secondary data from reliable global sources such as United Nations and Indonesian government websites, particularly referencing the *UN E-Government Survey of 2022* (United Nations, 2023). This comprehensive dataset encompasses a variety of indicators related to the E-Government System in Indonesia, providing diverse insights into its implementation and effectiveness. The research process involves detailed data collection followed by an examination incorporating both quantitative metrics and qualitative insights. By synthesising data from various sources, this study examines the current state of e-government initiatives in Indonesia, thus contributing to the discourse on digital governance and public service delivery in the country (see Figure 1).

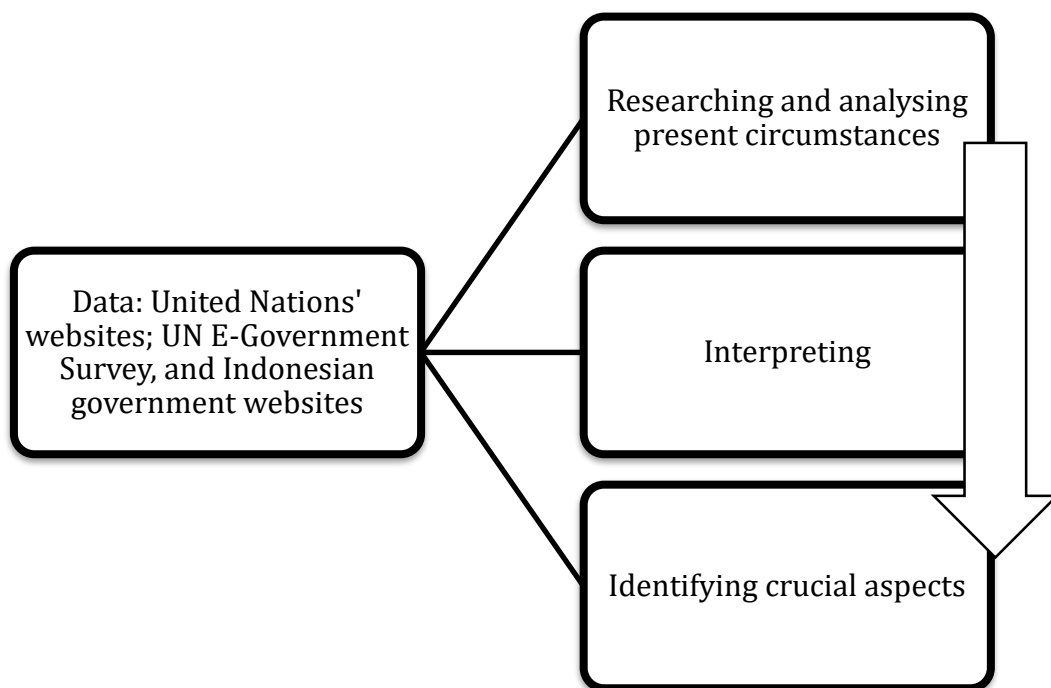


Figure 1. Step-by-Step Research Stages
Source: Processed by Authors (2023)

During the analytical phase, the authors utilised accessible data visualisations, including graphs, tables and diagrams, to enhance clarity in interpreting the obtained

outcomes. This methodological approach facilitated a more transparent analysis, thereby simplifying the identification of significant patterns or trends in the data. Furthermore, the authors conducted a rigorous assessment of the acquired data, evaluating multiple factors, such as the E-Government Development Index, e-participation, online services, telecommunications infrastructure and the Human Capital Index. Through comprehensive analysis, this report provides an in-depth understanding of the dynamics and implementation of the E-Government System in Indonesia, offering valuable insights into its operational framework and performance.

While this study draws upon secondary data from credible sources, it is essential to acknowledge certain methodological constraints. Firstly, relying on secondary data limits the scope of readily available information, potentially overlooking relevant aspects. Secondly, the focus on quantitative analysis may lead to a superficial understanding of the social and cultural contexts shaping e-government systems in Indonesia. Moreover, inherent bias in the data is possible despite mitigation efforts. It is essential to recognise that this study represents an initial exploration into e-government systems in Indonesia. Future research could explore mixed methods, integrating qualitative and quantitative approaches alongside primary data collection to attain a more comprehensive understanding.

Results and Discussion

The development of e-government as a catalyst for agile government transformation in Indonesia reflects efforts to leverage ICT to enhance the efficiency, accessibility and responsiveness of public services. 'Agile government transformation' refers to the ability to adapt and respond to changes quickly and effectively in line with the needs and dynamics of society. In the context of Indonesia, the development of e-government is key to realising agile government transformation. Below are several points explaining the significance of e-government development as a catalyst in agile government transformation in Indonesia.

Analysing E-Government Development Trends in Indonesia

Information technology tremendously impacts many facets of society, particularly in the public sector (Chohan & Hu, 2022; Wilson, 1996). The use of e-government is a significant innovation used by the government to send information to the public about government policies and issues and deliver services more efficiently (Aryanti et al., 2021; Schnoll, 2015). The EGDI is an indicator used to measure progress in the application of ICT in government, particularly through electronic platforms. Developing countries, including those in the Global South, often face challenges achieving optimal levels in this index.

The development of e-government in Global South remains suboptimal and generally has not reached the threshold of the world average value (0.6102; see Figure 2).

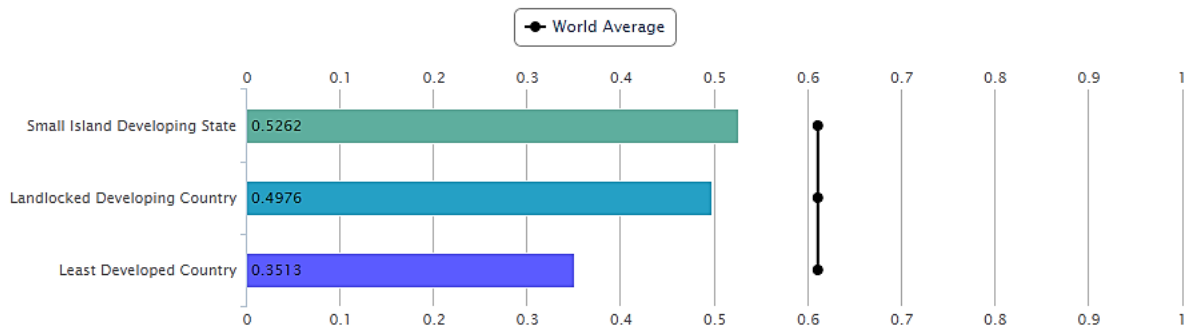


Figure 2. E-Government Development Index in Global South Countries
Source: United Nations (2023)

As shown in Figure 3, the uneven trend of the e-government development index for countries in the Global South (Asia, Africa, Oceania and Latin America) is attributed to various factors, including disparities in technology infrastructure. Global South countries exhibit significant differences in the availability and accessibility of ICT infrastructure (Majeed & Ayub, 2018). Economically advanced countries tend to have better infrastructure, while less developed countries may experience obstacles such as limited internet access or inadequate telecommunications infrastructure (Ajakaiye & Ncube, 2010; Schuppan, 2009). Additionally, disparities in skills and digital literacy also play a significant role. Levels of digital literacy and technology skills vary among Global South countries (Matli & Ngoepe, 2020). Those nations with better education and broader access to technology training tend to have better capabilities for developing and utilising e-government solutions (Helsper, 2021; Singh, 2017). Furthermore, financial resource constraints significantly affect the progress of e-government development (Bwalya & Mutula, 2016). Many Global South countries face financial resource constraints that limit their ability to develop and implement complex e-government projects. This constraint can impede progress in improving the quality of e-government services (Glyptis et al., 2020; Joshi & Islam, 2018).

Moreover, high levels of corruption and a lack of transparency in governance can be barriers to the effective implementation of e-government solutions. Lack of public trust and inefficient institutions can also hinder the adoption of e-government technology (Alcaide Muñoz & Rodríguez Bolívar, 2017; Ndou, 2004). Differences in sociocultural contexts among Global South countries also influence the adoption of e-government (Alsaif, 2013; Olaitan, 2015). Factors such as political participation culture, attitudes towards data privacy, and social norms can affect how society responds to and uses e-government services (Carter & Weerakkody, 2008). Lastly, differences in development priorities are one of the key points explaining the disparity in e-government uptake among southern countries (Dias, 2020). Global South countries often face distinct development challenges, such as poverty, inequality and public health issues (Cloete, 2012; Rorissa & Demissie, 2010). As a result, governments may not prioritise e-government as part of their development agenda.

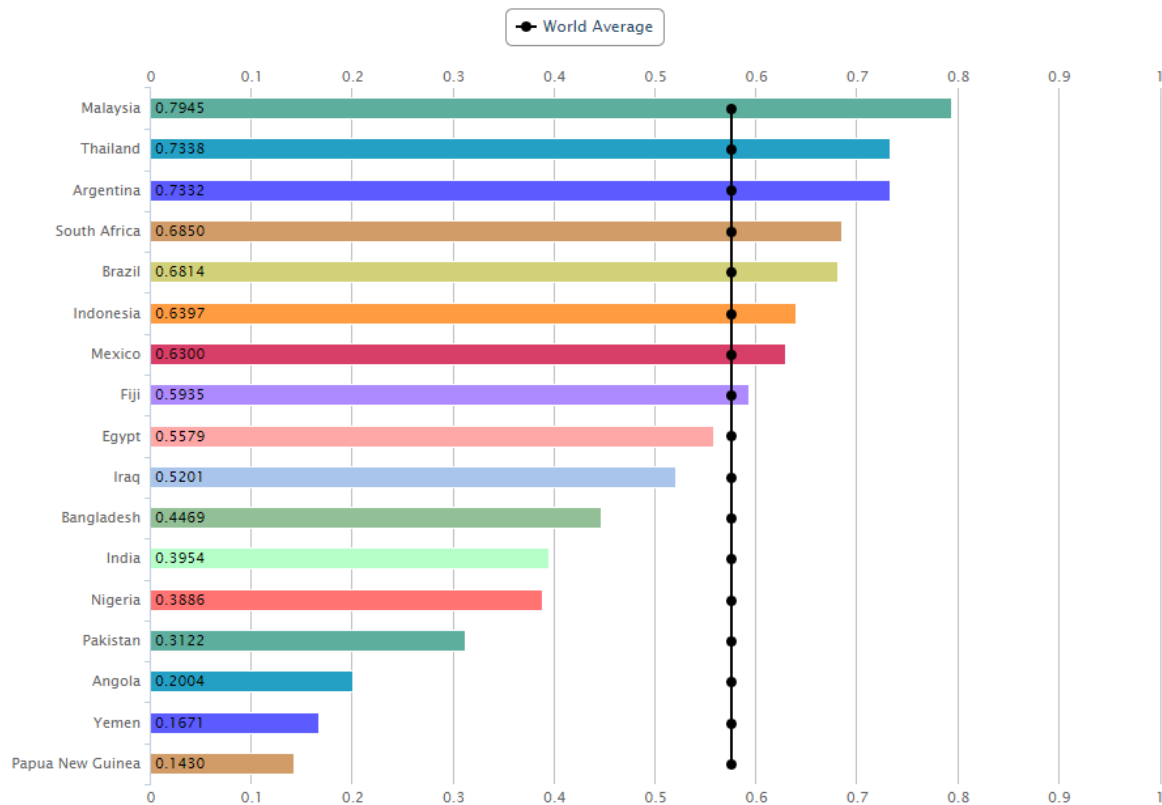


Figure 3. Trends E-Government Development Index in Several Global South Countries
Source: United Nations (2023)

The EGDI reflects the extent to which a country has successfully adopted and utilised ICT to effectively provide public services to its citizens. EGDI scores are affected by the many challenges confronting countries in the Global South, such as limited ICT infrastructure, a lack of accessibility and a shortage of trained workers.

Table 1. E-Government Development Index in Global South Regions
Source: United Nations (2023)

Region or Country	EGDI Average
Americas – North America	0.8831
Asia – Western Asia	0.6915
Asia – Southeast Asia	0.6405
Americas – Caribbean	0.5988
Asia – South Asia	0.53
Africa	0.4054

Scores on the EGDI in the southern world regions vary widely, reflecting differences in the readiness, adoption and use of ICT among countries (see Table 1). In South Asia,

countries such as India and Sri Lanka have made significant progress in e-government development by launching various platforms and applications to provide online public services to their citizens. However, challenges remain in combatting the vast digital divide in the region. In Southeast Asia, countries such as Singapore, Malaysia and Thailand rank higher in the e-government index, showing greater readiness to adopt technology for public services. Other countries such as Indonesia and the Philippines are making progress, yet room for improvement is seen regarding ICT infrastructure and accessibility.

In Sub-Saharan Africa, most countries face challenges in e-government development due to limited ICT infrastructure, resource constraints and a wide digital divide. However, some countries, such as Rwanda, have successfully launched significant e-government initiatives to improve the accessibility of public services (Mukamurenzi et al., 2019). Furthermore, in Latin America and the Caribbean, countries such as Brazil and Mexico have relatively high levels of e-government development (Ramirez-Madrid et al., 2024), while countries such as Haiti and Honduras face serious challenges adopting technology for public services due to factors such as political and economic instability (Rubino-Hallman et al., 2007; Kalesnikaite et al., 2023). In the Middle East and North Africa, nations such as the United Arab Emirates and Qatar have shown significant progress in e-government development (Dhaoui, 2022), with substantial investments in ICT infrastructure. However, in states such as Sudan and Libya, political challenges and armed conflicts often hinder e-government progress (Dias, 2020). Thus, gaps in e-government development in the Global South reflect differences in socioeconomic conditions, ICT infrastructure and the ability and commitment of governments to adopt technology to improve public services.

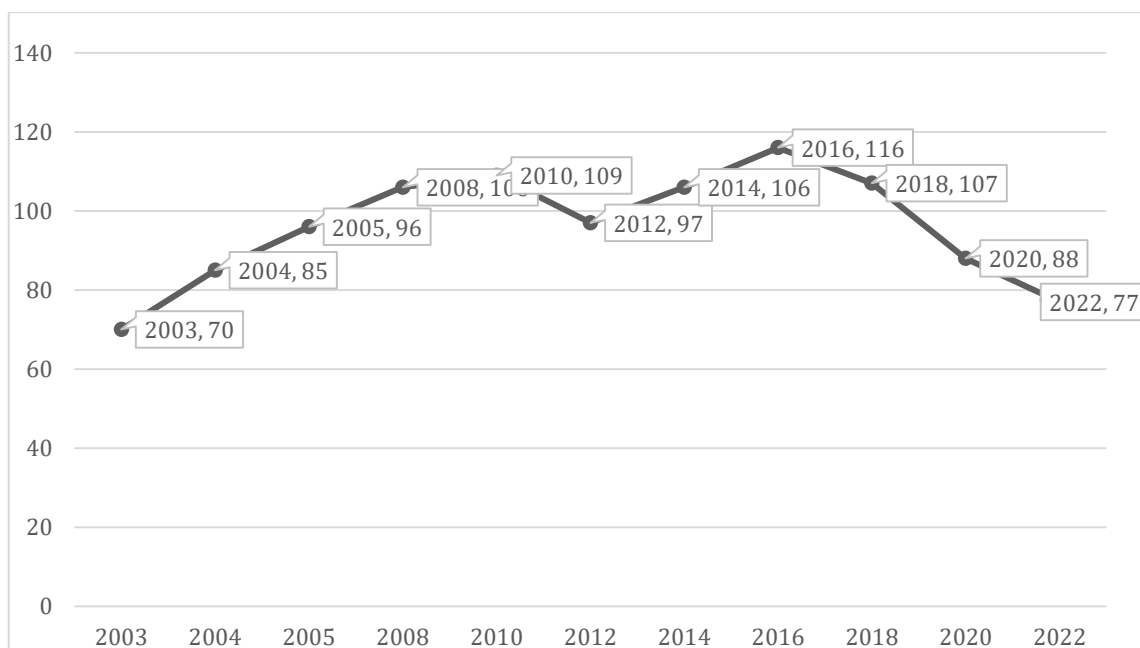


Figure 4. The Rank of E-Government Development Index in Indonesia
Source: United Nations (2023)

In the Indonesian context, the government has started to develop information technology to make it easier for government institutions to exchange information (Chohan & Hu, 2022). In the early stages of 2001, Indonesia acknowledged e-government with the issuance of Presidential Instruction Presidential Regulation No. 6. The regulation promotes the adoption of telematics technology to realise the objective of a transparent and authoritative government, sometimes referred to as 'good governance', hence expediting the attainment of the ideal democratic system. Indonesia's e-government programme has been in operation since 2003. Despite the lengthy period, e-government has not shown significant progress and is still considered unsatisfactory. Demonstrating a lack of effectiveness, there has only been an increase of 0.1 from 2003 to 2018. This failure is mainly due to the lack of government attention and support for the development of e-government in Indonesia (Novitasari et al., 2022). In addition, Indonesia was ranked 77th out of 193 countries in the *2022 UN E-Government Survey*, which ranks countries based on their implementation of e-government systems (United Nations, 2023).

Figure 4 illustrates the fluctuating trajectory of Indonesia's position in e-government advancement between 2003 and 2022. The lower line on the graph indicates a higher ranking for Indonesia. In 2003, Indonesia began with a ranking of approximately 70th spot. Subsequently, a steady decrease in rating occurred until approximately 2008, when Indonesia's standing plummeted to approximately 106. Significant instability was seen after 2008, with Indonesia's ranking dropping to about 116th place in 2016. Nevertheless, after attaining this stage, there were discernible oscillations in the ranking. Though facing several challenges, Indonesia successfully improved its ranking in 2020 to a position below 100. After 2020, Indonesia's e-government rating had a noticeable enhancement, resulting in a resurgence to 77th in 2022. This achievement improved 11 ranks from 2020, when Indonesia was ranked 88th.

The fluctuating position of Indonesia in digital service development motivated enhancement of the implementation of policies regarding electronic-based government systems. In 2018, the Indonesian government evaluated digital-based services through the Ministry of Administrative Reform and Bureaucratic Reform. The evaluation programme followed the provisions outlined in Presidential Regulation No. 95/2018 concerning Electronic-Based Government Systems. An assessment was conducted on 637 governmental entities encompassing both national and local levels. After the evaluation, Indonesia's position on the National Electronic-Based Government System Index has continued to move up. Based on the results of monitoring and evaluation in 2022, the Indonesian Index was 2.34 on a scale of 5 with a 'sufficient' category ranking. This achievement exceeded the annual target set in 2022 of 2.30. Furthermore, according to the *2022 UN E-Government Survey*, Indonesia successfully raised its EGDI score between 2019 and 2022.

In a special case, the improvement of Indonesia's ranking in the period 2019–2022 seems to be driven by the fact that in that year a pandemic occurred (see Figure 5). The COVID-19 pandemic catalysed the transformation and optimisation of e-government in Indonesia (Rachmawati et al., 2021). Changes involved a number of strategic initiatives

and adjustments aimed at strengthening public services and improving government efficiency in the face of the global health crisis (Fischer et al., 2023). One of the most significant changes is the digitisation of public services (Fischer et al., 2023). The Indonesian government quickly adapted to social distancing by moving various services to digital platforms. These initiatives included online document filing, healthcare registration and civil registration services. This move allowed citizens to access essential services from the safety of their homes, reducing the need for physical interaction and the potential spread of viruses. Furthermore, there has been a significant increase in the use of online communication platforms (e-participation) for both internal communication between government departments and interaction between government officials and the public.

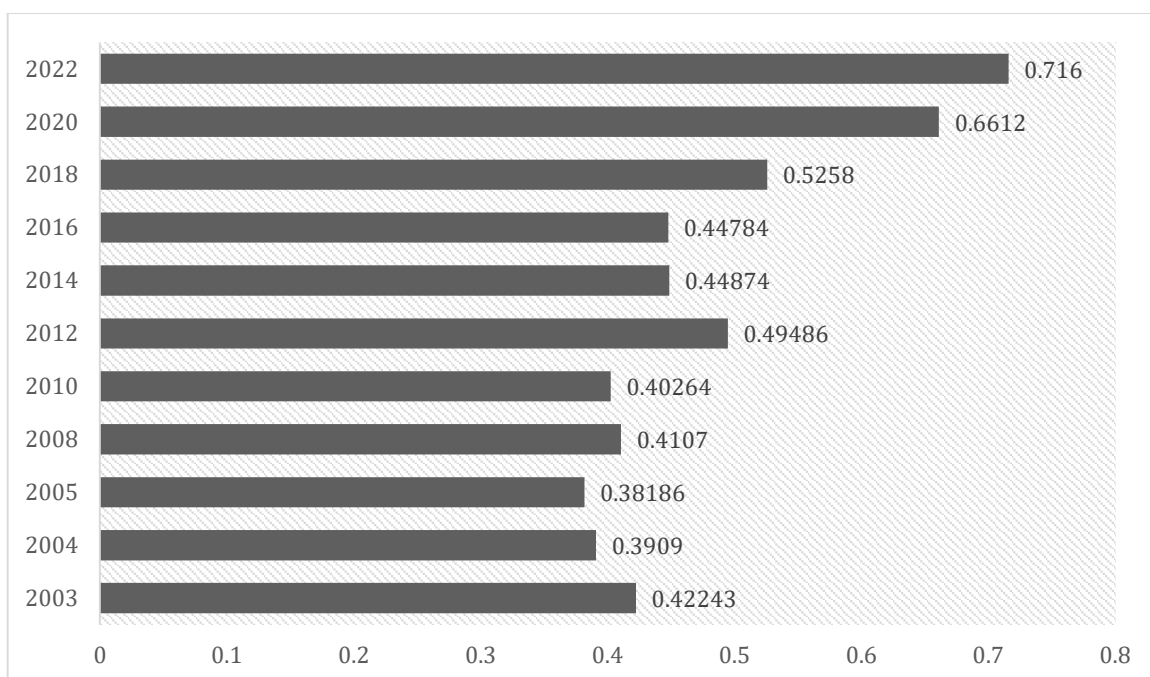


Figure 5. The Value of E-Government Development Index in Indonesia
Source: United Nations (2023)

Figure 6 illustrates the trend of e-Participation scores in Indonesia from 2003 to 2022 with a scale of scores ranging from 0, which is the lowest score, to 1, which is the highest score. At the beginning of the period in 2003, we see an e-participation score of 0.2586, signalling the first steps in government and citizens' efforts to utilise ICT in the public decision-making process. The sector showed a slow but steady increase until 2005, when it reached a value of 0.2857. This score reflected early efforts in digitising some government services and encouraging online public participation. However, in 2008, Indonesia was faced with a drastic and profound decline, with the e-participation score slipping to 0.0454. The decline is indicative of the major challenges faced in policy implementation and a result of wider digital infrastructure issues. However, Indonesia's e-participation score has started to recover and has experienced a consistent upward

trend year-on-year. This improvement could be the result of stronger investments in e-government technology, the launch of new participation platforms, or increased digital awareness and skills among the population. In the period between 2016 and 2020, a significant spike can be witnessed, with the e-participation value nearing a peak at 0.75. This rating indicates a golden era of e-participation in Indonesia where government initiatives and public engagement through digital channels reached a new level of maturity supported by increased internet and smartphone access among the population. Finally, in 2022, despite a small drop to 0.7159, Indonesia's score still signifies a high level of e-participation.

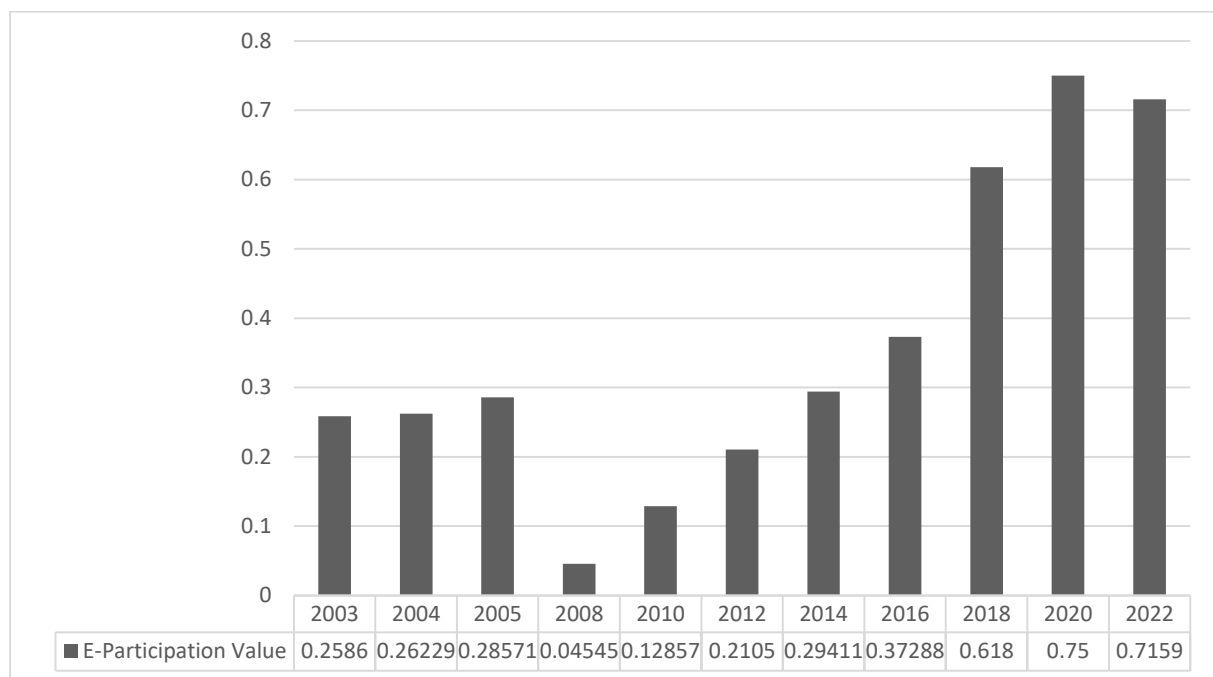


Figure 6. The Value of E-Participation Index in Indonesia
Source: United Nations (2023)

Indonesia's E-Participation Index in 2022 ranks 37 out of 193 countries assessed by the UN (see Figure 7). In 2022, Indonesia managed to jump up 20 ranks and achieved a score of 0.71590. This score is above the world average score of 0.4450, above the Asian regional average of 0.5024, and the Southeast Asian regional average with a score of 0.5444.

Indonesia's success in this ranking can be credited to the advancements made through the implementation of Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System, as well as the positive effects of digital initiatives in addressing public service complaints through the 'SP4N LAPOR' programme since 2015 (Wildhani et al., 2023). Alongside advancements reflected in Indonesia's score on the E-Participation Index, Indonesia has also witnessed advancements in legislation pertaining to e-participation in recent years. An instance of this can be seen in the Constitutional Court Decision Number 91/PUU-XVIII/2020 regarding the procedural examination of

Law Number 11 of 2020 on Job Creation. The ruling affirms that the involvement of the general public in the creation of legislation must include significance and substance. Article 96 of Law No. 13 of 2022 on the Formation of Legislation incorporates and enforces the decision made by the Constitutional Court regarding the regulation of public involvement. The article asserts that public engagement can be carried out through both traditional offline methods and modern online platforms. Currently, e-participation in Indonesia is authorised under law (Azwin, 2023).

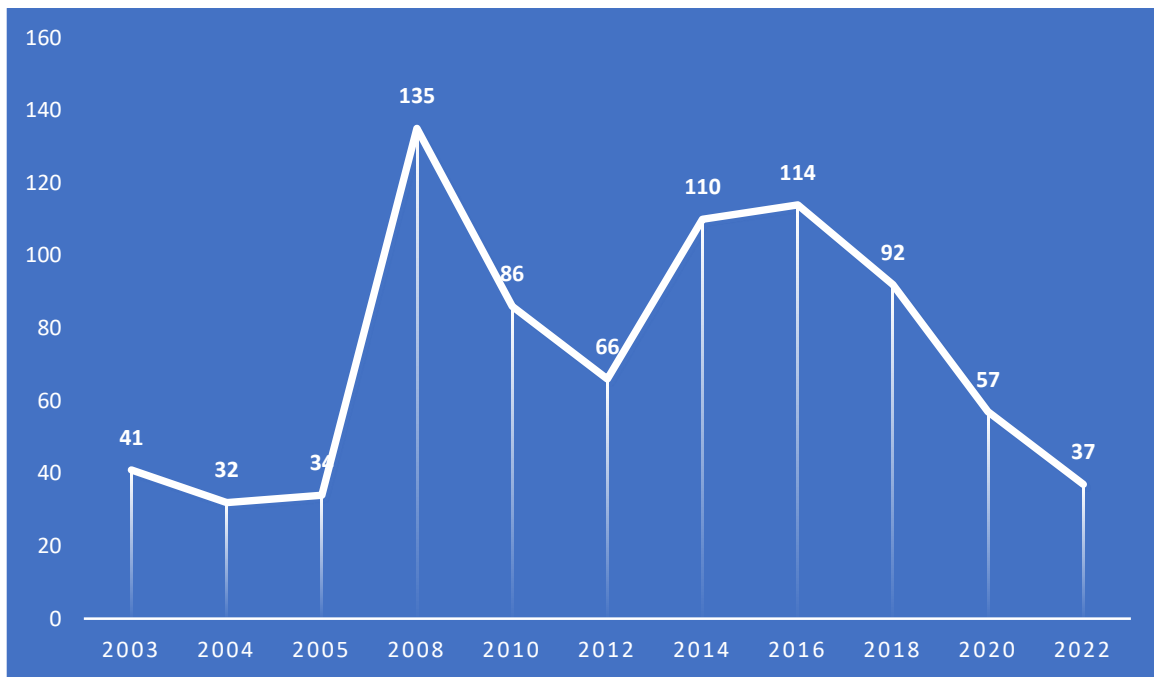


Figure 7. Rank of E-Participation Development Index in Indonesia
Source: United Nations (2023)

The Indonesian government has demonstrated its commitment to e-governance through various initiatives, such as the ‘100 Smart City’ programme and the development of digital public service applications (Ferza et al., 2022). These policies aim to improve public services’ transparency and efficiency and increase public e-participation. The rise of Indonesia’s EGDI in 2022 reflects significant progress in three key aspects: the Online Service Index (OSI), the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI). These improvements signify the serious and continuous efforts of the government and relevant sectors in promoting the digitisation and efficiency of public services (see Table 2).

The OSI is a composite indicator measuring how effectively a government uses ICT to deliver public services at the national level (Gavkalova et al., 2022). For OSI, Indonesia’s 2022 score of 0.7644 reflects dramatic progress in the implementation of online public services. This development not only improves accessibility and ease for the public in utilising public services but also demonstrates innovation in e-government technology. The integration of Indonesia’s online services covers a wide range of sectors,

from health and education to licensing, all of which contribute to improving the quality of services to the public.

Table 2. E-Government Development Index Sub-Components in Indonesia
Source: United Nations (2023)

E-Government Development Index Sub-Components			
Year	Online Service Index Value	Telecommunication Infrastructure Index Value	Human Capital Index Value
2003	0.43231	0.04500	0.79000
2004	0.32432	0.04838	0.80000
2005	0.29615	0.04944	0.80000
2008	0.33444	0.07015	0.82992
2010	0.24444	0.11429	0.85400
2012	0.49673	0.18966	0.79819
2014	0.36220	0.30544	0.67860
2015	0.36232	0.30158	0.67960
2018	0.56940	0.32220	0.68570
2020	0.68240	0.56690	0.73420
2022	0.76440	0.63970	0.74380

Meanwhile, Indonesia's TII score of 0.6397 indicates significant improvements in national telecommunications infrastructure. Key factors include the development of broadband networks, improved internet access quality and expanded telecommunication service coverage in remote areas. Finally, Indonesia's HCI score of 0.7438 demonstrates a commitment to developing human capital capacity. This score also signifies an improvement in people's quality of life along with improved access to information and services. Overall, these achievements signal a paradigm shift in public service delivery in Indonesia with a transition towards a more inclusive, efficient and future-oriented system. This success also positions Indonesia as an example for other countries in their efforts to utilise technology to improve the quality of government and services to the public.

Development of Electronic Government Sub-Components in Indonesia

Online Service

The OSI assessment is based on a comprehensive survey of 193 member countries, focusing on the government's online presence, including an analysis of national websites, as well as e-government policies and strategies adopted, both generally and in specific sectors. In 2022, the OSI was calculated using five sub-indices with specific weights: service provision (45%), technology (5%), institutional framework for e-government

(10%), content provided (5%) and e-participation (35%). These OSI scores are then normalised and tabulated on a scale of 0 to 1, where 1 indicates the best online service provision and 0 the lowest.

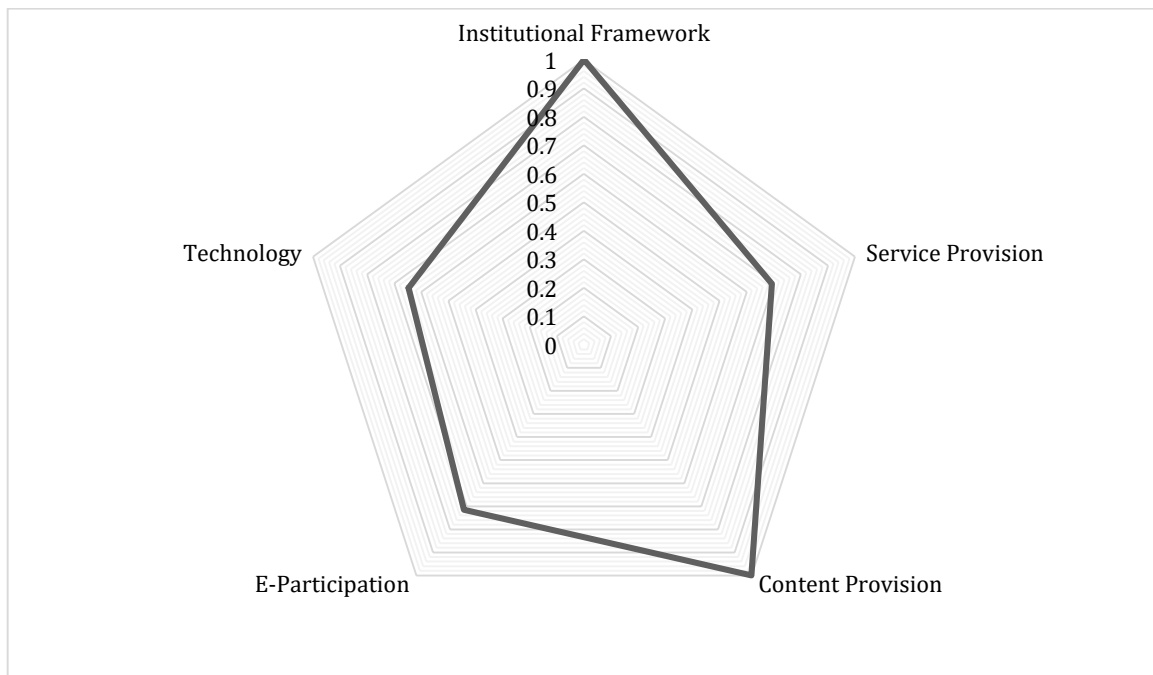


Figure 8. Online Service Indicators Value
Source: United Nations (2023)

Indonesia has a high OSI score. Despite the challenges, Indonesia is making progress towards digital transformation. Several online service channels are currently available in Indonesia. The House of Representatives, for example, has the DprNow! app, which was released in 2018. Less than a month after its launch on August 29, 2018, the number of active users reached more than 5,150 accounts. In addition, at the local government level, the e-Perda application was initiated by the Directorate General of Regional Autonomy of the Ministry of Home Affairs. The application was officially launched on March 9, 2022, offering a 'clarification' feature that can be used by the public to participate in the preparation of regional regulations and regional head regulations. Another avenue for public participation is the e-partisipasi.peraturan.go.id channel released by the Directorate General of Legislation of the Ministry of Law and Human Rights in October 2022. This channel provides a public consultation feature that provides an opportunity for the wider community to provide input for legislation at the central government level, ranging from draft laws to draft ministerial regulations. Furthermore, there is also partisipasisihat.kemkes.go.id, which was initiated by the Ministry of Health to accommodate input and responses related to the preparation of Indonesia's Health Bill. On the site, the public can download the draft bill and utilise the Feedback and Questions feature.

Figure 8 shows the five sub-components of the OSI in Indonesia. These components are used to assess the development and efficiency of online services provided by the government. The institutional framework is the foundation for all online service efforts. In Indonesia, this refers to the approved laws, policies and standards that shape how the digital service system works. In addition, service delivery is a further indicator to assess OSI. Service delivery is measured by examining how public services are delivered to citizens through online platforms. In Indonesia, the service delivery indicator is assessed by the various services available online, such as civil registration, tax filing and health services. Content provision is another indicator, which is used to assess the quality and quantity of information available on government websites. In Indonesia, this includes access to legislative data, public statistics and policy-related information. Furthermore, e-participation is another significant indicator, which is measured by how well the government engages citizens in the policy-making process through online channels. In Indonesia, e-participation includes platforms for dialogue between citizens and policymakers as well as tools to enable public participation in decision-making. The last indicator is technology, which explores the technological infrastructure supporting the delivery of e-government services. In Indonesia, this measure examines the reliability and security of IT systems, the availability of online services across multiple devices, and the use of the latest technologies to improve service delivery. A fairly low score here indicates a strong investment in ICT and dedication to continuous innovation in online services is required.

Telecommunication Infrastructure

Telecommunications infrastructure plays a key role in the EGDI, which is a comprehensive measure of a country's e-government performance (Gupta et al., 2020).

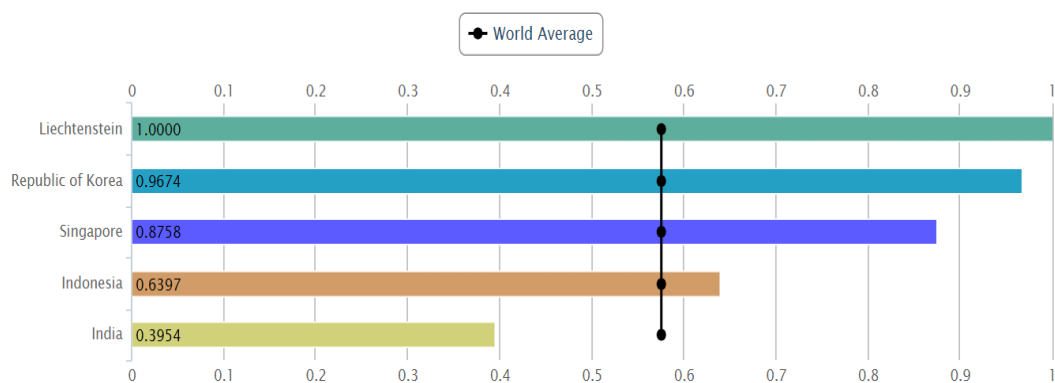


Figure 9. Telecommunication Infrastructure Index
Source: United Nations (2023)

Figure 9 provides a visual representation of how the telecommunications infrastructure index compares across entities or regions. Each bar length reflects the size of the index on a scale of 0–1. Liechtenstein has the highest infrastructure score in the world, reaching a perfect score of 1. Liechtenstein possesses a highly advanced

telecommunication infrastructure, boasting above-average penetration rates for both fixed and mobile services. The government have implemented a range of policy and regulatory measures in recent years to promote competition and encourage infrastructure investment. On the Asian regional scale, South Korea is excelling in the proliferation of broadband internet connections. Approximately 97% of the population in South Korea has internet connectivity and about 46% of individuals possess a personal high-speed internet connection that surpasses the previous ISDN standard, with speeds exceeding 256 kbit/s.

Singapore has a highly developed telecommunications infrastructure, almost reaching the pinnacle of the TII scale. The country boasts a highly advanced telecommunications infrastructure, resulting in exceptionally fast mobile internet speeds that surpass those of other countries in the region. Singapore has achieved the remarkable feat of being the first nation worldwide to attain complete 5G coverage across its entire territory. Finally, the bottom bar depicts Indonesia. Although Indonesia's level results in a shorter bar than the three nations above it in Figure 9, the result is still impressive as it shows more than half of the maximum scale. Indonesia's placement in Figure 9 implies that the country has made significant progress building its infrastructure, yet there is still room for growth and improvement to reach the standards set by the leaders above it in the figure. Indonesia's position in this graph can be interpreted to mean that the country is on a positive path in the development of its telecommunications infrastructure. With a score of over 0.6, Indonesia appears to have surpassed many of the minimum thresholds required to support a robust telecommunications ecosystem. However, compared to sub-region, region and world leaders, it appears that there are still gaps to be filled in Indonesia's telecommunications infrastructure. Indonesia's level of telecommunications development may signal an opportunity for significant investment and a focus on innovation in the telecommunications sector to achieve higher levels of sophistication.

The comparison of the TII Index between India and Indonesia reveals significant disparities in the level of telecommunications infrastructure development in both countries. In addition to their categorisation in the EGDI, India and Indonesia's rankings in the TII are reflective of challenges faced in the Global South. India scored 0.3954 in the TII, indicating investment and development efforts in telecommunications infrastructure, albeit not reaching a high level. Compared to India, Indonesia scored higher at 0.6379, indicating a superior level of telecommunications infrastructure development. India falls within the category of the Middle E-Government Development Index (MEGDI), reflecting moderate development in e-government. Despite India's evolving telecommunications infrastructure, the country is positioned in the middle concerning the utilisation of information technology to enhance public services and government administration. On the other hand, Indonesia is categorised under the High E-Government Development Index (HEGDI), signifying significant progress utilising information technology to enhance the efficiency of public services and government administration. The superior telecommunications infrastructure development in Indonesia may contribute to its attainment of the HEGDI status.

The evolving telecommunications infrastructure in Indonesia and India reflects the efforts undertaken by Global South countries to pursue advancements in this sector. Global South nations often strive to improve the accessibility and quality of telecommunications infrastructure to support economic growth, communication and societal connectivity. The categorisation of Indonesia in the HEGDI and India in the MEGDI reflects how Global South countries utilise ICT to enhance public services and government administration. This mirrors efforts by Global South nations to address governance challenges, including complex bureaucracies and inadequate traditional infrastructure.

Human Capital Index

The HCI is composed of four key elements: (1) the rate of literacy among adults; (2) the total gross enrolment ratio encompassing primary, secondary, and tertiary education; (3) the anticipated duration of schooling; and (4) the mean number of years spent in education. HCI is calculated as a weighted average of its four component indicators. Initially, each indicator is standardised using the Z-score method to obtain a Z-score value for each. To compute the HCI for a given country, the formula involves a weighted arithmetic mean. In this calculation, the adult literacy rate is assigned a weight of one-third, while the gross enrolment ratio, estimated years of schooling and mean years of schooling each receive a weight of two-ninths.

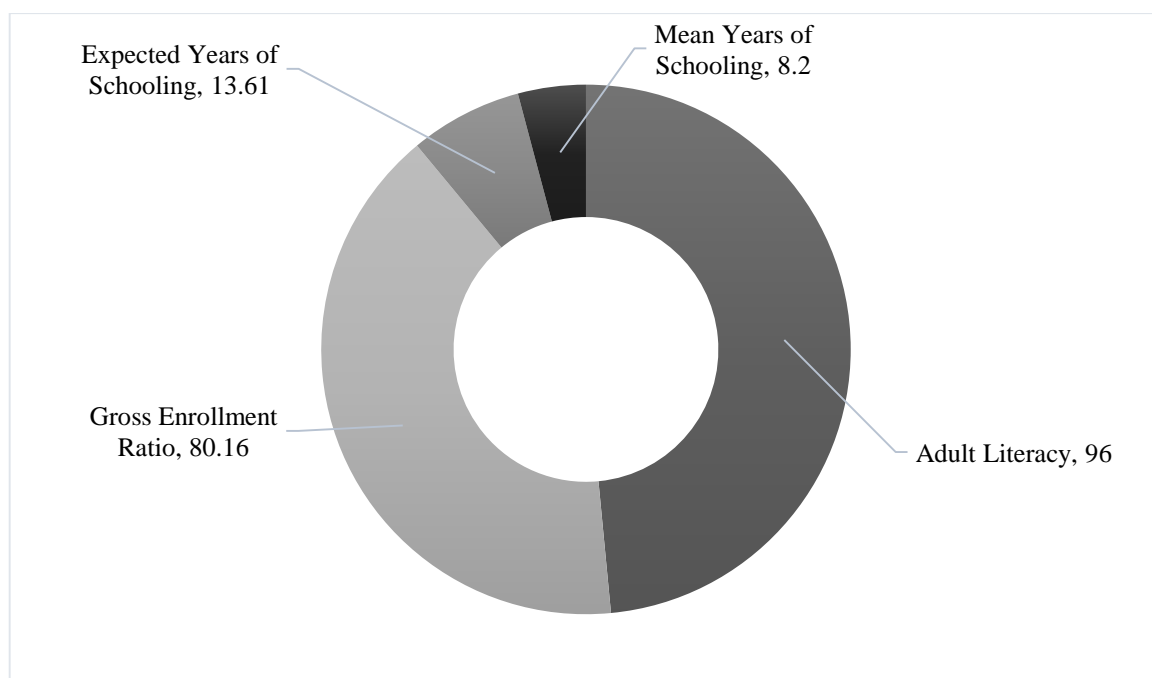


Figure 10. Telecommunication Infrastructure Index
Source: United Nations (2023)

The doughnut chart illustrating Indonesia’s HCI offers insights when analysed alongside the EGDI, which assesses the capacity and performance of national public

sector services in the digital age. The adult literacy rate, prominently high at 96, is crucial for the success of e-government initiatives. Literacy is the first step enabling citizens to engage with digital platforms, access online services and participate in the digital economy. A literate population is more likely to effectively use e-government services, which are becoming increasingly important for inclusive and efficient governance. The gross enrolment ratio of 80.16 reflects not only current educational attainment but also the potential for a digitally literate populace (see Figure 10). Indonesia's ratio suggests a broad base of the population with basic education, which is necessary for understanding and utilising e-government platforms. The future challenge is to ensure that the curriculum includes digital literacy and skills necessary to navigate and benefit from e-government services.

The expected years of schooling at 13.61 years shown in the data forecasts the Indonesian population's future educational levels. For e-government strategies, this suggests a promising trend of a more educated citizenry in the coming years, which could translate into higher engagement and demand for digital public services. As more individuals complete higher levels of education, they may also contribute to the development and enhancement of these digital platforms, fulfilling both a user and innovator role in the e-government ecosystem. The mean years of schooling at 8.2 might indicate the current level of education among adults, which correlates with their ability to interact with e-government services. The mean years of schooling level is crucial because it suggests the existing capabilities within the adult population to engage with digital government platforms. The focus of e-government initiatives should be aligned with the current education levels while pushing for continuous learning and improvement.

When placed beside EGDI, HCI data offer a multidimensional view of how prepared a nation's population is to interact with and benefit from e-government services. For Indonesia, the high literacy rate and significant educational engagement suggest a solid foundation for the adoption and use of digital government services. The challenge is ensuring that Indonesia's e-government platforms are user-friendly and that continuous education and digital literacy programmes are in place to keep pace with the rapidly evolving digital landscape. The ultimate goal for Indonesia is to harness its human capital to improve its EGDI ranking, reflecting a well-developed, efficient and inclusive digital government infrastructure.

Conclusion

This research shows that the Indonesian government has taken significant steps to develop services through digital platforms. Indonesia's E-Government Development Index encourages the implementation of agile governance principles. The transformative potential of e-government in making governance more agile is evident. To harness this potential, this study advocates for persistent progress in digital infrastructure and collective efforts to promote digital literacy and inclusivity. The findings of this study serve as a call to action for policymakers to refine strategies that strengthen the resilience

and effectiveness of governance through the adept use of digital technology. Further in-depth research on the impact and effectiveness of e-government development in Indonesia is necessary and will provide insights into the contribution of e-government to responsive governance. Furthermore, comparative studies with other countries that have successfully implemented e-government effectively are also needed to offer valuable insights into the potential obstacles and best strategies and practices that can be applied in Indonesia.

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