

Mapping and Analyzing E-Government Sentiments in Local Governments in Indonesia

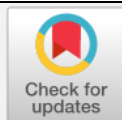
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ABSTRACT

This study aims to comprehensively map and evaluate the quality of E-Government services in local governments throughout Indonesia, focusing on public perceptions. Employing a descriptive method and qualitative approach, data collection involves non-participant observation. Researchers observed the implementation of E-Government within provincial-level local governments participating in the 2021 Electronic-Based Government Systems evaluation through Google Play. Data analysis utilizes an interactive model to provide nuanced insights. The findings reveal that E-Government implementation in Indonesian provincial governments is primarily concentrated within the E-Service category, comprising 50% or 89 applications. The most advanced category is E-Information, encompassing 38% or 67 applications. However, the E-Participation category is notably underrepresented, with only 15% or 19 applications implemented by provincial governments in Indonesia. This study contributes to a deeper understanding of Indonesia's current landscape of E-Government services. It underscores the importance of further developments, particularly in promoting citizen participation and engagement.

Keywords: E-Government; Indonesia; Local Governments;
Public Perceptions; Service Quality

1. Introduction

Integrating Information and Communication Technology (ICT) in governance through E-Government initiatives represents a significant step forward in how administrative processes are conducted and how citizens interact with their governments (Cheshmehzangi, 2022a; Cho & Rethemeyer, 2023; Liu & Yuan, 2015). This transition signifies a departure from traditional bureaucratic methods, ushering in an era where efficiency and transparency are enhanced through digital platforms. Governments worldwide are increasingly recognizing the transformative potential of E-Government strategies, understanding their ability to improve service delivery, ensure accountability, and enhance overall effectiveness across different sectors.

This global shift towards E-Government is reflected in diverse governance approaches, including creating online portals for simplified public service inquiries and implementing digital platforms to facilitate citizen engagement in decision-making processes (Doran et al., 2023; Kuzior et al., 2023; Malodia et al., 2021). By integrating ICT-driven E-Government initiatives, governments are reshaping their relationship with citizens, fostering a more dynamic and interactive engagement model.

These initiatives not only improve the accessibility of government services but also promote greater transparency and responsiveness in public administration. Citizens now have unprecedented opportunities to interact with government agencies in real-time, offering feedback and actively participating in governance processes. This transition towards a more collaborative governance approach empowers citizens and enables governments to make more informed decisions that better address the needs and preferences of the people they serve.

The role of e-government in improving society's quality of life is a crucial aspect that continues to evolve in today's digital era. Through the integration of information and communication technology (ICT) in governance, E-Government has brought significant benefits to society at large (Cheshmehzangi, 2022b; Chukwudi et al., 2023; Goloshchapova et al., 2023).

Firstly, E-Government enhances accessibility to public services by reducing physical barriers and time constraints needed to access government information and services. With E-Government platforms, people can easily access information about government programs, administrative requirements, and other public services without visiting government offices. This helps reduce the costs and time required for individuals to obtain the necessary services and improves the accessibility of public services for those in remote areas or with limited mobility.

Secondly, E-Government also enables increased participation and engagement of citizens in government decision-making processes. Through interactive E-Government platforms, citizens can provide input, give feedback, and even participate in public consultations on government policies and programs. This helps improve government accountability and ensures that adopted policies better reflect the needs and aspirations of the people.

Furthermore, E-Government helps improve the efficiency and effectiveness of public services by reducing bureaucracy, speeding up administrative processes, and increasing transparency in the management of public resources. With integrated and automated systems, governments can more quickly respond to the needs of the people, reduce the likelihood of corruption, and improve the management of public finances more efficiently.

Additionally, e-government also plays a role in improving public access to information and education. Through E-Government portals and platforms, people can easily access information on various topics, ranging from health and education information to job opportunities and social assistance programs. This helps improve public knowledge and awareness of important

issues and provides more equitable access to resources and opportunities (Pedersen, 2018; Yang & Rho, 2007).

Challenges and opportunities in E-Government implementation encompass various factors affecting its effectiveness and success, including technological limitations, organizational constraints, socio-political dynamics, and citizen engagement (Dwivedi et al., 2011; Umbach & Tkalec, 2022). By examining these factors, stakeholders can devise informed strategies to overcome obstacles and capitalize on advantages to advance E-Government agendas. One primary challenge is the digital divide, which refers to disparities in ICT access and usage among different societal segments, hindering inclusive access to online government services. Bridging this gap requires targeted interventions such as infrastructure development, digital skills training, and outreach programs. Technological limitations, including outdated ICT infrastructure and cybersecurity concerns, disrupt seamless service delivery and data security, necessitating investments in technological upgrades and robust cybersecurity measures. Organizational inertia and resistance to change within government institutions impede e-government adoption due to bureaucratic complexities and a lack of innovation capacity. Overcoming these barriers requires strong leadership, stakeholder engagement, and capacity-building efforts.

However, E-Government offers opportunities for enhancing government efficiency, transparency, and citizen engagement through streamlined administrative processes, data-driven decision-making, and open data initiatives (Kassen, 2014). Leveraging e-government platforms fosters real-time communication and engagement, empowering citizens to participate actively in governance processes and enhancing overall governance effectiveness. Recent developments in E-Government underscore a dynamic landscape shaped by technological advancements and evolving governance paradigms, providing valuable insights into emerging trends, challenges, and opportunities that will influence digital governance in the years ahead.

E-Government has evolved significantly due to technological innovation (Adeel et al., 2023; Ramzy & Ibrahim, 2022), including mobile devices, cloud computing, AI, and blockchain. Mobile apps, chatbots, and AI analytics have transformed service delivery and citizen interaction, providing personalized access to government services. Recent trends emphasize citizen-centric governance, engagement, and co-creation through online platforms and participatory mechanisms. Future projections include IoT integration for efficiency, blockchain for secure transactions, and closer public-private collaboration for innovative solutions.

In addition, the future of E-Government will be shaped by evolving regulatory frameworks and policy priorities aimed at addressing emerging challenges such as data privacy, cybersecurity, and digital inclusion. Governments must balance leveraging digital technologies to enhance service delivery and protect citizens' rights to privacy and data security while ensuring equitable access to digital services for all segments of society.

Indonesia's strong commitment to implementing Information and Communication Technology (ICT) in governance through e-government initiatives underscores its proactive approach towards modernizing administrative processes and enhancing citizen engagement. The establishment of Presidential Instruction of the Republic of Indonesia Number 3 of 2003, dedicated to the National Policy and Strategy for E-Government Development, signifies a strategic framework aimed at harnessing digital technologies to improve government services and foster transparency.

The country's journey towards embracing E-Government began in 1995 with pioneering initiatives like Bina Graha Net, reflecting an early recognition of the potential of ICT in enhancing government operations. These early initiatives laid the foundation for subsequent

developments, including establishing government websites and online platforms facilitating citizens' access to information and services across Indonesia.

Despite initial challenges, Indonesia's efforts in E-Government have yielded significant progress, as evidenced by improved E-Government Development Index (EGDI) scores (Sukarno & Nurmandi, 2023). The EGDI scores, initially below the ASEAN, Asian, and global averages, have seen a steady upward trend, surpassing regional and global benchmarks. The rise in EGDI scores from 0.66120 in 2020 to 0.71600 in 2022 reflects Indonesia's strides in leveraging ICT to enhance governance effectiveness and service delivery (United Nations, 2023).

Furthermore, Indonesia's improved global ranking in the United Nations survey, climbing from 88 in 2020 to 77 out of 193 countries in 2020 (United Nations, 2023), underscores the country's commitment to advancing E-Government initiatives on the international stage. This progress highlights Indonesia's evolving role as a regional leader in leveraging digital technologies to drive socio-economic development and promote inclusive governance.

The advancements in Indonesia's E-Government landscape demonstrate the government's dedication to embracing digital transformation and reflect broader global governance trends. As digital technologies continue to evolve, governments worldwide are increasingly recognizing the importance of E-Government in enhancing transparency, efficiency, and citizen engagement.

The success achieved in improving E-Government management and services has propelled the Indonesian government to embark on a continuous journey of enhancement and innovation, ensuring that digital governance remains a priority at both the central and local levels. Implementing the Electronic-Based Government Systems evaluation, mandated by Presidential Regulation of the Republic of Indonesia Number 95 of 2018, is vital for assessing and benchmarking the nation's E-Government performance.

The 2021 Electronic-Based Government Systems evaluation, which yielded an index of 2.24, reflects a comprehensive assessment covering a wide spectrum of ministries, agencies, and local governments. With 517 entities evaluated, including 92 ministries/agencies and 425 provinces, regencies, and cities, the evaluation provides a holistic view of Indonesia's E-Government landscape (Kementerian Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Republik Indonesia, 2022). This inclusive approach ensures that the evaluation captures the diversity of E-Government initiatives across different administrative levels, facilitating targeted interventions and improvements.

Moreover, the set target Electronic-Based Government Systems index of 2.6 by 2025 (Kementerian Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Republik Indonesia, 2022) underscores the government's commitment to continuous improvement and excellence in E-Government implementation. Achieving this ambitious target requires concerted efforts to enhance further the accessibility, efficiency, and quality of online services offered to citizens. To realize this goal, it is imperative to prioritize providing online services and encourage their utilization among citizens. This entails not only the development of user-friendly digital platforms but also proactive measures to promote digital literacy and awareness among the populace.

Furthermore, pursuing the Electronic-Based Government Systems index target goes beyond numerical benchmarks; it embodies a broader vision of leveraging digital technologies to drive socio-economic development and promote inclusive governance. Implementing Electronic-Based Government Systems must be accompanied by strategic initiatives to address underlying challenges such as the digital divide, cybersecurity, and data privacy.

While Indonesia has made strides in improving E-Government implementation, particularly at the national level, the progress at the local government level has been uneven. Despite efforts to enhance digital governance, only a few local governments have transitioned to the interactive stage, where citizens can actively engage with government services and participate in online decision-making.

The prevailing trend across most local governments is providing outdated and limited information through E-Government platforms. This indicates that many regions are still in the emerging or enhanced stages of e-government development. Governments typically offer basic and static information on their online portals in the emerging stage, such as contact details and basic service descriptions. While this marks a significant step towards digitalization, it falls short of meeting citizens' expectations for interactive and responsive government services.

Moving to the enhanced stage, governments provide more dynamic content and periodic updates on their online platforms. This includes information on public events, news updates, and announcements to keep citizens informed about government activities and initiatives. However, citizen engagement and interactivity remain limited despite these improvements, reflecting a gradual progression towards more comprehensive E-Government services.

In contrast, the interactive stage represents the pinnacle of E-Government development, characterized by robust features facilitating active interactions between citizens and the government. This includes functionalities such as online service requests, feedback mechanisms, interactive forums, and virtual town hall meetings, empowering citizens to participate in governance processes and contribute to decision-making actively.

The transition from the emerging and enhanced stages to the interactive stage requires technological advancements and changes in organizational culture and governance practices. Governments must invest in user-friendly platforms, digital literacy initiatives, and citizen engagement strategies to effectively facilitate this transition. Moreover, fostering a culture of transparency, accountability, and responsiveness is essential to building trust and encouraging citizen participation in e-government initiatives.

Therefore, to fully realize the potential benefits of E-Government for the public, it is essential to view it as more than just a technical tool but rather as a platform that actively facilitates interaction and engagement between citizens and the government. This means citizen participation should be prioritized and integrated into the design and implementation of e-government services (Axelsson et al., 2010; Sun et al., 2015). By incorporating feedback, collaboration, and co-creation mechanisms, E-Government can become a powerful tool for promoting transparency, accountability, and responsiveness in governance.

Furthermore, the quality of content available on E-Government platforms is crucial in driving citizen engagement and usage. Citizens are more likely to utilize E-Government services if they perceive the content as relevant, accurate, and up-to-date (Nadzir et al., 2020; Wirtz & Kurtz, 2018). Therefore, continuous assessment and improvement of the content offered through E-Government platforms are essential to meet users' evolving needs and expectations.

Moreover, evaluating E-Government quality based on user perceptions and expectations is paramount for maintaining its relevance and effectiveness. User-centric assessments provide valuable insights into the usability, accessibility, and overall user experience of E-Government services (Kotamraju & Van Der Geest, 2012; Verdegem & Verleye, 2009). By understanding how citizens perceive and interact with E-Government platforms, policymakers and administrators can identify areas for improvement and tailor their strategies to meet the public's needs better.

Given the evolving landscape of E-Government initiatives in Indonesia and the increasing emphasis on citizen engagement, it is essential to delve into the quality of services provided by local governments through the lens of public perceptions. By undertaking a comprehensive evaluation, this research seeks to identify the current state of E-Government services and understand how these services are perceived and experienced by the public.

This study aims to go beyond traditional assessments of e-government effectiveness by focusing on citizens' perspectives when interacting with these services. By capturing public perceptions, the research intends to uncover insights into the strengths and weaknesses of existing E-Government initiatives at the local level. This approach acknowledges citizens' diverse needs and expectations, highlighting areas where improvements can be made to enhance service delivery and overall satisfaction.

Furthermore, by emphasizing public perceptions, the research aims to bridge the gap between policy objectives and citizen experiences. While Indonesia has made strides in advancing E-Government at the national level, understanding how the public perceives these initiatives locally is essential for informed decision-making and policy formulation. This research will provide empirical evidence to inform evidence-based policy decisions to improve citizen engagement and satisfaction with government services.

The novelty of this research lies in its comprehensive approach to evaluating E-Government services by integrating public perceptions. By focusing on the quality of services from the citizen's perspective, the study offers a nuanced understanding of the effectiveness and impact of E-Government initiatives in Indonesia. This approach adds depth and richness to the evaluation process, providing valuable insights that can inform policy interventions and drive improvements in service delivery at the local government level.

2. Literature Review

2.1. Definition of E-Government

E-Government leverages digital technology to revolutionize governmental activities, enhancing effectiveness, efficiency, and service delivery (Bannister & Connolly, 2013; Bekkers & Homburg, 2009; Gauld, 2009). This highlights the transformative potential of e-government, which aims to modernize traditional bureaucratic processes and improve citizen-centric services. Additionally, the importance of E-Government in facilitating vital information exchange between government entities and citizens, utilizing information technology infrastructure for seamless communication and interaction, underscores its pivotal role in fostering transparent, accessible, and responsive governance (Hofmann et al., 2012).

Moreover, three key characteristics encapsulate the essence of E-Government initiatives: a new interaction mechanism, information technology utilization, and service quality improvement (Indrajit, 2006). E-Government introduces novel, modern modes of interaction between governmental bodies and various stakeholders, including citizens, businesses, and other governmental agencies. This dynamic shift in interaction paradigms enables more direct, efficient, and user-centric engagement. Central to E-Government initiatives is the extensive utilization of information technology, particularly the Internet, to digitize and streamline governmental processes. By leveraging cutting-edge technologies, E-Government endeavors to enhance accessibility, transparency, and efficiency in service delivery. Additionally, E-Government initiatives are driven by a steadfast commitment to enhancing the quality of services rendered to citizens. Through digital transformation and process optimization, e-government aims to deliver services that are more responsive, personalized, and aligned with citizens' needs and expectations.

Furthermore, the enduring popularity of E-Government initiatives can be attributed to their profound benefits for both governments and citizens (Ronchi, 2019; Rose et al., 2015). These benefits include delivering high-quality public services, facilitating active citizen participation in governance processes, and broadening government outreach. This acknowledgment underscores the pivotal role of E-Government in fostering inclusive, participatory, and accountable governance structures.

Lastly, E-Government initiatives have three overarching objectives: enhanced government efficiency, improved service delivery, and enhanced democratic processes (Lee-Geiller & Lee, 2019; Malodia et al., 2021). E-Government seeks to streamline governmental processes, optimize resource utilization, and foster greater operational efficiency across various administrative domains. Central to E-Government initiatives is the commitment to delivering services that are more accessible, responsive, and tailored to citizen needs by leveraging digital technologies and e-government endeavors to enhance the overall quality and effectiveness of public services. Additionally, E-Government is pivotal in enriching democratic processes by promoting transparency, accountability, and citizen participation in governance. Through digital platforms and tools, E-Government empowers citizens to engage meaningfully in decision-making processes and hold government institutions accountable.

2.2. Modernizing Administrative Processes Through E-Government Initiatives

Implementing E-Government initiatives significantly modernizes administrative processes by transitioning tasks like applications, registrations, and payments to digital platforms (Milakovich, 2021; Sun et al., 2015; Vimala et al., 2023). This shift reduces manual processing burdens and minimizes administrative errors, enhancing efficiency. For example, citizens can conveniently apply for permits or licenses online, saving both citizens' and government agencies' time and resources.

Furthermore, E-Government portals serve as centralized hubs for accessing various information and services, eliminating the need for physical visits to government offices. This improved accessibility leads to substantial time savings and increased convenience for citizens, enhancing overall service efficiency. Through these portals, citizens can access government information, submit inquiries, and track the status of their applications online, reducing reliance on in-person interactions and administrative delays.

Moreover, E-Government platforms facilitate seamless communication between citizens and government agencies, enabling faster response times and more transparent interactions. These platforms promote a responsive and accountable governance framework by offering channels for citizen feedback, issue reporting, and online consultations. Additionally, transparent access to government data and performance metrics fosters trust and accountability among citizens, further bolstering service efficiency.

E-Government systems often integrate advanced data analytics and reporting tools that empower government agencies to analyze trends, identify bottlenecks, and make informed, data-driven decisions. This data-driven approach allows agencies to optimize resource allocation, prioritize service delivery, and enhance operational efficiency. For instance, by analyzing citizen feedback and service usage data, government agencies can identify areas for improvement and allocate resources accordingly, resulting in more targeted and efficient service delivery.

2.3. Mapping of E-Government

Since the seminal work of Layne and Lee in 2001, the evolution of E-Government has seen the civil dimension's integration into the stages of information integration and online service provision. This integration has led to the classification of E-Government into three main dimensions: E-Information, E-Services, and E-Participation (Lee-Geiller & Lee, 2019; Lee et al., 2011; Nam, 2014).

E-Information, as an integral component of E-Government, is a platform for disseminating crucial information to citizens. However, its effectiveness is often hindered by various limitations. Firstly, access to information may be limited due to factors such as digital literacy levels, internet connectivity issues, or inadequate infrastructure in certain regions. This limited access inhibits the reach of government services to all segments of society, potentially exacerbating existing disparities.

Secondly, disseminating information through E-Government channels can be slow and inefficient, particularly in cases where outdated technology or bureaucratic processes impede timely updates and communication. Delays in providing essential information can hinder citizen engagement and contribute to frustration among users seeking prompt responses or updates.

Moreover, inaccuracies in the information presented through E-Government platforms can erode trust in government services and undermine the credibility of the information provided. Whether due to outdated data, errors in content creation, or lack of verification mechanisms, inaccuracies diminish the utility of E-Information services. They may deter citizens from relying on them for essential information.

Additionally, the lack of direct interaction in E-Information systems poses a significant challenge in addressing citizens' inquiries, concerns, or feedback in real-time. Unlike traditional face-to-face interactions with government officials, E-Information platforms often lack interactive features or mechanisms for immediate response, leaving users feeling disconnected and dissatisfied with the level of engagement offered.

Collectively, these limitations contribute to user discomfort and dissatisfaction with E-Information services within the broader context of E-Government initiatives. Addressing these challenges requires strategic interventions to enhance accessibility, improve dissemination processes, ensure data accuracy, and implement interactive features that facilitate meaningful engagement between citizens and government agencies.

E-Services, within the realm of E-Government, represent a comprehensive suite of activities and efforts that leverage information technology to deliver various services to citizens (Pardo et al., 2012). This dimension of E-Government consists of three fundamental components: service providers, service recipients, and service channels that harness information technology infrastructure to facilitate service delivery (Rowley, 2011).

The concept of E-Services underscores its pivotal role in facilitating online transactions between service providers and recipients (Jeong, 2007). By leveraging digital platforms and communication technologies, E-Services streamline and optimize the delivery of services, enhancing both efficiency and accessibility for users.

Integrating E-Services into E-Government initiatives marks a significant departure from traditional service delivery models, offering citizens unprecedented convenience and flexibility in accessing essential services. Through user-friendly interfaces and secure online platforms, citizens can avail themselves of a wide range of government services, from applying for permits and licenses to accessing educational resources and public utilities.

Furthermore, E-Services enable seamless interactions between government agencies and citizens, fostering a more responsive and citizen-centric approach to service delivery. By digitizing and automating various administrative processes, E-Services reduce bureaucratic red tape, minimize paperwork, and expedite transactional workflows, ultimately enhancing the overall user experience.

Overall, E-Services represent a transformative aspect of E-Government, leveraging technology to modernize service delivery mechanisms, improve accessibility, and enhance the overall efficiency of governance structures.

E-Participation constitutes a pivotal dimension within E-Government, signifying a paradigm shift towards actively empowering citizens to engage in policy-making (Abdulkareem et al., 2022; Adnan et al., 2022; Krishnan et al., 2013). This dimension marks a departure from the traditional governance model, wherein citizens are viewed merely as recipients of government policies, to a more inclusive approach wherein citizens become proactive contributors of ideas and feedback.

The essence of E-Participation lies in its objective to broaden the scope of governance initiatives by fostering active citizen involvement in decision-making processes. By leveraging various communication techniques facilitated by technology, E-Participation initiatives aim to promote citizen engagement and participation across diverse segments of society. Furthermore, E-Participation provides citizens with relevant and easily understandable information, encouraging deeper involvement in governance processes.

2.4. Sentiment Analysis

Sentiment analysis, or opinion mining, is vital to discern the emotional tone conveyed within the textual content and subsequently classify it as positive or negative (Greco, 2022; Mohammad, 2016; Nimesh et al., 2019). As elucidated by MonkeyLearn, this analytical method involves dissecting and categorizing emotions—ranging from positive, negative, to neutral—embedded within text through sophisticated text analysis algorithms (Basmmi et al., 2020).

The evolution of sentiment analysis has led to the adoption of tiered sentiment analysis, which prioritizes precision in gauging the popularity of sentiments to ensure the seamless functioning of existing programs. Expanding polarity categories becomes imperative to encompass nuanced variations in positivity and negativity, such as positive, positive, neutral, negative, and negative sentiments.

Moreover, sentiment analysis encompasses the intricate process of discerning sentiment and categorizing text polarity within documents or sentences. This analytical framework enables the classification of sentiments as positive, negative, or neutral, providing invaluable insights into the prevailing emotional context within textual data.

In E-Government, sentiment analysis is critical in gauging public opinion and assessing the effectiveness of government initiatives and services (Malodia et al., 2021; Verma, 2022). Government agencies can analyze the sentiment expressed in citizen feedback, social media interactions, and online forums related to E-Government services, policies, and initiatives by employing sentiment analysis techniques.

One key application of sentiment analysis in E-Government is evaluating citizen satisfaction and perception of digital services and platforms. Government agencies can analyze sentiment across various digital channels to understand how citizens perceive the usability, accessibility, and overall effectiveness of E-Government portals, applications, and online services. Positive sentiment may indicate satisfaction with service quality and accessibility, while negative sentiment could signal areas for improvement or concerns that need to be addressed.

Moreover, sentiment analysis can be utilized to monitor public sentiment toward specific government policies, programs, or initiatives introduced through E-Government platforms. By analyzing sentiment expressed in online discussions, social media conversations, and public feedback, government agencies can assess the public's perception of these initiatives and identify any issues or concerns that may arise. This information can inform policy-making processes and help government agencies tailor their communication strategies to address public sentiment effectively.

Additionally, sentiment analysis can contribute to enhancing transparency and accountability in E-Government. Government agencies can identify areas where transparency and accountability may be lacking by analyzing sentiment expressed in citizen feedback and public discussions about government activities and decision-making processes. Positive sentiment regarding transparency efforts can reinforce public trust in government institutions, while negative sentiment may indicate areas where transparency measures need strengthening.

Furthermore, sentiment analysis can aid in crisis management and response efforts during emergencies or public crises. Government agencies can gauge public sentiment, identify emerging issues or concerns, and tailor their response strategies by monitoring sentiment expressed in social media conversations and online forums during such events. Positive sentiment may indicate public confidence in government response efforts, while negative sentiment could highlight areas where additional support or communication is needed.

3. Research Methodology

This research employs a descriptive approach with a qualitative methodology. Descriptive research aims to provide a thorough and precise depiction of a subject (Djamba & Neuman, 2002), in this case, the implementation of E-Government in provincial-level local governments participating in the 2021 Electronic-Based Government Systems evaluation. This approach is valuable for gaining a rich understanding of the phenomenon under investigation.

Qualitative methodology is utilized to delve into and comprehend the social issues surrounding E-Government implementation (Creswell & Poth, 2016). This involves exploring emergent procedures and questions, gathering commonly collected data, and conducting inductive data analysis to develop specific and general themes. By adopting a qualitative approach, the research aims to capture the nuances and complexities of implementing E-Government within provincial-level governance.

The data collection technique employed in this research is non-participant observation (Cooper et al., 2004). This means the researcher remains separate from the observed individuals and acts solely as an impartial observer. The observation focuses on implementing E-Government in provincial-level local governments participating in the 2021 Electronic-Based Government Systems evaluation. By observing the implementation process directly, the researcher can gain firsthand insights into the challenges, processes, and interactions involved.

Furthermore, the research utilizes Google Play to analyze the classification of E-Government applications and platforms and public responses. Google Play provides a rich data source, including user ratings, reviews, and download statistics, which can offer valuable insights into how E-Government initiatives are perceived and utilized by the public.

The list of participating provinces in the 2021 Electronic-Based Government Systems, along with their respective Electronic-Based Government Systems Index and ratings, is provided in **Table 1**. This table serves as a reference point for understanding the level of E-Government implementation across different provinces.

Table 1. Provinces Participating in the Electronic-Based Government Systems in 2021

No.	Province	Electronic-Based Government Systems Index	Rating
1	Aceh	3.19	Good
2	North Sumatra	2.77	Good
3	Riau	2.55	Fair
4	Riau Islands	1.96	Fair
5	West Sumatra	2.69	Good
6	Jambi	2.21	Fair
7	South Sumatra	2.62	Good
8	Bangka Belitung Islands	2.60	Good
9	Bengkulu	2.79	Good
10	Lampung	2.76	Good
11	DKI Jakarta	3.47	Good
12	West Java	3.28	Good
13	Banten	3.15	Good
14	Yogyakarta Special Region	3.49	Good
15	Central Java	2.74	Good
16	East Java	2.82	Good
17	West Kalimantan	3.26	Good
18	Central Kalimantan	1.00	Poor
19	South Kalimantan	2.60	Good
20	East Kalimantan	2.22	Fair
21	North Kalimantan	2.38	Fair
22	North Sulawesi	2.26	Fair
23	Gorontalo	2.51	Fair
24	Central Sulawesi	1.38	Poor
25	South Sulawesi	2.05	Fair
26	Southeast Sulawesi	1.05	Poor
27	West Sulawesi	2.03	Fair
28	Bali	3.68	Very Good
29	West Nusa Tenggara	2.94	Good
30	East Nusa Tenggara	2.28	Fair
31	Maluku	1.93	Fair
32	North Maluku	1.00	Poor
33	West Papua	2.04	Fair
34	Papua	1.80	Fair

Source: ([Kementerian Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Republik Indonesia, 2021](#))

Data analysis in this research uses the interactive model developed by Miles et al. This model comprises several stages: data reduction, presentation, conclusion drawing, and verification ([Miles et al., 2013](#)). Through this rigorous analytical process, the researcher aims to

distill the collected data into meaningful insights, present them clearly and organized, draw provisional conclusions, and verify their validity.

It is important to note that the conclusions drawn at this stage are preliminary and subject to change based on any new and robust findings that may emerge during the data collection process. This iterative approach to data analysis ensures that the research findings are thorough, robust, and reflective of the complex realities of E-Government implementation in provincial-level governance.

4. Results and Discussion

This section of the research delves into analyzing and interpreting the data gathered from E-Government applications utilized by provincial-level local governments in Indonesia. The primary source of this data is Google Play, where various applications about E-Government functionalities are available for download and use.

The researcher has categorized these applications into three main types: E-Information, E-Services, and E-Participation, based on their respective functionalities and features. E-Information applications primarily focus on disseminating information, such as government policies, news updates, and public announcements. On the other hand, e-service applications are designed to provide online services to citizens, such as online payment portals, application submissions, and service requests. Lastly, E-Participation applications facilitate citizen engagement and participation in governance processes, such as online forums, feedback mechanisms, and public consultations.

Furthermore, the researcher has conducted a sentiment analysis of user responses to these E-Government applications. This analysis categorizes user feedback and reviews as positive or negative sentiments. Positive sentiments may indicate user satisfaction with the applications' usability, functionality, and effectiveness, while negative sentiments may highlight areas for improvement or dissatisfaction with certain aspects.

The data analyzed in this discussion is derived from applications used by all 34 provinces in Indonesia, providing a comprehensive overview of the current state of E-Government implementation at the provincial level.

4.1. Mapping of Provincial E-Government in Indonesia

Table 2. Mapping of Provincial E-Government in Indonesia

No	Province	E-Information	E-Service	E-Participation	Total
1	Aceh	1	1	0	2
2	North Sumatra	2	2	0	4
3	Riau	1	3	0	4
4	Riau Islands	4	1	0	5
5	West Sumatra	0	13	0	13
6	Jambi	2	0	0	2
7	South Sumatra	0	4	0	4
8	Bangka Belitung Islands	1	0	0	1
9	Bengkulu	0	1	0	1
10	Lampung	1	2	0	3
11	DKI Jakarta	11	13	3	27

No	Province	E-Information	E-Service	E-Participation	Total
12	West Java	7	5	0	12
13	Banten	1	3	4	8
14	Yogyakarta Special Region	2	4	1	7
15	Central Java	8	7	1	16
16	East Java	16	5	0	21
17	West Kalimantan	0	1	1	2
18	Central Kalimantan	0	2	0	2
19	South Kalimantan	1	0	0	1
20	East Kalimantan	0	2	0	2
21	North Kalimantan	0	0	0	0
22	North Sulawesi	0	4	1	5
23	Gorontalo	1	1	0	2
24	Central Sulawesi	1	0	0	1
25	South Sulawesi	2	0	1	3
26	Southeast Sulawesi	0	0	0	0
27	West Sulawesi	2	2	1	5
28	Bali	0	6	1	7
29	West Nusa Tenggara	3	5	5	13
30	East Nusa Tenggara	0	0	0	0
31	Maluku	0	0	0	0
32	North Maluku	0	0	0	0
33	West Papua	0	2	0	2
34	Papua	0	0	0	0
Total		67	89	19	175

Table 2 provides a comprehensive overview of E-Government applications owned by provincial governments across Indonesia, all accessible through the Google Play Store. The dataset reveals a total of 175 applications within this category. These applications are further classified into three distinct categories: E-Information, E-Service, and E-Participation, showcasing the diverse functionalities and services these platforms offer.

The distribution of applications across categories highlights the varying emphasis of provincial governments in providing digital services to their constituents. Among the observed applications, 67 are dedicated to E-Information, focusing on disseminating government-related information and updates to the public. Additionally, 89 applications are classified as E-Service, providing online services such as payment portals, administrative assistance, and other interactive functionalities. Meanwhile, a smaller subset of 19 applications falls under the E-Participation category, demonstrating efforts to engage citizens in governance processes through feedback mechanisms, public forums, and collaborative decision-making platforms.

A notable trend observed in the dataset is the geographical concentration of E-Government initiatives, particularly on Java Island. DKI Jakarta emerges as a frontrunner with 27 applications, followed closely by East Java with 21 applications and Central Java with 16 applications. This concentration suggests a higher level of digital readiness and investment in E-

Government infrastructure in these regions, potentially driven by population density, economic development, and administrative priorities.

Conversely, provinces located in the eastern part of Indonesia, including East Nusa Tenggara, Maluku, North Maluku, and Papua, appear to have limited or no presence of E-Government applications on the Google Play Store. This observation underscores regional disparities in digital infrastructure and access to government services, reflecting potential challenges in extending digital governance initiatives to more remote or underserved areas.

4.2. Mapping of Provincial E-Government Based on Islands

4.2.1. Sumatra Island

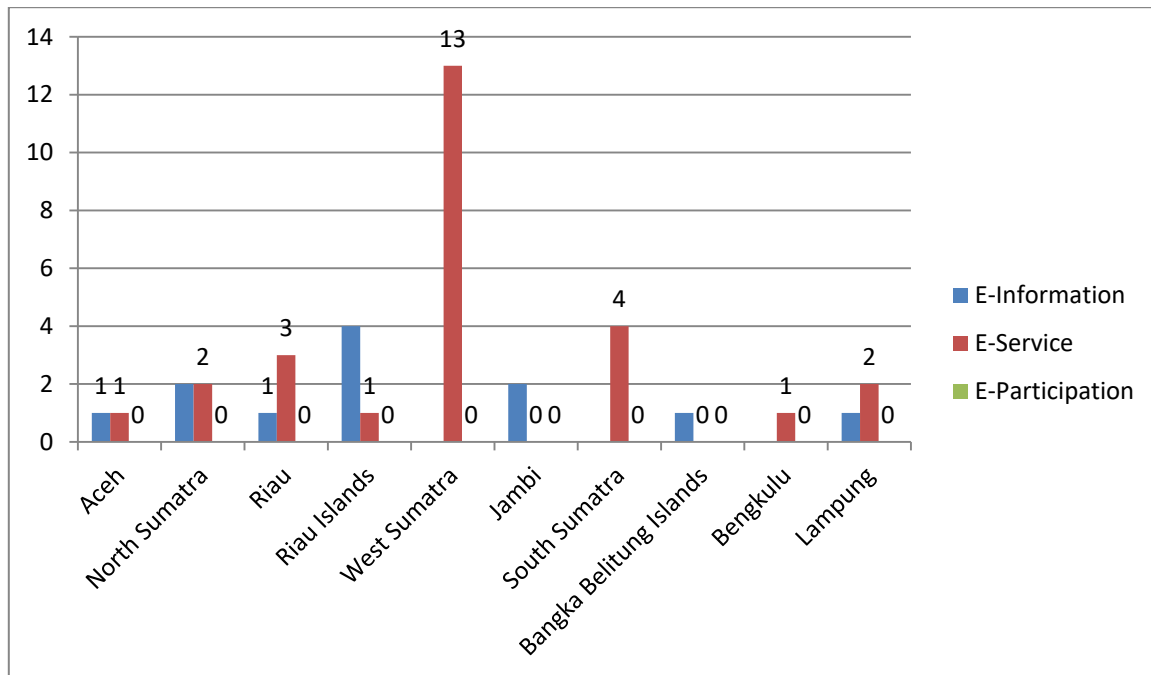


Figure 1. Mapping of Provincial E-Government on Sumatra Island

Figure 1 provides a detailed overview of the provincial-level E-Government landscape on Sumatra Island, showcasing 39 applications within this category. Among these applications, E-Service emerges as the dominant category, with 27 applications dedicated to providing various online services and functionalities to users. This indicates a strong emphasis on digital service delivery by provincial governments on Sumatra Island, potentially aimed at enhancing efficiency and accessibility in public service provision.

Following the prevalence of E-Service applications, the dataset reveals the presence of 12 applications categorized under E-Information. These applications likely serve as platforms for disseminating government-related information, updates, and public announcements, fostering citizens' transparency and awareness of governmental activities and initiatives.

Notably, the absence of applications developed and implemented for E-Participation is a significant observation. E-participation applications typically facilitate citizen engagement and involvement in governance through interactive platforms, feedback mechanisms, and participatory decision-making tools. The lack of such applications on Sumatra Island suggests potential opportunities for provincial governments to explore and invest in initiatives promoting citizen participation and collaboration in policy-making and governance activities.

4.2.2. Java Island

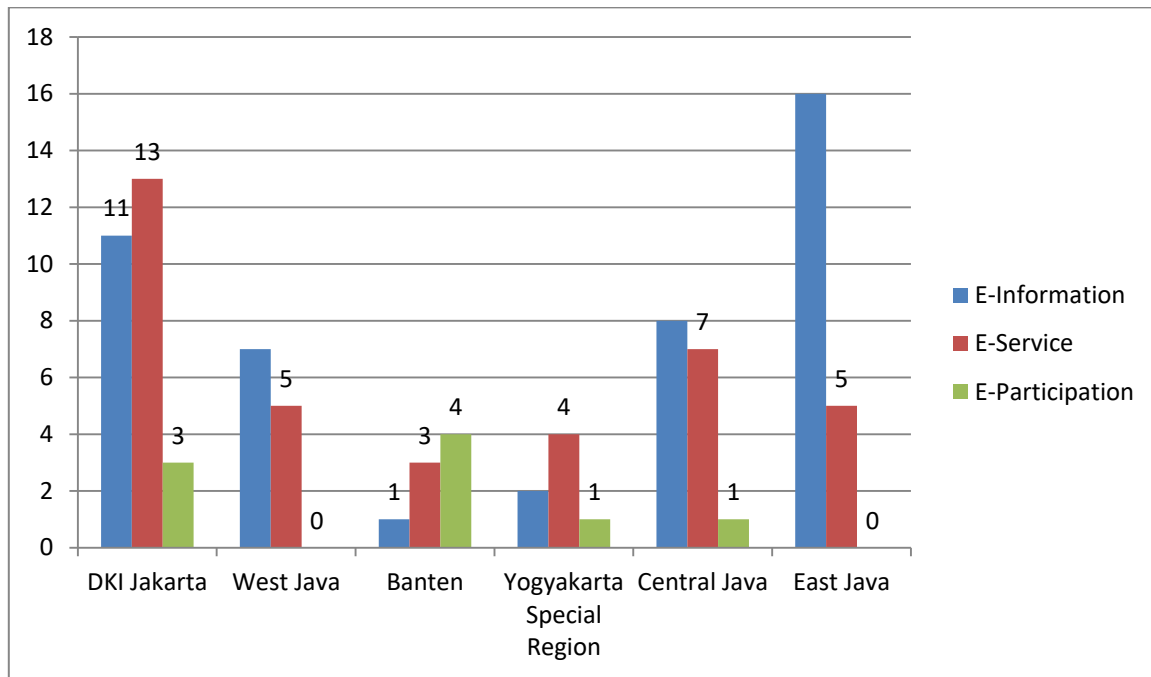


Figure 2. Mapping of Provincial E-Government on Java Island

Figure 2 provides a comprehensive insight into the landscape of provincial-level E-Government applications on Java Island, revealing 91 applications within this category. This significant number underscores the robust digital presence and initiatives undertaken by provincial governments on Java Island to enhance service delivery and citizen engagement through digital platforms.

The dataset analysis highlights the dominance of E-Information applications, comprising 45 applications. These applications serve as crucial channels for disseminating government-related information, updates, and public announcements, promoting citizens' transparency and awareness of governmental activities and policies. The prevalence of E-Information applications reflects a concerted effort by provincial governments on Java Island to ensure transparent communication and information accessibility to their constituents.

Following closely behind E-Information applications are E-Service applications, totaling 37 applications. This category encompasses various online services and functionalities facilitating administrative processes, transactions, and interactions between citizens and government agencies. The significant presence of e-service applications underscores the commitment of provincial governments on Java Island to leverage digital technologies to enhance efficiency and accessibility in public service delivery.

However, despite the substantial number of E-Government applications on Java Island, the dataset reveals a comparatively lower development of E-Participation applications, comprising only 9. E-Participation applications foster citizen engagement and involvement in governance processes through interactive platforms, feedback mechanisms, and participatory decision-making tools. The limited presence of E-Participation applications suggests potential areas for improvement and investment by provincial governments to enhance citizen participation and collaboration in policy-making and governance activities on Java Island.

4.2.3. Kalimantan Island

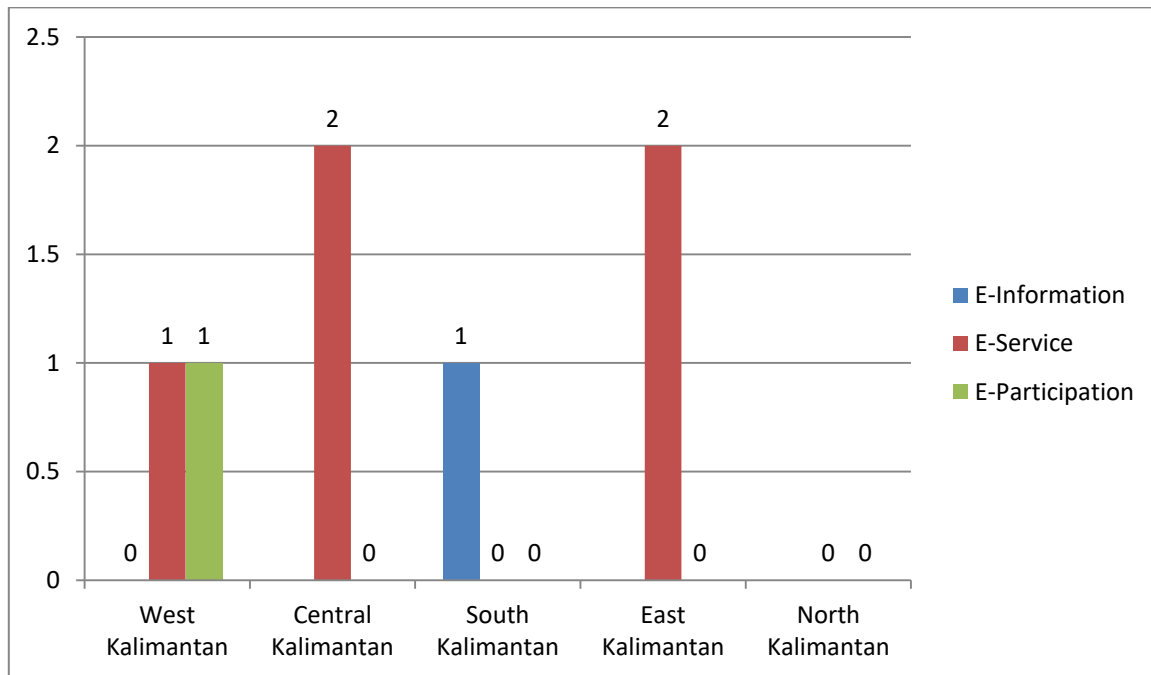


Figure 3. Mapping of Provincial E-Government on Kalimantan Island

Figure 3 presents an insightful overview of the provincial-level E-Government landscape on Kalimantan Island, showcasing 7 applications within this category. Despite the relatively lower number compared to other islands, the presence of these applications underscores the efforts of provincial governments on Kalimantan Island to embrace digitalization and enhance governance through digital platforms.

The dataset analysis highlights that e-service applications are the most prevalent, comprising 5 out of the 7 applications. This indicates a strong emphasis on providing online services and functionalities to citizens, potentially aimed at improving administrative efficiency and enhancing accessibility to government services on Kalimantan Island. The prevalence of E-Service applications reflects a proactive approach by provincial governments to leverage digital technologies for service delivery.

In contrast, E-Information and E-Participation applications are less developed on Kalimantan Island, each comprising only 1 application. E-Information applications serve as channels for disseminating government-related information to the public, promoting transparency and awareness regarding governmental activities and policies. The presence of only 1 E-Information application suggests potential opportunities for provincial governments to expand their efforts in providing accessible and transparent information to citizens.

Similarly, the limited development of E-Participation applications indicates a need for further investment and integration of platforms that facilitate citizen engagement and participation in governance processes. E-Participation applications foster inclusive decision-making and citizen involvement in policy-making, enhancing governance effectiveness and accountability.

4.2.4. Sulawesi Island

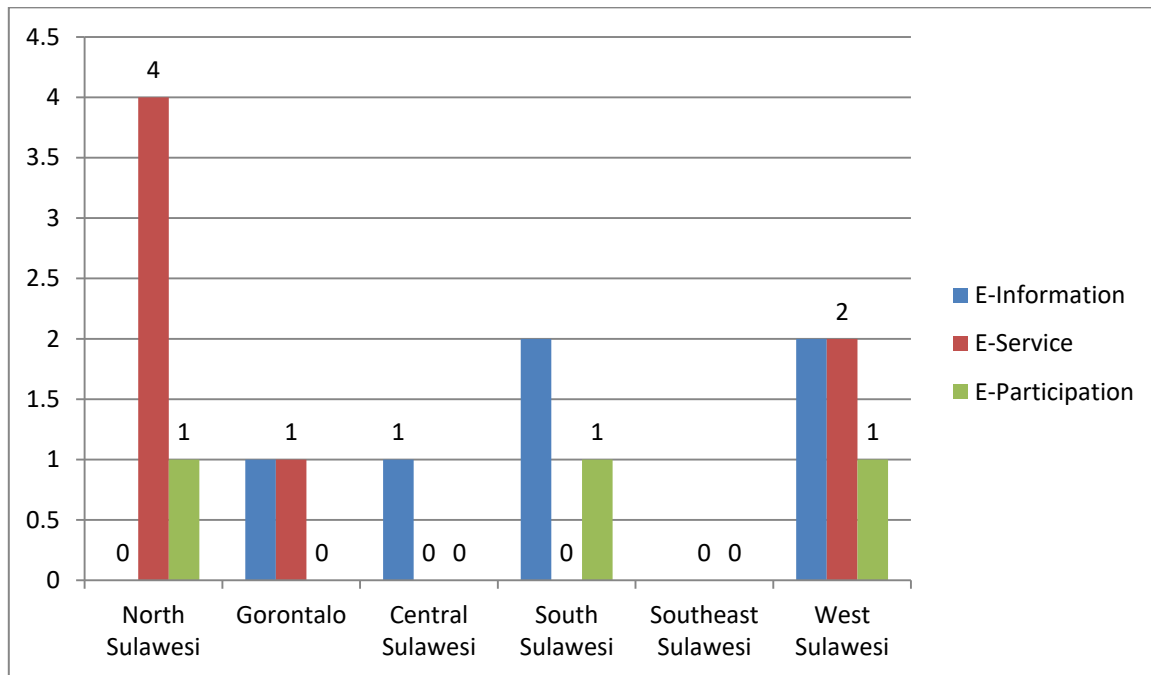


Figure 4. Mapping of Provincial E-Government on Sulawesi Island

Figure 4 provides a comprehensive insight into the landscape of provincial-level E-Government applications on Sulawesi Island, revealing 16 applications within this category. This analysis sheds light on the digital initiatives undertaken by provincial governments on Sulawesi Island to enhance service delivery and citizen engagement through digital platforms.

The dataset reveals that E-Service applications are the most prevalent, comprising 7 out of 16. This indicates a strong emphasis on providing online services and functionalities to citizens to improve administrative efficiency and accessibility to government services on Sulawesi Island. The prevalence of E-Service applications underscores the commitment of provincial governments to leverage digital technologies for efficient service delivery and citizen interaction.

Following closely behind E-Service applications are E-Information applications, totaling 6 applications. These applications are important channels for disseminating government-related information, updates, and public announcements, promoting citizens' transparency and awareness of governmental activities and policies. The presence of E-Information applications reflects efforts by provincial governments on Sulawesi Island to ensure transparent communication and information accessibility to their constituents.

However, despite the significant presence of E-Service and E-Information applications, the dataset reveals a comparatively lower development of E-Participation applications, comprising only 3. E-Participation applications foster citizen engagement and involvement in governance processes through interactive platforms and participatory decision-making tools. The limited presence of e-participation applications suggests opportunities for provincial governments to invest further in initiatives promoting citizen participation and collaboration in policy-making and governance activities on Sulawesi Island.

4.2.5. Bali, Nusa Tenggara, Maluku, and Papua Islands

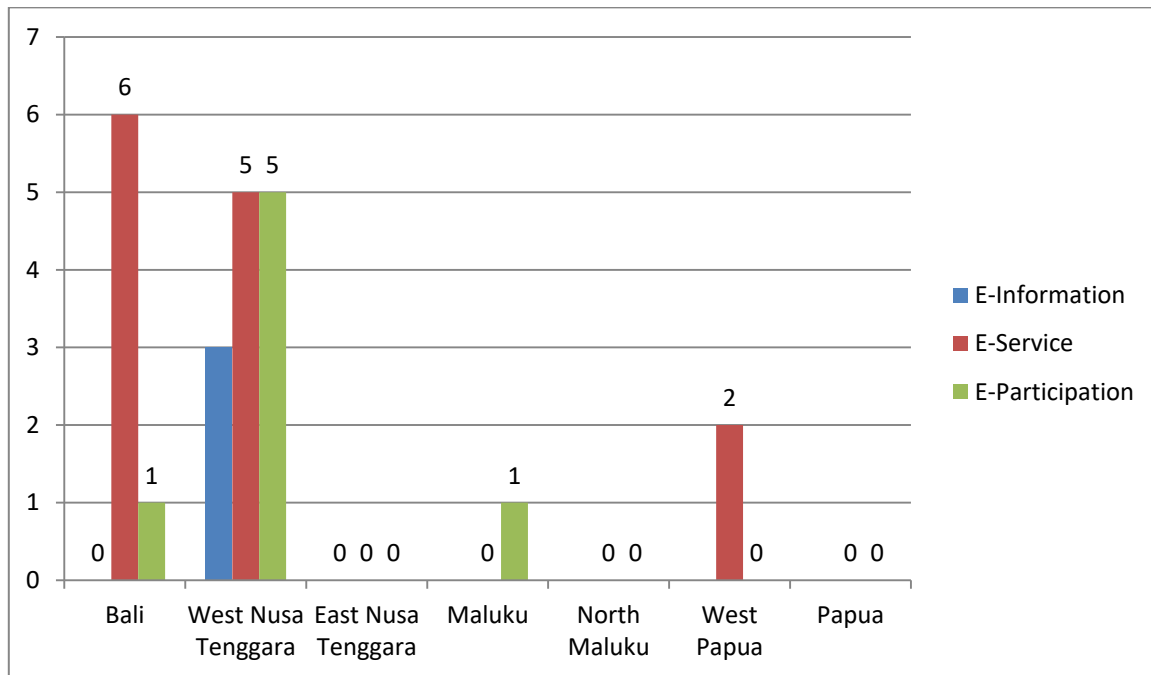


Figure 5. Mapping of Provincial E-Government in Bali, Nusa Tenggara, Maluku, and Papua

Figure 5 provides a comprehensive overview of the provincial-level E-Government landscape in Bali, Nusa Tenggara, Maluku, and Papua Islands, showcasing 22 applications within this category. This analysis sheds light on the digital initiatives undertaken by provincial governments in these islands to enhance service delivery and citizen engagement through digital platforms.

The dataset reveals that E-Service applications are the most prevalent, comprising 13 out of 22. This indicates a strong emphasis on providing online services and functionalities to citizens to improve administrative efficiency and accessibility to government services in these regions. The prevalence of E-Service applications underscores the commitment of provincial governments to leverage digital technologies for efficient service delivery and citizen interaction.

Following E-Service applications, E-Participation applications are also well-represented, totaling 6 applications. These applications foster citizen engagement and involvement in governance through interactive platforms and participatory decision-making tools. The significant presence of E-Participation applications reflects efforts by provincial governments in Bali, Nusa Tenggara, Maluku, and Papua Islands to promote citizen participation and collaboration in policy-making and governance activities.

Conversely, E-Information applications are less developed in these regions, comprising only 3 applications. E-Information applications serve as important channels for disseminating government-related information, updates, and announcements to the public, thereby promoting transparency and awareness among citizens regarding governmental activities and policies. The limited presence of e-information applications suggests potential opportunities for provincial governments to enhance their efforts in providing transparent and accessible information to citizens further.

4.3. Sentiments of E-Government in Provincial Governments in Indonesia

In this study, sentiment analysis utilized two categories: positive and negative. Sentiment analysis identifies how sentiment is expressed through text (Basmmi et al., 2020; Greco, 2022; Nimesh et al., 2019; Verma, 2022). The purpose of sentiment analysis is to gather opinions from users within E-Government applications developed by provincial governments in Indonesia.

4.3.1. Positive Sentiment



Figure 6. Positive Sentiment in E-Government Applications

Figure 6 indicates positive sentiment toward implementing e-government applications in provincial governments, which can be observed from frequently occurring words such as application (*aplikasi*), easy (*mudah*), beneficial (*manfaat*), good (*bagus*), and society (*masyarakat*). This implies that citizens using E-Government feel assisted by the presence of these applications.

4.3.2. Negative Sentiment



Figure 7. Negative Sentiment in E-Government Applications

Figure 7 reveals that negative sentiment toward implementing E-Government applications in provincial governments can be observed from frequently occurring words such as application (*aplikasi*), register (*daftar*), login, open (*buka*), sign in (*masuk*), update, please (*mohon*), and help (*tolong*). This indicates that the government needs to improve the developed applications according to the complaints raised by the community.

5. Conclusion

The conclusion of this study is as follows: Overall, the implementation of E-Government in provincial governments in Indonesia focuses more on the E-Service category, accounting for 50% or 89 applications. Furthermore, the most developed category is E-Information, accounting for 38% or 67 applications. However, the category least implemented by provincial governments in Indonesia is E-Participation, comprising 15% or 19 applications. Citizens feel assisted by applications developed by provincial governments in Indonesia. This is evident from the predominantly positive comments mentioning application, ease, benefits, good, and society. Although existing applications benefit the community, E-Government applications must be improved to gain better acceptance among the public. This is reflected in the negative comments, frequently mentioning application, register, login, open, sign in, update, please, and help. This implies that the government needs to improve the developed applications according to the complaints raised by the community.

Concerning the research conclusions, the author recommends that the government pay significant attention to implementing E-Government applications. This is because many applications developed still fall under E-Information and E-Service, while the category of E-Participation remains scarce. Yet, applications based on E-Participation would enhance public participation in the development process. Participation is crucial for achieving good governance. Furthermore, the developed applications need to be improved as there is still a relatively poor level of acceptance among the public, as seen from the negative feedback. Therefore, collaboration among the government, society, and technology-focused communities is necessary.

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7. Declaration of Conflicting Interests

The authors have declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

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