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E-Government Implementation in Semarang City Government: Challenges and Opportunities for Public Services from a Good Governance Perspective

Implementasi E-Government di Pemerintah Kota Semarang: Tantangan dan Peluang bagi Layanan Publik dari Perspektif Tata Kelola yang Baik

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Abstract Digital transformation through E-Government has become key to improving public service quality in the Industrial Revolution 5.0 era. This research analyzes the implementation of the Electronic-Based Government System (SPBE) in Semarang City Government from the perspective of good governance principles as regulated in Article 10 paragraph (1) of Law Number 30 of 2014 on Government Administration and New Public Service Theory by Denhardt J.V. & Denhardt R.B. (2000) which emphasizes the principle of "serving rather than steering". Using normative-empirical research methods with statute approach and conceptual approach, this study combines legislative regulation analysis with empirical data from in-depth interviews with civil servants from the Department of Communication, Informatics, Statistics and Encryption of Semarang City. The research findings show that SPBE implementation has achieved significant accomplishments with an SPBE Index of 4.27% rated "Satisfactory," increasing from 2.31% in 2021. Integrated platforms such as the SILAGA Super Apps and the One Data Portal have successfully eliminated bureaucratic barriers and improved public service accessibility. Evaluation through the New Public Service theoretical framework demonstrates strong coherent alignment with the principles of serving citizens (not as customers), transparency of public interest, and multidimensional accountability. The implementation of the eight principles of good governance has been comprehensively applied, although the principle of accuracy remains a major challenge related to data validity and cybersecurity. The research identifies four main challenges: technological infrastructure, human resource readiness, service inclusivity, and budget sustainability. Conversely, there are four strategic opportunities: utilization of Big Data and AI, integration with the INA Digital national system, collaboration with startups, and IoT implementation for smart environment. However, this research also identifies areas requiring strengthening, such as democratic participation in SPBE policy formulation, independent oversight mechanisms for surveillance technology, and citizen data protection in private sector collaboration. The 2025-2029 development roadmap targets a transition toward Cognitive Government with the concepts of Zero Document and Data-Driven Policy, making Semarang City a model of excellent digital governance while upholding good governance principles.

Keywords Digital Transformation, E-Government, SPBE, Good Governance, New Public Service

Abstrak Transformasi digital melalui E-Government menjadi kunci peningkatan kualitas pelayanan publik di era Revolusi Industri 5.0. Penelitian ini menganalisis implementasi Sistem Pemerintahan Berbasis Elektronik (SPBE) pada Pemerintah Kota Semarang dalam perspektif asas *good governance* sebagaimana diatur dalam Pasal 10 ayat (1) Undang-Undang Nomor 30 Tahun 2014 tentang Administrasi Pemerintahan dan Teori *New Public Service* Denhardt J.V & Denhardt R.B (2000) yang menekankan prinsip "serving rather than steering". Menggunakan metode penelitian normatif-empiris dengan pendekatan *statute approach* dan *conceptual approach*, penelitian ini menggabungkan kajian peraturan perundang-undangan

dengan data empiris dari wawancara mendalam dengan ASN Dinas Komunikasi, Informatika, Statistik dan Persandian Kota Semarang. Hasil penelitian menunjukkan bahwa implementasi SPBE telah mencapai capaian signifikan dengan Indeks SPBE 4,27% berpredikat "Memuaskan", meningkat dari 2,31% pada tahun 2021. Platform terintegrasi seperti Super Apps SILAGA dan Portal Satu Data berhasil menghilangkan sekat birokrasi dan meningkatkan aksesibilitas layanan publik. Evaluasi melalui kerangka Teori *New Public Service* menunjukkan kesesuaian koheren pada prinsip melayani warga negara (bukan sebagai pelanggan), transparansi kepentingan public, dan akuntabilitas multidimensi. Penerapan kedelapan asas *good governance* telah diimplementasikan secara komprehensif, meskipun asas kecermatan menjadi tantangan utama terkait validitas data dan keamanan siber. Penelitian mengidentifikasi empat tantangan utama: infrastruktur teknologi, kesiapan SDM, inklusivitas layanan, dan keberlanjutan anggaran. Sebaliknya, terdapat empat peluang strategis: pemanfaatan *Big Data* dan *AI*, integrasi sistem nasional INA Digital, kolaborasi dengan startup, dan implementasi *IoT* untuk *smart environment*. Namun, penelitian ini juga mengidentifikasi area yang perlu diperkuat, seperti partisipasi demokratis dalam perumusan kebijakan SPBE, mekanisme pengawasan independen terhadap teknologi surveillance, dan perlindungan data warga dalam kolaborasi dengan sektor swasta. Roadmap pengembangan 2025-2029 menargetkan transisi menuju *Cognitive Government* dengan konsep *Zero Document* dan *Data-Driven Policy*, menjadikan Kota Semarang model pemerintahan digital yang unggul dengan tetap menjunjung prinsip *good governance*.

Kata kunci Transformasi Digital, E-Government, SPBE, Good Governance, *New Public Service*

A. Introduction

In the increasingly rapid digital era, the utilization of information and communication technology has certainly spread to various sectors of life, especially in the government sector. In today's digital era, we have entered the industrial revolution 5.0 era, where continuous transformation, automation, and digitalization occur across various sectors.¹

Digital transformation in the context of public services in Indonesia has become one of the alternatives for optimizing the use of technology in improving service quality to the entire community. E-Government can be interpreted as the use of digital technology to transform government activities with the aim of increasing

¹ Simon Matome Nkgapele and Regina Mapula Mokgolobotho, "Developing Transformational Strategies to Improve the Accessibility of E-Governmental Services in South African Local Government," *International Journal of Law, Social Science, and Humanities* 1, no. 2 (November 12, 2024): 56–58, doi:10.70193/IJLSH.V1I2.147.

efficiency, effectiveness, and equity in public service delivery.² However, of course, in its implementation or practice, it is not as easy as touted, there are always challenges and opportunities for both the government and the community.³

Digital transformation has changed many aspects of our lives, from economy to socio-culture. Technological advancement provides convenience and efficiency but also raises complex challenges. Indonesian society, with its diverse background, must adapt to these changes. The main challenge is balancing the benefits of technology with its potential negative impacts on behavior and social aspects of society. Cooperation between government and society is very important to overcome these challenges and maximize the opportunities offered by the digital era.⁴

Philosophically, E-Government was created as a manifestation of the principle of people's sovereignty in the digital context. The state is obligated to provide optimal public services to all citizens.⁵ The fundamental function of E-Government is, of course, to realize transparency, accountability, and accessibility in government administration. The presence of E-Government is based on the concept that information and communication technology can bridge the gap between government and society, creating general and broad participatory space, and minimizing the occurrence of corrupt practices.⁶

The evolution of E-Government in Indonesia began with Presidential Instruction Number 3 of 2003 on National Policy and Strategy for E-Government Development, which marked the government's commitment to digital transformation and public service delivery. The implementation of E-Government in Semarang City, particularly SPBE, formally began in 2016 through Semarang City Regional Regulation Number 11 of 2016 on Public Service Delivery, which was then specifically detailed through Semarang Mayor Regulation Number 27 of 2021 on Electronic-Based Government System in the Semarang City Environment.

In analyzing the implementation of E-Government, it's crucial to establish a theoretical framework that goes beyond mere technical efficiency. The New Public Service (NPS) theory developed by Denhardt and Dhenhart (2000) offers a paradigm shift in public administration that emphasizes "serving rather than steering." Unlike the New Public Management approach that prioritizes business

² Anastasia Moloto and Mammo Muchie, "Factors That Affect the Effective Use of E-Government Procedures in Limpopo," *Journal of Service Science and Management* 16, no. 03 (2023): 221–48, doi:10.4236/IJSSM.2023.163013.

³ Jackson Yurname, "View of CHALLENGES AND OPPORTUNITIES OF E-GOVERNMENT IN STRENGTHENING THE TRANSPARENCY AND ACCOUNTABILITY OF THE GOVERNMENT," no. Vol. 2 No.5 (2024) MAY (May 2024): 1335, <https://injoser.joln.org/index.php/123/article/view/162/203>.

⁴ Irwan Suryadi, "The Future of Public Administration: Adapting to New Challenges and Opportunities in the 21st Century," no. Vol.1, No.1 (April 30, 2024): 55–71, doi:<https://doi.org/10.62207/mq81a375>.

⁵ Andrew Wijaya and Mohammad Saleh, "Sistem Pemerintahan Berbasis Elektronik (Spbe) Dalam Mewujudkan Prinsip Good Governance Pada Pemerintahan Daerah," *Jurnal Ilmu Hukum, Humaniora Dan Politik* 5 (2025).

⁶ Andriyanti Asianto et al., "Journal Series on Governance and Management of IT in Electronic-Based Government Systems (SPBE) in Indonesia," *Jurnal Indonesia Sosial Sains* 4, no. 09 (2023), doi:10.59141/jiss.v4i09.880.

efficiency, NPS places democratic values, public interest, and complex accountability at the center of public service delivery.⁷

The Relevance of NPS theory to E-Government implementation lies in its seven fundamental principles: first, serve citizens, not customers; second, seek the public interest; third, value citizenship over entrepreneurship; fourth, think strategically, act democratically; fifth, recognize that accountability isn't simple; sixth, serve rather than steer; and seventh, value people, not just productivity. These principles provide a critical lens to evaluate whether digital transformation genuinely serves the public interest or merely pursues technical efficiency at the expense of democratic values and citizen rights.

In the context of Semarang City, the implementation of SPBE presents a unique opportunity to examine how local government balance technological innovation with democratic governance. The tension between efficiency-driven digitalization and citizen-centered service delivery becomes particularly evident in challenges such as digital divide, data privacy concerns, and the risk of surveillance technologies shifting from serving to steering, or even controlling citizens.⁸ Therefore, evaluating SPBE through both good governance principles and NPS theory provides a comprehensive analytical framework that addresses not only legal compliance and operational efficiency but also democratic legitimacy and citizen empowerment.

The legality of E-Government implementation in Indonesia is regulated in a comprehensive and tiered hierarchy of legislation, starting from the constitutional level to regional regulations. Article 28 letter f of the 1945 Constitution serves as the constitutional basis that guarantees the right of every individual to communicate and obtain information, which philosophically legitimizes the use of information technology in public service delivery. Furthermore, Law Number 25 of 2009 on Public Service mandates the delivery of quality, transparent, and accountable services, while Presidential Regulation Number 95 of 2018 on Electronic-Based Government System provides a clear operational framework covering governance, management, and utilization of information technology to improve government effectiveness and efficiency across all agencies.

At the regional level, Semarang City has responded to this national legal framework by implementing progressive regulations through Semarang City Regional Regulation Number 11 of 2016 on Public Service Delivery, which regulates standards for information technology-based services and is technically activated through Semarang Mayor Regulation Number 27 of 2021 on Electronic-Based Government System in the Semarang City Government Environment. This regulation rigidly governs system architecture, data governance, and service integration between Regional Apparatus Organizations (OPD).

In improving the effectiveness of public services, one method being the implementation of E-Government, the government certainly cannot do so haphazardly, specific technical procedures need to be implemented in applying E-

⁷ Robert B. Denhardt and Janet Vinzant Denhardt, "The New Public Service: Serving Rather than Steering," *Public Administration Review* 60, no. 6 (2000): 549–59, doi:10.1111/0033-3352.00117.

⁸ Ratih Damayanti et al., "Transforming Taxation: Unlocking Efficiency and Resilience Through Digitalization," *The Indonesian Journal of International Clinical Legal Education* 6, no. 4 (October 31, 2024): 453–76, doi:10.15294/iccle.v6i4.13583.

Government to ensure transparency, legal certainty, and create benefits for the entire community, namely through the application of Good Governance Principles.⁹ This principle is a concept regarding good, effective, efficient, transparent, accountable, and participatory governance. The legal basis for this principle lies in Article 10 paragraph (1) of Law Number 30 of 2014 on Government Administration. By aligning with this principle, it is expected that the government can implement, identify, and analyze the challenges and opportunities in implementing E-Government for the entire community.

Law Number 30 of 2014 on Government Administration also provides more specific or focused working principles for the implementation of state administrative functions. Particularly, Article 10 paragraph (1) which regulates the principles or general principles of good governance (good governance principles), which include 8 principles, namely legal certainty, benefit, impartiality, accuracy, non-abuse of authority, transparency, public interest, and good service. These good governance principles serve as a reference for officials in carrying out their duties, authority, and functions as state administrative officials. As Damayanti (2018) emphasized in her research on bankruptcy law, these principles are fundamental in ensuring that government officials execute their authority within the boundaries of law and public accountability, which equally applies to digital governance systems where administrative functions are increasingly automated.¹⁰

Based on the complexity of the problems above, both philosophically, sociologically, and juridically, the implementation of E-Government in Semarang City, particularly in the Semarang City Government, requires governance that ensures this digital transformation is not only technically efficient but also capable of fulfilling the principles of good governance.¹¹ In this context, the Good Governance Principles as regulated in Article 10 paragraph (1) of Law Number 30 of 2014 on Government Administration are relevant in examining the above issue. These principles include eight fundamental principles: legal certainty, benefit, impartiality, accuracy, non-abuse of authority, transparency, public interest, and good service.¹²

Based on the urgency and complexity of these problems, a comprehensive study is needed to support technical implementation and evaluate its compliance with good governance principles. Therefore, the author is interested in conducting this research with the aim of analyzing the implementation of E-Government, particularly SPBE in the Semarang City Government, as well as evaluating by identifying challenges and formulating opportunities to improve the effectiveness of public service delivery.

⁹ Eko Prasetyo, Yoan Freddy Irawan, and Aji Supriyanto, "FACTOR ANALYSIS OF E-GOV ACCEPTANCE IN SOCIETY AND GOVERNMENT," *Https://Jurnal.Poltekstpaul.Ac.Id/Index.Php/Jsocied/Article/View/748* Vol.7, no. No.1 (July 2024): 7, doi:<https://doi.org/10.32531/jsocied.v8i2>.

¹⁰ Ratih Damayanti, *THE STATE POSITION AS A PREFERENT CREDITOR OF THE TAX DEBT IN BANKRUPTCY, JOURNAL OF PRIVATE AND COMMERCIAL LAW VOLUME*, vol. 2, 2018.

¹¹ Aprilia Hikari Tamira Jasmine et al., "Evaluasi Mandiri Sistem Pemerintahan Berbasis Elektronik (SPBE) Pada Diskominfo Kabupaten Semarang Berbasis Website Dan Mobile," *Jurnal Komputasi Dan Pengembangan Aplikasi* 1, no. 1 (January 31, 2025): 10–19, <https://journals.arces.org/jukompak/article/view/58>.

¹² JDIH BPK, "Undang-undang (UU) Nomor 30 Tahun 2014 tentang Administrasi Pemerintahan UNDANG-UNDANG NOMOR 30 TAHUN 2014 TENTANG ADMINISTRASI PEMERINTAHAN," Pub. L. No. 20, JDIH BPK 1 (2014), <https://peraturan.bpk.go.id/Details/38695/uu-no-30-tahun-2014>.

B. Method

This article employs a normative-empirical legal research design, combining doctrinal analysis of statutory regulations with empirical examination of the implementation of the Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik/SPBE) in the Semarang City Government. Unlike purely doctrinal legal research that aims to resolve concrete legal issues through authoritative textual interpretation, this study operates on a dual analytical level. First, it assesses the conformity of SPBE implementation with the General Principles of Good Governance (Asas-Asas Umum Pemerintahan yang Baik/AUPB) as stipulated in Article 10 paragraph (1) of Law Number 30 of 2014 concerning Government Administration.¹³ Second, it evaluates such implementation through the theoretical framework of *New Public Service*, particularly the democratic principle of “serving rather than steering.”¹⁴

The research adopts both a statutory approach (statute approach) and a conceptual approach (conceptual approach). The statutory approach is directed at examining the normative framework governing SPBE, including the 1945 Constitution of the Republic of Indonesia, Law Number 25 of 2009 concerning Public Services, Law Number 30 of 2014 concerning Government Administration, Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems, Regional Regulation of Semarang City Number 11 of 2016, and Mayor Regulation of Semarang Number 27 of 2021.¹⁵ These regulations are analyzed systematically to assess their normative coherence and hierarchical consistency within the Indonesian legal system. Meanwhile, the conceptual approach is employed to analyze the theoretical foundations of good governance and democratic public service. This research relies on the theory of *New Public Service* developed by Janet V. Denhardt and Robert B. Denhardt, which emphasizes citizen-centered governance, democratic participation, and public interest orientation over managerial efficiency alone.¹⁶ The conceptual framework is used as an evaluative lens to determine whether digital transformation in local governance strengthens citizens’ status as rights-holders or merely reinforces technocratic efficiency.

Empirically, the research was conducted at the Department of Communication, Informatics, Statistics, and Encryption (DISKOMINFO) of Semarang City as the leading sector responsible for planning, coordinating, and evaluating SPBE implementation. Primary data were obtained through semi-structured in-depth interviews with civil

¹³ rwansyah, Aji Ratna Kusuma, dan Bambang Irawan, “Implementing the Electronic-Based Government System as a Digital Governance Transformation Process in East Kalimantan Province,” *Jurnal Bina Praja* 17, no. 2 (Agustus 2025), <https://doi.org/10.21787/jbp.17.2025-2818>.

¹⁴ TB.M.Ferdiansyah Suryana dkk., “Transformasi Digital dalam Pelayanan Publik: Tinjauan Yuridis terhadap SPBE di Indonesia,” *Constitutio: Jurnal Riset Hukum Kenegaraan & Politik* 4, no. 1 (Juni 2025): 37–53, doi:<https://doi.org/10.47498/constituo.v4i1.4944>.

¹⁵ Restu Prasetyo, “Analisis Determinan Keberhasilan Implementasi SPBE di Pemerintah Daerah: Pendekatan Structural Equation Modeling (SEM),” *Jurnal Ilmu Pemerintahan, Administrasi Publik, Ilmu Komunikasi (JIPIKOM)* 7, no. 2 (Agustus 2025): 398–410, doi:10.31289/jipikom.v7i2.6264.

¹⁶ Lalu Rakhmat Suryaningrat dkk., “Analysis of the Implementation of Public Services in an Electronic-Based Government System (Mataram City Study),” *International Journal of Health, Economics, and Social Sciences (IJHES)* 7, no. 3 (25 Juli 2025): 1643–48, doi:10.56338/ijhess.v7i3.8161.

servants involved in SPBE governance. The interviews aimed to gather factual information regarding institutional readiness, digital infrastructure, governance architecture, bureaucratic coordination, human resource capacity, and policy challenges. The semi-structured format was chosen to ensure analytical flexibility while maintaining alignment with the research questions.¹⁷ In addition to primary data, this study utilizes primary legal materials (statutes and regulations), secondary legal materials (textbooks, scholarly journal articles, and previous research), and relevant non-legal materials concerning digital governance and public administration. These materials are not treated merely as static references but as argumentative texts that reflect paradigmatic positions requiring critical engagement. The literature selection is based on its theoretical significance and relevance to contemporary debates on socio-legal and administrative law research.¹⁸

Data analysis is conducted using a qualitative descriptive method with a two-layer evaluative model. The first layer examines normative conformity between SPBE implementation and the eight General Principles of Good Governance: legal certainty, expediency, impartiality, accuracy, prohibition of abuse of power, transparency, prioritization of public interest, and good service.¹⁹ The second layer applies the *New Public Service* framework to assess the democratic quality and citizen orientation of SPBE implementation. The argumentation is constructed through deductive reasoning when testing normative validity (i.e., whether practices conform to legal principles) and inductive reasoning when assessing empirical relevance and social efficacy. In this sense, legal validity is not measured solely by normative coherence but also by its practical effectiveness in administrative governance.²⁰

As a normative-empirical study, this research acknowledges certain methodological limitations. The empirical data are limited to interviews with government officials and do not include large-scale public perception surveys. Furthermore, this study does not conduct a technical audit of digital systems but focuses on governance structure and administrative law compliance. These limitations are intentional, as the primary objective is to clarify the relationship between normative validity and empirical implementation within the framework of good governance. Through this methodological design, the study aims to contribute not only to administrative legal scholarship but also to the broader discourse on digital transformation and democratic governance at the local government level.

¹⁷ Budi Nugraha, Adhy Andriwiguna, dan Triananda Genedin, "The Extent of the Maturity of the Implementation of E-Government at the Local Level in Indonesia: A Literature Review Based on SPBE Evaluation," *Dinamika Governance Jurnal Ilmu Administrasi Negara* 15, no. 4 (28 Januari 2026): 8–16, doi:<https://doi.org/10.33005/jdg.v15i4.5624>.

¹⁸ Amalia Rahmadani Ilham, Yupi Sasmita Dewi, dan Ryndian Gusty, "SISTEM PEMERINTAHAN BERBASIS ELEKTRONIK (SPBE) SEBAGAI PILAR GOOD GOVERNANCE: REFLEKSI TATA KELOLA PEMERINTAH DAERAH," *JIANA: Jurnal Ilmu Administrasi Negara*, 23, no. 1 (April 2025): 53–63, doi:<http://dx.doi.org/10.46730/jiana.v20i2>.

¹⁹ TB.M.Ferdiansyah Suryana dkk., "Transformasi Digital dalam Pelayanan Publik: Tinjauan Yuridis terhadap SPBE di Indonesia."

²⁰ Serlin Ahmad, Udin Hamim, dan Dwi Indah Yuliani Solihin, "Implementation of Public Service Digitalization to Improve Government Accountability in Gorontalo City," *Jurnal Sosial dan pembangunan* 41, no. 2 (Desember 2025): 189–98.

C. Discussion

Administrative Law is one of the branches of law that has a role in regulating the conduct of government actions and policies in carrying out their duties. Administrative Law can also be interpreted as all ordinances that organize the relationship between citizens (society) and government, including procedures for carrying out governmental duties. E. Utrecht also states that Administrative Law is a legal rule that examines the special legal relationships that enable state administrative officials to carry out their duties.²¹

The Legal Foundation of Administrative Law also consists of various legal sources that serve as the basis for carrying out public administrative functions, including the 1945 Constitution of the Republic of Indonesia (1945 Constitution), particularly Article 1 paragraph (3) of the 1945 Constitution which states, "The State of Indonesia is a state based on law," meaning that all actions taken by government officials or state administrative officials must comply with and not contradict the law (1945 Constitution of the Republic of Indonesia, Article 1 paragraph (3)). Then, the constitution, all laws related to Administrative Law, Government Regulations (PP), Presidential Regulations (PerPres), and Administrative Agency Decisions.²²

Law Number 30 of 2014 on Government Administration also provides more specific or focused working principles for the implementation of state administrative functions. Particularly, Article 10 paragraph (1) which regulates the principles or general principles of good governance (good governance principles), which include 8 principles, namely legal certainty, benefit, impartiality, accuracy, non-abuse of authority, transparency, public interest, and good service. These good governance principles serve as a reference for officials in carrying out their duties, authority, and functions as state administrative officials.²³

Law Number 25 of 2009 on Public Service serves as the juridical foundation mandating that public service delivery must be conducted with principles of public interest, legal certainty, equal rights, balance of rights and obligations, professionalism, participation, equal treatment or non-discrimination, transparency, accountability, facilities and special treatment for vulnerable groups, timeliness, speed, ease, and affordability.²⁴ This law defines public service as activities to fulfill service needs in accordance with legislation for every citizen and resident regarding goods, services, and/or public services.²⁵ In the context of E-Government, this law serves as the legal basis obligating the government to utilize information technology to improve the

²¹ Utrecht, *Pengantar Hukum Administrasi Negara Indonesia, Ichtar, Jakarta, 1962.*

²² "UNDANG-UNDANG DASAR NEGARA REPUBLIK INDONESIA 1945," n.d., accessed January 23, 2026.

²³ Ade Kosasih, John Kennedy, and Imam Mahdi, *Hukum Administrasi Negara Pengantar Kajian Tentang Kewenangan & Kebijakan Pemerintah, Angewandte Chemie International Edition, 6(11), 951–952., 2017.*

²⁴ UU Nomor 25 Tahun 2009, Pub. L. No. 25, JDIH BPK 1 (2009). <https://peraturan.bpk.go.id/Details/38748/uu-no-25-tahun-2009>

²⁵ Yupi Sasmita Dewi, "SISTEM PEMERINTAHAN BERBASIS ELEKTRONIK (SPBE) SEBAGAI PILAR GOOD GOVERNANCE: REFLEKSI TATA KELOLA PEMERINTAH DAERAH," *JIANA (Jurnal Ilmu Administrasi Negara)* 23, no. 1 (2025), doi:10.46730/jiana.v23i1.8247.

quality, accessibility, and efficiency of services to the community, thus aligning with the spirit of digital transformation that emphasizes fast, easy, transparent, and accountable service standards.²⁶

Presidential Regulation (Perpres) Number 95 of 2018 on Electronic-Based Government System (SPBE) comprehensively regulates the administration of governance based on the utilization of information and communication technology to provide services to SPBE users, including central and regional agencies. This Presidential Regulation explicitly outlines the objectives of SPBE in the Appendix section, particularly in the vision and mission of SPBE, namely to realize clean, effective, efficient, transparent, and accountable governance. This regulation serves as the operational foundation for all government agencies in implementing digital transformation of public services with comprehensive and integrated standards.²⁷

Semarang City Regional Regulation (Perda) Number 11 of 2016 on Public Service Delivery also serves as the legal foundation at the regional level governing the principles of public service implementation in Semarang City. This Regional Regulation adopts public service principles as mandated in Law Number 25 of 2009 on Public Service, which include public interest, legal certainty, equality, balance of rights and obligations, professionalism, participation, equal treatment, transparency, accountability, facilities and special treatment for vulnerable groups, timeliness and speed, ease, and affordability. In the context of E-Government, this Regional Regulation serves as the foundation for the Semarang City Government to develop electronic-based public service systems that are not only effective and efficient but also uphold the values and rights of citizens in accessing public services.²⁸

Semarang Mayor Regulation (Perwal) Number 27 of 2021 on the Implementation of Electronic-Based Government System in the Semarang City Government Environment is a technical operational regulation for SPBE implementation in Semarang City. This Mayor Regulation explicitly governs the SPBE architecture of Semarang City, including business process domain, SPBE service domain, data and information, SPBE infrastructure, SPBE applications, and SPBE security. This regulation also strengthens SPBE governance, covering planning, development, implementation, evaluation, and audit of all Regional Apparatus Organizations in the Semarang City Government Environment. The importance of such regulatory harmonization is underscored by Damayanti and Abdi (2021) in their study on legal synchronization, which emphasized that harmonization of laws at various levels becomes crucial as part of legal protection mechanisms, where the state must actively fulfill its obligation to

²⁶ Yayang Nuraini Zulfiani et al., "IMPLEMENTASI E-GOVERNMENT PADA KONSEP SMART CITY PEMERINTAH KOTA BANDUNG DALAM PELAYANAN PUBLIK BERDASARKAN UNDANG-UNDANG NOMOR 25 TAHUN 2009 TENTANG PELAYANAN PUBLIK," *Journal of Governance Innovation* 5, no. 1 (March 28, 2023): 175–92, doi:10.36636/JOGIV.V5I1.2282.

²⁷ JDIH BPK, "Peraturan Presiden (Perpres) Nomor 95 Tahun 2018 Tentang Sistem Pemerintahan Berbasis Elektronik," Pub. L. No. 95, JDIH Badan Pemeriksa Keuangan 1 (2018), <https://peraturan.bpk.go.id/Details/96913/perpres-no-95-tahun-2018>.

²⁸ JDIH BPK, "Peraturan Daerah (Perda) Kota Semarang Nomor 11 Tahun 2016 Tentang Penyelenggaraan Pelayanan Publik," Pub. L. No. 11, JDIH Badan Pemeriksa Keuangan 1 (2016), <https://peraturan.bpk.go.id/Details/27518>.

ensure all citizens obtain their rights through proper legislative frameworks.²⁹ This Mayor Regulation is a crucial instrument to ensure E-Government implementation is carried out systematically and aligned with good governance principles.³⁰

Good and clean governance, often referred to as good governance, is certainly the dream and hope of all levels of society. In the context of good governance, it refers to principles that guarantee transparency, accountability, participation, and justice in managing public resources. Society certainly has the right to desire the creation of a government that is not only effective in carrying out its functions but also clean and free from corruption, collusion, nepotism, and abuse of authority. If the government can operate well and cleanly, then the level of trust from society to the government will significantly improve. The definition of the word "government" refers to the entity administering governmental power in a state, while "governance" is often defined as the decision-making process and the process by which decisions are implemented or not.³¹ Good Governance can be defined as the state's method for government structures to manage economic and social resources focused on community development to realize good governance practices.³²

In the context of implementing E-Government (SPBE) in the Semarang City Government:

1. Implementation of E-Government in the Semarang City Government Governance System

a) Overview of SPBE Implementation in Semarang City

The implementation of E-Government in Semarang City has experienced significant development since the issuance of Semarang Mayor Regulation (Perwal) Number 27 of 2021 on the Implementation of Electronic-Based Government System in the Semarang City Government Environment. Based on interviews with civil servant officers at the Department of Communication, Informatics, Statistics and Encryption (DISKOMINFO) of Semarang City, digital transformation in public services shows impressive achievements with an SPBE index of 4.27% rated "Satisfactory" in the 2025 evaluation. This achievement represents a

²⁹ Ratih Damayanti Dan Fitriani Abdi, "UNSYNCHRONIZED IMPACT OF LEGAL REGULATION ON THE LOSS OF STATE'S STANDING FOR THE PREFERENCE RIGHT OF TAX DEBT IN BANKRUPTCY," *Indonesian State Law Review (ISLRev)* 3, no. 1 (October 31, 2020): 1–8, doi:10.15294/isrev.v3i1.48947.

³⁰ Kota Semarang JDih, "Peraturan Walikota Semarang Nomor 27 Tahun 2021 Tentang Penyelenggaraan Sistem Pemerintahan Berbasis Elektronik Di Lingkungan Pemerintah Kota Semarang ," June 10, 2021, <https://jdih.semarangkota.go.id/dokumen/view/peraturan-walikota-semarang-nomor-27-tahun-2021-tentang-penyelenggaraan-sistem-pemerintahan-berbasis-elektronik-di-lingkungan-pemerintah-kota-semarang-1207>.

³¹ Bayu Kharisma, "GOOD GOVERNANCE SEBAGAI SUATU KONSEP DAN MENGAPA PENTING DALAM SEKTOR PUBLIK DAN SWASTA (SUATU PENDEKATAN EKONOMI KELEMBAGAAN)," n.d., accessed January 5, 2026.

³² R.M. Iman Rifai Rusdy and Suci Flambonita, "PENERAPAN SISTEM PEMERINTAHAN BERBASIS ELEKTRONIK (SPBE) DI PEMERINTAH DAERAH UNTUK MEWUJUDKAN GOOD GOVERNANCE," *Lex LATA* 5, no. 2 (2023), doi:10.28946/lexl.v5i2.2351.

drastic improvement when compared to 2021 which was still at 2.31%, clearly indicating the strong commitment of the regional government, particularly the Semarang City Regional Government, in realizing sustainable digital transformation.

The technical implementation of SPBE in Semarang City is realized through the development of systematically integrated main platforms, namely the SILAGA Super Apps (Administration and Complaint Service Information System) and the Semarang City One Data Portal. These platforms are designed to integrate public services and sectoral data between Regional Apparatus Organizations (OPD) through the application of robust interoperability architecture. The success of this integration has concretely eliminated bureaucratic gaps that have been barriers in public service delivery, creating higher accessibility for the community to more transparent and efficient independent online services.

b) Application of Good Governance Principles in Semarang City SPBE

The implementation of SPBE in Semarang City certainly cannot be separated from the application of good governance principles as mandated in Article 10 paragraph (1) of Law Number 30 of 2014 on Government Administration. These eight principles include legal certainty, benefit, impartiality, accuracy, non-abuse of authority, transparency, public interest, and good service. In its implementation in the field, interesting dynamics have been revealed, including in the following principles:

1) Principle of Legal Certainty

The application of the principle of legal certainty in Semarang City SPBE has a solid foundation through a comprehensive regulatory hierarchy. Starting from the national level with Presidential Regulation Number 95 of 2018, then cascaded to the regional level through Semarang City Regional Regulation Number 11 of 2016 on Public Service Delivery, and operationalized through Semarang Mayor Regulation Number 27 of 2021. This tiered regulation provides legal certainty for both administrators and users of SPBE services, ensuring that all electronic-based government administrative actions have strong legitimacy.

Based on evaluation results, internal policy strength is assessed as very strong with clear SPBE architecture through Mayor Decrees. This demonstrates the regional government's commitment to ensuring that every digital service developed has adequate legal protection, thereby providing legal protection for both civil servants managing the system and the community using the services.

2) Principle of Benefit

The principle of benefit is reflected in the concrete impact felt by society and government. Data shows that SPBE implementation has significantly improved public service efficiency. In the licensing sector at the Investment and One-Stop Integrated Services Agency (DPM PTSP), the Community Satisfaction Survey (SKM) value reached 86.37, while the percentage of licenses issued according to service standards

reached 97.50 percent. These figures prove that digital transformation is not merely technological modernization but truly provides real benefits in improving service quality to the community. This aligns with Damayanti et al.'s (2025) theoretical framework that effective governance systems should be oriented not merely toward punishment or control, but toward achieving the higher goal of societal welfare through preventive and beneficial measures.³³

Furthermore, the benefit of SPBE is also evident from the elimination of bureaucratic barriers that have been public complaints. Service integration through digital platforms enables the community to access various public services without having to visit various OPD offices, thereby saving time, costs, and public effort.

3) Principle of Transparency

The application of the principle of transparency in Semarang City SPBE is realized through the implementation of Open Data principles on the Semarang City One Data portal. Sectoral data such as budget, poverty, health, and various other development data are presented in machine-readable open formats that can be accessed, downloaded, and reused by the community. This data openness ensures that public policies are based on data that can be verified by anyone in real-time, creating transparency in government administration.

The transparency mechanism is also strengthened by an audit trail and logging system that records every activity in the SPBE system. Every application in the SPBE ecosystem is equipped with features that automatically record the identity of the civil servant making changes, the time of changes, and the type of changes made to the database. This system effectively prevents abuse of authority and ensures accountability for every administrative action.

4) Principle of Accuracy (As the Main Challenge)

Of the eight good governance principles, the principle of accuracy is identified as the most challenging aspect in Semarang City SPBE implementation. Accuracy in the SPBE context demands data validity, cybersecurity, and error-free systems. The biggest challenge arises from efforts to integrate data from various OPDs with different standards, which often creates risks of duplication or data inaccuracy that can potentially cause errors in decision-making or public service delivery.

To overcome this challenge, the Semarang City Government implements several comprehensive strategies. First, data standardization through the Semarang City One Data policy that ensures all OPDs have uniform data format and standard references to guarantee interoperability. Second, conducting regular Information Technology (IT) audits to minimize security vulnerabilities and technical errors in information systems. Third, strengthening Human Resources (HR) through improving digital literacy of apparatus,

³³ Ratih Damayanti et al., "Renewal of Criminal Provisions in the Employment Cluster Job Creation Law," *Indonesian State Law Review* 8, no. 1 (June 29, 2025): 83–94, doi:10.15294/islrev.v8i1.19288.

particularly system administrators, to be more careful in inputting and managing data on digital platforms.

5) Principle of Non-Abuse of Authority and Accountability

To prevent abuse of authority, the Semarang City SPBE system implements Role-Based Access Control (RBAC) which ensures each civil servant can only access data according to their main duties and functions. This system is equipped with the use of electronic certificates in the form of Electronic Signatures from the National Cyber and Crypto Agency (BSRE) which provides data integrity assurance. If illegal or unauthorized changes occur, the document or data will automatically be detected as invalid, creating a layered security system.

The accountability mechanism is also strengthened through an integrated complaint platform, namely Lapor Semar which can be accessed via WhatsApp, social media, and website, as well as SP4N-LAPOR which is integrated with the national complaint system. The community can monitor the status of their complaints through a public dashboard that displays whether reports are being processed or have been completed, creating accountability in the speed of OPD response to community complaints.

6) Principle of Good Service and Public Interest

The implementation of the principle of good service and public interest is realized through an inclusive "No One Left Behind" approach that ensures SPBE can be accessed by all levels of society, including vulnerable groups such as the elderly, disabled persons, communities with low digital literacy, and areas with limited internet access. The strategies applied include providing multi-platform channels such as SAVIRA WhatsApp Bot (Semarang Virtual Assistance) to facilitate communities with low digital literacy, developing websites and applications that meet accessibility standards for disabled persons, providing officers at the Sub-district/District level to assist the community in operating digital services, strengthening the Semarang Digital program by multiplying free Wi-Fi points in community halls and public parks, and regular socialization and education through local communities.

c) SPBE Technical Architecture and Governance

Technically, the Semarang City SPBE architecture is designed considering six main domains as regulated in Mayor Regulation Number 27 of 2021, namely business process domain, SPBE service domain, data and information, SPBE infrastructure, SPBE applications, and SPBE security. This governance covers the entire cycle from planning, development, implementation, evaluation, to auditing of all OPDs in the Semarang City Government environment.

In the aspect of information security, the Semarang City Government has implemented ISO 27001 security standards and formed a Computer Security Incident Response Team (CSIRT) to anticipate cyber

attack threats such as ransomware and phishing that continue to evolve. Server infrastructure is managed through the utilization of Government Cloud or National Data Center (PDN) for efficiency and security, while system interoperability is guaranteed through strengthening Application Programming Interface (API) according to SPBE architecture.

d) Impact on Public Service Effectiveness

The implementation of SPBE in Semarang City has shown concrete impact on improving public service effectiveness that can be measured through various performance indicators. The achievement of an SPBE Index of 4.27% rated "Satisfactory" places Semarang as one of the city governments with the best digital governance in Indonesia, significantly increasing from 2021 which only reached 2.31%.

In the aspect of bureaucratic efficiency, the implementation of platforms such as the SILAGA Application and the Semarang City One Data portal has successfully integrated sectoral data between OPDs, thereby eliminating bureaucratic barriers and improving community accessibility to more transparent and efficient independent online services. The community no longer needs to visit various OPD offices to handle one type of service but can access it through one digital door.

The level of community satisfaction with information technology-based services also shows significant improvement. In the licensing sector at DPM PTSP, the SKM value reached 86.37%, indicating a high level of satisfaction with service quality. Service speed also increased with the percentage of licenses issued according to service standards reaching 97.50 percent, meaning almost all license applications are processed on time according to the promised service commitment.

Transparency and data accessibility have also experienced drastic improvement. The availability of regional statistical data has become increasingly accessible to the community and stakeholders for policy formulation, research, and public oversight purposes. Data available in machine-readable format enables data reuse by various parties for analysis and development of community service applications.

e) Vision and SPBE Development Roadmap 2025-2026

To face the challenges of Industrial Revolution 5.0 which emphasizes the integration of advanced technology with human touch, the Semarang City Government has prepared an SPBE development roadmap for the next 3-5 years (2025-2029) with a focus on transitioning from Digital Government to human-centered Cognitive Government.

The main targets to be achieved are increasing the Digital Government Index (previously known as SPBE Index) to more than 4.5 with a consistent "Excellent" rating, achieving the Zero Document concept where all administrative processes have been fully digitized without physical files in all OPD services, and implementing Data-Driven Policy where all strategic decisions of the Mayor are made based on real-time data visualization from city Big Data.

The development roadmap is divided into four strategic phases. The first year (2025) focuses on consolidation and national integration through INA Digital by conducting full synchronization of regional services with the National Portal and using Digital Population Identity (IKD) as the only access (Single Sign-On) for all public services in Semarang.

The second year (2026) will implement AI and Predictive Analytics with the application of artificial intelligence in public services such as more intuitive chatbots and disaster or traffic jam early warning systems capable of predicting events before they occur (predictive maintenance). The third year (2027) will strengthen the IoT ecosystem and Smart Environment through massive installation of IoT sensors in city infrastructure such as street lights, drainage, and trash bins connected to the control center for energy efficiency and rapid field service response.³⁴

The fourth to fifth years (2028-2029) represent the peak phase of transformation toward Personalized Government or Society 5.0, where public services are personal and proactive. The system will provide proactive notifications to residents such as child vaccination schedule reminders, tax renewals, or eligibility for social assistance without residents having to apply first (proactive services). At this stage, the government no longer waits for the community to request services but actively anticipates community needs based on data analysis and provides personalized services.

This roadmap reflects the long-term vision of the Semarang City Government to not only follow digitalization trends but to become a pioneer in technology application for community welfare while upholding good governance principles mandated in legislation.

2. Dynamics of Challenges and Strategic Opportunities of E-Government in Improving Public Services

a) Challenges in SPBE Implementation

1) Technological Infrastructure Challenges

SPBE implementation in Semarang City faces several significant challenges in technological infrastructure. The main challenge faced is the threat of increasingly evolving cyber attacks in the forms of ransomware, phishing, and various other types of attacks. In the increasingly advanced digital era, cybersecurity threats are no longer merely technical issues but have become strategic risks that can disrupt public service continuity.³⁵

The second challenge is the phenomenon of sectoral ego between agencies that hinders real-time data integration, or what is known as data siloization (separation). This condition occurs when

³⁴ Nickson M. Karie et al., "A Review of Security Standards and Frameworks for IoT-Based Smart Environments," *IEEE Access* 9 (2021), doi:10.1109/ACCESS.2021.3109886.

³⁵ Bagas Dwi Kencono, Honi Hari Putri, and Tyas Wida Handoko, "Transformasi Pemerintahan Digital: Tantangan Dalam Perkembangan Sistem Pemerintahan Berbasis Elektronik (SPBE) Di Indonesia," *JIIIP - Jurnal Ilmiah Ilmu Pendidikan* 7, no. 2 (2024), doi:10.54371/jiip.v7i2.3519.

each OPD tends to build its own application system without considering integration needs with other OPDs, thereby creating separate data islands that are difficult to integrate. This data siloization becomes a barrier in realizing integrated and efficient government.

To overcome infrastructure challenges, the Semarang City Government has implemented several strategic mitigation efforts. First, utilization of Government Cloud at the National Data Center for server efficiency and data security. Second, implementation of international security standard ISO/IEC 27001 on all government information systems. Third, formation of a CSIRT Team tasked with responding to cybersecurity incidents quickly and in a coordinated manner. Fourth, strengthening Application Programming Interface (API) through SPBE Architecture to guarantee system interoperability between OPDs so that data can communicate with the same standards.

2) Human Resource Readiness Challenges

Besides infrastructure challenges, civil servant HR readiness is a crucial factor determining the success of SPBE implementation. The main challenge faced is the digital literacy gap between generations of civil servants (digital gap). Civil servants from older generations tend to have lower digital literacy levels compared to younger generation civil servants, thus experiencing difficulties in adapting to digital systems.

The second challenge is resistance to change from manual to digital processes that are perceived as adding workload. Some civil servants still feel comfortable with conventional working methods and consider digital transformation as an additional burden, not as a tool to facilitate work. This resistance can hinder comprehensive technology adoption and reduce the effectiveness of systems that have been built.

The second challenge is resistance to change from manual to digital processes that are perceived as adding workload. Some civil servants still feel comfortable with conventional working methods and consider digital transformation as an additional burden, not as a tool to facilitate work. This resistance can hinder comprehensive technology adoption and reduce the effectiveness of systems that have been built. Wahanisa et al. (2021) in their study on e-government utilization during the Covid-19 pandemic found that the hindering factors include lack of motivation from leaders, officials, and operating officers to utilize digital facilities, as well as concerns regarding data leakage, unfamiliar devices for village officials, and errors of data input.³⁶

³⁶ Rofi Wahanisa et al., "The Utilization of E-Government Public Service for Improving Public Capability and Accessibility During the Covid-19 Pandemic," *Proceedings of the International Conference on Environmental and Energy Policy (ICEEP 2021)* 583 (October 16, 2021): 184–87, doi:10.2991/assehr.k.211014.039.

To overcome HR challenges, the Semarang City Government implements a comprehensive strategy that includes continuous training to improve civil servant digital competence gradually, preparation of simple and easy-to-understand digital Standard Operating Procedures (SOP), and implementation of digital performance-based reward and punishment policies to encourage massive technology adaptation. This strategy aims not only to improve civil servants' technical capabilities but also to change mindset and work culture toward the digital era.

3) Service Inclusivity Challenges

The third equally important challenge is ensuring SPBE service inclusivity so it can be accessed by all levels of society without exception. Vulnerable groups such as the elderly, disabled persons, communities with low digital literacy, and communities in areas with limited internet access risk being left behind in digital transformation if there are no specific policies to accommodate their needs.

The third equally important challenge is ensuring SPBE service inclusivity so it can be accessed by all levels of society without exception. Vulnerable groups such as the elderly, disabled persons, communities with low digital literacy, and communities in areas with limited internet access risk being left behind in digital transformation if there are no specific policies to accommodate their needs. This digital divide phenomenon is particularly evident in rural areas of Semarang Regency, where Mukminto et al. (2023) found that rural communities often lack knowledge and are reluctant to embrace new technologies, necessitating targeted community service programs to improve capabilities and accessibility in utilizing e-government services.³⁷

The Semarang City Government responds to this inclusivity challenge with a comprehensive "No One Left Behind" approach. The strategies applied include providing multi-platform channels that are not only smartphone application-based but also through lightweight platforms such as SAVIRA WhatsApp Bot to facilitate communities with low digital literacy and limited device specifications. Accessibility for disabled persons is strengthened through website and application development that meets accessibility standards such as screen reader features and appropriate color contrast, as well as providing self-service kiosks in disability-friendly public places.

To reach communities with low digital literacy, Information Technology (IT) officers are provided in each Sub-district/District level area tasked with helping the elderly and lay communities in operating digital services. Inclusive infrastructure is also strengthened through the Semarang Digital program by multiplying free Wi-Fi points in community halls, public parks, and areas with minimal signal to ensure

³⁷ Eko Mukminto et al., "Public Services Versus Covid-19: Participation of Villagers in Public Service Based on E-Government in Pandemic," *Jurnal Pengabdian Hukum Indonesia (Indonesian Journal of Legal Community Engagement)* 6, no. 1 (May 31, 2023): 1–16, doi:10.15294/jphi.v6i1.60650.

internet access equality. Digital literacy is also improved through regular socialization and education through local communities and self-help mobilizers to build community trust and skills in using SPBE service.³⁸

4) Budget Sustainability Challenges

The fourth challenge is ensuring funding sustainability for long-term SPBE development and maintenance. Current SPBE budget allocation in Semarang City is managed through the Budget Implementation Document (DPA) of DISKOMINFO and information technology budgets in each OPD, allocated for three main pillars: infrastructure (server, bandwidth, security), application development (integration, super apps), and operations/maintenance.

Although budget allocation is considered adequate to carry out basic service functions, strengthening is still needed in cybersecurity aspects and updating latest technologies such as Artificial Intelligence (AI) and Big Data. To ensure funding sustainability, the Semarang City Government implements an efficiency strategy through infrastructure consolidation at the DISKOMINFO Data Center (Regional Cloud) so OPDs do not need to budget for purchasing individual physical servers, integration of SPBE in the Regional Government Work Plan (RKPD) and Strategic Plan (Renstra) so budget availability is legally binding, exploring creative non-APBD funding through collaboration with the private sector in Corporate Social Responsibility (CSR) or Public-Private Partnership (KPBU) schemes, and shifting part of the budget portion from equipment purchases to HR capacity building so systems that have been built can be managed independently.

b) Strategic Opportunities for SPBE Development

1) Utilization of Big Data and Artificial Intelligence for Predictive Policies

The greatest strategic opportunity in Semarang City SPBE development lies in utilizing Big Data and AI to produce predictive policies. With massive data collected in the Semarang City One Data portal, the government has the potential to shift from merely reporting data to predictive analysis that can anticipate problems before they occur.

Predictive technology implementation can be applied in various sectors. In the disaster management sector, Internet of Things (IoT) sensors can be installed in rivers integrated with AI systems to accurately predict flood points based on rainfall data, water volume, and historical patterns. In the health sector, integrated health data analysis can be used for early detection of potential stunting in toddlers through identification of children's nutrition and growth patterns. In

³⁸ Ratih Damayanti, Dian, and Rezzi Nanda Barizki, "Kecerdasan Sosial Gen Z Dalam Berwisata Dan Memanfaatkan Media Sosial Instagram," *VISIONER : Jurnal Komunikasi, Bisnis Dan Konten Kreatif* 10, no. 1 (February 27, 2023): 69–80, doi:10.65873/xajqcm06.

traffic congestion sectors, systems can predict congestion points based on vehicle movement patterns and provide real-time alternative route recommendations.

AI utilization can also improve public service quality through more intuitive chatbots capable of providing personal responses according to community needs. With Natural Language Processing (NLP), chatbots can understand conversation context and provide more targeted solutions, thereby increasing community satisfaction with government digital services.

2) Integration with National System (INA Digital)

The second opportunity is full integration with the national system through the INA Digital Portal. In accordance with national digital governance trends, Single Sign-On (SSO) integration between regional applications and national Digital Population Identity (IKD) will facilitate the community because they only need one digital identity to access all services from Sub-district level to Central Ministries/Agencies.

This integration provides dual benefits, namely for the community who obtain ease of access without having to remember many usernames and passwords, and for the government who can share data securely and verified to improve service accuracy. For example, integrated population data can be used directly for health service registration, education, social assistance, and various other services without having to conduct repeated verification.

Furthermore, national integration also opens opportunities for policy and service standard synchronization, so that communities who move domicile from one region to another can still access public services with consistent quality. This aligns with universal and non-discriminatory public service principles.

3) Collaboration with Startups and Private Sector

The third opportunity is building a collaborative ecosystem with local startups and the private sector. Semarang City has great potential to become a sandbox or testing ground for technological innovations developed by startups, thereby accelerating technology adoption without excessively burdening the Regional Revenue and Expenditure Budget (APBD).

Through the Public-Private Partnership (KPBU) scheme, the Semarang City Government can partner with the private sector to develop various smart city services such as smart parking management that uses sensors to detect parking space availability and guide users to available locations, IoT-based waste management that can monitor garbage volume in smart bins and optimize waste collection routes, intelligent transportation systems that integrate public transportation

schedule information with real-time traffic conditions, and city security systems that utilize facial recognition technology and video analysis to enhance public security.³⁹

Collaboration with the private sector also brings benefits in terms of knowledge and technology transfer. Civil servants can learn from industry best practices in digital system management, while startups gain opportunities to develop their products on a larger scale with government support. This win-win solution model can create a sustainable innovation ecosystem.⁴⁰

4) Implementation of Internet of Things (IoT) for Smart Environment

The fourth opportunity is strengthening the IoT ecosystem to create a smart and responsive city environment. Massive installation of IoT sensors in various city infrastructure such as street lights, drainage, and trash bins connected to control centers can improve energy efficiency and accelerate field service response.

Smart street lights equipped with sensors can adjust lighting levels based on environmental conditions and traffic density, thereby saving electrical energy up to 30-40 percent. Drainage sensors can detect blockages and provide early warnings to maintenance personnel before flooding occurs. Smart trash bins can provide notifications when full so cleaning personnel can optimize collection routes.

IoT implementation can also be expanded to the urban agriculture sector, where soil sensors can monitor soil moisture and fertility to optimize water and fertilizer use. In the health sector, air quality sensors can be installed at various city points to monitor pollution levels and provide warnings to vulnerable groups such as asthma sufferers when air quality deteriorates.

3. Evaluation of SPBE Implementation Through New Public Service Perspective

Beyond compliance with *good governance* principles, the implementation of SPBE in Semarang City must be evaluated through the lens of *New Public Service* (NPS) theory to assess whether digital transformation genuinely serves democratic values and citizen empowerment. This section examines SPBE implementation against the seven principles of NPS, identifying areas of alignment, gaps requiring strengthening, and potential deviations that need mitigation.

a) Serve Citizens, Not Customers: Citizen-Oriented Service Delivery

³⁹ Galang Zukhrian Warsdapama, Achmad Nurmandi, and Helen Dian Fridayani, "Digitalisasi Daerah: Implementasi Pelayanan Publik Di Kota Semarang Berbasis Smart City Dimensi Smart Government," *Jurnal Ilmu Hukum, Humaniora Dan Politik* 4, no. 5 (July 5, 2024): 1299–1311, doi:10.38035/JIHHP.V4I5.2303.

⁴⁰ Zulfiani et al., "IMPLEMENTASI E-GOVERNMENT PADA KONSEP SMART CITY PEMERINTAH KOTA BANDUNG DALAM PELAYANAN PUBLIK BERDASARKAN UNDANG-UNDANG NOMOR 25 TAHUN 2009 TENTANG PELAYANAN PUBLIK."

The implementation demonstrates strong alignment with the first NPS principles. The No One Left Behind, approach explicitly treats all residents as citizens with constitutional rights rather than customers in a commercial transaction. This is evidenced by: the provision of multi-channel platforms (SILAGA Super Apps, SAVIRA WhatsApp Bot, website, mobile applications) designed for universal accessibility ensuring vulnerable groups such as the elderly, persons with disabilities, and communities with low digital literacy can access public services; deployment of IT assistants at sub-district levels to help citizens who struggle with digital services, demonstrating that government treats citizens as *rights-holders entitled to assistance* rather than objects expected to be self-sufficient; and development of websites and applications meeting accessibility standards for persons with disabilities (screen reader features, appropriate color contrast), showing commitment to not leaving marginalized groups behind.

The finding aligns with Denhardt theory argument that public servants do not deliver customer service, they deliver democracy. SPBE in Semarang City serves not merely as an efficiency tool but as an instrument of democratizing access, ensuring technology becomes a bridge rather than a barrier for certain groups.

b) Seek the Public Interest: Transparency and Public Participation

The second NPS principles regarding prioritizing public interest is implemented through Open Data principles on the Semarang City One Data Portal. Sectoral data such as budget, poverty, health, and development are published in machine-readable formats accessible, downloadable, and reusable by the public. This transparency enables public participation in policy oversight and ensures policies are based on publicly verifiable data in real-time. The transparency mechanism is also strengthened through audit trail and logging systems recording every activity in the SPBE system, preventing abuse of authority and ensuring accountability for every administrative action.

However, the identified challenge of *sectoral ego* among agencies hindering real-time data integration reveals a potential reduction in focus on broader public interest. This data siloization becomes a barrier in realizing integrated and efficient government, requiring strategic intervention to ensure the public interest principle is fully realized.

c) Value Citizenship over Entrepreneurship: Protection of Citizen Rights

SPBE implementation focuses not only on operational efficiency but also on protecting citizen privacy and data rights. The use of Electronic Signatures from the National Cyber and Crypto Agency (BSSN) and implementation of Role-Based Access Control (RBAC) demonstrate

government commitment to protecting citizen data from unauthorized access. Each civil servant can only access data according to their main duties and functions, preventing misuse of personal information. The integrated complaint platform (Lapor Semar and SP4N-LAPOR) equipped with a public dashboard also empowers citizens to actively participate in public service oversight.

Nevertheless, planned collaboration with startups and the private sector through Public-Private Partnership (KPBU) schemes requires strict oversight. There is a risk that citizens may become customer or data products, if their data is used for commercial purposes without clear consent. Government must ensure that such collaborations prioritize citizen rights over economic efficiency or profit.

d) Think Strategically, Act Democratically: Participation in Policy Formulation

The SPBE Roadmap 2025-2029 demonstrates Semarang City Governments capacity for long-term strategic thinking. The concepts of Data-Driven Policy and Proactive Services reflect policies based on data rather than assumptions or political interests. The transition target toward Cognitive Government with a human-centered approach also aligns with NPS values prioritizing humanity in technology.

e) Recognize that Accountability Isn't Simple: Multidimensional Accountability

SPBE implementation demonstrates deep understanding that accountability is not merely technical responsibility but also encompasses ethical, legal, political, and professional dimensions. The comprehensive application of eight *good governance* principles shows that government recognizes the complexity of accountability in public service. The audit trail, logging systems, and Computer Security Incident Response Team (CSIRT) formation reflect technical accountability. Integration with tiered regulations (laws, presidential regulations, local regulations, mayoral regulations) demonstrates strong legal accountability. Public complaint platforms integrated with transparent dashboards reflect political accountability to citizens.

The audit trail, logging systems, and Computer Security Incident Response Team (CSIRT) formation reflect technical accountability. Integration with tiered regulations (laws, presidential regulations, local regulations, mayoral regulations) demonstrates strong legal accountability. Public complaint platforms integrated with transparent dashboards reflect political accountability to citizens. As Haqi and Damayanti (2025) argue in their study on good governance principles, public accountability demands that public officials remain accountable

to the people, and the maintenance of democratic vitality requires mechanisms that prevent stagnation through continuous oversight and the introduction of new ideas in governance systems.⁴¹ This comprehensive understanding of accountability is crucial in digital governance where multiple dimensions of responsibility must be balanced.

f) Serve Rather Than Steer: Facilitation, Not Control

The SPBE philosophy in Semarang City is to facilitate service access rather than control citizens. Multi-platform provision (SAVIRA WhatsApp Bot, website, mobile applications) gives citizens choices to access services according to their capabilities and preferences. There is no coercion to use one particular platform, reflecting a facilitative approach respecting citizen autonomy.

However, the use of Big Data and Artificial Intelligence for predictive analytics potentially shifts toward *surveillance* if not strictly regulated. For example, stunting prediction through child health data analysis serves to help families receive early intervention (serving). But if such data is used to families or provide negative labeling, it becomes control (steering). Similarly, planned implementation of facial recognition technology and video analysis for city security can transform from serving public safety into a mass surveillance tool violating citizen privacy without clear regulations on usage limits, data storage, and independent oversight mechanisms. Government must establish a clear *Data Ethics Framework* involving civil society, academics, and human rights experts to ensure technology remains a tool for serving rather than excessive citizen control or surveillance.

g) Value People, Not Just Productivity: Human Resource Development and Welfare

Continuous digital training programs for civil servants demonstrate government investment in human resource development. The human-centered Cognitive Government approach in the 2025-2029 roadmap also reflects understanding that technology must serve humans, not vice versa. Simple and easily understood digital SOPs also show attention to civil servant adaptation ease, not merely pursuing efficiency targets.

Nevertheless, implementation of *reward and punishment* policies based on digital performance potentially creates excessive pressure on older-generation civil servants experiencing technology adaptation

⁴¹ Amar Haqi and Ratih Damayanti, "Juridical Revitalization of Parliamentary Term Limits Through Justice Principles for Strengthening Good Governance," *Law Research Review Quarterly* 11, no. 2 (May 26, 2025): 261–83, doi:10.15294/lrrq.v11i2.26321.

difficulties. If the *punishment* approach becomes too dominant, it can create work stress, reduce employee welfare, and even encourage unwanted early retirement. *Reward and punishment* policies need to be balanced with *mentoring* and *peer learning* approaches where young civil servants can help senior civil servants in technology adaptation. *Reverse mentoring* programs can be a more humanistic solution compared to digital performance-based punishment.

D. Conclusion

Based on the research findings and discussion regarding the implementation of E-Government in Semarang City Government from the perspective of good governance principles, several conclusions can be drawn as follows:

First, the implementation of E-Government through the Electronic-Based Government System (SPBE) in Semarang City Government has shown significant achievements since the issuance of Semarang Mayor Regulation Number 27 of 2021. This is evidenced by the achievement of an SPBE Index of 4.27% rated "Satisfactory" in the 2025 evaluation, drastically increasing from 2.31% in 2021. The technical implementation of SPBE is realized through main platforms such as the SILAGA Super Apps and the Semarang City One Data portal, which have successfully integrated public services and sectoral data between Regional Apparatus Organizations (OPD), thereby eliminating bureaucratic barriers and improving community accessibility to transparent and efficient digital services.

Second, the application of good governance principles as regulated in Article 10 paragraph (1) of Law Number 30 of 2014 on Government Administration has become the fundamental foundation in the implementation of Semarang City SPBE. Of the eight principles including legal certainty, benefit, impartiality, accuracy, non-abuse of authority, transparency, public interest, and good service, each has been implemented with comprehensive strategies. The principle of legal certainty is strengthened through a clear regulatory hierarchy from national to regional levels. The principle of benefit is proven by the increase in Community Satisfaction Survey to 86.37% and licensing service speed reaching 97.50% according to standards. The principle of transparency is realized through the One Data portal with Open Data principles accessible to the public. However, the principle of accuracy is identified as the most significant challenge because it demands high data validity and cybersecurity in integrating data from various OPDs with different standards.

Third, SPBE implementation in Semarang City faces four main challenges that must be addressed systematically. Technological infrastructure challenges in the form of evolving cyber attack threats and sectoral ego causing data siloization are mitigated through Government Cloud utilization, implementation of ISO/IEC 27001 standards, formation of CSIRT Team, and API strengthening. Civil servant HR readiness challenges in the form of intergenerational digital literacy gaps and resistance to change are overcome through continuous training, preparation of simple digital SOPs, and implementation of digital performance-based reward and punishment policies. Service inclusivity challenges to reach vulnerable groups are answered with a "No One Left Behind" approach through multi-platform channel

provision, accessibility for disabled persons, accompanying officers at Sub-district level, free Wi-Fi, and massive digital literacy. Budget sustainability challenges are overcome through infrastructure consolidation efficiency strategies, SPBE integration in RKPD and Renstra, and collaboration with the private sector through CSR and KPBU schemes.

Fourth, there are four strategic opportunities with great potential to improve SPBE effectiveness in enhancing public service delivery. The first opportunity is the utilization of Big Data and Artificial Intelligence to produce predictive policies such as flood point prediction, early stunting detection, and congestion anticipation. The second opportunity is full integration with the national system through INA Digital enabling Single Sign-On using Digital Population Identity for access to all services from regional to central levels. The third opportunity is collaboration with startups and the private sector to accelerate technology adoption such as smart parking, IoT-based waste management, and intelligent transportation systems without excessively burdening the APBD. The fourth opportunity is massive Internet of Things implementation to create a smart environment through sensors in city infrastructure that can improve energy efficiency and accelerate field service response.

Fifth, the concrete impact of SPBE implementation on public service effectiveness has been measured through various indicators. Bureaucratic efficiency has increased with the elimination of bureaucratic barriers through digital service integration. Community satisfaction has increased significantly with SKM values reaching 86.37% and licensing service speed reaching 97.50% according to service standards. Transparency and accountability are strengthened through audit trail systems, activity logging, Role-Based Access Control, use of electronic signatures, and Lapor Semar and SP4N-LAPOR complaint platforms integrated with public dashboards for real-time complaint status monitoring.

Sixth, the Semarang City Government has prepared a vision and SPBE development roadmap for the 2025-2029 period focusing on the transition from Digital Government to human-centered Cognitive Government in accordance with the Industrial Revolution 5.0 era. Main targets include achieving a Digital Government Index of more than 4.5 with an "Excellent" rating, the Zero Document concept where all administrative processes are fully digitized, and Data-Driven Policy for strategic decision-making. The phased roadmap begins with consolidation and national integration (2025), implementation of AI and predictive analytics (2026), strengthening of IoT ecosystem and smart environment (2027), to personalized government with proactive services (2028-2029).

Sevent, evaluation through the New Public Service theoretical framework reveals that while Semarang City SPBE demonstrates strong alignment with democratic service principles, several critical areas require strengthening to ensure long-term sustainability and democratic legitimacy. The strong alignment is evidenced in the citizen-oriented approach "No One Left Behind," transparency through Open Data, protection of citizenship rights via RBAC and electronic signatures, and investment in human capacity development. However, gaps exist in democratic participation mechanisms for SPBE policy formulation, independent oversight of surveillance technologies, and protection of citizen data in private sector collaborations. The research identifies three potential deviation risks; first,

efficiency-driven orientation potentially shifting toward New Public Management paradigm neglecting marginalized groups; second, surveillance technology (IoT, facial recognition) potentially transforming from facilitation to control without strict regulations; and third, public-private partnerships potentially commodifying citizens as data products without clear consent mechanisms. To address these challenges, the research recommends: establishment of a Public Participation Forum for SPBE involving civil society representatives formulation of a Data Ethics Framework with clear boundaries on citizen data use creation of an Independent Oversight Commission for surveillance technologies implementation of reverse mentoring programs for civil servant adaptation regular evaluation based on NPS indicators measuring not only technical efficiency but also democratic participation, vulnerable group satisfaction, and privacy protection; and transparency in private sector collaboration through publication of partnership contracts and data usage limitations.

Thus, the implementation of E-Government in Semarang City Government from a good governance perspective has shown significant success in improving public service effectiveness, although it still faces various challenges requiring continuous mitigation efforts. The existing strategic opportunities provide room for optimism that Semarang City can become a model of excellent digital governance in Indonesia while upholding good governance principles as mandated in legislation.

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F. Conflict of Interest Statments

The author declares that there is no conflict of interest in the research and publication of this article. The research was conducted objectively and independently without any influence from any party that could create bias in the research results.

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