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Analysis of E-Government Implementation in Semarang City Based on Mayor Decree No.50/571 of 2023 on SPBE Architecture Determination

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Abstract: This study provides an in-depth analysis of the implementation of e-government in Semarang City, driven by Mayor Decree No.50/571 of 2023 concerning the establishment of the Electronic-Based Government System (SPBE) framework. The research evaluates the alignment of Semarang City's e-government strategies with national regulations, including PerPres No.95/2018 on SPBE, PermenPANRB No.5/2018 on SPBE evaluation criteria, and PerPres No.132/2022 on national SPBE architecture. Employing qualitative methods through literature reviews, interviews, surveys, and observations, this study examines e-government readiness, smart governance, digital service integration, and benchmarking practices. The results highlight significant progress in enhancing public service efficiency and transparency, though challenges such as system interoperability, cybersecurity risks, and public engagement remain. Recommendations include strengthening infrastructure, improving human resource capacity, and fostering citizen involvement for sustainable e-government development.

Keywords: Digital governance; e-government; SPBE; Semarang City; ICT integration

1. Introduction

The exponential growth of information and communication technology (ICT) has drastically reshaped the way governments operate worldwide. The global shift towards digital governance emphasizes improving efficiency, transparency, accountability, and citizen engagement in public services [1],[2]. E-government initiatives have become essential for governments to meet rising citizen demands for fast, accessible, and transparent services [3]. By leveraging ICT, governments can streamline bureaucratic processes, minimize corruption, reduce costs, and enhance public trust [4].

Indonesia has acknowledged the significance of digital transformation by introducing several key regulations to support e-government implementation [5]. Notably, PerPres No.95/2018 on the Electronic-Based Government System (SPBE) serves as a foundational framework to integrate information systems across government institutions, aiming to improve service delivery [6]. Additionally, PermenPANRB No.5/2018 provides comprehensive guidelines for evaluating the effectiveness of SPBE initiatives, ensuring that government institutions adhere to national digital governance standards [7]. More recently, PerPres

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No.132/2022 on the National SPBE Architecture standardizes digital governance practices nationwide, fostering a cohesive and integrated approach to e-government implementation.

Semarang City, as one of Indonesia's leading urban centers, has aligned with these national policies by issuing Mayor Decree No.50/571 of 2023 . This decree formalizes the city's SPBE framework, marking a strategic step toward advancing digital governance. Through this initiative, Semarang City aims to standardize digital services, integrate various government systems, and enhance public access to services. However, several challenges hinder the full realization of this vision. These include inadequate digital infrastructure, limited system interoperability, cybersecurity vulnerabilities, and low digital literacy among the population [8].

To address these issues, this study seeks to conduct a comprehensive analysis of e-government implementation in Semarang City. The primary objectives of this research are to evaluate the extent to which Semarang City's SPBE initiatives align with national e-government policies, identify the challenges impeding successful implementation, and propose strategic recommendations to optimize and sustain digital governance in the city. The findings from this study are expected to provide insights that can guide policy improvements and inform best practices for advancing e-government initiatives in Semarang City and beyond [9]. This study provides a novel contribution by offering a comprehensive evaluation of Semarang City's SPBE implementation post-Mayor Decree No. 50/571 of 2023, uniquely integrating Smart City maturity assessments with digital infrastructure readiness under the new regulatory framework.

2. Literature Review or Related Research

This literature review aims to position the research on E-Government/SPBE implementation in Semarang City within a broader scientific context. The review covers the fundamental concepts of digital governance, the E-Government framework in Indonesia (SPBE), and relevant previous studies discussing the challenges and opportunities of SPBE implementation at the local level.

2.1. Fundamental Concepts of E-Government and Digital Governance

The exponential growth of Information and Communication Technology (ICT) has spurred a global transformation toward Digital Governance. This concept emphasizes utilizing ICT to enhance efficiency, transparency, accountability, and citizen engagement in public services [1], [2]. E-Government initiatives are considered crucial for governments to meet citizen demands for fast and transparent services, aiming to streamline bureaucratic processes, minimize corruption, and boost public trust [3], [4], [10].

2.2. E-Government Regulatory Framework in Indonesia (SPBE)

The Indonesian government has acknowledged the significance of digital transformation by issuing several key regulations that serve as the foundation for E-Government implementation, specifically known as the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik - SPBE) [5].

a. Presidential Regulation (PerPres) No. 95 of 2018 on SPBE: This regulation acts as a foundational framework to integrate information systems across government institutions, aiming to improve service delivery [6].
b. Minister of State Apparatus Empowerment and Bureaucratic Reform Regulation (PermenPANRB) No. 5 of 2018 (and its derivatives): This regulation provides comprehensive guidelines for evaluating the effectiveness of SPBE initiatives, ensuring government institutions adhere to national digital governance standards [7].
c. PerPres No. 132 of 2022 on National SPBE Architecture: This more recent regulation aims to standardize digital governance practices nationwide, fostering a cohesive and integrated approach to E-Government implementation.

2.3. Previous Studies on E-Government Implementation in Indonesia

Several previous studies have examined the implementation of E-Government and SPBE in Indonesia, identifying progress, challenges, and success factors. The trajectory of E-Government and the Electronic-Based Government System (SPBE) implementation in

Indonesia has been the subject of intensive academic scrutiny, with numerous studies identifying significant progress alongside persistent challenges. A primary focus of this research highlights the technical and resource-based obstacles. Consistently, studies indicate that successful SPBE implementation is hampered by factors such as inadequate digital infrastructure, profound issues of system interoperability across different government units, and inherent cyber vulnerabilities [8], [13], [17]. Furthermore, a crucial constraint lies in human factors, specifically the low digital literacy observed among both the civil apparatus and the general public. Addressing these shortcomings demands substantial, strategic investment in scalable ICT infrastructure and planned Human Resources (HR) capacity building to equip personnel with the necessary digital skills [12], [17].

Beyond the technological sphere, the role of governance and leadership is deemed vital. Research underscores that robust leadership and the enforcement of strong, centralized governance policies are critical prerequisites for successful E-Government adoption at the regional level, drawing parallels from national initiatives such as the implementation of the Electronic Identity Card (E-KTP) [11], [12]. In terms of impact and collaboration, the benefits of E-Government extend beyond mere efficiency. Studies have demonstrated a tangible positive effect on reducing corruption within local government bureaucracy, thus enhancing public trust and accountability [15]. Crucially, the overall effectiveness and sustainability of digital transformation necessitate proactive cross-sector collaboration, moving beyond siloed departmental operations [14]. Finally, a recurring theme in the literature is the necessity of Maturity Level and Evaluation frameworks. Evaluating the E-Government Development Index or the SPBE maturity level is an essential mechanism for quantifying progress, ensuring adherence to national standards, and pinpointing areas that require continuous systematic improvement, emphasizing the need for ongoing system evaluations and the adoption of global best practices [9], [16].

3. Methods

This research utilizes a qualitative descriptive method to provide a comprehensive understanding of the e-government implementation in Semarang City. The qualitative approach is particularly suitable for analyzing complex social and technological phenomena such as digital governance, which involves multiple stakeholders, regulatory frameworks, and evolving technologies [10].

3.1. Data Collection

The study integrates both primary and secondary data sources to ensure a well-rounded analysis.

Primary data was collected through structured interviews with key stakeholders in the Semarang City Government, including officials from the Communication and Informatics Agency (Diskominfo), public service agencies, and the IT development division. These interviews aimed to gain insights into the progress, challenges, and future of SPBE implementation plans. Surveys were also administered to 300 Semarang City residents (N=300) to capture public perception, satisfaction, and engagement with digital government services, focusing on aspects such as accessibility, service quality, user interface experience, and data security (as presented in Table 3). The respondents were selected using a Stratified Random Sampling technique, with the population divided into two primary demographic calssifications, youth and adults, to ensure proportional and accurate representation of user views across different age groups. Additionally, field observations were carried out in various public service offices to assess the actual usage of SPBE systems and identify operational challenges in service delivery [11].

Secondary data were collected through an extensive review of national regulations, including PerPres No.95/2018, PermenPANRB No.5/2018, and PerPres No.132/2022. Official government reports detailing the progress of SPBE development in Semarang City were also analyzed. Moreover, peer-reviewed journal articles and scholarly publications published in the last five years were reviewed to understand e-government readiness, smart governance, digital service integration, benchmarking practices, and citizen engagement [12], [13].

Comparative studies and benchmarking reports from other smart cities in Indonesia and globally were also incorporated to identify best practices in e-government implementation.

4. Result and Discussions

4.1. Recomendations

By systematically addressing these challenges, the study proposes strategies for improving governance outcomes, including cross-sector collaboration, enhanced digital literacy programs, and the consolidation of government services onto unified platforms [14]. The SPBE implementation in Semarang City has significantly improved public service efficiency, transparency, and accountability [15]. Key achievements inportals andzing administrative processes, developing integrated service portals, and enhancing data management.

To determine the maturity level from the table, we need to understand the scale or assessment criteria used in the Smart City Maturity Level concept [16]. Typically, the Smart City Maturity Level scale can be categorized as follows:

a. Level 1 (Initial): No integration, services are still manual. Score range 0-20.
b. Level 2 (Managed): Partial digitalization with basic data management. Score range 21-40.
c. Level 3 (Integrated): Integration between services and systems within one city. Score range 41-60.
d. Level 4 (Collaborative): Cross-sector collaboration and integration between cities. Score range 61-80.
e. Level 5 (Optimized): Fully integrated and sustainable systems. Score range 81-100.

Table 1. The Smart City Maturity Levels in Semarang City (2021-2023).

Dimensions	2021	2022	2023
Digital Infrastructure	68	74	80
Data Management	62	68	73
Public Service Delivery	70	75	82
Innovation Capability	65	70	76

Overall, considering the average score and its distribution, the Smart City Maturity Level of Semarang City in 2023 can be categorized as Level 4 (Collaborative). This means that services are provided through integration with other SPBE services, promoting collaboration between applications and government systems.

Table 2. The E-Government Readiness in Semarang City (2021-2023).

Category	2021	2022	2023
Infrastructure	70	75	80
Human Resources	65	70	75
Public Engagement	60	65	68
Policy and Governance	72	77	82

Table 3. Survey on Public Perception of E-Government services in Semarang City (N=300).

Aspect	Very Statisfied (%)	Statisfied (%)	Neutral (%)	Disstatisfied (%)	Very Disstatisfied(%)
Accesbility of Online Services	25	50	15	8	2
Service Response Time	20	45	20	10	5
Data Security and Privacy	15	40	25	16	5
Ease of Use (User Interface)	30	50	10	7	3
Availability of Information	22	48	18	9	3
Overall Statisfication	24	46	18	9	3

The survey of 300 Semarang City residents (N=300), selected via Stratified Random Sampling across youth and adult demographics, reveals a generally positive perception of the

city's E-Government services, with Overall Satisfaction registering at a combined 70% (46% Satisfied, 24% Very Satisfied). The data highlights the city's success in user-facing design, as the Ease of Use (User Interface) received the highest combined satisfaction rate of 80%, immediately followed by Accessibility of Online Services at 75% and Availability of Information at 70%. These results confirm the effectiveness of the city's efforts to establish user-friendly and widely accessible digital platforms. However, the survey simultaneously points to a critical area of concern: Data Security and Privacy. This aspect recorded the lowest combined satisfaction rate (55%) and the highest combined dissatisfaction rate (21%), coupled with the largest proportion of Neutral (25%) responses. This finding suggests a significant level of public skepticism or uncertainty regarding data protection measures within the SPBE system, validating the identified challenge of cybersecurity risks and emphasizing the urgent need for enhanced security protocols and transparent communication to build citizen trust. Furthermore, while Service Response Time garnered 65% combined satisfaction, it also registered the highest percentage of Very Dissatisfied (5%) responses, indicating that specific service processes still experience significant operational delays.

Table 4. Interviews with Government Officials on SPBE Implementation.

Department	Challenges Identified	Proposed Solutions
Communication & IT	Lack of system integration	Develop a centralized data system
Public Services	Low public digital literacy	Conduct regular digital literacy training
Administration	Data security concerns	Implement advanced cybersecurity tools
Urban Planning	Limited inter-departmental collaboration	Create cross-department task forces

Table 5. Interviews with Government Officials on SPBE Implementation.

City	Digital Infrastructure Score	Human Resource Score	Policy & Regulation Score	Overall Score
Semarang	78	70	75	74
Surabaya	82	75	80	79
Bandung	80	74	78	77
Jakarta	88	82	85	85
Yogyakarta	75	68	72	71

The results indicate that Semarang City's SPBE implementation aligns with national policies and has enhanced service efficiency. Nevertheless, the city must address challenges in system integration, cybersecurity, and digital literacy to fully realize its e-government potential. Comparative analysis with other smart cities suggests that Semarang can benefit from continuous system evaluations, increased stakeholder collaboration, and the adoption of global best practices. This maturity level achievement confirms the Digital Maturity theory, which asserts that policy governance serves as the fundamental foundation before the integration of information systems can operate optimally.

Table 6. The Challenges and Solutions for E-Government Implementation in Semarang City

Challenges	Proposed Solutions
System Interoperability	Develop centralized and integrated digital platforms
Cybersecurity Risks	Implement robust cybersecurity measures
Public Digital Literacy	Conduct digital literacy programs
Infrastructure Limitations	Invest in scalable IT infrastructure

5. Conclusions

The implementation of E-Government in Semarang City, strongly supported by Mayor Decree No. 50/571 of 2023 and aligned with national mandates like PerPres No. 95/2018 on SPBE, demonstrates substantial progress toward advancing digital governance, achieving a Level 4 (Collaborative) Smart City Maturity Level in 2023. Key achievements include a high level of Policy and Governance readiness (score 82 in 2023) and enhanced service efficiency, reflected by high public satisfaction with the Accessibility and Ease of Use of online services.

However, critical challenges persist that must be strategically addressed to ensure sustainable development. These include overcoming the lack of system interoperability by developing centralized data platforms, addressing low public digital literacy through targeted training programs, and mitigating cybersecurity risks by implementing robust defense measures to build greater public trust. To fully realize its e-government potential and advance toward an Optimized (Level 5) maturity, Semarang City must prioritize continuous investment in scalable digital infrastructure, foster greater inter-agency collaboration, and integrate citizen feedback into system development, thereby solidifying its position as a model for successful, integrated, and citizen-centric SPBE implementation in Indonesia.

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