Jurnal Manajemen Pelayanan Publik Vol. 09 No. 02, June 2025
http://dx.doi.org/10.24198/jmpp.v9i2.60904

Examining the Depok Single Window: Challenge and Strategy for Digital Service Development

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ABSTRAK

Artikel ini menganalisis perkembangan platform Depok Single Window (DSW) dalam penerapan EBGS di Kota Depok dengan menggunakan kerangka teoritis Layne dan Lee. DSW dibangun untuk meningkatkan efisiensi administrasi, kemudahan akses layanan publik, dan kepercayaan publik dengan digitalisasi layanan. Sejak dirilis pada tahun 2018, DSW telah berkembang dari 15 menjadi 145 fitur, antara lain layanan kesehatan, perpajakan, dan pengaduan publik. Dengan menggunakan teori Layne dan Lee dan pendekatan kualitatif dengan metode studi kasus, penelitian ini mengungkapkan masalah utama, seperti kurangnya integrasi vertikal dan horizontal di antara institusi, infrastruktur teknologi yang kurang optimal, dan ketidaksesuaian antara desain dan kebutuhan masyarakat yang sebenarnya. Meskipun saat ini DSW berada pada tahap transaksi, DSW belum mengarah pada integrasi vertikal layanan di berbagai tingkat pemerintahan, dan dengan demikian, layanan tetap terfragmentasi, mengandung ketidaksesuaian teknologi dan akses internet yang buruk. Oleh karena itu, hasil analisa mengidentifikasi tiga tugas prioritas untuk memperkuat koordinasi antarlembaga, meningkatkan tingkat literasi digital saat ini, dan membangun infrastruktur sambil bermigrasi ke tahap integrasi horizontal. Dengan demikian, temuan berikut menggarisbawahi fokus baru reformasi administrasi digital untuk mendukung modernisasi menuju pelayanan publik melalui people-oriented dan memulihkan kepercayaan publik terhadap pemerintahan digital.

ABSTRACT

This paper analyzes the development of the Depok Single Window (DSW) platform in implementing EBGS in Depok City using the theoretical framework of Layne and Lee. The DSW is built to increase administrative efficiency, ease of access to public services, and public trust by digitalizing services. Since its release in 2018, the DSW has grown from 15 to 145 features, among others healthcare, taxation, and public complaint services. Utilizing Layne and Lee's model with qualitative case studies methods, this research reveals major issues, such as a lack of vertical and horizontal integration among the institutions, suboptimal technological infrastructure, and poor match between design and actual community needs. Although the current stage is a transaction, the DSW has not yet led to vertical integration of services through different levels of government, and thus, services remain fragmented, containing technological incompatibility and poor internet access. Accordingly, it identifies three priority tasks for strengthening interagency coordination, raising the current level of digital literacy, and building infrastructure while migrating to the horizontal integration stage. Thus, the following findings underscore a new type of reform in digital administrative development to support modernization towards public services through people-oriented and restoring public confidence in digital government.

ARTICLE HISTORY
Submitted: 16 01 2025
Revised: 23 03 2025
Accepted: 30 04 2025
Published: 07 06 2025

KATA KUNCI
E-Government*; Pelayanan Publik; Pemerintah Daerah; Transformasi Digital*

KEYWORDS
Digital Transformation; E-Government; Public Services; Local Government

INTRODUCTION

Information and communication technology advancements have driven the establishment of e-government systems globally. The United Nations Development Program (UNDP, 2010) defines e-government as using information technology to enhance governmental efficiency, streamline processes, and improve public service quality. Many governments have implemented integrated systems and applications, often called one-stop shops, to deliver diverse public services through unified platforms (Knox & Janenova, 2019). The primary goal of e-government is to ensure the

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timely, cost-effective, and accessible delivery of high-quality services.

Globally, e-government development has spurred a digital transformation in governance, becoming a significant phenomenon and policy priority (Maznorbalia & Awalluddin, 2020). In Indonesia, e-government development has been a priority since 1992, when standalone computer systems were first used to issue citizen identity cards and process driving licenses. Presidential Instruction No. 6 (2001) promoted information technology development, followed by Presidential Instruction No. 3 (2003), which outlined strategies for e-government advancement.

Presidential Regulation No. 95 of 2018 on the Electronic-Based Government System (EBGS) represents a comprehensive policy aligned with the 2015-2019 National Bureaucratic Reform Roadmap. This policy establishes development strategies and components for implementing e-government, including criteria for assessing e-government maturity. The e-government index incentivizes central and regional institutions to develop efficient systems while promoting competition. Institutions achieving a “good” score are rewarded by the Ministry of Administrative Reform (spbe.go.id).

The EBGS policy aligns with global trends, including the UNDP’s E-Government Development Index (EDGI). Indonesia's EDGI ranking has improved from 106th in 2008 to 88th in 2020 and 64th in 2023, demonstrating the policy’s effectiveness in enhancing transparency, accountability, and inclusivity. Furthermore, the EBGS index has shown consistent progress, rising from 1.98 (moderate) in 2018 to 2.79 (good) in 2023 (Ministry of PANRB, 2024).

Regional governments have embraced the EBGS framework to improve public service delivery. For instance, Depok City, a satellite city of Jakarta, accelerated its e-government initiatives inspired by Jakarta’s smart city development in 2016 and the launch of the Jakarta Kini (JAKI) app in 2019. JAKI integrates various public services, including licensing, taxation, and environmental information (jakarta.go.id, 2021). 2019 Depok City enacted Regional Regulation No. 2 on Smart City Implementation and launched the Depok Single Window (DSW) in 2019 to deliver integrated electronic public services. DSW provides health, education, licensing, and taxation services. Its alignment with EBGS criteria is evident in its improved score from 3.17 (good) in 2019 to 3.70 (very good) in 2023 (desw.depok.go.id).

Despite progress, the system's effectiveness faces significant challenges, including data integration issues, low public participation, and limited digital literacy among citizens. These barriers hinder the seamless operation of e-government platforms and reduce their overall impact on public service delivery (Nurhidayat et al., 2024; Ramadhan & Pribadi, 2024). Further, the Deputy for Institutional and Governance Affairs at the Ministry of Administrative Reform has identified interoperability issues as a significant challenge in EBGS implementation. Service users must navigate multiple accounts and applications for different public services, highlighting gaps in integration and coordination (kominfo.go.id, 2021). Without system-wide integration, government agencies must individually manage data collection and dissemination (Tambouris, 2001).

Integrated applications require all government units to operate on a unified platform, which, while challenging, offers substantial benefits such as reduced operational costs, minimized errors, faster processing times, and seamless services (Wimmer & Tambouris, 2002; Gouscosa et al., 2007; Janssen & Klievink, 2008). To address the gap between e-government development and the benefits of digital public services, research based on Layne and Lee’s (2001) e-government development model is essential.

Literature Review

In an era of change in how governments operate, the digital era signifies the adoption or enhancement of information technology to improve service quality, efficiency, transparency, and accountability. Digital transformation in public sector organizations reflects not just a shift from developing information technologies but a fundamental rethinking of organizational processes and integrating comprehensive institutional changes (OECD, 2016).

Over the past two decades, advancements in information technology have driven governments toward digitization, significantly transforming administrative processes, government-community relationships, and public service mechanisms. Government digitalization has reshaped operational methods within public organizations, enhancing service integration through digital platforms. This transformation has streamlined bureaucratic procedures, facilitating greater citizen participation in public service delivery.

However, the digital transformation of government faces notable challenges. Key issues include the persistent reliance on paper-based procedures, siloed processes hindering service integration, and the limited utilization of digital technology in government-citizen interactions (Bertot et al., 2016; Coleman, 2008). As Veenstra et al. (2011) noted, these barriers underscore the critical importance of organizational process changes in digitalization initiatives. The scope, complexity, and effectiveness of these changes are closely tied to the organization's goals and level of commitment.

Veenstra et al. (2011) emphasize that digital transformation in government should prioritize improving governance quality over simply adopting advanced technology. Accordingly, digital government development requires strategies to redesign business processes, structures, procedures, and services (Tangi et al., 2021). However, such fundamental changes often face resistance, disrupting established norms. Moreover, organizational members may perceive digitalization as experimental, leading to uncertainty about outcomes. Governments face two key challenges in digital transformation: enhancing organizational capacity and building the digital competence of their workforce (Kuhlmann & Heuberger, 2021). Strengthening organizational capacity entails managing change aligned with the organization’s vision and mission. Simultaneously, workforce development requires equipping personnel with new skills and competencies for the digital era.

Layne and Lee (2001) proposed an evolutionary model of e-government transformation, encompassing four stages: (1) Catalog, representing the initial shift to digital formats); (2) Transaction, characterized by online services and reliable databases for transactions; (3) Vertical integration, involving interconnected processes across different government levels; and (4) Horizontal integration, describing seamless connectivity between government systems, functions, and public services. This final stage enables citizens to access comprehensive services via a unified digital platform (Coleman, 2008). To assess e-government development, Layne and Lee (2001) identified four key parameters: motives, strategies and objectives, focus areas, and stakeholders.

The catalog stage is critical for the government's digital transformation. It marks a transition from paper-based processes to technology-driven systems aimed at improving accessibility, facilitating information sharing, and supporting advanced e-government functionalities. This phase enables citizens to access various government information and

documents electronically. Its effective implementation lays the groundwork for a more interactive, transactional, and integrated public service system, creating a foundation for subsequent transactional stages (Shonhe & Grand, 2019).

However, Layne and Lee (2001) identified five primary challenges associated with the catalog stage: (1) interagency competition in service application development, leading to incompatible and non-interoperable systems; (2) maintaining the validity and reliability of data and information; (3) ensuring the sustainability and timely updates of information systems; (4) safeguarding data privacy and security; and (5) managing responses to public inquiries and complaints through designated communication channels, such as official websites and emails (Yang, 2003).

A significant challenge in e-government development is ensuring that online content and services are accessible, user-friendly, and meet the diverse needs of citizens with varying levels of technological literacy. These challenges underscore the importance of establishing an effective governance framework to coordinate digital initiatives across ministries and agencies, which often proves difficult during cataloging. This stage is pivotal in creating the structural framework for transitioning to more advanced e-government phases, offering robust online service platforms to enhance citizen engagement.

Furthermore, the catalog stage is essential for integrating back-end systems and databases, reinforcing the infrastructure supporting online public service transactions. Therefore, governmental organizations must prioritize system and data integration, strengthen cybersecurity measures, and implement comprehensive change management strategies, particularly in areas involving human resource capacity and organizational dynamics (Al-Sebie & Irani, 2005).

A fragmented approach to addressing e-government challenges often limits initiatives to mere digitization, failing to transform public service operations fundamentally. Governments must transition from traditional paper-based methods to digital platforms, requiring a comprehensive reconfiguration of core processes, workflows, and organizational structures to effectively integrate digital tools (Bertot et al., 2016). This shift necessitates developing technological competencies and building organizational capacity to create a digitally skilled workforce capable of implementing effective change management—critical for the digital transformation of public administration.

In the transactional phase, government-citizen interactions evolve through various technological channels, including the Internet and intranet (Tangi et al., 2021). This phase facilitates procedural activities, such as downloading, completing, and submitting documents online for public services. Government portals have become more integrated and functional, bridging informational and transactional dimensions. However, challenges persist, particularly in ensuring authentication, confidentiality, security, and the seamless integration of transactional services. Effective systems must leverage centralized databases and interconnected applications to enable service integration. Governments must manage change strategically to advance this phase, balancing traditional service delivery with new digital formats. This balance requires enhancing digital literacy, strengthening technological infrastructure, and improving the operational efficiency of digital public services (Layne & Lee, 2001).

The progress achieved in the transactional phase directly influences the transition to vertical integration, which aims to establish a sophisticated and interactive digital government (Zheng et al., 2013). Vertical integration emphasizes the seamless connection

of government systems and services to deliver comprehensive public services. Strategic objectives include transforming internal business processes across ministries and agencies at all levels, unifying databases as centralized references, and enhancing public organizations' capacity to manage integrated networks (Twizeyimana & Andersson, 2019). However, achieving these goals requires overcoming silo mentalities, work fragmentation, and jurisdictional barriers. Resistance to integration is often perceived as threatening agency authority, hindering progress toward a fully digitalized, citizen-centric system (Chan et al., 2020). Addressing these issues is vital for realizing an end-to-end digital service ecosystem.

It is crucial to restructure services based on citizens' specific needs and characteristics to enhance public service delivery. This restructuring should go beyond improving government employees' technological capabilities and digital proficiency. A citizen-centered approach is essential, prioritizing user needs and fostering efficient government and public interactions through accessible and user-friendly technology. Centralizing access to public services on a single government website can streamline bureaucratic complexities involving multiple agencies (Pateli & Philippidou, 2011). With the widespread availability of digital channels, citizens no longer need to visit service providers in person to access government services (Chan et al., 2020; Fischer et al., 2021).

The culmination of e-government development is horizontal integration, which seamlessly unites services across ministries and agencies, transcending jurisdictional boundaries. This phase reflects the government's ability to manage networks across institutions at national, provincial, and local levels. While vertical integration focuses on aligning public services within government tiers overseeing similar functions, horizontal integration encompasses a more extensive range of services, ensuring coordination across diverse ministries and institutions. Chen et al. (2023) noted that horizontal integration allows citizens to access multiple services via a unified, end-to-end digital platform.

Achieving horizontal integration requires robust coordination, efficient data sharing, and harmonized technology across agencies. This stage transitions the service model from individual functions to a comprehensive government digital platform to simplify public service access and delivery. By consolidating services beyond institutional boundaries, citizens can benefit from streamlined, comprehensive digital offerings (Wimmer & Tambouris, 2002; Kernaghan, 2005). However, implementing this integration demands significant organizational changes to address challenges such as silo mentalities, fragmented operations, and insufficient inter-agency coordination (Scholta et al., 2019; Janowski, 2015). Overcoming these obstacles is essential to realize a fully integrated, citizen-focused public service ecosystem.

Layne and Lee (2001) characterize the evolution of digital government as a transformative and multifaceted process comprising distinct stages (Janowski, 2015). Each stage demands substantial, systemic changes across a broad spectrum. Insights from various countries' e-government initiatives underscore the critical importance of governmental commitment to developing and implementing user-friendly information technologies in every agency. Such commitment drives sustainable changes and fosters an accessible, efficient, and equitable public service model. Digital transformation fundamentally involves reengineering organizational processes to eliminate siloed operations and fragmentation. This entails integrating systems and services across agencies, strengthening network governance, streamlining workflows, and ensuring effective data management to maintain accuracy and reliability (Weeden and Breen, 2021). At its zenith,

e-government culminates in a comprehensive digital platform that overcomes organizational and technological barriers, delivering a responsive and citizen-focused public administration model (Malodia et al., 2021).

The catalog stage serves as the initial phase of e-government, aimed at delivering public service information via the Internet for swift and convenient access (Layne & Lee, 2001; Srivastava & Teo, 2007). This stage focuses on digitizing paper-based documents, offering downloadable forms, and developing scalable applications to address community needs (Seetharaman et al., 2011; Sun et al., 2014). While this phase facilitates citizen-government interactions through electronic platforms, it has a limited impact on core service processes. Additionally, despite its relevance to community outcomes, governments have not consistently addressed public input received through these systems (Luna-Reyes et al., 2011).

The transactional stage introduces specific motivations and objectives for e-government implementation (Layne & Lee, 2001; Al-Sebie & Irani, 2005). Key aims include (1) expanding electronic services to enhance efficiency and accelerate processes, (2) reducing costs, and (3) simplifying public service delivery. A central goal is encouraging citizens to transition from manual, paper-based interactions to digital platforms by making electronic services more appealing (Shareef et al., 2014). Furthermore, this stage seeks to integrate electronic government systems with legal frameworks to ensure compliance and legitimacy. Strengthening cybersecurity and establishing robust authentication standards are critical for enhancing trust in electronic transactions (Sadykov & Taizhanov, 2014).

The strategic objective of e-government development is to provide citizen-focused service platforms that address public needs while accounting for security and performance risks to avoid disruptions to other services (Wimmer & Bredow, 2003). Significantly, this objective does not compromise the core business processes of public organizations, ensuring continuity even in the event of electronic system malfunctions. However, despite these advancements, the adoption of e-government has not yet resolved issues of siloed operations and fragmented government functions (Layne & Lee, 2001). At the same time, government-citizen interactions have become more dynamic, with governments actively managing feedback and addressing complaints about public services (Evans & Yen, 2006).

The next phase in e-government evolution, following the transaction stage, is defined by vertical and horizontal integration. This stage aims to deliver comprehensive one-stop services, enhancing service delivery efficiency while expanding the scope of integration (Layne & Lee, 2001). The strategic focus is on integrating functions across vertical and horizontal dimensions and aligning organizational culture to ensure system integration is resilient and feasible at multiple levels of government (Gerpott & Ahmadi, 2016). A critical component of this phase involves integrating Information and Communication Technology (ICT) systems across agencies, necessitating the restructuring and redesign of core business processes to foster seamless integration of services (Gerpott & Ahmadi, 2016).

Another key objective is linking and integrating information sources, a crucial step in achieving comprehensive service integration (Ruhode & Owei, 2010). The government's approach has evolved from merely identifying stakeholder needs to actively involving them in developing e-government systems. Such involvement is essential, as stakeholder expectation shifts significantly influence vertical and horizontal integration strategies. This phase highlights the complexity of creating a citizen-centric e-government system (Rowley, 2010). Consequently, collaboration with stakeholders is indispensable to align e-

government services with user needs and achieve meaningful integration. Given its dynamic nature, this stage requires continuous evolution to adapt to the complexities of stakeholder interests, reaffirming the centrality of citizen needs in e-government development (Schöll & Klischewski, 2007).

Layne and Lee's (2001) concept of e-government development is distinct in employing a four-phase, incremental model that comprises the phases of Catalog, Transaction, Vertical Integration, and Horizontal Integration. This approach focuses on more than just technology adoption, requiring organizational transformation, and the integration of systems and services designed with citizens in mind. This framework systematically outlines the progression of e-government, tackling fragmentation, resistance to change, and inter-agency coordination issues. This approach prioritizes high-quality governance and citizen involvement, offering a comprehensive strategy for both technological and operational change, thereby establishing a robust theoretical basis for the successful implementation of e-government.

RESEARCH METHODS

This study employs a qualitative case study approach to analyze the implementation of the DSW, proposed by Layne and Lee's e-government development model. Primary data were collected through semi-structured interviews with key stakeholders, including Depok City officials, service user representatives, and academic experts, to explore dimensions such as motivation, strategic objectives, focus, and service users and also a survey targeted at Depok City citizen who use the Depok Single Window application to assess the quality of e-government products. The Depok Single Window application had 21,556 active users in February 2022. Researchers conducted screening and asked filter questions so that the population will be calculated based on the number of users in the last 1 year and using at least 3 types of services in DSW. The population that will be used is Depok Single Window users with an age range of 17-64 years where this age is productive and has reached cognitive maturity. Researchers interviewed based on that category.

Secondary data contextualize Depok City's efforts within broader trends and best practices, including government regulations, e-government assessment reports, and comparative studies on e-government development in Indonesia and globally. This comprehensive approach ensures a holistic understanding of the initiative's implementation and impact. Thematic analysis of the collected data identified patterns, challenges, and opportunities in the implementation of the DSW. Triangulation of interviews and secondary sources enhanced the reliability and depth of the analysis, guided by Layne and Lee's e-government development model. The findings highlight key priorities for improvement, emphasizing the need for system integration and alignment of technological advancements, policy frameworks, and user engagement to achieve sustainable e-government transformation in Depok City.

RESULTS AND DISCUSSIONS

The Depok Single Window (DSW) was launched on August 17, 2018, as a digital initiative to provide integrated services, simplifying access for Depok City residents to various government services (Kompas.com, 2018). Established under Mayor Regulation No. 4 of 2021, DSW aligns with the national Electronic-Based Government System (EBGS) policy. Most city government agencies, including the Education, Social, Labor, and Child Protection Office and the Community and Family Empowerment Office, have integrated their services into the DSW platform. However, not all service products from each agency are included in the system (Depokpos.com, 2021).

The DSW initially launched with 15 features, but over time, it has undergone significant expansion, now encompassing 145 features that address a diverse array of public needs. This growth reflects the system's adaptability and the increasing digitalization of essential services in Depok. Among the most impactful features are tools designed to manage and mitigate the spread of the COVID-19 pandemic. These tools provide critical resources for health monitoring, tracking infections, and disseminating up-to-date public health information. In addition to pandemic-related tools, DSW offers comprehensive health services, including hospital information systems that facilitate access to medical care and support informed user decision-making. The platform also integrates essential municipal services, such as taxation features that streamline payment processes, and the Integrated Social Welfare Data (DTKS) system provided by the Ministry of Social Affairs, which supports welfare program eligibility assessments and social assistance distribution.

Economic services form another core aspect of DSW's offerings. These include job vacancy listings that connect residents with employment opportunities and utility payment options for water and electricity, making routine transactions more efficient and accessible. Furthermore, the system incorporates the Integrated System for Complaints and Aspirations (SIGAP), which enables users to submit grievances and share feedback, fostering a more responsive and accountable local government. DSW also supports the community's economic empowerment through features dedicated to small and medium enterprises (SMEs). These tools facilitate access to business resources, financial services, and digital marketplaces, promoting local entrepreneurship and economic growth. This substantial expansion of DSW demonstrates its evolving role as a multifaceted digital platform, which is essential to addressing the dynamic needs of the Depok community while enhancing government efficiency and public engagement.

Evaluating e-government quality, particularly efficiency, is essential to determining whether electronic services effectively provide convenience to users, which is a core goal of e-government. Efficiency in this context refers to the ease of use, including the functionality of links, clarity in product naming, navigability, layout design, updated information, availability of search tools, and the accuracy of the provided information. Studies indicate that users generally find DSW's menus and interface intuitive and informative. Features like downloading and uploading forms during public service processes enhance user convenience. However, the extensive range of menus and options can occasionally overwhelm users, making it challenging to locate specific features (In-Depth Interview with Sulasih Nur Fauziah, June 20, 2022). Interviews with DSW managers reveal that the system's information is structured according to the services offered by individual agencies and tailored to meet the needs of users:

"… building DSW is still what the Depok City Government has... Not yet at the stage of knowing what the needs of the community are and still in the stage of delivering what the City Government has, the spirit is in the stage of providing all the potential that the City Government has to the community." (In-Depth Interview with Denhas Ary Wibowo S.Kom, M.T, Depok City Government, May 12, 2022).

Some service features within the DSW system lack information or remain inactive because the responsible agencies do not provide the associated services. This issue is particularly problematic for users seeking economic services for high-demand small and medium-sized businesses. Furthermore, while users appreciate the convenience of downloading forms and data, they often find the system's informational features less helpful. This challenge stems from insufficient integration between agencies in delivering services through the DSW platform. The Communication and Information Service manages the system and focuses on maintaining reliable IT infrastructure. However, responsibility for the content, including updating service

data and addressing community needs, lies with the individual agencies.

The study by Papadomichelaki and Mentzas (2012) underscores that the reliability of information technology (IT) in digital services is a critical determinant of public trust in government websites. Trust in digital governance grows when citizens perceive platforms as reliable, especially in delivering timely information and providing seamless services. Meeting these expectations strengthens public confidence and improves perceptions of government effectiveness. To build trust, governments must prioritize transparency, security, and responsiveness in e-government services, ensuring they address citizens' needs effectively (Ramadhan & Pribadi, 2024). However, in Depok City, significant challenges undermine the reliability of IT systems and, consequently, public trust in digital services. One of the most pressing issues is the uneven internet connectivity across the city. Variability in network quality creates barriers to consistent access, especially for users in areas with limited infrastructure, reducing their ability to utilize government services fully.

Additionally, technical compatibility issues with widely used platforms, such as iOS and Android devices, further diminish the system's effectiveness. For instance, users often encounter difficulties when attempting to access features or complete transactions due to discrepancies in device compatibility. Such technical obstacles not only frustrate users but cast doubt on the robustness and inclusivity of the digital platform. These challenges highlight the need for targeted IT infrastructure and system design improvements. By addressing connectivity gaps and ensuring compatibility with diverse operating systems, the government can enhance the reliability of its digital services, thereby strengthening public trust and encouraging broader adoption of online platforms. In doing so, Depok City could better align with the principles identified by Papadomichelaki and Mentzas, fostering a more trustworthy and user-centered digital governance framework.

These factors collectively affect public trust in DSW's benefits. Key indicators of trust include the security and privacy of user data during interactions with government services (Gefen, Karahanna, & Straub, 2003). To build trust, DSW managers prioritize data protection by conducting regular vulnerability tests to prevent breaches and safeguard users' information and activities. This ensures service transactions meet efficiency, effectiveness, speed, and safety standards. The Depok City Government has implemented stringent measures to strengthen digital security, such as a secure area with restricted access controlled by biometric authentication and fingerprints. Only authorized personnel are permitted entry, ensuring limited access to critical systems. Additionally, the National Cryptography and Cyber Agency conducts biannual cybersecurity tests, and third-party collaborations support vulnerability assessments (In-Depth Interview with Denhas Ary Wibowo S.Kom, M.T, Depok City Government, May 12, 2022). These measures underscore the government’s commitment to protecting digital services and enhancing user trust.

Efforts to ensure security, comfort, and convenience within the DSW platform remain fragmented across agencies. The primary responsibility currently lies with the Communication and Information Service, which oversees the DSW portal. While this service ensures portal protection, individual agencies manage the data related to their respective services. Although DSW managers monitor agency-level data protection measures, they cannot enforce regular updates or improvements to these practices. The primary objective of e-government initiatives is to maximize the benefits of digital services for the public. Beyond facilitating secure and reliable digital services, a key aspect is the availability of consulting features on government websites. These features, such as question-and-answer (Q&A) services, are crucial in demonstrating government responsiveness and serve as a benchmark for user satisfaction.

However, the effectiveness of digital services like DSW depends significantly on users' education levels, digital literacy, and prior experience, which shape public perceptions of their benefits.

A study on DSW reveals the inclusion of a Q&A feature through the SIGAP platform, enabling users to seek additional information about various services. This feature allows DSW managers to monitor public inquiries, needs, and complaints using a dashboard that identifies the relevant agencies. The dashboard also highlights agencies with the highest volume of complaints and tracks their responsiveness to user concerns (In-Depth Interview with Denhas Ary Wibowo S.Kom, M.T, Depok City Government, May 12, 2022). This monitoring tool plays a vital role in evaluating the performance and responsiveness of individual agencies. Despite these advancements, the DSW application has yet to integrate the services of different agencies fully. The Communication and Information Service ensures that user inquiries are appropriately routed to the relevant agencies responsible for providing responses and additional information. A representative of the Communication and Information Service describes this decentralized consultation process:

"It is the responsibility of the local civil service within their respective offices. Related agencies operate various features behind the system. Public complaints are handled exclusively through SIGAP. When a report is submitted, it is routed to the city data center, where it is categorized and directed to the appropriate regional apparatus. Each apparatus, using their SIGAP dashboard, addresses the complaints accordingly." (In-Depth Interview with Denhas Ary Wibowo S.Kom, M.T, Depok City Government, May 12, 2022).

The Communication and Information Service has a limited mandate concerning overseeing agency performance managing digital services. Its primary responsibilities are confined to setting service standards, such as ensuring prompt responses to public inquiries and guaranteeing that adequate information is provided. This lack of evaluative authority places the onus for resolving user queries and complaints squarely on the relevant agencies responsible for their respective service domains. A persistent issue highlighted by users relates to inconsistencies in follow-up actions. For instance, while the SIGAP platform efficiently acknowledges the receipt of inquiries, it lacks a standardized framework for response timelines to address and resolve specific concerns. One commonly reported problem involves delays in addressing technical difficulties, such as accessing service features.

The absence of clear response time benchmarks exacerbates user dissatisfaction and undermines the perceived reliability of the system. Thus, although SIGAP excels in initial acknowledgment, the subsequent steps toward resolution often fall short of user expectations (In-Depth Interview with Harti Kasdijah, Respondent, May 16, 2022). This situation underscores the critical need for enhanced inter-agency coordination and the establishment of comprehensive performance metrics, including response time standards, to ensure user-centric service delivery and maintain public trust in digital platforms.

The Depok Single Window (DSW) was established to enhance public service efficiency, improve accessibility, and integrate services within Depok City. Its development is driven by three primary objectives: first, administrative efficiency. DSW aims to streamline bureaucratic processes, expedite service delivery, and ensure data reliability. This reflects a global trend in leveraging digital transformation to simplify governance and improve operational efficiency. Second, improved accessibility. By providing a centralized platform for accessing multiple services, DSW brings public services closer to the community. This initiative promotes equitable access, ensuring all residents can benefit from government services regardless of their circumstances. Third, public trust and data security are essential. DSW prioritizes safeguarding user and agency data through regular vulnerability assessments and partnerships with the State

Cyber and Cryptography Agency. These efforts build confidence in the platform's reliability and security. This motive shows that the Depok City Government's commitment to supporting the Electronic-Based Government System (EBGS) aligns with broader national priorities to accelerate digital transformation in government operations. This commitment is critical for local administrative reform and advancing e-government initiatives across Indonesia, as EBGS has become a cornerstone of the country's modernization efforts.

The development of e-government requires a clear roadmap with defined strategies and goals. The DSW highlights three key strategies. The first is gradual feature expansion. DSW has grown from 15 to 145 features, but this expansion depends more on agency readiness than user needs, resulting in some services being misaligned with public expectations—second, infrastructure strengthening. Efforts focus on improving IT reliability and internet access. Currently, DSW is optimized for Android, limiting accessibility for iOS users. Budget constraints have hindered the Depok City Government's ability to ensure equitable internet access, creating a reliance on central government support for infrastructure development—and, third, cybersecurity enhancement. Security measures include restricted access to the DSW control room via biometric authentication and regular vulnerability assessments conducted in collaboration with the State Cyber and Cryptography Agency and private partners.

The three strategies focus on integrating cross-sector services to deliver responsive, secure, and efficient digital services that meet public needs. Building public trust is a core objective of the DSW initiative, achieved through prioritizing data security and offering consulting services in every sector. As digital public services are still relatively new to Depok residents, the government emphasizes strengthening its capacity and enhancing digital literacy among service providers. Transitioning from analog to digital systems necessitates adapting business processes and improving institutional capacity to meet evolving public demands. Key focus areas in developing DSW include service integration, user-centric design, accessibility, security and privacy, and performance monitoring. Currently, in the interaction and transaction stage, DSW offers services such as payments, complaints, and document downloads. Service integration prioritizes horizontal collaboration across agencies; however, not all agencies have fully integrated their services into the DSW portal. This contrasts with vertical integration in e-government development, which connects similar services across central, provincial, and local levels, such as health services.

In Indonesia, ministries provide various applications for local governments, but many are standalone systems not integrated into service workflows. Consequently, local governments face a proliferation of disconnected applications. For instance, Depok City uses the DSW portal alongside sector-specific applications like Satu Sehat Indonesia by the Ministry of Health, which has yet to integrate with DSW. The platform also emphasizes a user-centric design, aiming for user-friendly technology. However, issues such as compatibility with iOS devices and irregular information updates hinder its effectiveness. Furthermore, the design often reflects agency capabilities rather than addressing the actual needs of Depok residents, leaving many services suboptimal and inconsistent with public expectations.

Ease of access is a key priority in developing the DSW, focusing on a user-friendly interface that aligns with public digital literacy levels. However, challenges remain, particularly regarding the compatibility of DSW technology with users' device operating systems. Security and privacy are also critical to DSW's development, as protecting public and government data directly impacts system functionality and public trust, including confidence from the private sector. To ensure robust data security, the government collaborates with the State Cyber and Cryptography Agency, which oversees cybersecurity testing and maintenance, and partners with private-

sector organizations to strengthen daily cyber protection operations.

Monitoring and evaluation are integral to improving DSW's performance. Key areas include ensuring the accuracy and currency of data provided by agencies, evaluating the functionality of DSW features, and assessing the reliability of electronic services. Effective monitoring enables managers to address issues like poor internet connectivity and ensure smooth document processing and electronic payments. The SIGAP supports this process by tracking system operations, evaluating agency performance in managing service features, and monitoring responsiveness to public inquiries and complaints. However, SIGAP's effectiveness is limited, as DSW managers cannot compel agencies to update information or provide timely follow-ups, leaving them reliant on reminders to ensure service quality.

The SIGAP platform builds public trust by enabling citizens to submit questions, feedback, and complaints. However, delays or failures in responding to inquiries through SIGAP can undermine confidence in the DSW. At the national level, the government operates the National Public Service Complaint Management System (SP4N-LAPOR!), a centralized platform connected to 34 ministries, 96 institutions, and 493 local governments. Despite its mandatory implementation, SP4N-LAPOR! It faces integration challenges with existing complaint systems, such as SIGAP, which local governments use. Consequently, many agencies run parallel systems, complicating efforts to achieve vertical integration for complaint services.

The management of DSW is closely tied to the readiness and capacity of individual agencies to provide services. Although DSW now includes 145 features from various agencies, many do not reflect the community's actual needs. Instead, they are shaped by the agencies' capabilities, highlighting a gap in aligning services with public expectations. Key challenges include ensuring data and content's relevance, accuracy, and quality within each service feature. The State Cyber and Cryptography Agency plays a critical role as the primary authority overseeing national cybersecurity. Local governments like Depok City must collaborate with this agency to secure approval before launching public service applications. The private sector also contributes significantly to DSW operations by conducting regular vulnerability assessments of systems and applications. The findings from these assessments guide DSW managers and private sector partners in implementing necessary improvements, ensuring the system's security and reliability.

The operation and development of DSW rely on collaboration among the Communication and Information Service, service-provider agencies, the State Cyber and Cryptography Agency, the private sector, and the public. Within this framework, the Communication and Information Service acts as the lead agency, responsible for developing technological infrastructure, ensuring cybersecurity, and overseeing the management of data and services. While the SIGAP supports monitoring, the Communication and Information Service's role is limited to providing feedback to agencies on non-optimal services, outdated data, and unresolved public complaints or inquiries. This collaborative approach highlights the need for stronger integration and agency accountability to enhance DSW's effectiveness.

Critical considerations include the standardization process enforced by the State Cyber and Cryptography Agency, data protection measures, and potential reliance on private sector services. Accordingly, enhancing digital competencies and the skills of DSW management staff should be prioritized to advance DSW. Public engagement is vital to DSW's success, as the initiative aims to deliver accessible, efficient, fast, and cost-effective services. DSW's success depends on public trust and its utilization. However, user feedback highlights challenges, including system incompatibility, slow data updates, and insufficient information that fails to meet needs, making public perception a key factor in its sustainability.

Table 1.
DWS's Development in Layne & Lee Framework

Layne & Lee Framework		DWS's Development
Stage 1 – Cataloguing	• Create a public image on the Web	• Users generally find DSW's menus and interface intuitive and informative. Features like downloading and uploading forms during public service processes enhance user convenience.
	• Set up the evolutionary path for later stages	• Gradual feature expansion: DSW has grown from 15 to 145 features, but this expansion depends more on agency readiness than user needs, resulting in some services being misaligned with public expectations • Infrastructure strengthening: DSW optimized the Android platform, thus limiting accessibility for iOS users. Budget constraints have hindered the Depok City Government's ability to ensure equitable internet access, creating a reliance on central government support for infrastructure development • Cybersecurity enhancement: Security measures include restricted access to the DSW control room via biometric authentication and regular vulnerability assessments conducted in collaboration with the State Cyber and Cryptography Agency and private partners.
Stage 2 – Transaction	• Make online transactions attractive	• There has been increased interaction, which includes features such as tax payments, electricity and water bill payments, document uploads, and consulting services that enable the public to access data and information related
	• Link e-Gov systems and legacy systems	• The DSW offers a variety of service features for community members, although not all options align with community needs or provide comprehensive data and information. One key feature, SIGAP, is an essential channel for users to interact with relevant agencies to submit inquiries, feedback, and complaints. However, the response to public requests is not yet standardized, particularly regarding the timeliness and solutions provided by the relevant agencies.
	• Establish standards for security and authentication	• DSW pays full attention to the transaction security system by protecting data and information from service users and the government. DSW periodically conducts vulnerability tests biometrics and collaborates with the State Cyber and Cryptography Agency. • Developing technology infrastructure is a priority focus area to ensure that electronic-based services are accessible to all people. However, internet networks and technological compatibility with technological devices used by the community are problems that must continue to be anticipated.
Stage 3 – Vertical Integration	• Integrate appropriate vertical functions within meaningful constraints	• The platform integrates essential municipal services, such as taxation features that streamline payment processes, Ministry of Health's Satu Sehat, and the Integrated Social Welfare Data (DTKS) system provided by the Ministry of Social Affairs, which supports
	• Integrate and align business cultures	

Layne & Lee Framework		DWS's Development
	• Merge e-Government and ICT systems	welfare program eligibility assessments and social assistance distribution. • However, not all agencies have fully integrated their services into the DSW portal. • The extensive range of menus and options can occasionally overwhelm users, making it challenging to locate specific features
	• Local systems linked to higher level systems	
	• System integrated within familiar functionalities	
Stage 4 – Horizontal Integration	• Integrate appropriate vertical and horizontal functions within meaningful constraints	
	• Integrate and align business cultures	
	• Merge e-Government and ICT systems	
	• System integrated across different functions	

Source: Layne and Lee (2001); Schöll & Klischewski (2007); Authors.

To address these issues, the Depok City Government must mitigate potential drawbacks, such as fragmented digital services that reduce efficiency and increase costs. Additionally, overly complex systems can hinder usability, and misalignment with public needs diminishes effectiveness. Limitations in digital infrastructure, such as technological compatibility and reliable internet access, further jeopardize DSW's adoption and benefits. Analysis using Layne and Lee's (2001) e-government development framework indicates that DSW is transitioning from the transaction stage to horizontal integration. This progression diverges from Layne and Lee's theory, which posits that vertical integration follows e-government development. Although the Depok City Government has adopted various electronic services, such as the Ministry of Health's Satu Sehat application, these are not integrated with DSW's health services managed by the Health Office. As a result, vertical integration remains unachieved, with no unified business processes connecting health services across government levels.

Regarding policies and practices, DSW has evolved from providing static information—characteristic of the catalog stage— to offering interactive services that allow users to transact electronically. The analysis reveals several characteristics of the DSW that confirm its position in the e-government transaction stage. First, there has been increased interaction, which includes features such as tax payments, electricity and water bill payments, document uploads, and consulting services that enable the public to access data and information related to public services. Second, the DSW offers a variety of service features for community members, although not all options align with community needs or provide comprehensive data and information. One key feature, SIGAP, is an essential channel for users to interact with relevant agencies to submit inquiries, feedback, and complaints. However, the response to public requests is not yet standardized, particularly regarding the timeliness and solutions provided by the relevant agencies. Third, DSW pays full attention to the transaction security system by protecting data and information from service users and the government. DSW periodically conducts vulnerability tests biometrics and collaborates with the State Cyber and Cryptography Agency.

Fourth, developing technology infrastructure is a priority focus area to ensure that electronic-based services are accessible to all people. However, internet networks and technological compatibility with technological devices used by the community are problems that must continue to be anticipated.

To elevate the development of the DSW to the next level, the Depok City Government must address the following challenges: (1) The integration of services offered by various agencies, including both local and central agencies such as Health, remains inadequate. A cohesive integration of business processes is essential before we can unify the systems and applications within the DSE platform. (2) The services provided through the DSW feature have not been tailored to meet public needs but rather reflect the capabilities and resources available within the agencies. Consequently, many service features are underutilized and may not meet the public's requirements. (3) The system's complexity has confused service users. While the development of 145 features illustrates the commitment of each agency to deliver electronic services via the DSW platform, this proliferation poses risks of overlap. It contributes to a user experience that is less than friendly, especially given the varying levels of digital literacy among users. (4) Finally, the technological infrastructure is suboptimal, mainly due to inconsistent internet connectivity, which hinders DSW accessibility for the community.

CONCLUSIONS

The analysis of the Depok Single Window (DSW) indicates that it currently functions only at a transactional level, as described in Layne and Lee's e-government model. Although Depok City has introduced online payment options, electronic forms, and complaint submission systems, it has yet to achieve vertical and horizontal integration, hindering the implementation of smooth digital governance in the city. This fragmentation arises from the lack of vertical integration between local and central agencies. Agencies' internal operations are often structured in a way that prioritizes their own objectives over those of their users, thus limiting horizontal integration. Inconsistent internet access and compatibility problems hinder public participation. Institutional reluctance and opposition to change hinder digital transformation efforts, resulting in decreased public satisfaction due to users being compelled to access multiple platforms, which in turn causes inefficiencies, delays, and diminished trust in government services. As a consequence, digital service adoption continues to be low, which undermines the overall e-government transformation in Depok. To drive e-government forward, Depok needs to speed up digital reforms through improved institutional coordination, upgraded infrastructure, and integrated services. Key to developing a connected, responsive, and citizen-centric public service system will be aligning digital governance with citizen needs, fortifying regulations, and investing in digital literacy.

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