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S2
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Science and Technology Index

Daftar Isi (Table of Content)

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Comparison of Website Maturity in e-Government Implementation at the City Level in Indonesia

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ABSTRACT

This study examines the e-government implementation in Indonesia, focusing on the comparative digital maturity of Bandung and Malang City. Employing a qualitative descriptive research methodology, this analysis primarily utilizes data from the official government websites, Bandung.go.id and Malangkota.go.id, both recognized for achieving high levels of digital maturity. The research aligns with the United Nations' digital maturity evaluation criteria, scrutinizing key dimensions of e-government deployment. The findings reveal that both cities have established an integrated digital ecosystem that facilitates online services across various sectors. However, the arrangement of online services on the Malang City website lacks user intuitiveness, which may hinder public engagement. In terms of telecommunications infrastructure, Bandung City demonstrates superior performance, showcasing exceptional internet speeds, network coverage, and the availability of advanced technologies such as 4G+ and 5G. Both cities are committed to enhancing community internet access by providing free Wi-Fi initiatives. Furthermore, the study highlights substantial efforts by the local governments to improve human resource quality, evidenced by notable achievements in human resource management within their respective administrations. This research underscores the critical importance of digital maturity in enhancing public service delivery and promoting inclusive access to information technology in urban settings.

Keywords: E-government, website maturity level, ICT, Indonesia

ABSTRAK

Studi ini mengkaji implementasi e-government di Indonesia dengan fokus pada perbandingan kematangan digital Kota Bandung dan Malang. Menggunakan metodologi penelitian kualitatif deskriptif, analisis ini terutama memanfaatkan data dari situs web resmi pemerintah, Bandung.go.id dan Malangkota.go.id, yang keduanya diakui telah mencapai tingkat kematangan digital yang tinggi. Penelitian ini sejalan dengan kriteria evaluasi kematangan digital Perserikatan Bangsa-Bangsa, dengan memeriksa dimensi kunci dari penerapan e-government. Temuan menunjukkan bahwa kedua kota telah membangun ekosistem digital terintegrasi yang memfasilitasi layanan daring di berbagai sektor. Namun, pengaturan layanan daring di situs web Kota Malang kurang intuitif, yang dapat menghambat keterlibatan publik. Dalam hal infrastruktur telekomunikasi, Kota Bandung menunjukkan kinerja yang lebih baik, dengan kecepatan internet yang luar biasa, cakupan jaringan, dan ketersediaan teknologi canggih seperti 4G+ dan 5G. Kedua kota juga berkomitmen untuk meningkatkan akses internet masyarakat melalui inisiatif penyediaan Wi-Fi gratis. Selain itu, studi ini menyoroti upaya signifikan oleh pemerintah daerah untuk meningkatkan kualitas sumber daya manusia, yang dibuktikan dengan pencapaian penting dalam manajemen sumber daya manusia di masing-masing pemerintahan. Penelitian ini menekankan pentingnya kematangan digital dalam meningkatkan pelayanan publik dan mempromosikan akses informasi teknologi yang inklusif di lingkungan perkotaan.

Kata Kunci: E-government, tingkat kematangan website, TIK, Indonesia

INTRODUCTION

The utilization of technology and digital platforms has substantially expanded in the past few decades, profoundly altering how we engage, labor, and conduct our everyday activities (Rehman Khan et al., 2022). Diverse stakeholders, including individuals, society, industry, organizations, and governments, rapidly embrace digital technology to conduct various operations in their respective domains (Anggara et al., 2023). Technology has enabled the development of sophisticated medical gadgets and rapid diagnostic solutions in the health industry (Benjamin & Potts, 2018). Digital platforms have revolutionized the education sector, altering how we acquire knowledge and retrieve information (Mensah et al., 2020). Technology is employed in the government sector to offer citizens more efficient and effective services. Various initiatives, such as online payments, digital administrative registration, and other e-government services, have transformed how citizens engage with government institutions (Datta et al., 2020).

In response to this situation, the Indonesian government took measures to expedite the digital transformation process, bolstered by the Indonesian digital roadmap for 2021-2024 (Chong et al., 2023). the 2021-2024 Digital Indonesia Roadmap aims to elucidate the policy trajectory, execution, and attainment objectives in expediting Indonesia's digital transformation (Setyorini & Hendriyanto, 2017). Four critical priorities for accelerating national digital transformation, as identified by Katharina and Jaweng (2021), are infrastructure, governance, economics, and digital society. The ongoing efforts to construct and enhance telecommunications infrastructure, along with the advancement of complementary technology, aim to maximize the utilization of digital space by the community (Sugeng, 2020). In addition, efforts are being made to enhance human resources in the digital sector, as well as to finalize key legislation such as the Personal Data Protection Bill and the Job Creation Bill, which specifically pertain to the telecommunications and broadcasting industry (Wismayanti et al., 2023).

This momentum is a valuable opportunity to promote accelerated and more extensive digital transformation, particularly for local governments across Indonesia. Local governments in Indonesia face pressure to adopt and utilize technology to improve public services, transparency, and governance efficiency (Roengtam et al., 2017). The implementation of digital transformation at the municipal level plays a pivotal role in constructing a government structure that is contemporary and adaptable to the demands of its population (Hossain, 2021). Digital transformation for local governments is about adopting technology and changing how people think, work, and serve society (Talafidaryani et al., 2021). By implementing strategic and comprehensive measures, local governments in Indonesia can attain governance that is more efficient, inclusive, and innovative (Morita et al., 2020).

An essential aspect of digital transformation in local government is the official government website, which must be highly pertinent to society's present and future requirements and behaviors (Mergel et al., 2019). Government websites serve as more than just a platform for sharing information; they also function as a mechanism that alters how the government engages with society (Gavriluã et al., 2022). By leveraging online platforms, such as tax payment, resident registration, and permit acquisition, the government can offer expedited and streamlined services to the public (Tejedo-Romero et al., 2022). Websites are crucial in advancing government efficiency, transparency, and community engagement (Pereira et al., 2012). Emphasizing the importance of websites in government will yield significant advantages for societal progress and development in an era of growing digital connectivity (Zou et al., 2023).

An e-government implementation is considered successful in a country when its government website effectively presents comprehensive and current information, has interactive features, and provides a range of online services for citizens to use (Mensah et al., 2020; Ronchi, 2019; Sun et al., 2015). An indicator for assessing the effectiveness of e-government implementation in a country is the degree of adequacy of the websites of each regional government in Indonesia (Nasiri et al., 2022). The Indonesia Government Web Maturity 2021 report presents specific statistics on the current status and level of maturity or appropriateness of websites belonging to regional governments in Indonesia, including both provincial and district/city levels (Aldiansya, 2022).

The United Nations (2020) uses the Government Web Maturity indicator, which has four levels of maturity, namely: *Emerging*, the website can be accessed by the public with limited functions and provides basic information about the government and existing services; *Enhanced*, the website not only provides basic information but also a space for initial interaction with the community, for example providing downloadable forms and providing a feedback mechanism; *Transaction*, increasing interaction with services that can be completed online and website security has also been improved with access via HTTPS; *Connected*, the website focuses on community needs (citizen-centric), with an emphasis on convenience in obtaining services online. This level describes how a government website facilitates access to information and online services for the public.

The objective of Government Web Maturity is to assess the extent to which local governments utilize websites to deliver services to the community, generate resources for website-based public service enhancement initiatives, and receive suitable recommendations on enhancing the adoption of information and communication technology (ICT) by the government to improve community services (Muftikhali & Susanto, 2017). Within the city category, every city government possesses official government websites (Cheisviyanny, 2018). Out of 98 cities in Indonesia, 40 are classified at the Transaction level, 23 have reached the Enhanced level, and 33 have achieved the Emerging

level (Angelia, 2021). According to the Indonesia Government Web Maturity study, Bandung City and Malang City have achieved the highest maturity. The websites of both cities have achieved a state of connectivity, wherein the entire website system is integrated with parallel departments. Top of Form

The United Nations (2020) has recommended three components for measuring government digital maturity: the Online Services Index, the Telecommunications Infrastructure Index, and the Human Resources Index. Year et al. (2020) define the Online Services Index (OSI) as a metric gauges the extent to which government services are accessible online. A higher number of digital services indicates a higher level of development in electronic government. The OSI framework also considers the government's provision of online services, considering factors such as the availability of information, user-friendliness, interactivity, and the capability to perform specific tasks online (Ma & Zheng, 2018, 2019).

The Telecommunications Infrastructure Index (TII) plays a crucial role in the level of e-government maturity because the availability and quality of telecommunications infrastructure directly influence the ability of a country or government to provide effective e-government services (Momen & Ferdous, 2023). High-speed and dependable internet connections facilitate convenient access to government portals and online services, hence enhancing the adoption of e-government (Yýldýrým & Bostancý, 2021). Furthermore, as stated by (Furuholt & Sæbø, 2018), the significance of a comprehensive and advanced telecommunications infrastructure lies in its ability to extend e-government services to remote regions, thereby ensuring equitable access to government services for all citizens, irrespective of their geographical location.

The Human Resources Index (HRI) also plays an essential role in the level of e-government maturity because human resources (HR) readiness, skills, and understanding of information and communication technology (ICT) directly influence the government's ability to implement and manage e-government (Pramesti et al., 2020). The amount of e-government maturity is contingent upon the technological proficiency and familiarity of the HR department. HRI includes factors such as proficiency in digital literacy, competence in internet usage, and comprehension of technological applications (Kozanoglu & Abedin, 2020; Meng et al., 2023). Human resources with proficient technological skills are generally more adept at functioning efficiently within an e-government setting (Salsabila & Purnomo, 2017). On the other hand, as Panagiotopoulos et al. (2019) stated, a comprehensive comprehension of the advantages of technology for both the government and society facilitates the more effective integration of digital advances into government services.

Multiple studies have analyzed the level of digital maturity in e-government in Indonesia. A study by Akbar et al. (2021) utilizes the Gartner model to assess the level of e-government maturity, indicating that e-government maturity in Indonesia is now at an

adequate stage. In addition, other studies have employed multiple e-government maturity measuring frameworks, including PeGI, COBIT 5, and Janssen (Hasan & Arief, 2018; Marthalina, 2022; Nugroho & Purbokusumo, 2020; Rahma et al., 2018; Sumijan & Purnama, 2020; Wahyuni, 2017). Then, another research by Surya & Nugroho (2022) also quantitatively examined 35 City or Regency Government Websites in Central Java using indicators of ease of information, two-way communication, financial services and transactions, integration and political participation, which then obtained several results. Thirty-five government websites in Central Java Province have a model maturity level that still needs to be mature.

In contrast to previous research, this research examines how e-government is implemented through websites in Bandung City and Malang City so that these cities become the two cities in Indonesia that can reach the highest level of government digital maturity. This research compares website maturity in e-government implementation between Bandung City and Malang City in Indonesia, focusing on digital maturity evaluated based on the UN framework. Three assessment indicators were issued by the United Nations (2020). First, are public services integrated so that they are easy to access? Second, is the condition of the telecommunications infrastructure adequate? Third, what is the quality of human resources in society and government? This research can help evaluate the extent to which city government websites have matured in providing online services to the public. By knowing the comparison of maturity levels of city government websites in Indonesia, governments can compete with each other to improve the quality of online public services, which will encourage innovation and creativity in developing better e-government.

RESEARCH METHODS

Qualitative research is used to deeply understand social phenomena by emphasizing individual meanings, views, and experiences (Bhattacharya, 2017). This research uses a descriptive approach, which emphasizes mapping, explanation, and creating a detailed picture of the phenomena observed and involves collecting data systematically, compiling the information found, and describing the phenomena as best as possible (Newman et al., 2019). The data collection technique used is secondary data obtained through a literature review. The main data source in this research comes from the official websites of the Bandung City and Malang City Governments, which are already at the maximum maturity level. All data taken in this research is all the latest data accessed in December 2023. For more details on the research stages, see Figure 1 below.
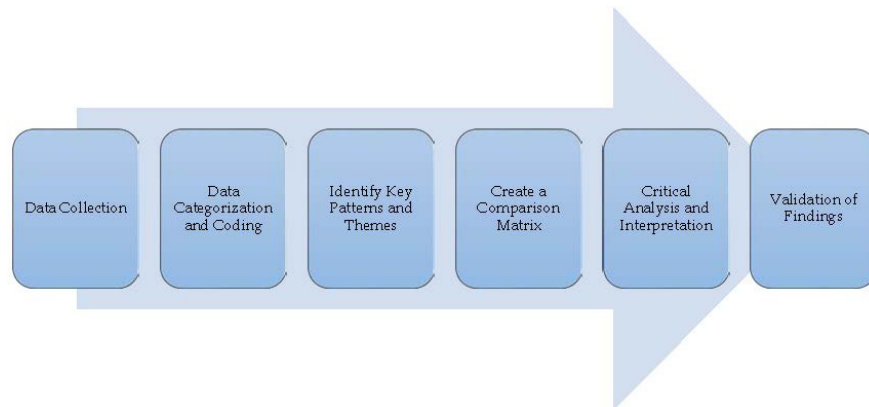
Figure 1. Research Stages

Figure 1 shows that the research stages started with collecting relevant data from the official websites of the Bandung City Government (https://www.bandung.go.id) and Malang City (https://malangkota.go.id). After collecting the data, the next step is to conduct data analysis using Qualitative Content Analysis (QCA) techniques. This process begins with coding, identifying important data related to e-Government maturity. Coding includes electronic public service features, telecommunications infrastructure quality, and human resource competency. After coding, the data is then grouped into predetermined categories. After the data is categorized, the researcher will look for patterns and main themes that emerge from the data. This process involved theme analysis to identify the main themes emerging from each city. Researchers will find similarities and differences between data from Bandung and Malang based on these themes. It is important to understand how each city implements e-government and its strengths and weaknesses in terms of electronic public services, telecommunications infrastructure, and the quality of human resources.

The next step is to create a comparison matrix that maps various e-Government maturity indicators between Bandung and Malang. This matrix will help in visualization and comparative analysis. Researchers will conduct critical analysis using a comparison matrix to interpret the results. Several aspects that will be analyzed include identifying the strengths and weaknesses of each city in implementing e-government. Researchers will also examine factors that support or hinder e-government maturity in each city. Based on these findings, researchers will recommend improvements to increase e-Government maturity in both cities. The findings from this comparative analysis will be validated through consultation with e-government experts or relevant academics to obtain input and verification. In addition, findings will also be compared with previous studies to ensure consistency and validity. This step is important to ensure the recommendations are based on accurate and comprehensive analysis.

RESULT, DISCUSSION, AND ANALYSIS

Electronic Public Service

a.   Bandung City

An essential aspect of enhancing public services involves establishing a cohesive digital framework across different government sectors, enabling secure data sharing, and fostering efficient collaboration to deliver improved services to the community (Novriando et al., 2020). Undoubtedly, the Bandung City Government has demonstrated an unwavering commitment to prioritizing digital transformation as the basis for delivering enhanced services to its citizens. The digital transformation in this city is more than just adopting an e-government program. It is a tangible demonstration of a genuine dedication to provide ease, accessibility, and superior service quality to all residents. Table 1 describes some services incorporated into the *Bandung.go.id* website.

Table 1. Electronic-Based Public Services in Bandung City

Kind of service	Service Name	Contact			Social media			
		🌐	📞	✉	f	ⓘ	twitter	▶
Education	Mobile library	✓	✓	✓	✓	✓	✓	
	Education Management System	✓	✓	✓	✓	✓	✓	✓
	Bandung Masagi Character Education	✓	✓	✓	✓	✓	✓	✓
	Champion School	✓	✓	✓	✓	✓	✓	✓
	Smart Indonesia Program	✓	✓	✓	✓	✓	✓	✓
Health	Information on Hospital Data in Bandung City	✓	✓	✓	✓	✓	✓	✓
	Laboratory Price List Information	✓	✓	✓	✓	✓	✓	✓
	Mobility Health Services	✓	✓	✓	✓	✓	✓	✓
	Information on Community Health Center Data in Bandung City	✓	✓	✓	✓	✓	✓	✓
Infrastructure	Street Lighting Improvements		✓	✓		✓		
	Technical Implementation Unit Activity Management Information System and Monitoring	✓	✓	✓	✓	✓	✓	✓
Disaster Management	Fire and Disaster Management	✓	✓	✓	✓	✓	✓	✓
	Bandung Alert	✓	✓	✓	✓	✓	✓	✓
Employment	Bandung Integrated Manpower Management Application	✓	✓	✓	✓	✓		
Transportation	Parking Complaint Service	✓	✓	✓		✓		
	Bandung City Crane Information System	✓	✓	✓		✓		
	Bandung Easy Mobility	✓		✓	✓	✓	✓	
	Motor Vehicle Examiner	✓	✓	✓	✓	✓	✓	
Population	Providing Mobile Services	✓	✓	✓	✓	✓	✓	✓
	Civil Registration and Other Population Registration Services Using E-Mail	✓	✓	✓	✓	✓	✓	✓
	Salaman+ (Done in Your Hand)	✓	✓	✓	✓	✓	✓	✓

Category	Service							
Businessmen	Bandung City National Crafts Council	✓	✓	✓	✓	✓	✓	✓
	Marketing Service Facility for Cooperatives and SMEs	✓	✓	✓	✓	✓		
	Invest Bandung	✓	✓	✓	✓	✓	✓	✓
	Integrated Entrepreneurship Information System	✓	✓	✓	✓	✓	✓	✓
	Bandung City Cooperative Monitoring System	✓	✓	✓	✓	✓	✓	✓
	Cooperative Information Application System	✓	✓	✓	✓	✓	✓	✓
Tourist	*Patrokamala*	✓	✓	✓		✓		✓
	Cangkurileung	✓	✓	✓	✓	✓	✓	✓
	Bandung Tourism Application	✓	✓	✓	✓	✓	✓	✓
Licensing	City Spatial Planning Services Information System	✓	✓	✓	✓	✓	✓	✓
	Hayu Bandung	✓	✓	✓	✓	✓	✓	✓
	Environmental Document Information System	✓	✓	✓	✓	✓	✓	✓
	Licensing for the Formation of Mass Organizations/NGOs	✓	✓	✓	✓	✓	✓	✓
Local tax	Property tax	✓	✓	✓		✓	✓	
	New Taxpayer Registration and Tax Reporting	✓	✓	✓		✓	✓	
	Deed Issuance Report System	✓	✓	✓		✓	✓	
Open Data	Real-Time Information Sharing Application	✓	✓	✓	✓	✓		✓
	Bandung City Information and Documentation Management Officer	✓	✓	✓	✓	✓	✓	✓
	Public Information Request System	✓	✓	✓	✓	✓	✓	✓

Source: (Bandung.go.id)

The *Bandung.go.id* website is the primary hub for the public to access a wide range of essential public services. This website offers seamless integration of many services, allowing users to conveniently access a wide range of public services without complex procedures. The *Bandung.go.id* website showcases service information and facilitates direct communication with contacts and social media platforms associated with each service. The capacity to establish direct connections facilitates seamless interaction between the general people and pertinent institutions or officials. By providing explicit contact details, individuals may conveniently send inquiries, lodge grievances, or solicit essential information without physically visiting an office or navigating many websites.

Implementing the single entrance idea by *Bandung.go.id* is crucial in facilitating the public's access to electronic-based public services. By consolidating diverse services onto

a single platform, individuals are relieved from searching for information or services across multiple sources, saving time and effort. They can efficiently locate the necessary information without navigating between multiple websites or physical locations. More than just providing the services themselves, the website also creates the impression of complete integration in the provision of public services. This illustrates that the Bandung City government is focused on ease of access, comfort, and convenience when using these services. In this way, *Bandung.go.id* is an information site and an effective means of encouraging public participation in utilizing public services. This transformation significantly changes how public services are accessed and enjoyed by the public, reflecting the government's commitment to continuously improving the quality of services and connectedness with its citizens.

Implementing online public services in Bandung City shows strong integration and clear grouping based on main service topics. This feature lets users conveniently search for information or services about company licenses, health services, education, transportation, and government programs, all in one centralized location. This strategy not only enhances information accessibility but also reduces confusion and restructures an initially intricate system into a more orderly one for the community. Categorizing services according to primary subjects enhances website usability, enabling customers to comprehend and locate desired information effortlessly without excessive navigation.

This method enhances the user experience by making it more straightforward and efficient. The categorization of services in this manner will be more comprehensible to the general public as it directly pertains to their everyday requirements and actions. For instance, individuals seeking education information can directly navigate to the education category, while those needing transportation-related information can promptly access transportation services. These clear and intuitive groupings can also provide users with a more consistent experience, ensuring that searching for information or services is manageable and manageable. This helps reduce barriers to information accessibility, increases public participation in online public services, and optimizes the efficiency of utilizing services the Bandung City Government provides.

b. *Malang City*

Implementing integrated electronic public services in Malang City has become essential for improving accessibility and quality of services to the community. Various initiatives have been launched to ensure that public services can be accessed quickly and efficiently through the integrated *Malangkota.go.id* portal. The city of Malang is gradually striving to realize e-government in its governance. This can be seen from several departments in Malang City which already have online-based service programs. Malang City has a public information and service portal through *Malangkota.go.id,* which provides complete information regarding

various services available. This portal not only provides information about the services provided but also provides direct access to these services. People can submit applications, access forms, and even track the status of their applications through this portal. Table 2 below describes several services integrated into the *Malangkota.go.id* website.

Table 2. Electronic-Based Public Services in Malang City

Kind of service	Service Name	Contact			Social media			
		🌐	📞	✉	f	◎	🐦	▶
Smart Governance	Public Service Mall	✓	✓	✓				
	One Unfortunate Data	✓						
	Complaints Service	✓	✓		✓		✓	
	Population Services	✓	✓	✓	✓	✓	✓	✓
	Regional Tax Services	✓	✓	✓		✓	✓	
	Licensing Services	✓		✓	✓	✓	✓	✓
	Procurement Services	✓	✓	✓	✓	✓		✓
	Malang City CSR Forum							
	Gift of Digital Information Innovation	✓	✓	✓	✓		✓	
Smart Economy	Sports Field Rental	✓	✓	✓	✓	✓		
	MSME shopping	✓	✓	✓				
	Food Prices	✓	✓	✓	✓	✓	✓	✓
	Business Information Portal	✓						
Smart Branding	Malang City Tour	✓						
	Malang Creative Center	✓	✓	✓	✓	✓	✓	✓
	Creative Economy of Malang City	✓						
	Malang City Tourist Information Center	✓	✓	✓	✓	✓	✓	✓
Smart Living	Malang City CCTV	✓						
	Malang is a Child-Friendly City	✓			✓			
	Health Insurance Services	✓						
Smart Environment	Drainage	✓	✓	✓		✓		
	Domestic Wastewater	✓	✓	✓				
	Tree Data	✓						
	Regional Drinking Water Company	✓	✓	✓	✓	✓	✓	
	Weather	✓						
Smart Society	Disaster Services	✓	✓	✓	✓	✓	✓	✓
	Community Information Group	✓	✓	✓	✓		✓	
	Emergency Services	✓	✓	✓		✓		
	Village Based Data	✓						
	Traffic Info							

Source: (Malangkota.go.id)

The weakness in providing online public services in Malang City lies in the grouping of service types, which is less based on the main topic of service but more based on supporting components of the smart city concept, such as Smart Governance, Smart Economy, Smart Branding Smart Living, Smart Environment, and Smart Society. While this notion seeks to explain comprehensive endeavors in creating a smart city, categorizing services according to smart city components may pose a challenge for regular users in locating the required services.

Grouping public services based on smart city concepts may seem less intuitive for the general public looking for certain information or services. Casual users looking for specific services, such as business licensing, health services, or transportation information, may need help navigating the website because these services are spread out under abstract smart city categories. In order to enhance user accessibility, there needs to be a more direct connection between specific service categories and smart city concepts. This approach can be done by providing a more detailed search feature, allowing users to search for services based on general smart city categories and the desired service specifications.

Apart from that, there also needs to be a clear guide or instructions for ordinary users to become more familiar with the smart city concept, providing a brief explanation of each service category and how they are connected to practical services sought by the public. A more intuitive grouping of services and straightforward navigation will improve the user experience searching for and using public services online in Malang City. This will help increase the efficiency and effectiveness of the electronic service platform, so that people can more easily and quickly obtain the services they need without obstacles in navigating the website.

Telecommunication Infrastructure
a.   Bandung City

The transformation of internet access in villages in West Java has been in the spotlight in recent years. Data from Open Data – West Java Data Ecosystem shows that as many as 4.353 out of 5.312 villages in West Java have internet access in 2021. However, if you look at the district/city level, especially in Bandung City, it can be said that internet access has reached 100% (Republika.co.id, 2021). This marks extraordinary progress in equalizing internet access at the local level. Figure 2 shows the coverage of the cellular data network provider Telkomsel in Bandung City. Most of the Bandung City area is covered by 4G+ and 4G network services, while 5G network services are starting to be available at several points. The existence of 5G services is an important milestone because it brings great potential to creating more advanced digital solutions and innovations.
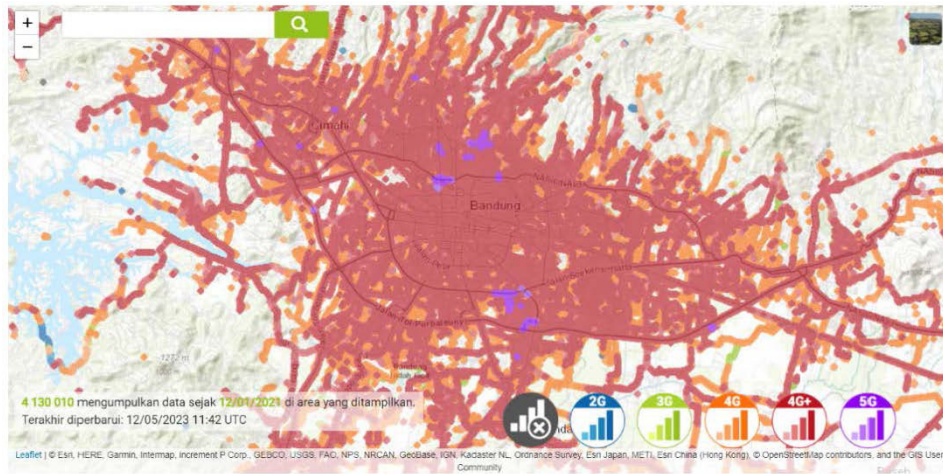
Figure 2. Telkom Cellular Data Network Coverage in Bandung *(nperf.com)*

The advantages of 5G technology, especially internet speeds that are much higher than previous generations, play an essential role in supporting public service needs in Bandung. A faster network will enable communication and data exchange processes between government entities and the public to occur more efficiently. This will support services like e-government, online healthcare, distance education, and other digital initiatives. The role of society also experienced a significant shift in this transformation. People are not just internet users but are also the leading players who utilize internet technology in various aspects of their lives. High internet speed will expand the accessibility of information and services, encouraging active public participation in utilizing technology for personal needs, work, and interaction with public services. Thus, a fast and high-quality internet network, especially the increasingly developing 5G technology, is a symbol of technological progress and an essential foundation for advancing public services, expanding innovation opportunities, and developing an inclusive digital ecosystem for the people of Bandung City.

Efforts to realize the smart city concept in Bandung can also be seen through the implementation of WiFi router facilities spread across all points in the city to ensure connected and affordable internet access for all its citizens. In 2021, through the Communication and Information Service, the Bandung City Government has provided free WiFi facilities widely distributed in 151 sub-districts. Each sub-district has 2 RWs, facilitated with free WiFi access, bringing the total to 302 WiFi points at the RW level. Apart from that, 51 additional WiFi points are spread from city parks to several houses of worship. Five hundred free WiFi points are provided in Bandung City (Lastriana, 2021).

The wide availability of free WiFi also supports public access to various services provided by the Bandung City government, including e-government services, health information,

transportation services, and information related to government programs. This allows the public to interact with the government and utilize the various services. The availability and spread of free WiFi can be a good indicator of the extent to which the government is committed to expanding access to digital technology among the public. This reflects the government's ability to create infrastructure that supports digital growth and inclusiveness for all citizens. Thus, the availability of accessible WiFi facilities is not just about providing free internet access but is also a measure of the government's maturity and readiness to encourage digital inclusion, effective public services, and increase community participation in the digital era.

Internet speed is vital in advancing digital maturity in a country or community (Wassie et al., 2023). In an information and communication technology era, internet speed is not just a luxury. However, it is a critical element that determines how effectively an entity utilizes technology to improve social, economic, and political life. High internet speeds enable the government to provide public services online more quickly and efficiently. With a stable and fast connection, licensing processes, tax payments, registration, and various administrative services can be completed quickly and easily accessible to the public. Table 3 below presents the ten cities with the fastest internet in Indonesia.

Table 3. Cities with the Fastest Internet in Indonesia

Rating	City	Downloads	Upload	Latency
1	Makassar	25.30 Mbps	11.64 Mbps	45ms
2	Jakarta	24.31 Mbps	13.06 Mbps	30 ms
3	Bekasi	23.55 Mbps	13.79 Mbps	23 ms
4	Tangerang	23.37 Mbps	13.92 Mbps	25 ms
5	Depok	22.74 Mbps	13.93 Mbps	26 ms
6	Surabaya	22.36 Mbps	12.08 Mbps	35 ms
7	Medan	22.34 Mbps	11.87 Mbps	44 ms
8	Bandung	21.79 Mbps	13.92 Mbps	30 ms
9	Semarang	20.93 Mbps	11.85 Mbps	33 ms
10	Palembang	20.61 Mbps	14.33 Mbps	39 ms

Source: (Speedtest Global Index)

Even though the City of Bandung has achieved digital maturity for good governance, the challenge of internet access speed is a significant concern. The city of Bandung is not in the fastest position nationally; in fact, it is still in eighth place. Increasing internet speed will significantly improve the quality of public services, administrative efficiency, and community participation in digital transformation. Therefore, efforts to improve

infrastructure and internet connections are significant to ensure that the success of the digital maturity of the City of Bandung is accompanied by optimal accessibility for the community.

b. Malang city

The internet condition in Malang City highlights the reality that although Malang City has shown significant development in information and communication technology infrastructure, the availability of internet access still needs to be evenly distributed. Figure 3 below shows the coverage of the cellular data network provider Telkomsel in Malang City. Most Malang City area is covered by 4G+ and 4G network services. However, several minor points in the Malang City area still depend on 3G connections. At the same time, the absence of a 5G network indicates challenges in responding to the need for more sophisticated internet connectivity. Limited internet access in areas still using 3G connections can be an obstacle. People living in areas with suboptimal connections may need help accessing online services, obtaining the latest information, or participating in growing digital initiatives.
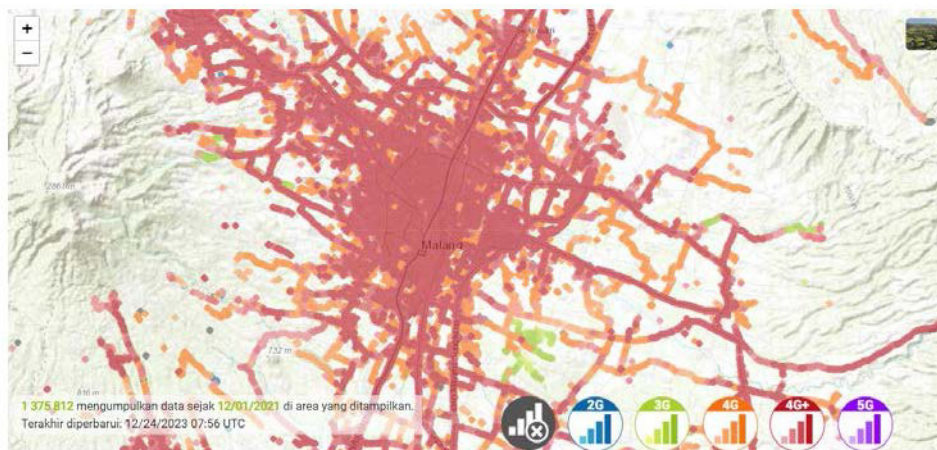
Figure 3. Telkom Cellular Data Network Coverage in Malang *(nperf.com)*

Having internet access provided by the government is an excellent first step in encouraging community involvement in the digital world. However, it is also essential for the community to make optimal use of these facilities. The steps taken by the Malang City Government in providing free WiFi services in 551 RWs spread across 57 sub-districts are a progressive step towards digital inclusion for its community. This step shows a commitment to expanding internet access, creating opportunities for all city residents to connect with information and communication technology (ICT) without financial barriers. If compared with the number of WiFi facilities issued by the Bandung City Government,

there may still be significant differences. A comparison of the number of WiFi facilities between Malang City and Bandung City can provide an exciting picture of the extent to which the two cities have invested in providing free internet access for their residents. The number of WiFi facilities issued by the Malang City Government can compete with the number issued by the Bandung City Government.

Malang City has taken significant steps with the number of WiFi facilities that have been provided; it is necessary to consider that competition in numbers is only sometimes the sole indicator of success. The quality, coverage, speed, and benefits of free WiFi access are also essential factors in evaluating its positive impact on society. These two cities, Malang City and Bandung City, are committed to encouraging internet accessibility for their communities. The comparison of the number of WiFi facilities is one aspect, but what is more important is how this internet access is used effectively by the community to obtain maximum benefits in various aspects of life, from education and the economy to participation in public services.

Malang City's absence from the list of ten cities with the fastest national internet indicates that it may still need help improving its internet connectivity. This condition highlights the challenges in the telecommunications infrastructure in Malang City, which affects internet speed. Factors such as population density, uneven infrastructure, or insufficient investment in network development can cause lower internet speeds in Malang City (Bachtiar et al., 2020). The lower internet speed in Malang City, while Bandung achieved a better ranking, indicates a difference in the progress of telecommunications infrastructure between the two cities. However, these challenges also provide opportunities for Malang City to increase investment and focus on developing telecommunications infrastructure to support better digital progress. Collaboration with telecommunications service providers and adopting innovations in communications technology can also help accelerate the increase in internet speed in Malang City. Strong collaboration between government, the private sector, and society can be the key to advancing telecommunications infrastructure more effectively.

Quality of Human Resources
a.   Bandung City

The successful implementation of e-government depends on technological infrastructure and the quality of supporting human resources (HR). In implementing e-government, human resources is vital so that e-government can run. In order to run effectively, human resources must have the ability to use the applied results of e-government which will be used. According to research by Anisah et al. (2023) conducted at the Bandung City Personnel, Education and Training Agency (BKPP), human resources in the government sphere still need to gain competence in their fields. Skills in system

operation, data management, and technology utilization are the main foundations for implementing technological innovation in public services.

The Bandung City Government has shown a serious commitment to improving the quality of human resources (HR), which is the backbone of E-Government implementation and the efficiency of public services. One of the concrete steps taken is through a comprehensive HR competency development program. This program includes various types of training, from leadership to technical training tailored to the position, such as training for village heads and various other ASN positions. This approach shows the Bandung City Government's efforts to pay attention to the diverse skills needs for various levels and functions in government administration. It serves as an investment in individual development and a strategy to improve the productivity and overall performance of government organizations.

The Bandung City Personnel and Human Resources Development Agency (BKPSDM) is central to designing, managing, and implementing these programs. The success of achieving accreditation from the State Civil Service Agency (BKN) is proof of the quality and effectiveness of the efforts made to develop HR in Bandung. Achieving an 'A' accreditation certificate for the 2023-2028 period from the National Civil Service Agency (BKN) in the field of Apparatus Competency Development (assessment center) is clear evidence of recognition of the Bandung City Government's commitment and success in managing and developing human resources. Improving the quality of human resources through this competency development program positively impacts the implementation of E-Government in the city of Bandung. Skilled and trained employees enable a smoother and more effective implementation of technology and innovation in public services.

b.   *Malang city*

Malang City continues to make various breakthroughs to improve the professionalism of the Malang City State Civil Apparatus (ASN), including by holding *e-Kinerja* Training of Trainers (ToT). The *e-Kinerja* application is a good instrument for leaders to assess the performance of ASNs in Malang City and whether they can carry out their duties and mandates or not. This application makes it easier for officers to carry out various reports, including daily work reports. This application is also an effort to appreciate the performance of employees within the Malang City Government. Employees who show exemplary performance will receive good appreciation, and vice versa. This *e-Kinerja* system will minimize or suppress organizational miscommunication because all performance or reports are based on data. This existing data can be used as a reference for a leader to design programs and make decisions because this e-performance system is integrated into other systems.

Another effort made by the Malang City government to improve the quality of State Civil Apparatus (ASN) resources is holding outreach on handling complaint reporting. These efforts have a significant meaning in creating a bureaucratic environment that is clean, accountable, and responsive to community needs. This socialization is directed at encouraging transparency and accountability among ASNs, preventing corruption, and increasing integrity in government duties in the Malang City Government. The Malang City Government ensures that every ASN understands complaint-handling procedures by holding regular outreach activities. ASNs are reminded that responding to every complaint is an obligation that must be fulfilled wholeheartedly. Through this approach, it is hoped that ASN will not only carry out its duties administratively but also have an active role in providing fair and transparent solutions to the community.

The 2021 Meritocracy Award with the title 'Very Good' achieved by the Malang City Government is an extraordinary achievement that reflects a solid commitment to implementing the principles of the merit system in the administration of the State Civil Apparatus (ASN). This recognition illustrates that the Malang City Government has successfully implemented the meritocracy standards regulated in Law Number 5 of 2014 concerning ASN. Implementing the merit system is a strategic basis for ASN management in the Malang City Government, and achieving this achievement confirms that the steps taken follow the principles of meritocracy. This system emphasizes rewards based on performance, competency, and achievement that are measured objectively. Thus, this provides recognition to individuals based on their services and encourages the creation of a healthy and competitive work environment among ASNs.

By upholding the merit system, the Malang City Government provides equal opportunities for every State Civil Apparatus (ASN) individual to develop according to their abilities and dedication. In this context, the 2021 Meritocracy Award achievement proves that the Malang City Government prioritizes achievements in the name of institutions and appreciates individual efforts in creating better public services for the community. This achievement also provides a positive signal to the public about the Malang City Government's strong commitment to improving service quality and bureaucratic efficiency as a consequence of implementing an effective merit system, ASN in the Malang City Government will continue to be superior, high-quality human resources and able to answer the challenges of the times in providing the best services for city residents.

Comparison

Table 4 below will map a comparison matrix of various e-government maturity indicators between Bandung and Malang.

Table 4. Comparison of e-Government Maturity in Bandung City and Malang City

Indicators	Aspect	Bandung City	Malang city
Electronic Public Service	Grouping Service	Based on the main topic (Education, Health, Infrastructure, etc.)	Based on Smart City components (Smart et al., etc.)
	Connectedness Service	Service integrated with contact and social media direct	Service integrated with access direct to service And application status tracking
	Convenience Access	Easy access with clear categories	Possible not intuitive enough for the user to lay
Telecommunications Infrastructure	Internet access	100% of villages in Bandung City have Internet access	Some areas still use 3G connections, and there is no 5G service yet
	Scope Network	Most regions are covered by 4G+ and 4G networks; several points are Already available for 5G service.	Majority of the region covered by 4G+ and 4G networks
	Facility WiFi	302 points for Free WiFi at RW level; 51 points for addition to the garden city And House worship; a total of 500 points for Free WiFi	551 RW with facility Free WiFi is spread across 57 sub-districts
	Internet Speed	Ranked 8th in Indonesia with download speed 21.79 Mbps, upload 13.92 Mbps, latency 30 ms	No enter in the list of ten cities with the fastest internet national
Quality of Human Resource	Training And HR Development	Develop comprehensive HR competencies, including training leadership until technical by position.	Hold various activity socialization And training such as TOT *e-Kinerja* and handling reporting complaints periodically, ensuring ASN's strong understanding of procedure handling complaints And transparency.
	Success And Confession	Achievement 'A' accreditation from BKN for the 2023-2028 period shows the quality and effectiveness of development programs regarding HR competency.	Grace Meritocracy 2021, with the predicate ' Very Good,' delivers a signal to the public about the commitment to a strong Malang City Government in increasing quality service And efficient bureaucracy.

The city of Bandung groups electronic public services based on main topics such as education, health, and infrastructure, facilitating public access to the information they need. In contrast, Malang City groups services based on the smart city concept, which may need to be more intuitive for ordinary users looking for specific services. In addition, the City of Bandung shows service integration with direct contacts and social media. The city of Bandung has equal internet access, with 100% of villages covered and several points with 5G service, which shows strong technological innovation. On the other hand, Malang City still needs help with several areas relying on 3G connections without 5G services available. However, Malang City has provided free WiFi in 551 RWs, showing commitment to digital inclusion even though its internet speed is not among Indonesia's ten fastest cities.

The city of Bandung stands out in developing HR competencies with a comprehensive training program covering leadership and technical aspects appropriate to the ASN position. The city also achieved 'A' accreditation from BKN, indicating recognition of the effectiveness of its human resource development program. Malang City, on the other hand, organizes outreach and training activities such as TOT *e-Kinerja*, which increases ASN's understanding of complaint procedures and transparency. The 2021 Meritocracy Award, the City of Malang, received also provides a positive signal regarding their commitment to improving service quality and bureaucratic efficiency.

COUNCLUSION

Based on the analysis of e-government implementation in Bandung City and Malang City, this study highlights significant progress in integrating online public services and telecommunications infrastructure. Bandung's city has successfully integrated public services effectively with a structured system based on main service topics. In contrast, the city of Malang faces challenges in creating a smart city concept that is more intuitive for the general public. Bandung outperforms Malang in terms of internet speed, network parity, and the availability of extraordinary 4G+, 4G, and even 5G services. Nevertheless, these two cities strongly commit to improving internet accessibility by providing free WiFi at various points. However, equal distribution of the internet network is still an important issue in Malang City. The government's efforts to improve the quality of human resources were also emphasized, with the City of Bandung recording significant achievements in developing the competence of the state civil service (ASN). At the same time, the City of Malang demonstrated success using the *e-Kinerja* application and awards in ASN meritocracy.

This research faces several limitations, including limited data, time constraints, and study scope limited to only two cities. The proposed recommendations include continued investment in human resource development in information technology, increasing cooperation with higher education institutions, strengthening transparency through the *e-Kinerja* system, and expanding evaluations of the effectiveness of e-government programs. For future studies, it is recommended to involve further quantitative approaches, expand the scope of research to other cities in Indonesia, and further research aspects of cyber security and the socio-economic impact of e-government implementation.

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Reksi Anggara, Eko Priyo Purnomo, Tiara Khairunnisa